Doctorate in Professional Studies

Perspectives on Strategic Transformation Drivers for National and Supra-national Policy Delivery in the Future Internet and High-tech Research & Development

Short Title:

Perspectives on Strategic Transformation Drivers

A project submitted to Middlesex University in partial fulfilment of the requirements for the degree of Doctor of Professional Studies

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Abstract

This study investigates an approach to create a more radical agenda setting for innovation in the high-tech environment of the Future Internet by practitioners involved in development of parts of the Future Internet meta-agenda. This is contextualised with policy objectives and actions at a high level (national or supra-national) institution such as the European Commission (EC).

The meta-agenda for the Future Internet is presented as a radical, pervasive, self-intelligent global technology infrastructure. However, much of the progress within EC research framework programmes has tended to be incremental or horizontal expansion (broadly the same level) in its nature which in effect contributes more to the production of knowledge, rather than facilitating radical forms of innovation. Without an increased rate of progress in radical innovation, the meta-goals set by the EC and its cluster groups will become increasingly difficult to attain.

Such 'futures' research demands engagement with, and enquiry of, 'Future Internet' communities, including technology, academic and key corporate contributors. The purpose of the second objective is to create a new model of understanding of the powers of influence for strategic agenda setting and delivery appropriate to national or supra-national innovation research policy.

The first strategic objective of this study is the innovation agenda. This is to explore if a differentiated or effective innovation agenda with a more radical approach to the development of Future Internet infrastructure can be established from practitioner participant input (bottom up approach) rather than being cascaded from a strategic policy (top down).

The second strategic objective is a model or framework of understanding. This is to develop a strategic model for the understanding of the requirements in terms of process, players and relationships necessary for research agenda setting, and thereby identify possibilities for policy implementation approach in supra-national (or national) bodies such as the European Commission (top down approach). The challenge here is to create a better understanding of how to achieve radical or strategic change in major policy or meta-agenda objectives.

Core research questions posed sequentially in the first strategic objective, to virtual professional community (VPC) groups were:

1. What key broad areas are barriers to Future Internet (FI) adoption?
2. What are the key structural knowledge areas for next stage development?
3. What are the key areas for short / med term next steps?

First strategic objective research questions covered in the structured questionnaire were then rated by practitioner participant's assessment of the achievability and impact of the top issues emerging from the VPC groups in order to assess a combined ranking. The top ranked issues formed the innovation agenda.

Core research questions posed sequentially in the second strategic objective, to (VPC) groups were:

1. What are the influences from a national or supranational body (e.g. the EU/EC) in achieving the strategic goals or meta-agenda goals of a major high-tech concept such as the Future Internet?
2. Map the issues to areas of activity, power or excellence to form the components of a model of understanding with potential for use by relevant strategic management or leadership.

Second strategic objective research questions covered in the VPC groups were then cognitively developed by the author into a sense making framework and a conceptual model of understanding.

Key Words

Radical Innovation, Agenda Setting, Thought Leadership, Future Internet

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Glossary of Key Technology Terms

API: An API (application programming interface) is ‘a language and message format used by an application program to communicate with the operating system or some other control program such as a database management system (DBMS) or communications protocol. APIs are implemented by writing function calls in the program, which provide the linkage to the required subroutine for execution. Thus, an API implies that some program module is available in the computer to perform the operation or that it must be linked into the existing program to perform the tasks.’ (PCMag.com, 2011)

Business ecosystems: ‘A company is viewed not as a member of a single industry but as part of a *business ecosystem* that crosses a variety of industries. In a business ecosystem, companies coevolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations.’ (Harvard Business Review, May/June 1993)

Business utility: In this context it is about ‘interoperability as a utility-like capability essential for enabling business innovation and value creation. Future Internet technologies will re-shape interoperability as a capability, leading to the need to reappraise interoperability between enterprises’. Web interoperability services being seen as a utility like capability (pervasively available at relatively low prices and highly interchangeable), rather than as an adjunct to a commercial offering(COIN, 2011)

Fuzzy logic: Fuzzy Logic is a superset of conventional logic that has been extended to handle the concept of partial truth- truth values between "completely true" and "completely false". As its name suggests, it is the logic underlying modes of reasoning which are approximate rather than exact. The importance of fuzzy logic derives from the fact that most modes of human reasoning and especially common sense reasoning are approximate in nature (Imperial College, 2011). The essential characteristics of fuzzy logic as founded by ZadeH (1965) are that.exact reasoning is viewed as a limiting case of approximate reasoning. In fuzzy logic everything is a matter of degree and any logical system can be fuzzified. In fuzzy logic, knowledge is interpreted as a collection of elastic or, equivalently , fuzzy constraint on a collection of variables and inference is viewed as a process of propagation of elastic constraints.

Fuzzy Sets: Fuzzy Set Theory (based on Fuzzy Logic) was formalised by Zadeh (1965). What Zadeh proposed is very much a paradigm shift that first gained acceptance in the Far East and its successful application has ensured its adoption around the world.

Interoperability: Interoperability is "The ability of two or more systems or components to exchange information and to use the information that has been exchanged" (Institute of Electrical and Electronics Engineers, 1990)

Mash-up: In Web development, a mash-up is a web page or application created by combining data or functionality from different sources. (Oxford Dictionaries, 2014) The term implies easy, fast integration, frequently using open APIs and data sources to produce enriched results that were not necessarily the original reason for producing the raw source data.

To be able to permanently access the data of other services, mash-ups are generally client applications or hosted online. Since 2010, two major mash-up vendors have added support for hosted deployment based on Cloud computing solutions.

In the past years, more and more Web applications have published APIs that enable software developers to easily integrate data and functions instead of building them by themselves. Mash-ups can be considered to have an active role in the evolution of social software and Web 2.0. Mash-ups composition tools are usually simple enough to be used by end-users. They generally do not require programming skills. Therefore, these tools contribute to a new vision of the Web, where users are able to contribute.'

Self-adaptive knowledge: Self-adaptive software systems are able to adapt at runtime to changing operating environments. Self-adaptation is today complex and costly to implement, and has been applied in particular domains where systems must have guaranteed dependability, for instance telecom exchanges or space vehicles. However, self-adaptation has become a requirement for more and more software systems, including mobile systems.

Georgas (2005) says 'Self-adaptive systems continually evaluate and modify their own behaviour to meet changing demands. An important element in the construction of architecture-based self-adaptive software is the specification of adaptation policy'

Smart devices: 'A smart device is an electronic device generally connected to other devices or networks via different protocols such as Bluetooth-NFC-WiFi-3G-etc. that can operate to some extent interactively and autonomously.' (Collins Dictionary, 2014)

Chapter 1: Introduction

This report brings together three key areas of contribution to the strategic progress of a supranational (or national) agenda in a hi-tech environment(s). Firstly, it undertakes an empirical assessment of a practitioner-led approach to setting an innovation agenda for the genesis of the Future Internet (described later in this section) sequentially using online forums and a structured questionnaire. Secondly, it develops cognitive views on additional and related influences using theories, existing works and the application of new ideas and interpretations related to the study area. Thirdly, it attempts to bring together these approaches to develop a model of understanding for agenda setting at a supranational (and national) level in a high technology led environment. Additionally it goes on to outline post-project activity aimed at providing a route or routes for influencing change and facilitation of adoption of the findings. The key academic focus for this report overall is the development and application of agenda setting theory which focuses on the "ability to influence the salience of topics on the public agenda" (McCombs 1975, McCombs 2002, McCombs 2005).

The opportunity being addressed is the current lack of tangible strategic progress within the Future Internet practitioner community in moving towards the EU's 2020 public agenda vision of the Future internet (Martinez Gonzalez, 2011). This research and report seeks to make contributions in this context.

This chapter will outline the background to the area of research and the COIN initiative (see later separate section on the COIN initiative) that provided much of the inspiration for, and the basis on which, this research was built. This section will also include a description of the aims of the research. Then the relevant theoretical positions and practical concepts relevant to this research are considered before outlining the approach taken to the research. Further consideration is given to converging the empirical research with related cognitive key issues in attempting to develop a model of understanding relevant to agenda setting in a supranational (or national) context in a high-tech environment such as the Future Internet.

This report takes an integrated approach to reporting the study and providing a critical commentary on the development of evidence. This is done firstly when it is synthesized as background to the empirical and cognitive assessments, and secondly in applying it to, and developing, evidence which has emerged as part of the research. This project has multiple layers of complexity in its background, interpretation, application and its framing or positioning (Greeno, 2009). It can only represent one aspect or view across a section of an immensely interactive and dynamic set of factors. In the following section the future internet is first described before going on to identify the current state of development and the need for radical or strategic progress.

Author's background relevant to the study

This study represents a key step on my long term progression and growth and highlights the increasing impacts that I am developing in research, policy and commercial consulting. This can be read in conjunction with 'a journey of personal progression' as illustrated in the Reflexive account of Personal Learning and Professional Journey section later in this report.

As a commercial executive and director I was involved for many years in key elements of major systems and interoperability issues on an international basis. This was particularly from the point of view of incorporating product development and innovation of both a radical and incremental nature, primarily through a product modularisation approach. This background included a range of projects from small up to £100m +. It is during this time that I really started to understand the importance of identifying future trends and preparing for strategic transformation while still delivering on the current and medium term organizational imperatives. However, understanding the dynamics of the bigger picture while you are focussed on delivering in one area is a hard balancing act to learn and adopt in practice. Through the convergence of a number of background skills and experience I was asked to lead a major initiative (with set-up grants of £10m+) on behalf of a Regional Development Agency (RDA) and the European Regional Development Fund (ERDF). Within this initiative I held responsibility for setting up and initially leading a globally cutting-edge highly innovative

business network programme (a designated Public Corporation in its own right) building business networks for a region's businesses, collaboratively linking SME (small and medium sized enterprises) networks and collaboration practice in the supply chain process. The aim was to link SME's to large scale contract opportunities using a single IT, commercial and brokerage platform, and integrated processes, systems and tools. However, the issues of online collaborative working and international interoperability became a potential barrier when we organised and won two multinational opportunities in the aerospace industry. The set-up, establishment and operation of the initiative was successfully completed with the organisation being subsequently split into separate units and taken over privately as planned.

Throughout the initiative I spoke at, and held work-shops, at a number of conferences and institutes/societies on the issues of practical collaboration and internet based interoperability. These included the International ICE (International Concurrent Enterprising) and IEEE International Technology Management Conference, and the ESoCEnet Industrial Forums (European Society of Concurrent Engineering Network).

During this period, and subsequently, I was invited to participate in a number of European Commission (EC) funded research initiatives in a range of capacities that included two of particular relevance to this study. Specifically, I was contracted as an industrial and innovation impact expert advisor and contributor in the ECOLEAD initiative (European Collaborative Networked Organizations Leadership Initiative). This was collaboration in research, testing and dissemination with key partners including UNINOVA (New University of Lisbon, Portugal), University of Amsterdam (Netherlands), Federal University of Santa Catarina (Brazil), Institute of Technology of Monterrey (Mexico), University of Bremen (Germany) and the Czech Technical University (Czech Republic) along with key industrial partners such as France Telecom (France) and Siemens (Austria). The second relevant initiative was COIN (Collaboration and Interoperability for Networked Enterprises) which is more fully described in a subsequent sub section of the introduction. This particular initiative forms a key part of the background thinking in this study.

Subsequently, some aspects of the communications and technology issues identified in these projects were taken further in my MSc research and report in the subject area of 'innovation in use of new Voice and Video over Internet (V^2oIP) telecommunications, identifying key issues for uptake prioritisation and focus on near term development'. However, some of the wider issues in respect of leadership, vision, direction and momentum as well as meta-goal progress from both the ECOLEAD and COIN initiatives continued to raise, and leave unanswered, some important and big questions. I have continued to explore these questions within research and special interest groups including the Entrepreneurship and Innovation Research Group, the International and Development (Economics) Research Group and the China Management Institute, all at Nottingham Business School (where I have been a University Associate/Fellow), and other European / International Forum groups such as the European Innovation Policy Group and the Future Internet Socio Economics Group along with several other groups. This study plays a part in this overall development of understanding and practice in this area.

The learning and practical application gave a strong base and background to my management, leadership and collaboration skills, and I began to understand the effect and advantage of clear focus from the top to the bottom of the organisation as a practical delivery mechanism as opposed to some logical theory. However along with this came an understanding that the method of delivering focus was just as important as the focus itself. Collaboration and collaborative management appeared to offer greater prospect of successful and embedded strategic change than a more traditional command and control type of approach. Much of the practice of collaborative management has now been collated in a number of works, a good example being the Handbook of Collaborative Management Research (Rami Shani et al, 2008). A level of understand emerged of the business dynamics of strategy, management and operations, in which it was clear that an incredibly powerful attribute was that of leadership, and more specifically a form of almost 'pure leadership' outside of direct management or operational issues; this is now more generally termed 'thought leadership'.

This is eluded to in much of Belbin's research and theory including Management Teams: Why They Succeed or Fail (Belbin 1981). Although more famous now for the description and use of eight team roles, an additional key finding from his wider papers is that leaders come in all shapes and sizes, from all sorts of backgrounds and from most ranges of academic ability. However, one clear factor which they all seemed to have in common was an ability to communicate an idea. For some this was with pictures, for some with written text and others through the spoken word – but in all cases of effective leadership the communication of concepts and ideas was positively achieved. However, from my experience I was aware that some at lower levels could also communicate concepts and ideas although often not achieving the commitment and drive to further them. Through observation and reflection it became apparent that successful high level leadership within large organisations or in a wider community, or collaboration, included a combination of a broad and deep understanding of the subject or issues along with a high level of communication of concepts and ideas, and personal presence or gravitas in delivering them. These different, and yet complementary issues, cutting across leadership and management became a significant focus for part of my Continuous Professional Development (CPD) or Life Long Learning (LLL) activities over the last ten years. The fusion of the issues of radical technical or operational progress along with community or organisational transformation were established for me as being interrelated and worthy of further investigation.

What is the Future Internet? Working Definition:

The following definition is given by the UK Technology Strategy Board (2011) and is the one used throughout this work as it is considered as the best and the easiest to understand. The Future Internet is 'an evolving convergent internet of things and services that is available anywhere, anytime as part of an all-pervasive omnipresent socio–economic fabric, made up of converged services, shared data and an advanced wireless and fixed infrastructure linking people and machines to provide advanced services to business and citizens.'

Historical Development of the Internet

In 1958 President Eisenhower commenced the Advanced Research Projects Agency (ARPA) in order to increase key technological progress for the US. It may not be coincidence that this followed the USSR's launch of the satellite called Sputnik. ARPA was given the primary focus of developing information technologies that could survive a nuclear attack. The initial ARPANET network was up and running by October 1969, being the first live network to run on the then newly emerging packet switching technology. Initially this was a connection between just two computers at Stanford and UCLA which quickly crashed. However, the next attempt proved to be more successful and from this it can be said that the Internet had begun. Increasingly computers were added on to the network and it can be seen as the origin or precursor of the large and widely used Internet that we have today.

What we would recognise as E-mail was initially developed in 1971 by Ray Tomlinson (Six Revisions, 2014). As part of his development he decided to use the "@" symbol to separate a user name from a computer name (which subsequently became known as the domain name with the capability of covering more than just a computer).

However, this initial internet was quite basic or unsophisticated in what it could communicate in terms of message and attachment packages. To develop this capability, a better set of communicating rules (protocols) was needed which resulted in a protocol war beginning in 1986. A number of European countries were developing a system known as Open Systems Interconnection (OSI) around this time, and in contrast the United States adopted and spread the Internet/Arpanet protocol, which in the end won the 'contest'.

An equally important development took place in 1990, being the creation of the World Wide Web (www). Sir Tim Berners-Lee was instrumental in this new development. He developed the core of the World Wide Web in the form of hypertext transfer protocol or as it is now generally referred to as 'HTTP'. The HTTP protocol is in essence a widely adopted rule set determining how files and other such information are transferred from one computer to others. In effect, Berners-Lee established an effective language of communicate between

computers. This highly effective language of internet communication facilitated a fast developed browsers supporting usage of HTTP. This massively accelerated the popularity and uptake of computers in use. During the 20-year period in which ARPANET was the core of the Internet, the network across the world grew from an initial four computers (connecting four sites at the University of California at Los Angeles, the University of California at Santa Barbara, Stanford Research Institute, and the University of Utah) to in excess of 300,000. However, within two years of the HTTP protocol being created (by 1992), the number of connected computers had exceeded one million (Computer History Museum, 2013). By this time the original ARPANET had ceased to exist. Contributory factors for this explosion of internet growth up to 1992 include that computers were nine orders of magnitude faster than those at the end of the 1960s and that network bandwidth (capacity to take volume of traffic) was twenty million times greater (Computer History Museum, 2013).

1991 was a significant year as it saw the first search protocol that examined file contents as opposed to merely file names and the first webcam was deployed at a Cambridge University computer lab.

1995 is also significant as it is when meaningful commercialisation began on the internet. Although there were some businesses online prior to 1995 the SSL (Secure Sockets Layer) encryption was created and rolled out by Netscape. This made it much safer to undertake financial transactions online such as credit and debit card payments. Also, in 1995 several technologies were introduced including JAVA and JAVAscript which brought real enhancement to product information which could then be available to both users and consumers. At this point, commercial users outnumbered the combination of research and academic users by a factor of two (Illinois University, 2014).

The term "Web 2.0" became known in 1999. This refers to both websites and Rich Internet Applications (RIA) being both substantially interactive and ‘user-driven’. Although known in 1999 it became more commonly used around 2004. The concept also emerged of the Web as a Platform with software applications being created to fully utilise the internet connectivity. However, this had the effect of moving functionality away from the desktop which had many

advantages, but also started to identify downsides such as operating system dependency along with compatibility or interoperability issues. Although there have been some good developments in interoperability issues over the last decade, it remains one of the key issues in resolving and achieving the prospect of the Future Internet.

Rationale for the Research

One of the founding fathers of contemporary internet technology is Kevin Ashton. He cofounded the Auto-ID Center at MIT (the Massachusetts Institute of Technology), which in relation to RFID (radio frequency identification), and indeed many other sensors, created a global standard system. He has also become well known for inventing the term "The Internet of Things" which describes a connected system between the Internet and the physical world through the use of ubiquitous sensors. In 1999, Ashton, then of Procter & Gamble (P&G), put forward the idea that adding radio-frequency identification and other sensors to everyday objects will create an Internet of Things (IoT), and lay the foundations of a new age of machine perception. More recently, Ashton (2009) went even further by stating that "the Internet of Things has the potential to change the world, just as the Internet did; maybe even more so." This thinking represents a stage genesis of the Future Internet.

The current concept of the wider Future Internet (as opposed to the sub-set Internet of Things) goes even further and describes a radical, pervasive, self-intelligent global technology infrastructure with the potential to enable and impact many parts of business and individual lives both as we know them now and in how they are emerging, in ways we are yet to fully comprehend. The term Future Internet emerged across many working EU research groups and has been consolidated and become widely used by the European Commission, and thereby ensuring its wider use and acceptance. There is a developing opinion within a number of scientific forums that at some point there will be a need to take the step from supporting single business processes towards being able to deal with on demand mash-up of information and services (Polowczyk, 2013 and Juarez Vives,

2013). In other words, the need is for user friendly (easy for ordinary operatives to use) innovation that allows the integration of processes and services into something much more complete, and better for organisations. This will include ‘things’ and ‘processes’ within or controlled by smart devices that interact with their environment and customer or user instructions. It will also need to interact with both rules and fuzzy logic (Zadeh,1965) (the logic underlying modes of reasoning which are approximate rather than exact). An example could be artificially intelligent devices that recognise when an elderly individual has fallen or changed behaviour and automatically communicates this with relevant individuals or organisations. This is much wider than just the Internet of Things and is generally represented within the ‘Future Internet’ concept, in which the Internet of Things is just one part.

The X-ETP Future Internet Research Group (2010, p. 8) say that ‘services are part of the new capabilities that the Future Internet will bring into the everyday life of citizens and businesses of organisations’. In this perspective, ‘Internet of Services’ encompasses also non-electronic services that operate in the real world and that citizens and communities exploit in their lives and businesses. As a key element, service consumers look for the perfect interactivity. By perfect we mean here permanent (i.e. an interactivity that has no time limits), transparent (i.e. the service consumer is only concerned with the benefits of the service he/she is using), seamless (i.e. the interaction is performed using the ‘typical’ devices of the context), and trustworthy. The X-ETP Future Internet Research Group has developed a simple concept of the future Internet illustrating it with four pillars as follows:

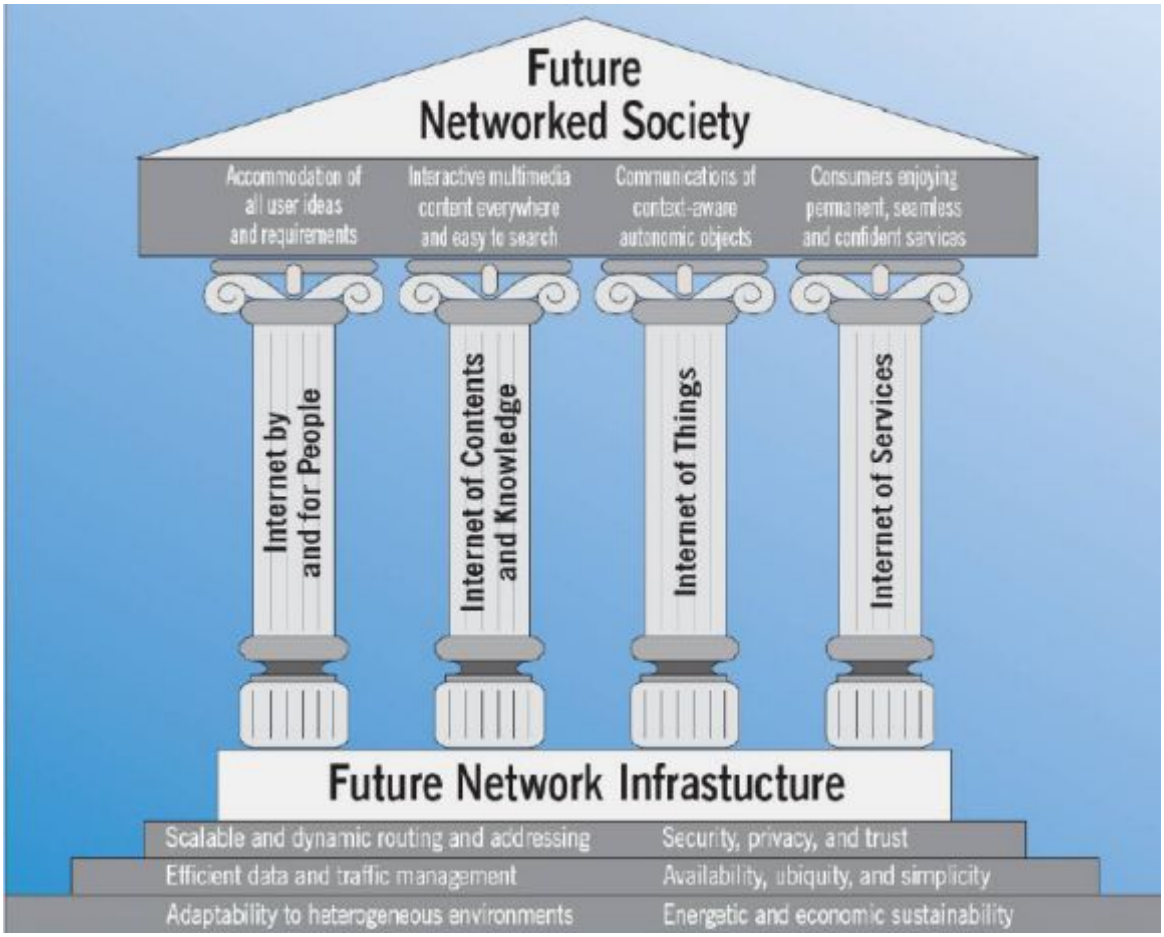


Figure 1: Future Networked Society

(X-ETP Future Internet Research Group, 2010)

Figure 1 presents the bedrock or foundations on which the future network infrastructure can be reasonably progressed towards its aims. Although each of these foundations is a massive area in its own right and possibly involves substantial assumption, it is not proposed to duplicate or assess this part of the X-ETP Future Internet Research Group assessment of these foundations within the focus of this study. It then goes on to represent the future network infrastructure through four key pillars. First is the internet by and for people which is about accommodation of user ideas and requirements. Second is the internet of contents and knowledge which is about interactive multimedia content everywhere and easy to search. Third is the internet of things which is about communication of context aware autonomic object. Last is the internet of services which is about consumers enjoying permanent, seamless and confidential services. They envisage that in bringing together and integrating these four key pillars a future

networked society will be enabled. The adoption and usage of this aim can be seen as a broad fulfilment of the Future Internet meta-goal or objective.

The overall meta-goal of the Future Internet and its application as a standard business process is, however so big and requires genuine innovation on so many fronts that its overall achievement is well beyond the scope of both the COIN research initiative (see later in this section) and the research reported in this study. The European Commission (EC) maintains a vision of substantial progress by 2020 which it emphasises in many documents including the latest research framework; the renamed FP8 - Horizon 2020 (EC Europa 2014). The long journey towards the Future Internet has started with several steps already taken (see appendices 2, Relevant EC Projects under FP6 and FP7 and 3, Future Internet business-economic studies). If this is continually built upon over the next ten years, and emergent options embraced, it is possible that the overall goal of effective realisation of the 'Future Internet' can be significantly achieved (EC Europa 2014).

However at a more current and generic level there is a real debate as to how and in what direction Future Internet related research, consultancy and business should move in relation to the Future Internet agenda. This can be seen in a cluster e-mail circular from Cristina Martinez Gonzalez[1] (2011) where she started by outlining that "in (European Commission (EC) FP7) we built the means to understand, in (EC) FP8 we need to build the means to change." This is a good summary as although masses of technical, product and systems information have been established or enabled to achieve a depth of understanding, the fundamental changes required such as technical, society and business / organisational integration, to deliver an effective Future Internet are substantially still to be enacted. A wider challenge or opportunity is to catalyse the competitiveness of European (and wider) enterprises (Martinez Gonzalez, 2011). The need for this becomes greater with the emergence of the newer developing major economies and the ever increasing expectations of our societies.

[1] Cristina Martinez Gonzalez, Head of Future Internet Enterprise Systems cluster, European Commission - Information Society Directorate-General. E-mail circular to Future Internet Enterprise Systems community members 21/03/2011

This position of a good volume of knowledge having been developed and yet there remains a need, indeed an increasing need, to develop it into more fundamental, radical or strategic change (Wischnevsky, 2008) through direction and integrated innovation is the essence of this study. On the one hand the environment for this meta-agenda is in many ways developed, assessed and regulated by practitioners and yet the progress on strategically realising the vision through frameworks and agenda remains somewhat elusive. Therefore the first part of this study is to test whether practitioners have a radical or strategic approach to developing an innovation agenda, with the second part looking at key influences of agenda setting and policy in delivering such progress. The ultimate goal in this study is the development of a new model of understanding in this area.

The COIN initiative

COIN (Collaboration and Interoperability for Networked Enterprises) has been one of the leading and largest international research initiatives undertaken by the European Commission in the EU 7th Framework Programme for research (FP7). Its focus is on enterprise interoperability (the ability of two or more systems or components to exchange information and to use the information that has been exchanged) and collaboration, representing potential key elements in the meta-agenda of the Future Internet (Technology Strategy Board, 2011). Key collaborative participants in this initiative include a number of prominent universities and research institutions across Europe, the main participants are listed in Appendix 1.

Its stated focus is somewhat technical, so a summary has been added showing descriptions in brackets. It is enterprise (business/organisational) collaboration and interoperability services with self-adaptive knowledge (the ability to continually evaluate and modify its own behaviour to meet changing demands or instructions) and business utility (pervasively available at relatively low prices and highly interchangeable) for networked enterprises. By 2020 the COIN Information Technology vision is of Software as a Service (SaaS) (accessing the

software by all interested parties, through the internet) in significant part becoming a base of Utility services (SaaS-U) (many low cost internet based services readily transferable). However, this has significant implications for business models. Traditionally the argument may be that the pay-back period for significant and on-going spend on sales, marketing, and start-up costs is long, although there is the prospect of significantly increased profitability in the longer run (Weingartner, 1969). The fundamental problem with this is that as the integrated infrastructure to deliver the vision does not exist yet, how long is the longer run? If it turns out to be eighteen months or two years away, strong businesses can probably cope with that. Alternatively, what if the achievement period turns out to be five or ten years forward or even longer? How many businesses could survive that and reap the rewards of their investment? Most could not, although there are some with the revenues and reserves to be able to do so, and they probably include organisations such as Google and Microsoft, however it remains questionable whether they would (Kahn, 2009).

While the integration of SaaS and SaaS-U has not yet been experienced, there is an emerging picture of how competitive advantage can be achieved with the application of SaaS alone. This can be presented using Porter's Generic Strategies (Porter 1980) in which he describes the two key strategies for competitive advantage in a broad market scope as cost and differentiation. With SaaS, lower costs can come from network automation of labour intensive services and business processes. Economies of scale can also be achieved from aggregating customers through the network onto a uniform infrastructure. Differentiation can come from a reengineering of business processes and service delivery through network automation where network effects are enabled and enhanced by customer to customer interaction rather that the traditional customer to provider activity.

There are many ways of looking at this emerging focus and the positioning of both SaaS and SaaS-U, with one way being illustrated as follows:

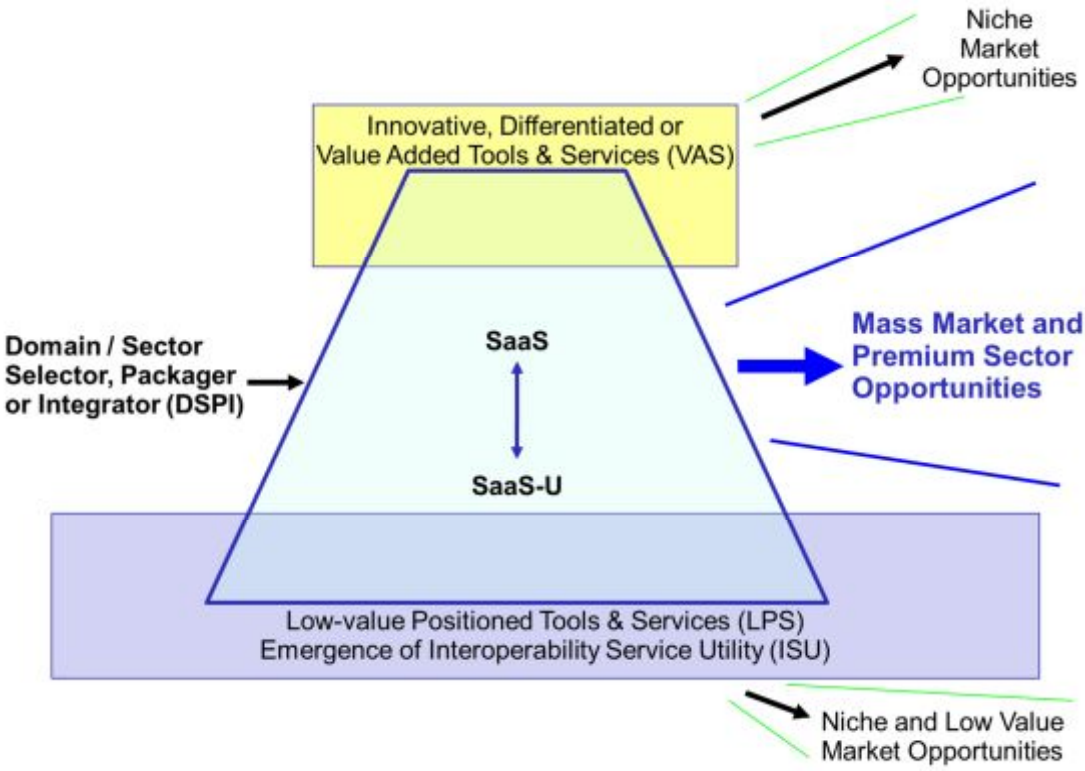


Figure 2: SaaS and SaaS-U Relationship

Figure 2 shows how a base level of low value tools and services (SaaS-U) providing infrastructure and common base services which can interact and work with innovative and differentiated value added services and tools(SaaS) in order to satisfy mass market and premium sector business opportunities. It also illustrates that SaaS and SaaS-U separately can probably only satisfy niche market opportunities.

The COIN project rationale argues that this focus will find its implementation in the field of interoperability among collaborative enterprises (for example the free exchange of usable information and smart auto-interaction between organisations working together anywhere in the world and at any time), supporting the diverse collaborative business forms, from supply chains to business ecosystems. It further argues that for them it will become a standard process, comprising both commodity and value adding services with its delivery based upon the anticipated general interoperable infrastructure termed the Interoperability Service Utility (ISU) (the ability of devices and services to be able to generally communicate information/data in readily usable/readable formats).

In classic business and marketing frameworks (e.g. Grant & Jordan 2012, and Hill 2012), product concepts are developed, and then movement is towards a certain level of standardisation or codification (Balconi, 2002; Roberts, 2001) which allows mass market exploitation. In the case of the Future Internet its development is still at the product and concept creation stage with interoperability, or codified search and open selection, being a big step yet to be achieved in the overall journey.

An understanding of how cross-business process works (Martin, 2010) within a collaborative network (the process is also referred to as distributed collaboration management) is at the heart of creating innovative and baseline (utility) services in moving towards the Future Internet. It helps to form the architecture or structure of the 'mechanics' of process interoperability as well as highlighting both potential and actual relevant services. This is not a static picture as the global scale and distribution of companies have changed the economy and dynamics of businesses. This necessitates some clarity of understanding as to how innovative services can sit along-side commodity or utility services, and how they can combine to participate in the delivery of a Future Internet scenario.

Trial groups of management in the COIN research readily saw the potential for Web-based collaborations and interoperable cross-organizational processes, but they raised a slightly different although connected issue. They confirmed that they typically require dynamic (responsive as opposed to fixed) and context-based interactions across complex and bespoke combinations taking place between people and services[2]. This view adds an extra dimension to a sole focus on commonality of process. In other words, while commonality of process is essential in efficient collaboration of any meaningful scale, that alone does not override the need for dynamically changing requirements and new opportunities. This leads to an emerging priority of finding practical applications for technical developments prior to, or at the same time, as addressing their interoperable operation. Therefore, development of a Future Internet agenda looking at

[2] COIN user groups feedback forum, 26-28 Jan 2011, Seville

individual services is needed just as much as an overview or detailed understanding of interoperable processes.

Overall Purpose and Aims

The overall purpose here is to contribute to the bigger picture of supra-organisational strategic change in relation to high technology development exampled by the meta-agenda for the Future internet. The aims of this work are in making a research contribution to the overall purpose through examining a generic (bottom-up) approach to accelerating or achieving a more radical agenda for progress towards the meta-agenda, and subsequently to explore a cognitive (top-down) approach to theory development of the supranational strategic influences in driving such a meta-agenda. In order to fulfil the aims, specific objectives for the research are required. These will be detailed in the next chapter.

One of the main requirements for developing policy, and innovation and research agenda, in relation to the high tech environment and specifically the Future Internet is at least the creation of an expanding and revealing (dynamic) body of knowledge and insight in relation to professional practice and commerce. This will allow progress towards a greater understanding and subsequent application of mutually beneficial interaction and complex solutions between, firstly, technical developers and secondly, business, and other organisational communities. This can be described as a ‘circularity’ of business and technical effects (described later in this document). The application, transfer of ability and continuing development of this may have the prospect of extending into real commercial and organizational development environments with practical and commercial reach, and impact well beyond the activity conducted and proposed in this research.

At one level of application this could facilitate a more integrated forward-looking and dynamic approach to developing and resolving the emerging opportunities. The knowledge and understanding from this could create the conditions to express and engage with the emerging Future Internet ideas within developing business and organizational agendas. This in turn may have the capacity to help participating businesses better prepare for future opportunities and benefits. On

the other hand the emergence of such a ‘conduit’ of capability helps to facilitate the understanding of collaboration and interoperability business related issues within the technical communities as they continue to develop the technical innovation agenda.

The first part of the challenge in this research is to see if an effective and more radical agenda can be established by the practitioner community of the developing Future Internet. This would drive the next phase of collaborative research action, Future Internet related research proposals, and business/organisational consulting over the next period (several years). In this context such an agenda could be seen as an innovation agenda (Gassmann, 2006) to add focus and dynamism in moving more radically towards the meta-agenda or policy aims of the European Commission (and various governments) in achieving their concept of the Future Internet. In terms of the process of creating strategic delivery of this type of policy or meta-agenda, the attempt to create a particular innovation agenda creates the possibility of examining and interpreting potential links with related areas of how innovation is catalysed such as thought leadership and knowledge creation. The bigger effect here could be in developing a framework for understanding real-world impacts in delivering research, policy and agenda development, and related commercial consulting.

The establishment and understanding of an innovation agenda is important as a baseline for further activity; the tactical or bottom up approach (EC Europa 2014; FInES 2011; European Commission 2008). However, possibly just as important, is an understanding of how the creation and leadership functions of an effective innovation agenda fit into a model of understanding, or indeed of practice; a strategic or top down approach. It is from this strategic understanding that significant wider influence can be achieved in more effective agenda creation and implementation in multiple areas of professional business and research practice. The achievement of either an effective innovation agenda or a model of understanding would be a real and meaningful deliverable for this project. The achievement of one of these goals would fully meet the goal of this research at outset. If both could be achieved it would be beyond expectations at outset.

The whole initial area of the project research is focussed on the possibility of achieving an agenda for effective innovation in the business and technical/scientific development arena of the Future Internet. The purpose here is to drive future development and a key element will be to establish key issues to drive organizational adoption of the Future Internet or at least movement towards it. It would further develop the future innovation agenda in the particular area of business applications of the Future Internet.

The establishment of an innovation agenda would facilitate (adapted from European Commission 2011, Digital Agenda for Europe 2010):

1. Better recognition of the emerging key issues and engagement within peer and related groups
2. Enhanced knowledge in this area
3. Development of an alternative or better base and positioning to achieve future funding from the EU and other sources for those collaborating in the proposed post project activity plan (see later).

This research could potentially provide an opportunity to advance activity and knowledge to create a view of what future research and business collaboration could look like. It potentially could transcend the current product, service and technical developments. It has potential to embrace information from, and issues affecting, many areas such as business, society and economy in maximising an agenda for effective development and enterprise adoption of the Future Internet. Further interpretation and development may provide some understanding of the roles within the development process in relation to large initiators such as the European Commission.

The need for this is already acknowledged by the academic and business communities. The Future Internet Enterprise Systems cluster (FInES 2011) said that “not all is well for European enterprises today despite some recognized advances in the business domain. European ICT research should be re-directed to better serve the interests of European enterprise, anticipating and shaping the new environment, thus supporting changing business realities and responding to changing societal needs.”

The European Commission (2008) confirm that the potential impacts to society and business are profound. It further advises that collaborative and virtual enterprises no longer necessarily mirror the more traditional physical business world, and progressive digital activity continues to blur the physical and the virtual. However, these collaborative and virtual organisations are not yet integrated which restricts much of the potential timely scalability, potential progress and competitive/pricing advantages which current and proposed research initiatives are trying, at least in part, to address.

In this current and emerging context, a new way of conducting enterprise becomes an outstanding requirement. It may contribute to causing a re-assessment of what "enterprise and business" means in both a strategic and component development context. This challenge can in part be facilitated by establishing the most relevant research agendas (in essence the next phase of questions that need answering) with enhanced strategy around a meta-agenda to drive Future Internet related research proposals and business/organisational consulting into the next phase.

A model of understanding, if achieved, would potentially assist in developing a catalysing role in the delivery process of Future Internet progress, issue resolution and adoption. Progress in these areas can provide profound and pervasive results for both business and society. Equally, the acceleration of the process and meta-agenda could perhaps be achieved potentially quicker and more efficiently with the development of such a model of understanding.

At the end of the project there are some final thoughts on the project activity and findings, however as these are somewhat reflective, they are detailed in the last section; ‘Reflexive account of Personal Learning and Professional Journey’.

This introduction has outlined the background, context and aims of this study. The following chapters will progress through the objectives, related concepts and research, the project activity, interpretation and conclusions.

Chapter 2: Terms of Reference

Primary Objectives

Having looked at the background to and rationale for this research, I will now consider the objectives for the research.

In order to take forward the overall purpose and aims (detailed in the previous chapter) of this study, the objectives are detailed below. This research has both primary objectives and secondary objectives. The primary objectives are:

1. The Innovation Agenda:

   To explore if a differentiated or effective innovation agenda towards the Future Internet meta-agenda can be established through a practitioner forum (bottom up approach). The challenge is to see if a more radical agenda will be forthcoming from practitioners than from the major bodies such as the European Union; and

2. Model of Understanding:

   To develop a strategic model for the understanding of the requirements in terms of process, players and relationships necessary for research agenda setting, and thereby identify possibilities for policy implementation approach in supra-national (or national) bodies such as the European Commission (top down approach). The challenge here is to create a better understanding of how to achieve radical or strategic change in major policy or meta-agenda objectives.

Core research questions posed sequentially in the first strategic objective, to virtual professional community (VPC) groups were:

1. What key broad areas are barriers to Future Internet (FI) adoption?
2. What are the key structural knowledge areas for next stage development?
3. What are the key areas for short / med term next steps?

First strategic objective research questions covered in the structured questionnaire were then rated by practitioner participant's assessment of the achievability and impact of the top issues emerging from the VPC groups in order to assess a combined ranking. The top ranked issues formed the innovation agenda.

Core research questions posed sequentially in the second strategic objective, to (VPC) groups were:

1. What are the influences from a national or supranational body (e.g. the EU/EC) in achieving the strategic goals or meta-agenda goals of a major high-tech concept such as the Future Internet?
2. Map the issues to areas of activity, power or excellence to form the components of a model of understanding with potential for use by relevant strategic management or leadership.

Second strategic objective research questions covered in the VPC groups were then cognitively developed by the author into a sense making framework and a conceptual model of understanding.

If the primary objectives are achieved, then the information generated can help achieve some of the secondary objectives. The secondary objectives are focussed on relatively shorter term activities to engage the business community, research practitioner community and indeed academia, in generating activity aimed at implementation. This is intended to help drive forward the impact of the research and contribute to, and advance, dissemination into the body of knowledge. In post project activity the secondary objectives should result in instigating and developing collaborative research proposals in response to research calls from research funders, and through engagement generate further understanding and questioning of supranational and national agenda setting and delivery in relation to its effectiveness and opportunities for improving it.

The secondary objectives are therefore inherently related to implementation, application and dissemination activity subsequent to this research in order to achieve impact.

Secondary Objectives

The secondary objectives are:

1. Dissemination and Adoption by Business:

   This can be achieved firstly by identifying key areas from the practitioner led innovation agenda, this being focused on technical development related to specific uses. Secondly, taking information knowledge and ideas to the business, professional and public communities, and other organisations, through consultancy and advisory practice, to help them prepare for and engage with emerging and cutting-edge technology. This can have the additional effect of supporting them in building business justifications and cases, and through that the investment decisions, which would help to lead commercialisation and adoption of the technical developments in the identified areas.

2. User and Potential User Feedback to Developers

   The engagement with operational organisations noted in the previous point can also create useful and meaningful knowledge on relevant issues and requirements from the perspective of user and prospective user organisations. This type of information can include feedback on practical technology adoption issues and business case (commercialisation) requirements or competitive and commercial advantages. This type of feedback can help the technical developers to progress their activities and outputs in ways which are more readily appropriate to adoption and commercialisation, and so be more likely to achieve real-world impact.

3. Moving towards Thought Leadership

   The activities in the previous two points can, taken together, create a means of (with wider community engagement) facilitating engagement and thought leadership at a policy and meta-agenda level. The issue of thought leadership will be addressed more specifically later in the

discussion chapter. The policy level of engagement can be further enhanced if the second primary objective is achieved and a relevant model of understanding is available within which to consider strategic or meta-agenda setting.

4. Enhanced Contribution to New Research Consortia

   The activity in the previous three points can also enhance the development of new research consortia in building research proposals. In setting the initial direction and focus of new consortia, the combination of policy level engagement, user and prospective user (and thereby business case) engagement along with technical developer engagement may create the combination of views to give added value or differentiation to such new proposals.

As the ‘dissemination and adoption by business’ section above is enacted, and it generates user and potential user feedback which can be relayed to developers, this ‘conduit’ effect could create synergistic interaction by facilitating output and input from one side(users) to the other (developers) in order to refine and develop the processes and offerings. The developers can be seen as generic owners or custodians of the Future Internet policy and technical agenda. Equally, the users can be seen as testing and development of the organizations business models, paving the way for potential adoption (and investment decision issues) in relation to the Future Internet research agenda. This effect of catalysing and dynamically refining effective innovation and adoption through a synergistic interaction is illustrated in the following figure:

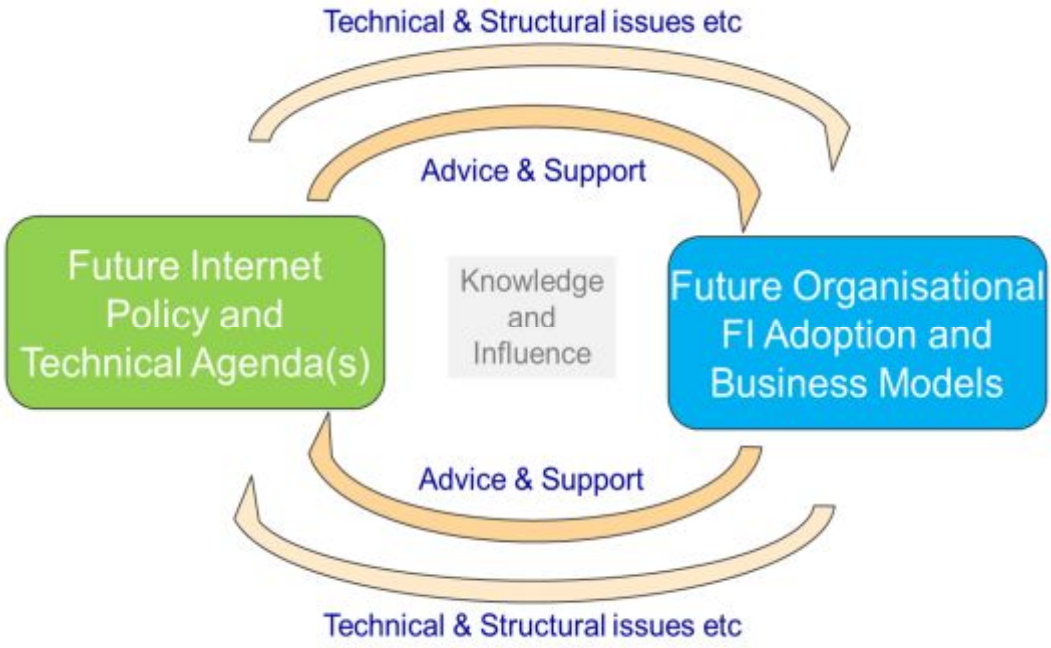


Figure 3: Circularity of Technical Agenda & Organisational Adoption

Figure three illustrates a position of knowledge and influence created or enhanced through delivering and advising and supporting role in taking activity, information and progress from the research, technical and development practitioner community of the Future Internet and presenting in ways that can be absorbed into future organisational business models and thereby enhancing the chances of its adoption, or its earlier adoption than would have otherwise been achieved. This brings the prospect of competitive advantage for early adopter organisations (Covin 2006, Piccoli 2005). The same position of created or enhanced knowledge and influence may also be achieved through the reverse process of taking issues relevant to cutting-edge and emerging organisational and business practice and delivering them to those involved in the Future Internet policy and technical agenda so as to facilitate their understanding of 'real-world' impact and exploitation potential.

The achievement of the primary objectives and the successful engagement with activities in the secondary objectives can collectively allow the building of a particular position of knowledge and potential influence, or in other words thought leadership, across many areas, bodies and communities. This may include the areas of research, business and supranational policy with subject and content contribution at catalysing specific research and innovation initiatives and at a

research framework (policy implementation) level. The facets of thought leadership are considered later in the discussion chapter of this report; however the potential sphere of influence is indicated in the following illustration:

Figure 4: Sphere of Knowledge and Influence in High-tech research and strategy

Figure four illustrates that establishing knowledge creates a possibility of influence when linked to activity in relevant communities. This knowledge, activity and influence can be used to bring a focus to, catalyse and drive innovation through the creation of specific proposals for research and/or development. Equally, the same knowledge, activity and influence can help to create a position of thought leadership through the inspiration of others and establishing strategic direction or agenda, or at lease asking strategic questions.

The relating of primary research objectives to secondary or implementation objectives is an established approach of business related innovation research. This is supported by van der Duin and den Hartigh (2009) who advise that conducting futures research is not a goal in itself but serves a specific purpose, for example building a vision … for the future. They further advise that a promising idea for

an innovation that is based on an envisioned future can be supported or countered by future changes in technology, economy and/or society. Certain future expectations may turn out to be false and may have to be replaced by others. Conversely however, unforeseen future developments can make it more likely for an innovative idea to be realised. The implication of this is firstly that innovators should take future changes into account and secondly, that every innovation process should take the future into account in an explicit way in development and validation. Taking this specifically into the area of technology development, Grilo and Jardim-Goncalves (2010) argue that it is generally accepted that information and communication technology (ICT) is an enabler for innovation. What is less clear and controversial, however, is the changing nature of innovation and the mechanisms for catalysing innovation. Still, it is generally accepted (EC.Europa.EU 2014; EARTO 2012; EC FIArch Group 2011) that in order to take full advantage of ICT, companies must increase their level of interoperability.

It can be difficult to visualise and conceptualise the overlapping relationships between the related issues of:

a. The Future Internet meta-agenda
b. Future business models
c. Implementation adoption and related investment decision issues
d. Catalysing innovation and thought leadership
e. Research agenda setting (policy implementation) and its relation to practice

The following diagram shows a view of the overlapping nature of these issues and how the related and interacting nature of each can be seen as a whole, or in other words a holistic overview:

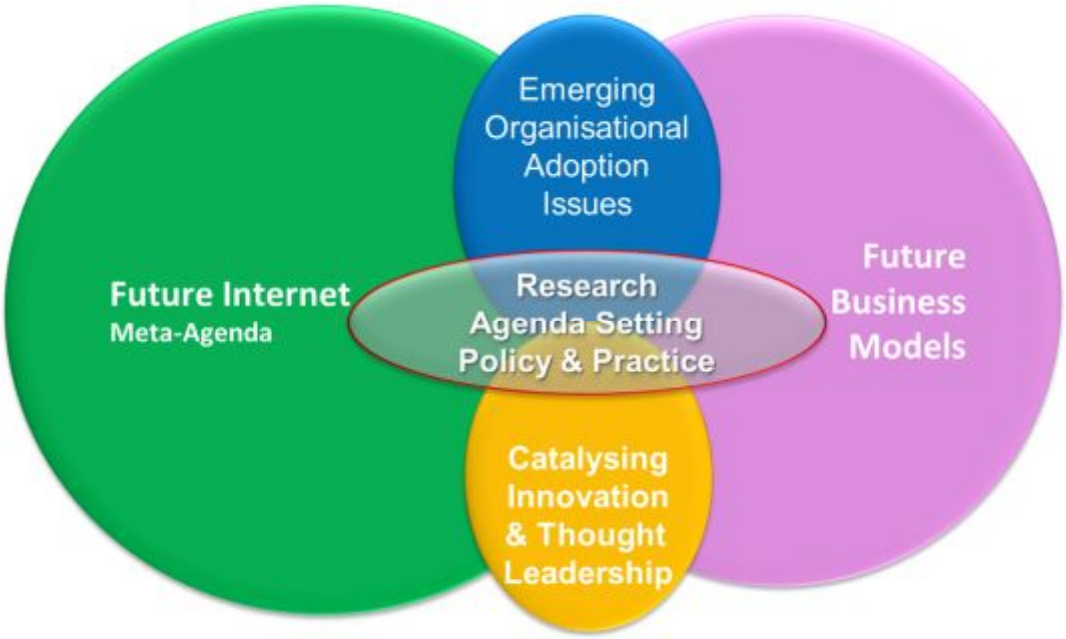


Figure 5: Overlapping and Interacting FI Adoption

Figure 5 illustrates firstly that the aims and meta-agenda for the Future Internet are inherently related to commercial future business models and the two overlap. If the research and development of the Future Internet is to be realised then there needs to be adoption of it within business. Such adoption and commercial justification will therefore necessitate its inclusion in future business models. Linking these two areas at present are the emerging organisational adoption issues from research trials and from commercial justification models, and the direction of the innovation agenda which goes hand in hand with the direction of strategic thought leadership in understanding the technical and commercial possibilities.

The primary objectives of this research along with the secondary subsequent implementation objectives will facilitate a level of influence across this holistic overview. This effect can be illustrated as follows:

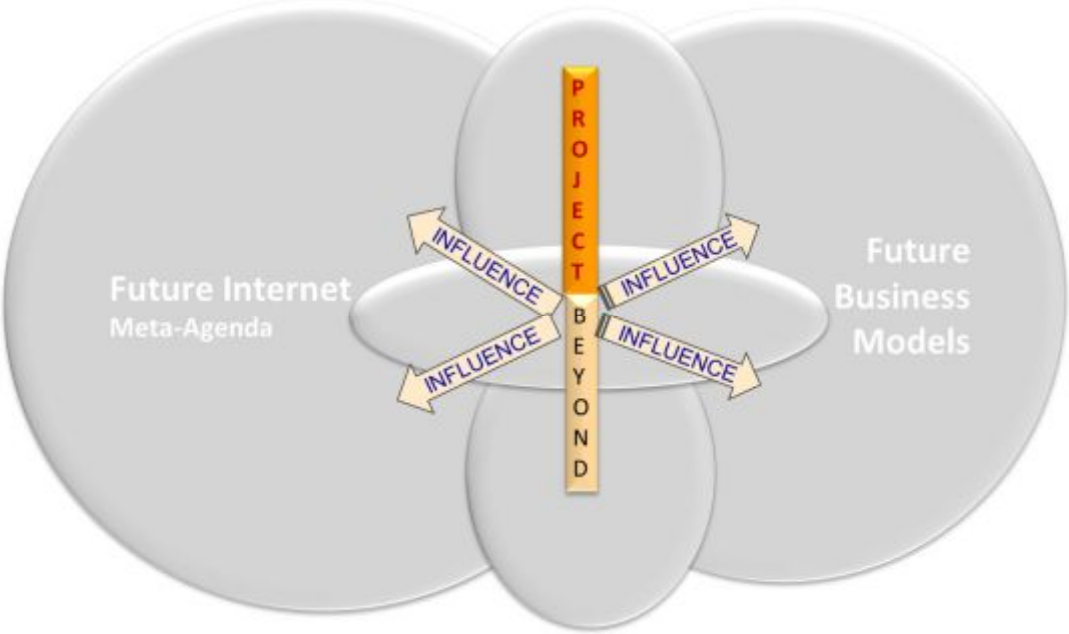


Figure 6: Project Influence

Figure six takes figure five as its base and represents the dissemination of influence across the identified areas which may be made possible through the outcome of this study and the implementation of proposed post project activity.

This area of research across the fields of technology, enterprise and policy will undoubtedly continue to expand and progress in the years ahead, and those who are equipped with progressive practical and enterprise related agendas of issues for resolution, along with understanding of agenda setting at a policy level can play an increasingly catalysing and leading research and business role. This is potentially a major impact within future trends for society and organisations.

The conceptual or overview flow for this project from the present and into the future is as follows:

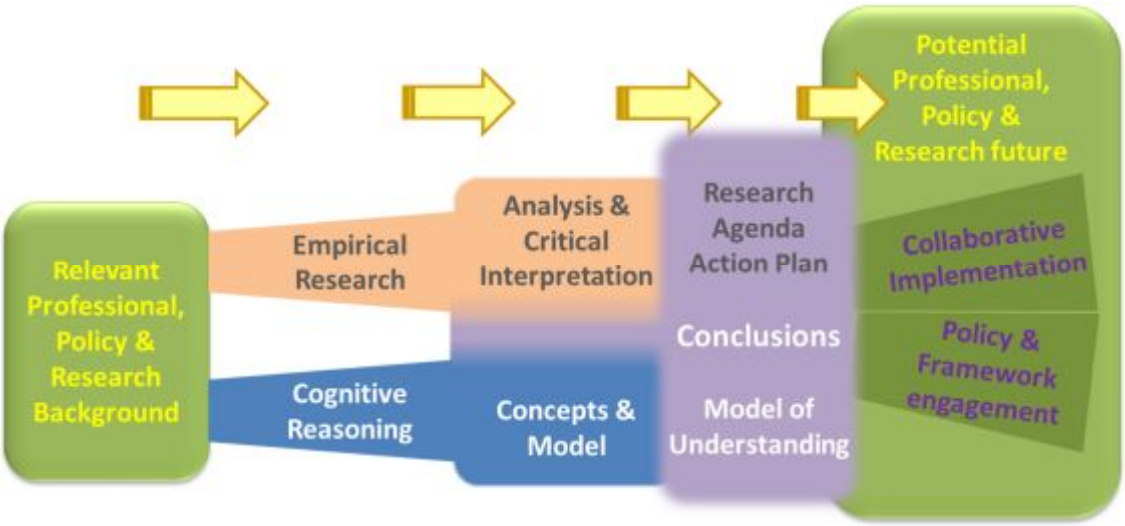


Figure 7: Overview Pathway for This Study

Figure seven gives an overview of the flow of this project. It starts with the background brought into this study from a number of initiatives including the COIN project. It then illustrates that there are two related tracks broadly along the lines of empirical research and cognitive reasoning which come together in the conclusion phase. It then leads into post project activity in the areas of potential collaborative proposals and implementation, and in engagement with relevant policy and frameworks.

The project will potentially build knowledge and insight allowing progress towards a real synergistic interaction (as previously described). The dual challenge is to see if a relevant agenda can be established (questions; lines of future research/application) to drive Future Internet related research proposals and business/organisational consulting into the next phase. This is fundamentally the establishment of an innovation agenda. Secondly to see if process influences through a model of understanding can be developed with a base in the emergent research and cognitive assessment of this project. In this respect a building or cumulative effect can be considered between the primary objectives of this project as follows:

1. To test whether an Innovation Agenda can be established from a bottom up survey of those with an understanding of, and actively engaged with, delivery of the FI (Future Internet) meta-agenda.

2. Through understanding the implications of this initial research and with the critical integration and interpretation of other related work to establish a model of understanding of research agenda setting at a supra national (or national) level.

The initial research will take place through practitioner interest group forums where initial open questions will be introduced and developed. These will lead to the development of further questions and initial analysis. This first stage analysis will form the basis of a detailed questionnaire in the second stage to develop and progress the questioning, and facilitate quantitative interpretation of the research. The third stage will be the merging of this empirical approach with a cognitive conceptual collation to consider a model of understanding. This is represented in the following figure eight.

Stage 1	**Stage 2**	**Stage 3**
Practitioner Group Forums	Structured Questionnaire	Concepts and Model
Empirical	***Empirical***	***Cognitive***

Figure 8: The three Key Stages in this Research

The initial first stage questions will be open in nature, but within the shared practitioner Future Internet context and environment, as follows:

4. What key broad areas are barriers to Future Internet (FI) adoption?
5. What are the key structural knowledge areas for next stage development?
6. What are the key areas for short / med term next steps'?

The context and focal theory progressively integrated within this report is the agenda setting theory, however this is focussed on and adapted to research agenda setting in a supra-national (or national) environment such as the European Commission. Agenda setting theory describes the "ability to influence the salience of topics on the public agenda" (McCombs, 1975, 2002 & 2005). This will be explored in the subsequent sections and chapters.

Chapter 3: Review of Relevant Literature

Having considered the background, rationale and objectives of this project, I will now review some key relevant literature.

This section sets out information and ideas which give a context for the research and subsequent model development. It broadly follows a sequential approach in line with the development of this report. The sub-sections of this review are:

1) Background
2) The Future
3) The Technology Issues
4) Driving Technology Innovation Forward
5) Business Considerations
6) Making Things Happen
7) Driving Innovation
8) Driving and Influencing the Agenda

1. Background to the Study

What we understand as science has certainly changed significantly throughout history. Interest in the nature of knowledge can be traced back as far as the ancient Greeks and beyond. The prevalent approach up to and throughout the middle ages in the debate about knowledge was primarily the pure-view of theologians. During the middle ages the church frequently persecuted philosophers and scientists for non-conformist forays into the unknown. This is not to say that empirical approaches had not existed prior to this. For example, Aristotle's practice of scouring through fisherman's nets and deducing that, for example, sharks and rays apparently to be a different family of being from the fishes, and further noting that they were all different to marine mammals. Aristotle undertook a mechanistic approach of discipline which can be readily recognised in modern empirical science. Aristotle's initial cataloguing of the nature in the world (natural science) was not at that time considered to be science, but rather a philosophic endeavour (ZME Science 2012). However when

subsequently moving into the renaissance period, gave birth to the Age of Enlightenment, leading philosophers and scientists started to frequently include findings from the emerging empirical studies (or science). This represented the emergence of comfort, or acceptance of, the concurrency and combination of both theory and empirical issues. Bacon was a leader of the emphasis on the importance of experimentation either as an alternative to or in addition to theory and contemplation. Then Newton, a pioneer of modern physics exemplified it in his practice. Objectivity, readily associated with the current view of science was in the infancy of being codified into a discipline and the role of subjectivity was becoming less prevalent.

Prior to the industrial revolution there is little evidence that innovators particularly knew of or necessarily used relevant scientific principles. Many things were built by trial and error with any scientific principles becoming clearer once they or others looked to explain in subsequent times why particular inventions worked. The relevance and impact of systematic forms of study in science were articulated and developed by notable scientists such as Copernicus, Galileo and many others. The commonality of their work focussed on scientific observations which led to the deduction of scientific laws. It also represented a period of establishment of the practice of verification of scientific theories.

Agarwal (2013) argues that during the 19th century, science progressed rapidly. Consequently, technology also progressed rapidly as the progress in science was translated into production and engineering processes, and the development of existing and new products. Through the major technological developments during this period the interrelationship between science and technology became firmly established. By the late 1800's there had been a great expansion of new science approaches and combinations, and the emergence of specialities from a philosophical perspective (Gardner 1987). Equally, philosophy was fast being effectively redefined as a study of something which by its nature did not allow a definite answer to be found. Agarwal (2013) goes on to show that technologies emerged which incorporated a number of scientific principles, as opposed to the previous method of trial and error. Examples of this are Davy's safety lamp and electric generator. When a number of scientific principles became known, several of these principles were applied to manufacture a sophisticated machine. For

example, an electric generator involves the principles of electricity, mechanical engineering, heat conduction, etc. Large scale industrialization across Europe and America and the large scale of internationalisation of markets and technology users continued across the 20th century and into the 21st century as efficiency and economies of scale continued to generate growing prosperity and wealth of assets and intellectual property. The term cognitive science began to emerge in the mid 1970's (Gardner 1987). This had a strong foundation in philosophy and as such had an associated long history. However, even with so many sophisticated tools, frameworks and approaches, much of this cognitive science still remain focused on similar issues and questions to those that interested the Greeks around two and a half millennia ago. This generally includes questions of what it means to know something or indeed to have accurate beliefs as opposed to being mistaken or ignorant of the matter.

Schumpeter (1934) highlighted the importance of technology as the driver of economic growth and development, noting that economies do not tend to equilibrium (unlike classical economists). He argued that economies were continually being 'disrupted' by technology based innovations. He identified a key figure in this approach as the entrepreneur who initiates change and brings about innovations using technology leading to 'creative destruction.' He argued that new industries arise and old industries are swept away which is often a painful adjustment. This can be seen, for example, in the emergence of railways, steam ships and air travel. This approach was linked to and built on Kondratiev's 'long wave' cycle (Kondratiev1984 (1925)) which demonstrates a wave pattern to technological change where the waves are driven by clusters of innovation based on "new" technologies. Schumpeter's approach was described by Ettlie (2006) as 'punctuated equilibrium' illustrating an effect where technologies evolve through relatively stable periods of incremental change (the equilibrium) punctuated by radical or disruptive breakthroughs that can either enhance or destroy the competencies of existing organisations.

Rothwell (1994) described five models, or generations, of the innovation process and related them broadly to decades from the 1950's to the 1990's. The first generation was described as 'technology push.' In this generation, technology is the 'driver' and the innovation process is linear or sequential. The starting point is

a scientific discovery which is then followed by research and development activity, and subsequently by engineering and manufacturing. The marketplace is seen as a passive receptacle for the fruits of research and development. He also sees firms in this period as large and vertically integrated. The first generation is positioned mainly in the 1950s. The second generation was described as 'demand pull.' In this generation there is a similar linear process, however the market need is the driver. This is followed sequentially by design and engineering, manufacture, marketing and sales. The second generation is positioned mainly in the 1960's. The third generation was described as 'coupling.' In this generation there is a coupling of, or attempt to synergise, research and development with market needs to form a new driver. The remainder of the innovation process remained linear or sequential. This recognises the importance of interaction, at least in the initial stages with extensive use of feedback. The process is more complex than linear in the early stage, but overall it is still basically linear. Fundamentally it attempts to recognise the confluence of technological capability and market need. The third generation is positioned mainly in the 1970's. The fourth generation was described as an 'integrated model.' In this generation, a 'team' approach is the 'driver.' cutting across all parts of the new product development process. There is great stress on communication and team working on concurrent stages, or in other words activities taking place in parallel with co-location of specialists. The fourth generation is positioned mainly in the 1980's. The fifth generation was described as a 'network model.' The driver here is the combining of ideas, skills and competence within the organisation's wider network. Facilitating factors of this networked approach include improved communication and developments in ICT, for example CAD (computer aided design) and CAM (computer aided manufacturing). These factors were occurring at the same time as substantial growth of strategic alliances and joint ventures. Together they created the networked model. The fifth generation is positioned mainly in the 1990's. Although Rothwell's models ended in the 1990's, the methodology of innovation did not and into the 2000's the emergent model was of open innovation (Chesbrough 2003, 2007). Open innovation could therefore be described as the sixth generation applying broadly from 2000 to date. Open innovation is covered in more detail in section six (Making things happen) of this chapter.

The impact and reach of technology innovation was generally magnified by the number of people it could affect and it's increasing pace due to improving transportation and communication links, improved education and wealth. However, it should be noted that the greatest effect of this impact (by absolute quantity) was initially focused on and largely remains in the developed or western world. An interesting take on the reach of technology innovation was noted by Innovation America (2013) where they detailed 'What Sony played at its annual shareholder meeting in 2009.' This included the following points:

- 31bn searches on Google every month
- First commercial text message was in 1992. Today, the number of text messages sent/received every day exceeds the total population of the planet
- Years it took to reach a market audience of 50m:
    - Radio 38
    - TV 13
    - Internet 4
    - iPod 3
    - Facebook 2
- Number of internet devices:
    - 1984 1,000
    - 1992 1,000,000
    - 2008 1,000,000,000
- Estimated that 1 week worth of the NY Times contains more information than a person was likely to come across in a lifetime in the 18th century
- The amount of new technical information is doubling every two years

At the heart of this acceleration of information and communication has been the development of the internet and the world-wide web. The internet is described by Oxford Dictionaries (2013) as 'a global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols.' Oxford Dictionaries (2013) also describes the world-wide web as 'an information system on the Internet that allows documents to be connected to other documents by hypertext links, enabling the user to search for information by moving from one document to

another.' In other words, the internet provides the infrastructure, or routes, through which information and communications can travel, whereas the world-wide web provides the identification and linking of information allowing more complex and impactful usage of such speedy information. It is the combination of the internet and the world-wide web which facilitates the on-line environment as it is currently known. A key advantage of this is flexibility enabled by having accessible communications twenty four hours a day, seven days a week and in any location provided there is an internet connection. It inherently has a cost advantage over many other forms of communication and information transfer due to its speed, its ready assimilation at both ends, and its fully automated nature. It has the additional advantage of creating a documented 'audit trail' that is lasting and therefore available for revisiting.

This also encourages reflection and timely contribution when participants have considered issues and are ready to respond (Abawajy, 2012). Along with the advantages there are some corresponding disadvantages such as it being text based which relies on inputting text. For some, for example, without strong keyboard skills this can be a challenge however this can to some extent be circumvented with voice and video conferencing technologies (V²oIP) and voice recognition software. There is also the issue of soft communication such as facial expression, double meaning, gestures and satire, much of which can be significantly lost if text based communication becomes the primary vehicle. However one of the biggest issues seems increasingly to be that of information overload through the availability of massive information on virtually every subject. This is often made worse than it otherwise would be through the lack of attached key search words, and the limited ability of current search engines. However, current disadvantages can be looked at as opportunities for future product development and at least incremental innovation.

2. The Future

'The Internet is changing the way we work, socialise, create and share information, and organize the flow of people, ideas, and things around the globe (Manyika 2011). Yet the magnitude of this transformation is still

underappreciated. The Internet accounted for 21 percent of the GDP growth in mature economies over the past 5 years (Manyika 2011). In that time, we went from a few thousand students accessing Facebook to more than 800 million users around the world, including many leading firms, who regularly update their pages and share content. While large enterprises and national economies have reaped major benefits from this technological revolution, individual consumers and small, upstart entrepreneurs have been some of the greatest beneficiaries from the Internet's empowering influence. If Internet were a sector, it would have a greater weight in GDP than agriculture or utilities. And yet we are still in the early stages of the transformations the Internet will unleash and the opportunities it will foster. Many more technological innovations and enabling capabilities such as payments platforms are likely to emerge, while the ability to connect many more people and things and engage them more deeply will continue to expand exponentially.'

In setting the current technology scene Baden Powell (2011) said "we are in an 'arms race' of technology ... think of a runner turning up at the start line for a competitive marathon race and turning to their right to see that the competitor has a formula one car." He went on to say "Sometimes it can be a fine line between incremental and disruptive innovation and often there is a balance to be struck between the market demanding the product and the technologists pushing it" (see Rothwell's five models of innovation in section one of this chapter) and "Where we go now is not far removed from what many would regard as science fiction." This induces a challenging perspective. However, within current progress there is a debate across research, innovation and business/organisational realities. Indeed FInES (2011) advises that ICT (Information and Communication Technologies) research should be re-directed to better serve the interests of European enterprise (see full comments in Project Introduction).

3. The Technology Issues

This highlights a clear need in technical communication on key issues of debate such as interoperability of business information. The Open Group in its Architecture Framework, TOGAF (2009), speaks of Operational or Business Interoperability (which defines how business processes are to be shared),

Information Interoperability (which defines how information is to be shared), and Technical Interoperability (which defines how technical services are to be shared or at least how they connect to one another). It is fundamentally important, for example, to convey technical interoperability to IT (Information Technology) programmers and to 'convert' the interpretations appropriately for each type of audience. At the heart of policy here is what the European Commission (EC) sees as a compelling competitive advantage – collaboration, especially amongst the mass of small and medium sized organisations (SMEs). Small and medium sized organisations are seen as particularly important now as most established economies have seen difficult times in recent years, 2008 to 2013 and beyond (Griffith-Jones 2013), and small and medium-sized enterprises are contributing to employment growth at a higher rate than larger firms. In the EU economy about 99.9 per cent of the enterprises are SMEs (United Nations Economic Commission for Europe, 2014). This interoperability opportunity is based around the advent of stable and secure information technology platforms that are mainly web based. This new technology allows many organisations to collaborate, usually remotely, and in some instances create new forms of delivery mechanisms which are generally called Virtual Factories (VFs). However, according to Europe's Digital Competitiveness Report (2010), some 34 % of EU enterprises used ICT to exchange information with business partners and 15% used ICT for supply chain management. Such applications were mainly used by large enterprises, by a factor of 3 and upwards compared to SMEs. It is therefore clear that currently, any such ICT advantage is firmly weighted with large enterprises.

This now embedded use of ICT across research, business and society creates an enormous range and depth of related issues, to the extent that it would, and does, take major programmes of research to even attempt to address them. Many of the initiatives within such programmes are illustrated in appendix 2. The great breadth of issues to be resolved may well be unmanageable without a structured approach to cascading particular specific focuses to each individual piece of research (or at least specific area of research) within the overall meta-agenda. As part of this sub-segmentation, this study will focus on two particular facets of driving the meta-agenda in investigating whether a more radical innovation agenda can be achieved from the practitioner community and in developing ideas

on the key influencing areas on agenda setting in order to achieve strategic policy aims. These two study focus elements will be from contrasting perspectives. The innovation agenda focus will be through empirical examination and using the practitioner base will position it as a 'bottom-up' perspective. By contrast developing consideration of the influencers of agenda setting in this field will be through cognitive assessment and in its overview will represent a 'top-down' perspective.

4. Driving Technology Innovation Forward

Kroes[3] (2010) said "I have one goal ……. to convince you of the seriousness of Europe's digital problems and the urgent need for our leadership to address them." She went on to say "Anyone who lives in Europe or does business here stands to gain if we address these issues now while we still have the time." Further illustrating her point she said "over the last 15 years ICT investments across all sectors delivered 50% of our productivity growth. You probably also know that US productivity growth is higher than Europe's. And the lion's share of that gap is due to their bigger and better investment in ICTs. Would you say this is acceptable?"

Despite this, optimism remains and the Digital Agenda for Europe (2010) says that "The overall aim …….. is to deliver sustainable economic and social benefits from a digital single market based on fast and ultra-fast internet and interoperable applications." This alludes to a simple view of the Future Internet.

However, pervasive technologies are not all based on shared standards. There is a risk that the benefits of interoperability could be lost in such areas without common adoption of standards and/or the emergence of self-adaptive interoperability engines.

The emergence of common standards could be quite some way off, indeed if they are achievable. An EC White Paper - Modernising ICT Standardisation in the EU - The Way Forward (2009) stated that 'Standardisation is a voluntary cooperation

[3] Neelie Kroes, Vice-President of the European Commission responsible for the Digital Agenda

among industry, consumers, public authorities and other interested parties for the development of technical specifications. Industry uses standards to meet market needs - to support its competitiveness, to ensure acceptance of innovative solutions or to increase interoperability.' Unfortunately, many significant market participants see differentiation and service protection as key competitive differentiators which can 'strain' voluntary cooperation. Recent advertisements from iPhone make it a competitive feature to restrict iTunes to the iPhone. This is not really a technical restriction, but a business imposed one as part of a differentiation strategy.

The White Paper also says 'It is indeed imperative to modernise the EU ICT standardisation policy and to fully exploit the potential of standard setting. Otherwise the EU will fail to master the information society, will not realise a number of important European policy goals which require interoperability such as e-health, accessibility, security, e-business, e-government, transport, etc.'

Even at a more technical level, Grilo and Jardim-Goncalves (2010, p.1) say that 'in spite of the availability of many proposals to represent standardised data models and services for the main business ……..activities, the goal of seamless global interoperability is far from being realised.' Despite many proposals and projects, the goals here are still to be achieved.

5. Business Considerations

The Enterprise Interoperability Research Roadmap (2008) says that 'Europe has a unique opportunity to develop new business models that are not only sustainable in classic business economic terms for the private agents, but that are also consistent with the European values that underpin our society. These business models will be based on increasingly interconnected and interdependent networks of enterprises interoperating as nodes in 'innovation ecosystems.' The Roadmap is guided by a number of conditions including:

- The public interest dimension of Enterprise Interoperability as a strategic element of innovation ecosystems

- SMEs as the backbone of European industry and the unique contribution of SMEs to innovation

- The need to open up the field of Enterprise Interoperability research by linking with other scientific domains and communities

Some of the challenges within this remain profound. The EC FIArch Group (2011) estimates that that the number of nodes (computers, terminals mobile devices, sensors, etc.) of the Internet will soon grow to more than 100 billion. They also suggest that 'the services and open application interfaces will expand in a similar way and many of these services will be addressing essential societal needs in the domains of healthcare, transportation/ automotive, emergency services, etc.' They raise an emerging question of whether the architecture (and its properties) itself might become the limiting factor of Internet growth and deployment of new applications. The group go on to say that 'studies on the impact of research results have shown that better performance or functionality define necessary but not sufficient conditions for change in the Internet architecture (and/or its components); hence, the need also to demonstrate limits of the current architecture. Thus, scientists and researchers from companies and research institutes world-wide are working towards understanding these architectural limits so as to progressively determine the principles that will drive the Future Internet architecture, which will adequately meet the abovementioned challenges.' (EC FIArch Group 2011, p.2). However, the issues are not just technical. It has been argued by Li (2010) in The Economics of Utility Services in the Future Internet, written for the Future Internet Assembly that 'our analysis so far suggests that the pricing model based on the supply and demand model of market economy is unlikely to work for utility service provision in a Future Internet scenario. Market mechanisms alone do not provide sufficient economic incentives for market agents to become providers of utility services only, within a timeframe acceptable to commercial operators, or for market agents to remain in business if the pricing model is simply based on cost.'

A potential or probable business lifecycle for fundamental IT developments should also be kept in mind. Carr (2003) published an influential article, provocatively entitled "IT Doesn't Matter" and subsequently expanded into a

book (2004), in which he examines the evolution of information technology in business and shows that it follows a pattern strikingly similar to that of earlier technologies like railroads and electric power. The academic view of technology development here is very much centred on open innovation as it is the only model which caters for the widespread collaboration of diverse contributors not necessarily from a single network (description of open innovation in section 6 of this chapter – Making Things Happen). According to Carr (2003), for a brief period, as they are being built into the infrastructure of commerce, these "infrastructural technologies" open opportunities for forward-looking companies to gain strong competitive advantages. However, as their availability increases and their cost decreases - as they become ubiquitous - these technologies become commodity inputs. From a strategic standpoint, they become invisible; they no longer ‘matter’.

For the present and the future, there are four basic definitions of strategy (Mintzberg, 1994): (1) strategy as a plan, (2) strategy a pattern, (3) strategy as a position, and (4) strategy as a perspective. He goes on to describe how every one of these definitions has a distinct relationship to the future. Most relevant to this project and the post project uses is strategy as a perspective which is related to the present and the future. In the present, a perspective is usually 'related to a mission statement or fundamental purpose' whereas in respect of the future, the perspective is a vision of what you think or want it to be. In establishing a strategy perspective, as relevant to this project, Havas (2009) points out that futures building (prospective) activities can be conducted by a small group of experts, or by involving the representatives of key stakeholder groups.

There is however a newer dynamic related to the internet. It is the central concept of network economics where ‘the overall value of a network as well as the value for the individual participant depends on the number of other participants in the same network’ described by Shapiro and Varian (1998). As a consequence, networks are dependent on the expectations of potential customers, with the demand side predominantly driving the market dynamics. These network effects introduce a new form of externalities in economics, sometimes called network externalities or demand-side economies of scale. In contrast with traditional economics, the average demand increases with scale and then tapers off. Also,

because a network good is by definition an intangible based on ICT services, its supply is in principle perfectly elastic as noted by Anderson (2006). These perfectly elastic demand-side economies of scale are of potentially great competitive economic advantage for SME collaboration and this can be effectively supported through further general interoperability in the Future Internet.

Significant Future Internet related research has taken place and some is in progress. It is important to understand this, although not be constrained by it, as the Future Internet in whatever form it emerges has yet to occur. Substantial international open research in this area has been commissioned by the EC under their research framework programmes 6 (FP6) and 7 (FP7). An overview of the aims/purpose of example projects is provided in Appendix 2. Also there are Future Internet studies covering business-economic aspects and an overview of the aims/purpose of example projects is provided in Appendix 3.

These projects are indicative that development of the Future Internet is in various forms being researched and provisionally developed. In many ways this is representative of how its emergence is being 'played out.' It appears that a clear single vision, development route and exploitation path for the Future Internet are still missing. Fragmented potential routes are indicated, lacking a coherence, agreed or seriously 'orchestrated' collaborative approach. European Commission Vice-President Neelie Kroes (Kroes, 2014) said in February 2014 "Europe must play a strong role in defining what the net of the future looks like." She went on to say "We must strengthen the multi-stakeholder model to preserve the Internet as a fast engine for innovation." At the time of writing there are calls for papers in a number of related areas such as Enterprise Integration, Interoperability and Networking for the EI2N'2014 Conference in October 2014, and Industry Applications and Standard initiatives for Cooperative Information Systems for Interoperable Infrastructures for the OMG (Object Management Group) Conference, also in October 2014.These are examples of an ongoing array of cutting edge debates which are indicative that application issues are yet to be resolved.

6. Making Things Happen

As discussed in the previous points, some of the major barriers for Future Internet deployment are understood, well known and debated. One example is the lack of demonstrable business impact evidence for the emerging Future Internet. These barriers are recognised within EC research frameworks (e.g. Horizon 2020) where work-packages and papers are frequently required within projects specifically looking at the development, commercialisation, exploitation and business case issues following piloting and real life demonstration processes. This is a formalisation and continuation of a practice position developed by the EC under FP7, the framework programme before Horizon 2020 (FP8). It is hard to find evidence of any of these papers gaining general or wide business acceptance as the basis of a general business case and this lack of evidence may be seen as a potential negative for further activity without public funding.

Such support and substantiation of the potential business cases is needed to support possible future investment decisions in the field and thereby it's general commercialisation or general and coordinated public sector support. Also, it seems that there is an emerging picture of a quite uneven technical maturity of the developed and developing components, indicating another relevant barrier to adoption/exploitation. However, this could be a quite normal characteristic of multiple research results. Wolf (1986, p10) describes the need for 'methods that will integrate results from existing studies to reveal patterns of relatively invariant underlying relations and causalities, the establishment of which will establish general principles.' Here, however, it could perhaps have been expected to have reached a higher level of alignment in view of the huge effort devoted to technical development within the various projects/initiatives. Current models of innovation fully accommodate a period of divergent technical maturity before radical technical innovation occurs. The outstanding question here is whether we are in that period or whether we are not moving in the right direction, or adequately integrating activity for such radical innovation.

Therefore, although the general level of research in this area is good, it is substantively of a disjointed technical nature. Taking myriad current positions into account, it could be argued that there is an emerging additional requirement

(gap or hole in the whole) of relating such technical development to impact and adoption issues in business and other organisations, which in turn may support its more general commercialisation and adoption investment decisions. For the purpose of this project the research will therefore focus on this gap area, with a subsequent attempt to interpret a model of understanding of innovation at an EU level. The model also requires some exploration and consideration of the innovation of collaboration. It seems that innovation has become a primary force driving the growth and performance of organisations. However, Barsh et al (2008) research identifies 'a wide gap between the aspirations of executives to innovate and their ability to execute…….executives who focus on stimulating and supporting innovation ……. can promote and sustain it with the current talent and resources—and more effectively than they could by using other incentives.'

Barsh (2008) also found that 'since new ideas seem to spur more new ideas, networks can generate a cycle of innovation' - a type of open innovation cycle. Indeed innovation itself ranges across product to process and physical to intangible, as well as market and technical uncertainty. This has been shown in presentations given by Eschenbächer[4] (2011) within the COIN project as follows:

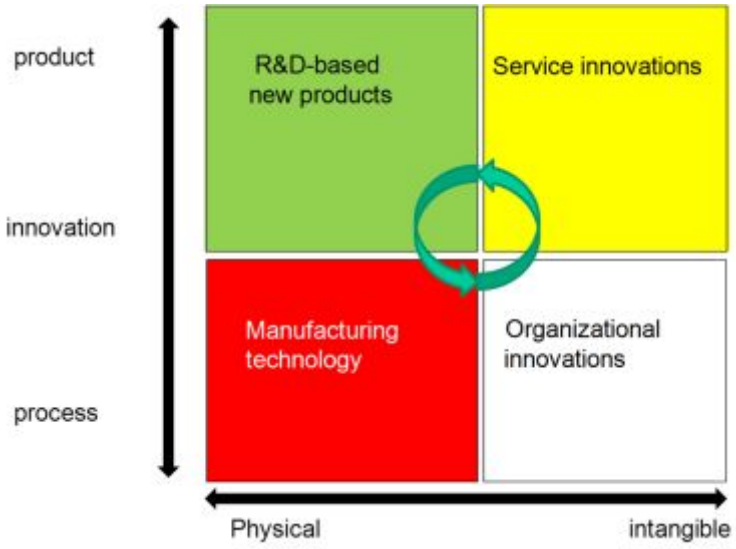


Figure 9: Innovation Cycle

[4] Dr Jens Eschenbächer (2011), Bremer Institute for Production and Logistics, Bremen University. COIN Project presentation on 4 May 2011.

Figure nine illustrates that innovation ranges across both product and process, and may relate to physical or intangible innovations.

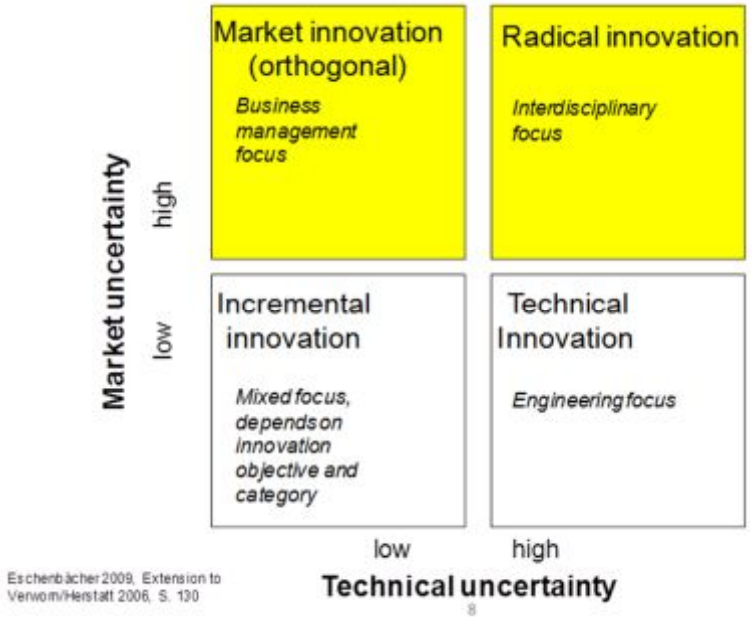


Figure 10: Innovation Uncertainty

Figure ten shows that innovation uncertainty can be shown as levels of market and technical uncertainty. Where both levels of uncertainty are low it results in incremental innovation, whereas when both measures are high it results in radical innovation.

This builds on the fundamentals of open innovation as described by Chesbrough (2003) in which he describes how a new paradigm, open innovation, 'strategically leverages internal and external sources of ideas and takes them to market through multiple paths'.

The following diagram shows Chesbrough's view on open innovation. As opposed to closed innovation, it involves the collaboration of many different partners and the research results can be transferred to other organisations as spin outs, spin offs and in other such directions.

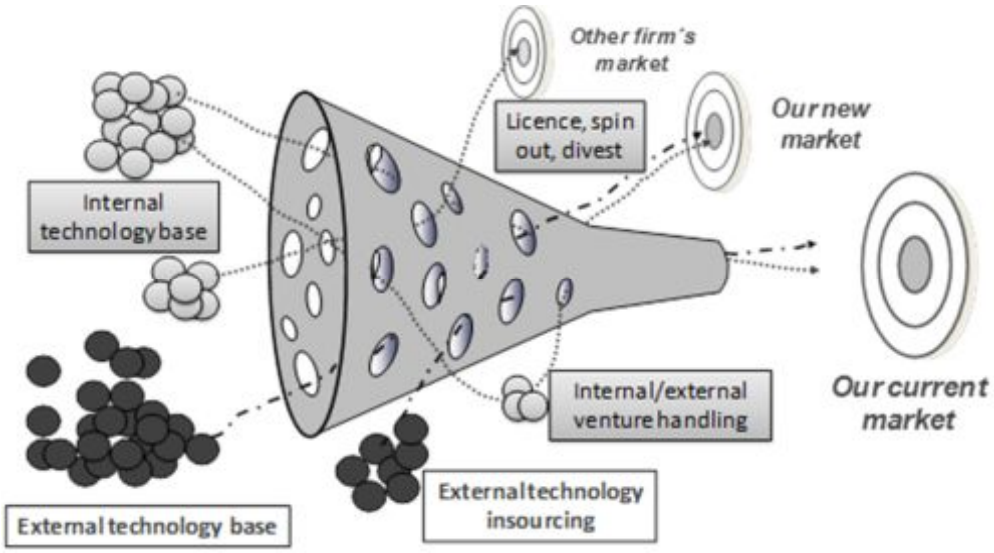


Figure 11: Chesbrough's Open Innovation Model

Figure eleven is adapted from Chesbrough (2006) and demonstrates why industry and researchers call for open innovation processes. As the filter process moves towards the target market innovations, contributors such as external technology insourcing can come into the process. Other ideas and new markets can also be spun off from the core process. It is a relatively fluid process bringing in what it needs and using what it finds where possible.

Shared knowledge could in many cases be crucial for the development of new products. Also, opportunities could be facilitated if a company decides to license or spin out knowledge. This could create opportunities for both new markets and new companies. As a general approach, it could be said that open innovation principles encourage collaboration regarding technology, patents, licenses and business models. Following the initial work by Chesbrough, the European Commission have tried to develop the principles of open innovation through a series of initiatives. This started with funding for 'Networks of Excellence' under their Framework Programme 6 (FP6). They describe a Network of Excellence as 'an instrument for strengthening excellence by tackling the fragmentation of European research, where the main deliverable is a durable structuring and shaping of the way that research is carried out on the topic of the network'. They tried to achieve this through supporting 'the durable integration of the research capacities of the participants'. The aim was to overcome the fragmentation of European research by:

■gathering the critical mass of resources

■gathering the expertise needed to provide European leadership

Also, Networks of Excellence had a requirement to ‘spread excellence beyond the boundaries of its partnership’.

The principles embraced still hold some favour in many research approaches although specific ‘Networks of Excellence’ have significantly disappeared since the funding for them ceased.

The next major incarnation was ‘Virtual Professional Communities’. These were described in the AMI Communities initiative (2008) as ‘a human-centric business entity, which has been designed to maximize the realization of knowledge workers and to best support innovation cycles within the related socio-economic environment. The VPC is an association of individuals identified by a specific knowledge scope with an explicit business orientation, aimed at generating value through members’ interaction, sharing and collaboration.’

They go on to describe that ‘the VPC business activities are performed by Virtual Teams (temporary aggregation of VPC members for addressing specific business opportunities). Those activities consists of professional knowledge services (consultancies, studies, etc.) typically exploiting the “frontier” knowledge developed by the community (original applications of state-of-the-art knowledge, first implementations of emerging innovative methodologies, etc.).

They illustrate this as follows:

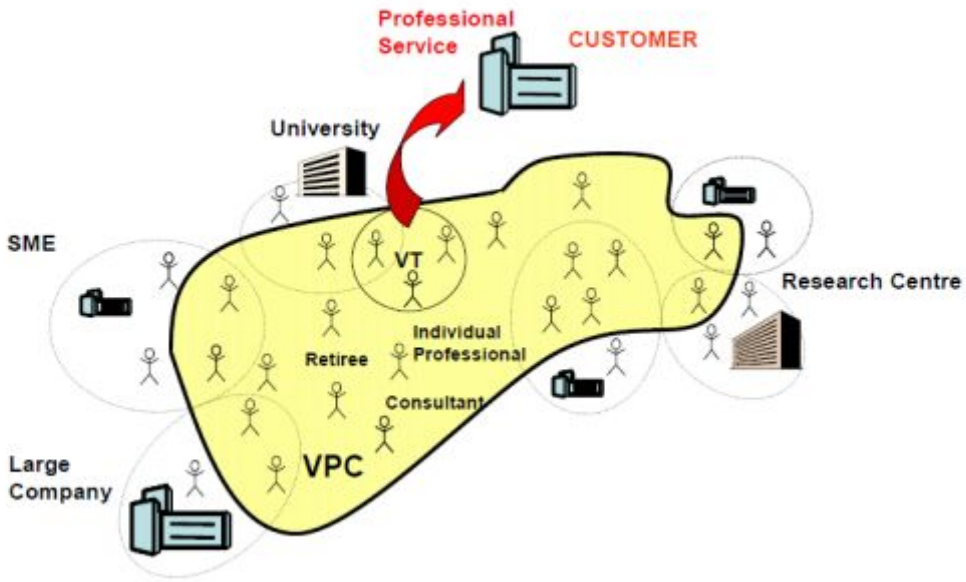


Figure 12: Virtual Professional Community

Figure twelve illustrates that a virtual professional community is made from many constituents. Companies, universities, retired interested parties along with many others can come together for a period to address particular challenges or opportunities.

Once again, although the principles remain with some increasing validity, the specifics and terminology appears to have anchored itself around high technology investigations, assessments and the like. In this context it is an appropriate method for the initial research in this project (see Methodology section).

The latest variation is ‘Living Labs’ which have been supported under the European Commission’s Framework programme 7 (FP7). The EC (ec.europa.eu 2913) describe Living Labs as ‘open innovation ecosystems in real-life settings in which user-driven innovation is fully integrated in the co-creative process of new services, products and societal infrastructures’. They further describe ‘the Living Labs model includes end-user participation from an early stage of the creative process of technology development. As a result, evaluating aspects such as social and economic implications of new technologies has become more accurate. So the needs of users are better listened to and fulfilled’.

It is too early to conclude on the progress of Living Labs to date, however they appear to be moving towards being trial beds for incremental innovation

particularly related to using technologies in new settings or in new combinations. Due to the user groups testing it often stops short of true ‘futures research’. The VPC approach remains most appropriate to this project.

7. Driving Innovation

The subject of future enterprises and innovation was considered within the COIN project. It was noted that it ‘is currently involving an intensive exchange of views, opinions and concepts in Europe and beyond. There are intensive debates on innovation processes and especially open innovation processes.’ In terms of innovations that promote a radical re-thinking of products, services and processes the question arose with regard to whether such innovations, due to their disruptive nature, can only be generated, nurtured, developed and deployed by either very large organisations within the walls of one company (Google, Microsoft, IBM and the likes), or by large collaborative networked organisations (CNOs). One main focus of this project is the collaborative network possibility offered generally by the Open Innovation approach, especially in the resulting post project collaboration, as espoused by Chesborough (2003) in his seminal book. According to Chesborough (2007), the main ideas of open innovation can be summed up in six points:

- Enterprises need to collaborate with capable and creative people from the inside and outside, because most expertise is scattered.

- Research is not locked in the single organisation. Collaboration partners work together by using IT technologies.

- Companies do not have to originate the research in order to profit from it. Time to market is not only depending on own developments. This is not refuting the vaunted time to market argument because the integration of other companies’ knowledge reduces the time to market.

- Building a better business model can sometimes be better than getting to market first. In other words the fast follower strategy as a business strategy can lead to more sustainable business models.

- The management of internal and external ideas is a key competence for every company.

- It is very beneficial if other companies work on the company's own innovation process. Additionally IPR from other companies can significantly improve the own business model.

Theoretical considerations on collaborative innovation are of course always subject to practical considerations. For example, opening up innovation business processes also carries some risks. There are difficult considerations on whether the risk of losing IPR might be sufficiently outweighed by the possibility of new and/or higher profits.

In this project innovation is considered in respect of futures research. Futures research was described by Berkhout (2007) as ‘the ability, the competence and the art of describing, explaining, predicting, exploring and interpreting future developments and its consequences, as the result of actions and decisions in the present’ Mendonça (2004) also suggests that ‘futures research focuses on changes and developments rather than on singular events’. van der Duin (2009) emphasises that ‘futures research is also a kind of art, which may give futures research a somewhat intangible flavour’ However they further emphasise that they ‘see futures research as an explicit and formal activity, which uses distinct methods, tools and processes’. Smith (2010) advises that to transform invention into innovation it requires the commercialisation of any invention. At a simple level he shows it as:

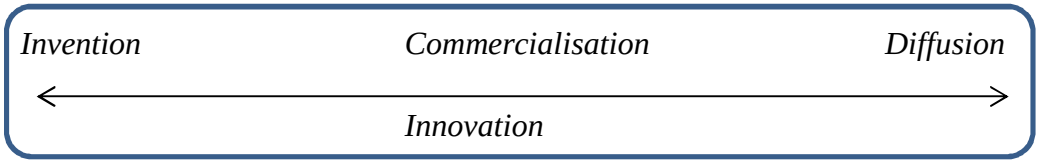


Figure 13: Invention v Innovation

Figure thirteen shows a process in which an invention becomes innovation through achieving commercialisation and diffusion into accepted use.

Additionally, Alegre (2004) determined that product innovating companies should have specific competitive priorities in their strategies. This extends to motivation for engagement, input and responses. They proposed that innovative companies follow a different set of competitive priorities compared to non-innovative companies because of the emphasis placed on flexibility and quality capabilities. Nelson (1993) identifies a distinct focus on both technology and pure science as core to future technology innovation. He also suggests engagement with the 'social institutions' that play a role in innovation are carefully considered. Such institutions include 'industrial and government research laboratories, research universities, and industrial policy agencies' Nelson (1993). These institutions are seen as providing a core of analyses of innovation approaches.

8. Driving and Influencing the Agenda

All of the issues highlighted, and many more, form a core of the problems and opportunities in driving forward progress in the Future Internet. However approaches cannot be simply viewed as isolated or purely technologically driven. Whether the agenda are in practice driven from a bottom up perspective by businesses, research organisations or communities of interest etc or from a top down perspective by supra national bodies such as the European Commission, or national bodies assumes a separation of the two types of approach. However, a third possibility exists of some sort of circularity or interaction between the two. Whilst the issues of funding and authority pertaining to agenda can be to some extent clearly identified, there is the potential for a more complicated interaction of leadership and in particular thought leadership cutting across practitioners and policymakers alike. If this cannot be attributed solely to either practitioners or policymakers, it may be best illustrated in a model of understanding. Leadership and thought leadership manifest themselves in the driver seen as influence.

Kelman (1958) identifies three broad varieties of influence as follows:

1. Compliance which is characterised by people appearing to agree with others whilst actually keep their dissenting opinions private
2. Identification which is where people are influenced by someone who is liked and respected, such as a famous celebrity

3. Internalization which occurs when people accept a belief or behaviour and agree both publicly and privately

Equally, Deutsch (1955) from a slightly different, yet related, perspective looked into the psychological needs in relation to influence that lead humans to conform to the expectations of others. The two identified and contrasting areas are:

1. Informational influence (or social proof), or in other words our need to be right. This involves an influence to accept information from another as evidence about reality. It occurs when people are uncertain, either because stimuli are intrinsically ambiguous, or there is social disagreement

In Kelman's typology informational influence leads to private acceptance

2. Normative influence, or in other words our need to be liked. This is an influence to conform to the positive expectations of others

In Kelman's typology normative influence leads to public compliance

Seiter (2010) looked further into influence, and considered it as persuasion. He described it as ‘a process aimed at changing a person's (or a group's) attitude or behaviour toward some event, idea, object, or other person(s)’. He went on to identify the two main routes to this as follows:

1. By appeal to reason. The reason can be through logic, logical argument, rhetoric, scientific evidence (proof) or scientific method
2. By appeal to emotion. The emotion can be affected by such influences as advertising, faith, presentation and imagination, propaganda, pity, seduction or tradition

The issue of thought leadership will be considered further in the discussion chapter where the issue of leadership skills in influence and persuasion will be applied.

The background to this study and some related key issues have now been considered, and the two tracks of approach, empirical and cognitive, have been outlined. The chapter has set a context for the study which will be developed further in the following chapters. Chapters four (Approach, Relationships & Methodology), five (Project Activity) and six (Project Findings) sequentially

move through the process of the empirical investigation and feed into the conclusions. Chapter seven (Discussion) adds a cognitive consideration of key impacting issues with some initial integration of the empirical investigation. This integration is taken further in chapter eight (Conclusion).

From the sections of this chapter it can be seen that there is a gap in the required knowledge at this point and the future needs will be considered from this angle within this study. The alternative view which could be considered is that a range of incremental progress is occurring, albeit at different levels of maturity and therefore it is an expected phase which should be left to its natural conclusion. There are two fundamental issues with the alternative view. The first is the strategic achievement of the Future Internet as envisaged by the EU which may or may not be achieved through a 'laissez faire' approach. This does not really hold logic as much of the incremental research and development is led and funded within framework funding programmes with the aim of achieving the strategic objective(s). The second is the major progress towards achieving the strategic objectives required by 2020 within the strategies of the European Union and its technology and research focussed bodies. The gap in knowledge and need for positive action to frame and progress towards such a meta-objective is the basis of this study. There are key soft skills and actions that need to be developed such as thought leadership, which will be considered further in the discussion chapter of this study.

Chapter 4: Approach, Relationships & Methodology

Having discussed the background, objectives and relevant literature to this project I will now consider the methodology employed to explore the research question.

In this section some of the key philosophies and issues affecting the methods of investigation and analysis will be considered. It follows a conceptual flow of thought and activity as follows:

- Ontology and Epistemology
- Mode of knowledge production
- Paradigm
- Methodology
- Methods
- Analysis and Ethics
- Risks

Ontology and Epistemology

In contemporary times, the dynamic expansion of information and communication technologies has resulted in research and development adopting an increasingly interdisciplinary approach.

This interdisciplinary approach inherently requires consideration of ontology; a description of the types of entities, and relations that constitute their respective domains of inquiry. In particular in this case the concept of applied ontology is relevant.

The Applied Ontology (2013) journal advised that 'Applied Ontology focuses on information content in its broadest sense. …… two broad kinds of content-based research activities are envisioned: ontological analysis and conceptual modelling. The former includes any attempt to investigate the nature and structure of a domain of interest using rigorous philosophical or logical tools; the latter concerns the cognitive and linguistic structures we use to model the world, as well as the various analysis tools and methodologies we adopt for

producing useful computational models, such as information systems schemes or knowledge structures.'

Progression beyond the empirical research moves into cognitive structures to develop a conceptual model of understanding. This represents progression from logical tools analysis into cognitive interpretation and understanding.

Ontology is related to epistemology as ontology is about what exists and is a view on the nature of reality and epistemology is about our perceived relationship with the knowledge we are discovering. The Stanford Encyclopaedia of Philosophy (2013) states that '…..broadly, epistemology is about issues having to do with the creation and dissemination of knowledge in particular areas of inquiry'.

This goes to the heart of knowledge production modes and has particular resonance here. This report brings into consideration the nature of knowledge production. At the centre of achieving a dynamic innovation agenda towards the Future Internet is the need to produce applied information which can be diffused into adoption and thereby meet the innovation objective. As Smith (2010) outlines, invention needs diffusion and adoption if it is to become innovation rather than merely invention. Therefore, if the agenda focus primarily produces more knowledge it does not necessarily progress innovation. However there is value in the production of knowledge in its own right as acknowledged by Grant (1996) who noted that a primary source of value is knowledge. Nevertheless, the assessment here is against a framework and objective of innovation.

The author's own position on the nature of reality and what exists has developed over a number of years with a clear distinction emerging between isolated knowledge and integrated knowledge with corresponding differences in their practical application. In many ways this view can be related to piecing together a jigsaw without a picture to work from. You hope all the parts are in there somewhere and each part is legitimate and valid in its own right. You then may try many combinations and sets of sub-combinations before a coherent overall picture starts to emerge. However as the overall picture emerges, you see something more than just the successful combination of the

pieces; you see the emergence of a new picture and an understanding, and appreciation, of the overall interpretation. This can be seen in high-tech development where for example testing interoperability of systems between two or three systems could be seen as a base for continual addition until you have widespread interoperability. In reality each system having to interact with each other makes the expansion potentially cumbersome and incapable of realistic expansion beyond a certain level. The problem (or opportunity) has a dimension beyond the component or test although the test has validity and potentially useful knowledge in itself. This type of appreciation and influence has driven the construction of the project activities here in having an empirical examination and in looking for a cognitive conceptual model from it; two clear yet related dimensions.

Mode of knowledge production

Modes of knowledge production have shifted in relation to needs of society and the interpretation of such needs by national and supranational bodies. Stehr (1994) argues that we are moving into the so-called 'knowledge-based economy' or 'knowledge society.' This theme is also developed by Graham (1998, quoted in Etzkowitz et al., 2000, p.329) who concludes that "... the knowledge industry in modern societies is no longer a minor affair run by an intellectual elite, an activity that might be considered by pragmatic leaders as expendable; it is a mammoth enterprise on a par with heavy industry, and just as necessary to the country in which it is situated." Gibbons (1994) characterised the progression in terms of a fundamental shift in the knowledge production system from 'Mode I' to 'Mode II', with Mode I being classic academic knowledge production, and with greater knowledge being produced in Mode II 'in the context of application.'

Gibbons (1994, p8) advises that 'in disciplinary science, peer review operates to channel individuals to work on problems judged to be central to the advance of the discipline. These problems are defined largely in terms of criteria which reflect the intellectual interests and preoccupations of the discipline and its gatekeepers.' This well reflects the initial interest group forums used in the initial stage of this research.

Gibbons (1994, p 5) further advises that ‘Unlike disciplinary science where results are communicated through institutional channels, in collaborative networks the results are communicated to those who have participated in the course of that participation and so, in a sense, the diffusion of the results is initially accomplished in the process of their production. Subsequent diffusion occurs primarily as the original practitioners move to new problem contexts rather than through reporting results in professional journals or at conferences. Even though problem contexts are transient, and problem solvers highly mobile, communication networks tend to persist and the knowledge contained in them is available to enter into further configurations’. ‘The modern high-tech challenge remains in ‘solving problems set by a sequence of application contexts’ (Gibbons 1994, p 9). Fundamentally this outlines a movement away form a linear model of wealth creation in which every actor has a single task feeding into the next task, to a more complex array of interconnection. This highlights the issue very well as the knowledge produced is of value in its own right, but it is the application contexts which elevate the dimensions and potential impacts of its use. This is exactly why this report takes an empirical approach towards an innovation agenda, and then attempts to add a cognitive context with a model of understanding.

Paradigm

When looking forward to events in the future, as opposed to analysing events that have already happened, there is a contrast and linkage between ontology and epistemology. In essence, ontology is about what is true whereas epistemology is more about methods of working out the truths. This of itself leads to a paradigm of choice. What exists today and current positions on thinking can be, in varying degrees, empirically examined. However, if the object is a future state defined in unspecific terms then much more of a cognitive interpretation of the vision needs to be applied. The problem is that grand visions are seldom realised in how they actually emerge, although the management of directional progress (the influences of making things happen) may be a key step in moving towards the goal. As previously described, you can have a methodology to piece together a jigsaw from its pieces even if you do not have a picture to start with. However, the picture that

emerges in completing the jigsaw may not be the one initially imagined. Therefore, in the examination phase, empirical examination and cognitive frame-working are examples of a paradigm choice, or taking different perspectives, of the same question, problem or opportunity.

Before considering the methodological stance it is necessary to understand the concept of paradigm as the methodological stance is in part determined by paradigms. University of Southampton (2013) advises that 'across disciplines (and within) there are varying views of what research is and how this relates to the kind of knowledge being developed. Paradigms guide how we make decisions and carry out research.' Guba (1990) tries to illustrate this by noting that 'lawyers, for example, will use an adversarial paradigm while selection committees will use a judgemental paradigm.'

University of Southampton (2013) further advises that 'a paradigm is simply a belief system (or theory) that guides the way we do things, or more formally establishes a set of practices. This can range from thought patterns to action. Disciplines tend to be governed by particular paradigms, such as':

•**Positivism** (e.g. experimental testing),
•**Post positivism** (i.e. a view that we need context and that context free experimental design is insufficient)
•**Critical theory** (e.g. ideas in relation to an ideology - knowledge is not value free and bias should be articulated) and
•**Constructivism** (i.e. each individual constructs his/her own reality so there are multiple interpretations. This is sometimes referred to as interpretivism)

Figure 14: Paradigms

Figure fourteen lists four key types of perspective, or paradigm approaches.

This understanding of paradigms has an inherent linkage to research approach and research methods. Dash (1993) illustrates this with the following extract from his original table:

Research paradigms	Research approach	Research methods
Positivism	Quantitative	Surveys: longitudinal, cross-sectional, correlational; experimental, and quasi-experimental and ex-post facto research
Anti-positivism	Qualitative	Biographical; Phenomenological; Ethnographical; case study
Critical theory	Critical and action-oriented	Ideology critique; action research

Figure 15: Paradigms & Research

The paradigm used in the empirical examination within this research is fundamentally post-positivism or anti-positivism as it is inherently qualitative (opinion, views and perspectives) and context relevant. However, in then taking thinking forward into an initial model of understanding the cognitive frame-working is more related to critical theory and constructivism as it then is one of multiple potential interpretations and is aimed at being action-oriented.

Methodology

Before looking at the project methodology in more detail, the methodological stance should be appreciated. This is illustrated here by mapping key project activities to the methodological stance framework as stated by Fisher (2007). Overall, the empirical investigation within this project can be seen as realist

research as the conclusion of this activity is aimed at identifying and evaluating options for action (an innovation agenda). However, the key component activities seem naturally to fall under different types of research. Probably the most contentious is considering the literature review as 'Ivory Tower' although the state of the art is currently mainly theoretical as the Future Internet is not currently achieved. The mapping can be shown as follows:

Type of research	Understanding & action	Characteristics
Ivory Tower	Knowledge is valuable in itself; it does not necessarily lead to action	Antiquarianism Intellectual elegance
Realist research	**The research identifies and evaluates options for action**	**Structured variables** **Reductionism** **Cause and effect** **Statistical analysis**
Interpretive ethnographic research	Understanding provides a context for thinking about action but does not specify it	Dialogic structures Participant observation Explores meaning Deals with complexity
Action research	**Changing our knowledge and understanding constitutes action**	**Gnosis and reflection** **Small scale projects** **Deals with personal relationships and values**
Critical social research	Changing the mass's knowledge of their position to bring about social change	Radical action Raising mass consciousness

Figure 16: Methodological Stance

The discussion and initial model of understanding within this report moves the later stages more into activities similar to those found in action research as it is about changing our knowledge and understanding of a current position to bring about technological and thereby social change. However, the project overall fits into what Gray (2009) describes as a form of 'real world' research comprising collaboration between the researcher and professional practitioners. It would be helpful here to also consider the issue of framing. Kaplan (2008) says that 'frames

are the means by which managers make sense of ambiguous information from their environments'. Walsh (1995) concludes that research in managerial cognition has suggested that cognitive frames are the means by which managers sort through unknown or conflicting ambiguities. The particular methodological stance adopted here draws upon the notions of actions research but does not fully play out the action research cycle as implementation and review at a supranational level are beyond the scope of this research.

A further term which will be referred to numerous times in this report is 'futures research.' This represents work on possible, probable and desirable futures and involves both interdisciplinary and disciplinary studies on future developments in society (European Journal of Futures Research, 2014). It is also described as futures-oriented research and thinking based on the evolving knowledge base of Futures Studies (Journal of Futures Studies, 2014). Its purpose includes a role to assist decision-makers and strategic planners in initiating and managing medium to long-term change (Institute for Futures Research, 2014) where they argue that structured progress into the longer term future is best based on a process of realistically envisioning and understanding strengths and the nature of obstacles to the desired success, or goal(s). They also advise that the creation of a desired future also requires creative leadership, the cooperation of all stake-holders and strategic action. Envisioning and understanding the strengths fits well with the empirical part of this research, and the cooperation of all stake-holders and strategic action fits well with the cognitive frame-working part of this report with the development of an initial model of understanding. Remeyni (2004, p76) shows a differentiation of futures research from forecasting as futures research has a forward orientation and is looking ahead, as opposed to backwards, adding that it 'is not as mathematical as forecasting.' This as much as anything identifies this research as being in that genre.

Research Methods

The creation of a model of understanding will involve the consideration of impacts associated with all the stages of the process life from inception to completion (it's lifecycles), or at least a stage of completion. When this is

added to the context of future strategy it involves a range of dimensions and approaches. It may well therefore be beneficial to use an appropriate range of research methods (mixed research methods). This would allow for greater scope to capture and understand findings, and better correlation of the effects and impacts emerging from such results.

The ontological choice of position in undertaking the study and conceptual modelling previously referred to fits extremely well with the approach taken in this research and report. An empirical research approach is taken to investigate whether a dynamic research or innovation agenda can be established from a practitioner base (a bottom up approach). This is undertaken through online focus groups and subsequently with a structured questionnaire. A summary of the data collection stages is as follows:

Data Collection Stages

Stage 1		
Practitioner Group Forums	Innovation Agenda	Identify broad areas for more radical FI innovation agenda; then
Practitioner Group Forums	Innovation Agenda	Identify structural areas for next stage development; then
Practitioner Group Forums	Innovation Agenda	Identify short / med term next steps
Practitioner Group Structured Questionnaire	Innovation Agenda	Rate for achievability & impact; then
Practitioner Group Structured Questionnaire	Innovation Agenda	Establish clear priority from each broad area
Stage 2……		

Stage 2		
Practitioner Group Forums	Concepts and Model/Framework	Establish influences in achieving strategic supranational goals; then
Practitioner Group Forums	Concepts and Model/Framework	Transposed to powers of influence - areas of activity, practice or excellence

The practitioner focus groups are made up of interested individuals; those with an understanding of the Future internet issues. This has inherent bias and balance issues which will be dealt with later in this overall section.

This project includes qualitative and quantitative methods, questionnaires and focus groups/forums. On mixing methods Mason (2006) says that ‘mixing methods has come to be seen as a good thing’. This is largely due to the range, progression and correlation of emerging evidence which has the potential to provide a more complete picture. She goes on to say that ‘researchers engaged in mixed method research need to have a good sense of the logic and purpose of their approach and of what they are trying to achieve, because this must ultimately underpin their practical strategy not only for choosing and deploying a particular mix of methods, but crucially also for linking their data analytically. Mixing methods is typically used to add breadth or depth to analysis.’ Mason highlights one use as being to ‘ask questions about connecting parts, segments or layers of a social whole’ but concludes that this requires an interactive logic. The good sense of the logic and purpose of approach along with application of an interactive logic may well be necessary as different parts of mixed methods research are potentially coming from very different perspectives on the nature of the world. Therefore these different perspectives could at times be considered as inconsistent without the application of interactive logic within the purpose of approach. The main method of avoiding this issue within this project is through keeping a clear perspective of approach initially on the creation of an innovation agenda from an empirical investigation, and then distinct from it (although related to it) the development of an initial cognitive framework as a model of understanding.

Although these issues are inherently related, their parallel and differentiated approaches are specifically aimed at addressing this potential issue.

The use of mixed research methods is congruent with a Triple Helix type of approach. Shinn (2002) says that 'the Triple Helix approach 'identifies the birth of a supplementary layer of 'knowledge development', a layer in which specific groups inside academia, enterprise and the government meet in order to address new problems arising in a deeply changing economic, institutional and intellectual world. The Triple Helix is intended to be a sociological expression of what has become an increasingly knowledge-based social order'. He goes on to consider 'endless transition' – first noted by Etzkowitz and Leydesdorff – and says 'This is an important addition. An emphasis on repeated co-evolutions attenuates the focus on a single landmark. We no longer have to search for 'a' single macro-entity which embodies a dramatic three-strand confluence. The model now becomes compatible with much smaller changes and co-evolutions occurring inside one of the three strands. People interested in the Triple Helix approach are now free to search for small variations and variants (endless transitions on a micro-level).

This is further explained by Svensson (2009) as Mode III research. This is distinct from mode I and mode II research as described by Gibbons (1994) and Nowotny (2001) and previously described in this chapter. Svensson says that Mode III research 'tries to combine traditional scientific values (like theoretical and general knowledge produced in a discipline based universities) with innovative and developmental ambition, which demands flexibility, closeness and mutual relationships with the participants. To explain how Mode III can be carried out Svensson uses the term interactive research.

Caswill (2000) gives a general definition; that 'interactive research means a research approach where researchers, funding agencies and 'user groups' interact throughout the entire research process, including the definition of the research agenda, project selection, project execution and the application of research insights. When considering this, Svensson says 'Interactive research could be seen as a form of joint knowledge formation between practitioners and researchers'.

There are two additional methods which relate to the later stage of this work on cognitive theory development and its interaction with the empirical practitioner focused research. These will be detailed under the sub-heading of Methods within chapter 7.

Initial stage – Gathering perspective on future issues from virtual communities

Initially the activity focus for this project was collecting data (see summary chart in sub-section above) from interest groups and online forums – Virtual Professional Communities (VPCs) (see literature review). These VPCs represented a variety of different interests including Future Internet, multi-sector and multi-functional management, technology businesses, industry, users, research and development organisations, government representatives and leading professors. The purpose of this stage was to engage with target groups to generate and collate knowledge and information in order to identify future programme issues and impacts related to the Future Internet and interoperability. The initial stage was designed to lead into a subsequent stage of exploration through the use of a questionnaire which has ethical implications which are considered in the subsequent sub-section of Analysis and Ethics.

In constructing the questionnaire it is considered that clear quantitative answers would allow translation into the clearest prioritisation of agenda objectives. It is initially considered that quantitative data will generally involve questions which can be numerically noted. This will usually be a Yes/No option or, with more relevance to this activity, an importance ranking (5 – 1 scale, with 5 being high and 1 being low). Although this gives some degree of quantitative interpretation, it cannot be said to be strictly quantitative. In completing the questionnaire, participants will inherently be making, at least to some degree, their own qualitative judgements of the issues relative to the numeric scale. Therefore, although it can be indicative and with strong clear results it can be highly indicative, it should not be seen as quantitatively proven. This is especially the case where results are close.

If the forums work in a positive and constructive manner it provides the possibility of engaging with many emerging ideas and concepts from myriad leading academics, commercial developers and others. Subsequent filtering and contextualising the contributions will form a process of 'moulding' them into focussed issues for the future. The transposing of these issues into a questionnaire will then allow the identified 'beyond the state of the art' ideas to be considered in the contexts of achievability and impacts.

The achievement of this depends on data collection. The University of Wisconsin (2013) advises that 'qualitative methods can be used to improve the quality of survey-based quantitative evaluations by helping generate evaluation hypothesis; strengthening the design of survey questionnaires and expanding or clarifying quantitative evaluation findings.' This closely represents the basis of data collection here with the interest groups and forums providing qualitative input around given themes and these inputs being clustered and refined through a number of levels. The clustering then allows a good degree of quantitative interpretation and forms the basis of the more quantitatively driven questionnaire.

So that information from the interest groups/forums and the questionnaire can be shared and used, it is necessary to code each participant in order to preserve the confirmed confidentiality (see further descriptions of confirmed confidentiality later). Therefore, any individual data shared beyond the researcher will always be against individual codes as opposed to any personal information which may allow individual identification.

Analysis and Ethics

During the questionnaire activity, the ethical issue of confidentiality will need to remain in focus. It is felt to be important that a covering letter be issued to confirm that this is genuine research in order to alleviate any perception that it is any sort of test of knowledge. A covering note will be issued with all questionnaires sent out which as well as providing an opportunity to encourage and entice recipients to respond, will cover such issues as:

- Explaining the use of the questionnaire

o Confirmation that no individually identifiable information would be passed beyond the researcher

It is important at this stage to outline the analysis methods that will be applied to clustering and filtering of the data gathered. In this context it will be text as data and application of thematic analysis with 'open coding' or in other words no pre-definition of the issues. Gibson (2006) described thematic analysis as "an approach to dealing with data that involves the creation and application of 'codes' to data. The 'data' being analysed might take any number of forms – an interview transcript, field notes ….. video footage. Also, there is a clear link between this type of analysis and Grounded Theory, as the latter clearly lays out a framework for carrying out this type of code-related analysis. 'Coding' refers to the creation of categories in relation to data; the grouping together of different instances of datum under an umbrella term that can enable them to be regarded as 'of the same type'. Decisions about what counts as a category come from all kinds of 'places' – theory, literature, research experience, the data itself."

On the coding Gibson (2006) further stated that "understanding the general principles of coding is pretty straightforward; the idea is to develop themes and to work out how they relate to each other within your data. While the 'concept' of thematic coding may be straightforward it is a lot less easy to do in practice. It is important to be sure that you are applying the codes in the same way every time you use them.

In some ways this inherently involves the researcher in the formation of the research results which is potentially a dilemma. It raises a subtle question of whether the researcher is influencing it or clarifying it, which at one level the difference is clear any yet at another level can be little more than a subtle difference. Care and reflection will be applied to ensure as much as possible that the clustering/coding is kept to a high level of consistency with clarity and focus. This issue may be a consequence of Futures type research in the real world. Gray (2009) says that "The real world, however, can also include ….. networks such as community groups, educationalists, professional associations, management associations or trades unions. Increasingly it could also include virtual communities where people communicate with each other through the Internet. In

other words, the real world comprises any setting where human beings come together for communication, relationships or discourse."

On the issue of influence, there could be some potential insider worker/researcher bias on the research interpretation and conclusions. Care is necessary to avoid or minimise this potential. Donaldson (2002) set out that 'self-report and mono-method bias often threaten the validity of research conducted in business settings and thus hinder the development of theories of organizational behaviour.' They also argue that traditional approaches for controlling self-report bias do not adequately prevent the problem. The advice of Denscombe (2004) is 'to reflect openly and explicitly when carrying out the tasks involved in the study.' Mead (1973) had a way of reaching conclusions from observed evidence, which she called "disciplined subjectivity," being a suspension of preconceptions in order to listen and learn.

When translating the findings into recommendations it will be beneficial to reflect on and consider any potential insider worker/researcher bias. This potential micro-level bias is seen mainly in this project in the clustering/ filtering and related interpretation action. Although consideration and reflection will be applied to minimise potential bias, its main benefit will be in grouping, or coding, similar terminologies to provide clarity and focus. However, in view of the strength and expertise of participants any questions or views put forward which are unclear will be interrogated and critically questioned within the forums.

It is highly possible that a high proportion of contributions will be from a disproportionately technical set of responders and thereby getting a biased result. The likely responders in target organisations may well be early adopters of such emerging technology infrastructures and products or services, and are likely to be somewhat technically biased themselves. This is in line with the approach taken generally within 'Futures Research' where the subject matter is such that you need to look to 'experts' to develop the ideas further. This has been referred to as the inherent constraints that make reliance on expert judgement an essential part of futures research (Helmer 1977). The knowledge necessary to progress the subject matter of this project is of a similar nature.

Age may also be an issue, as when younger people become future technology interested and adopters they tend to use and see technology in ways which have not been expected. Horrigan (2007) completed some research which cuts across this in which he describes what he calls 'Omnivores.' Having the youngest median age of his groupings he describes them as 'having the most information, gadgets and services, which they use voraciously to participate in cyberspace and express themselves online.' This is probably a separate area for substantial research in its own right into developing engagement, participation and usage in the youth and student fraternities.

Where the contributions or answers are individually qualitative they are to be interpreted and clustered into key issues thus allowing a degree of quantitative assessment.

Analysis of the results of the forum clustering and of the questionnaire was compiled step-by-step into a spread-sheet. To try to ensure accuracy, each entry has been double-checked on a different day. In addition, to validate responses, a small number of responders were randomly selected and contacted. Wherever possible these consolidated responses have been translated into graphs.

Another consideration which should be noted is in relation to the understanding of technical language and any inherent bias therein. The nature of this research is inherently futures research. In this case it is impractical to go out to a balanced or representative section of the community as a whole as there is simply not a sufficient level of required knowledge on the subject matter generally to allow meaningful comprehension, understanding, interpretation, opinions and application in relation to the forums or questionnaire. Therefore, participants are predominantly, if not exclusively, practitioners in varying degrees actively involved in the Future Internet research environment, be they also based in industrial, academic or political arenas. The majority will have extended periods of involvement within the relevant research frameworks and related forums and within these there has emerged the adoption of a relatively common vocabulary and understanding of the meaning of such vocabulary. The two things that fundamentally flow from this are, firstly, that the results of the forums and questionnaire only represent the views of practitioners in the Future Internet

research environment. This is however consistent with the aims of the research which in the first part is to see if practitioners can establish the issues for an innovation agenda. Secondly, the established vocabulary and understandings, although not general understood in wider environments, will have a high degree of commonality of meaning and use within the participating groups.

As four participant groups are used in this research (further detailed in the project activity section) there is the potential of overlapping participation; the same people being members of more than one group. Should such individuals be strong contributors, injecting the same points strongly across more than one group, it could distort the findings in terms of the issues raised and the quantum of positive or negative inputs. If this represents a significant level of activity then a process of de-duplication may have to be considered in the interpretation.

There are wider ethical issues which although beyond the direct scope of this project nevertheless relate to it. Perhaps the biggest one here is the future use, both intended and unintended, of innovation. This can be illustrated by the development of nuclear fusion technology. If this is used to provide affordable power for the developing world then it can be argued that it is a good thing although issues of risk and longer term decommissioning remain. However, if the technology is used to create nuclear missiles then it can be argued that it is a bad thing although the argument that it has kept peace between the major powers, or potentially contributed to that, cannot be wholly ignored (Jervis 1988). In this respect technical innovations and applications are effectively 'agnostic' (Bijker 2010) and it is the use or interpretation of the use which creates the ethical issues. Equally, with the Future Internet, it could be seen as a great enabler of information, services and processes for all in the world (individuals, organisations and public bodies etc). Equally it could be seen or used as demanding global uniformity, creating effective global monopolies and allowing third party tracking and monitoring of activities and communications. Either way, the technology is substantively the same with the ethical issues focussed on how it is used, by whom and for what purpose (Carroll 2004).

When the Chinese administration required Google to restrict its content in China, Google eventually accepted this. One side of the question is whether this is a

morally and ethically acceptable position. However, in a ‘free’ society is not Google perfectly at liberty to restrict its service in order to gain a dominant position in one of the world’s largest and fastest growing countries? Is it just capitalist and commercial sense? There is no one complete or wholly acceptable answer.

There is also a key ethical issue in relation to agenda setting. A key question here is of who sets the agendas of interest groups, leaders, and policy makers? As Schattschneider (1975) said ‘The definition of the alternatives is the supreme instrument of power” which would at least in principle mean that control over the agenda means control over the outcomes. Agenda setting is therefore not only about getting certain things on the agenda, it is also about keeping selected things off of it. It can be seen as the power of telling us what to think about, which has particular issues where it is a publically led and funded agenda. Perhaps a counter to that would be support for independent thought leadership in technology, academia and other areas. However, priming in politics, or politically driven institutions, may have profound effects. As Krosnick (1993) put it ‘media attention to the Persian Gulf war primes positive evaluation of Bush Presidency which reversed when focus was shifted back to the economy’. Krosnick went on to describe a tendency to construct issues in terms of opposing rights / moral principles, as opposed to economics or pragmatics.

Carusi (2006) outlines that ‘significant trust-related concerns have been raised by potential users of e-science tools with respect to their confidence in both the reliability of the ethic-related performance and security of the infrastructure, and trust in the work practices of potential collaborators in relation to ethical issues such as confidentiality and proper use of data and resources.’

She goes on to describe that ethical and trust-related issues are likely to arise in the collaborative use of e-science tools and into questions of how issues of distributed access, disclosure and anonymity in large scale data repositories are to be managed. Key to this will be to understand how potential users of e-science technologies orient to ethical and trust issues in the course of their work -- that is, how ethical practices and values are themselves distributed in e-science. It is already clear that collaborations, data sharing and data re-use supported by e-

science are creating a number of grey areas and new practices where it is not clear what the ethical implications for researchers and their subjects are going to be.

Serious ethical issues of fairness and responsibility across individuals, nations and generations will undoubtedly persist.

Risks

The main interpretational risk to the project is substantially from two sources:

- Technical responses not being achieved to a sufficient level to develop into proposal summaries.
- Not being able to sufficiently create, understand or identify the impact, based on the response results, as:
    - Group networks too heterogeneous by nature and business
    - Group individuals not at a level/positioning commensurate with early engagement/adoption
    - Too many proprietary and status interests
    - FI models not yet conceptually mature in the activity of selected group(s)

These remain unknowns at the time of committing to the project methodologies. However, this project design has tried to mitigate these risks primarily by focussing on appropriately knowledgeable and experienced groups from diverse organisations where future models are commonly used. Mitigation against the noted risks is not, and probably cannot be, complete.

Chapter 5: Project Activity

Having considered the methodologies of this project I will now articulate the project activity, in turn looking at its planning and then operation.

Setting-up the Groups

Initial attempts were made to use existing established external groups but this ran into many problems. In wider groups there was a lack of focus with many other issues being fed into the forums, effectively pushing down focus on existing subjects. Many use the more general forums to promote their services, to try seeking education on the subjects and frequently threads become diverted. There were problems in understanding who was participating and in prompting responses. The control of feeding structured questions into forums was rather 'hit and miss'. These are examples of the issues faced with further ones continuing to emerge. Overall the issues became insoluble within the timeframe required. This situation was discussed with some leading academics and researchers prior to the International Concurrent Enterprising Conference (ICE) in summer 2011. Proposed help in establishing the required groups (VPCs) was forthcoming from a number of individuals, with the vanguard being Kulwant Pawar, Professor of Operations Management, Nottingham University Business School, Bernhard Katzy, Professor of Innovation and Technology Management, Munich BV and Leiden Universities, and Roberto Santoro, CEO of the European Society of Concurrent Engineering and a President within the European Network of Living Labs. Prof Katzy offered and made a number of relevant introductions, while Prof Pawar and Mr Santoro promoted participation in my research within the sessions of the ICE Conference. The ICE Conference delivers presentations of the latest findings from research and sharing practical cases from industry on innovation by collaboration and entrepreneurial partnerships. Strong supporters of this are many organisations active in the Future Internet community.

Prof Pawar was especially helpful in this respect. An example of the slide used to raise the opportunity during the ICE Conference sessions is shown in Appendix 4. This resulted in many responses from those interested in and with knowledge of the Future Internet. From this a virtual group was created which was termed the

FI Cluster group (or FIC group), this being distinct from any EU sponsored FI clustering or grouping.

Additionally, another virtual group was formed, or re-formed, from the COIN project community (see background section). This group had been created previously by the researcher and used for research into innovative uses of 'V²oIP'-voice and video over internet protocols- technology. A good response was achieved when this research issue was suggested. This group was termed the COIN group. However it should be noted that this is distinct from any formal grouping of the EC COIN project.

Two further former research collaboration partners of the researcher were approached as they were both known to have virtual forum group networks generally in this area of research and development. The two organisations of Advanced Technology Global and Innovation Europe both agreed to make available their groups for the purpose of this research. These groups were termed the ATG group and the IE group respectively.

This gives the four groups used in this project:

1. ATG
2. IE
3. COIN
4. FIC

A breakdown of these groups, including participant numbers and locations, is given early in the Project Findings section of this report.

The virtual professional communities used here represent a sample (sub-set) of the 'population parameter' applicable to the Future Internet development. Keller (2009) advises that there are many methods of sampling such as representative, random, stratified random, cluster and many more. He concludes (Keller 2009, p159) that 'statistical inference permits us to draw conclusions about a population parameter based on a sample that is quite small in comparison to the size of the population.'

Buglear (2005) talks about the key factors in determining a sampling approach with such factors including the availability of participants in the population parameter, the location of participants and the degree of necessary self-selection. He identifies that where there are highly restrictive requirements for example in relation to technical competence or understanding there may be a need to use judgemental sampling or self-selecting sampling. However he points out that these two methods are 'almost invariably prone to bias.' The issue of bias is further considered later within this report.

Babbie (2001) advises that a judgmental or purposive sample is selected 'based on knowledge of a population and the purpose of the study. The subjects are selected because of some characteristic.' The example he uses is where a researcher is interested in learning more about students at the top of their class. In this scenario the researcher is going to sample students falling into the 'top of the class' category. In effect they are purposively selected as they meet a certain characteristic.

Purposive sampling can be very useful for situations where sampling for proportionality is not the main concern. This is particularly appropriate here where an 'experts view' of the future is the purpose. The VPC (virtual professional community) groups have been selected or created on a purposive basis and participation within them is on a self-selective basis.

Operational Governance

The externally hosted (IT hosted) groups of Advanced Technology Global and Innovation Europe both agreed to the confidentiality within the 'Notice' which was highlighted at the beginning of each discussion thread. The instigator and moderator of these threads was the researcher. Similarly, the other groups of COIN and FIC were hosted from an IT perspective by the researcher, or more precisely his personal services company. The 'Notice' was equally prominently displayed at start of each thread in the researcher hosted groups.

This approach to confidentiality was discussed in some length with the Chief Executive of Advanced Technology Global who is an experienced international

lawyer on intellectual property rights and it was considered as appropriate and adequate. That two groups were hosted externally from the researcher did not breach the confidentiality of the 'Notice' as the individuals with access to the forums in these organisations were members of the forums in any event and so within the terms of the 'Notice' had access to it anyway. It was also noted that contributions were voluntary and were noted up-front as open to the group. What clearly was not allowed was for the researcher to share any personal information across the different groups or in any way wider. However the non-personally identifiable outcomes and conclusions could be used, which fully met the needs of this research project.

As a result of the different network being used, there was no apparent duplication of participation across the groups.

A practical approach was adopted in order to prompt and progress the debates within the groups by e-mailing and/or mobile texting prompts to the members at the start of a discussion thread or at a point of significance. For the researcher hosted groups there was no problem as the members had communicated for this by e-mail in the first instance. However, for the externally hosted groups these messages had to be delivered by the host so as not to risk breaching any Data Protection provisions in the UK or elsewhere.

Within the European Union, the 'Principles of Application of Data Privacy' provide that data shall be collected and recorded for specific, explicit and legitimate purposes and the use of, and reason for, processing operations shall occur in a way that is not inconsistent with said purposes. Titles of example non-UK data protection 'rule-sets' are noted in appendix 10. The approach adopted was considered consistent with the key provisions and intentions of such legislation.

The Debate Questioning

The issue of confidentiality was addressed at the start of each discussion thread in each forum where a notice (as shown in Appendix 15) was posted.

With the infrastructure and practicalities of approach in place the initiation, prompting and progressing of the debates commenced. An open question was asked to each group being ‘What key broad areas are barriers to Future Internet (FI) adoption?’. From this the debates were progressed and prompted until a reasonable conclusion could be collated using a clustering approach to subjects, issues & semantics in order to collate and quantify interest shown in the identified issues. For example, phrases such as extended home living, continued own residence and ambient assisted living are considered as the same issue for the purposes of issue identification and focus at this initial level. Technically, the issue is one of semantic similarity and reconciliation.

The idea of semantic similarity can be seen in a well-known extract from the UK comedy television show of ‘Monty Python’ which goes as follows:

> This parrot is no more!
>
> It has ceased to be!
>
> It's expired and gone to meet its maker!
>
> This is a late parrot!
>
> This. . . is an ex-parrot!

While there was (and is) strong comedy in the way this was originally delivered, it does effectively make the point that in each of the five lines the words are different, although the point of the words and meaning amount to the same thing. Alberink (2003) advises that ‘clustering techniques operate on properties, relations and numerical properties of information’. As Firth (1957) put it ‘you shall know a word by the company it keeps’. Any meaningful ambiguities in the clustering exercises were additionally evaluated and verified separately by key experts within Advanced Technology Global and Innovation Europe to ensure an acceptable degree of professional interpretation within this clustering approach.

From the initial question the debates were progressed and encouraged, and relevant clarifications sought. Three clear areas emerged (see Project Findings section) at which point a further question was introduced for each of the three areas being, in each particular area ‘what are the key structural knowledge areas

for next stage development'? This caused lively debate with contributors substantially expressing clear views as to the next stage issues for development. The lively nature of the debate relates mainly to the emotion and vigour with which views were expressed, although the volume of responses also increased by approximately 25% to nearly 24 contributions per week. Over time this was collated and clustered to the point of a clear leader in each area. This created the themes for the next stage of the debate. A breakdown of participant and response numbers is given in the Project Findings section of this report.

Within the forums the question relating to each theme was asked 'what are the key areas for short / med term next steps'? Again there was strong debate with clear positions being taken. Quite specific potential areas of focus emerged at a level consistent with the project aims of EU research agenda items, still allowing for further detailed development on technical and other specifics in post project collaborative research proposals. The EU/EC often refers to areas where action can be delivered as part of their calls for proposals. The levels reached here are consistent with the level of the areas identified. These identified areas were the potential innovation agenda focus items.

All of the forum findings are detailed in the following 'Project Findings' section.

The Questionnaire

Having identified a number of key potential innovation agenda focus items on each main theme with an acceptable level of clarity, the next key phase was the translation of these key areas into a questionnaire in order to assess two attributes of each identified issue. The first attribute is that of achievability, or in other words the capability of existing or happening, or being true. The second attribute is that of impact, or in other words, a marked positive effect or influence on the intended recipient audience or within society. The assessment of these attributes by the research participants is their (educated and experienced) perception. This recognises the currency of their technical and expert knowledge in the general area of the Future Internet.

During the questionnaire creation period, the ethical issue of confidentiality remained in focus. It was important that a covering letter be issued to confirm that this is genuine research and not any sort of test of knowledge. A covering note was issued with all questionnaires sent out which, as well as providing an opportunity to encourage and entice recipients to respond, covered such issues as:

- Explaining the use of the questionnaire
- Confirmation that no individually identifiable information would be passed beyond the researcher

The following protocols were observed:

- A copy of a covering note to be sent to each party along with the questionnaire
- The covering note:
    - Offers each participant the opportunity to remain anonymous
    - Advises who will see the information
- All information to be treated in the strictest confidence
- Each person to be thanked for their participation in an automatic response e-mail

The questionnaire was developed around the findings of the interest group forums. The full details of the findings are in the Project Findings section. The questionnaire takes the aggregated top ranked issues for development and asks participants to rank them in relation to achievability and impact as perceived by the participants. The rankings were on a scale of 1 to 5 thus allowing a quasi-quantitative interpretation of the results.

The questionnaire is shown in Appendix 5. This was sent out by e-mail directly to all forum participants and was available from the interest group forums. Prompts were subsequently communicated through the interest group forums and follow-up messages were sent two to three weeks after issue, directly where appropriate and via forum controllers where relevant as noted in the Setting-up the Groups sub section. Where necessary reminders were repeated after four to five weeks after issue, and six weeks after issue the receipt of completed questionnaires was effectively closed. No further returns were received after this time. A breakdown

of numbers and response rates is given within the Project Findings section of this report.

Recording & Interpreting Results

At each stage of the forum debates positive responses from individuals were collated and clustered (as previously described). The introduction of the initial question and the clustering and recording of positive responses led to the establishment of three key areas (see project findings section) which were communicated to the groups prior to the introduction of the second question.

The second question was then introduced in relation to each of the three key areas initially identified. Again positive responses from individuals were clustered and recorded with a clear leading issue emerging in each main area (see project findings section). These findings were communicated to the groups prior to the introduction of the third question.

In relation to each of the leading issues established from question two, question three was then introduced in order to refine and focus on more specific issues with a shorter to medium term impact focus. Again positive responses from individuals were clustered and recorded with three or four leading specific issues being identified in each main area (see project findings section).

The clustering approach was itself extensive, taking hundreds of individual posts. Initially each of the posts were represented on a ‘sticky note’ along with identification of the contributor and retained until the threads reached completion. Assessment was then made by laying out each of the notes and initially grouping together those supporting the same issues or subjects. As participants were generally familiar with European Commission terminology due to their participation in EC initiatives the correlation of the input terminology did not turn out to be a big problem. However, occasionally a ‘double-check’ with the directors of the PVC groups added confirmation to the approach. At this point multiple support posts from the same contributor for the same issue were de-duplicated. Smaller groupings on contributory issues which were highly overlapping were also combined to form agenda level issues as appropriate to EC

activity. This clustering activity was additionally reviewed by a Fellow of the Royal Statistical Society to ensure that interpretation was on a fair and consistent basis appropriate to the agenda level of result which it was being used for, with no issues being found.

The clustering and response recording was completed on spread-sheets where the identified subjects, under each stage of clustered responses, were recorded against each individual with the allocation of a notation of 1. This was therefore not weighted to reflect multiple positive responses from any particular individual; it more realistically reflected the number or percentage of participants showing positive responses overall.

The eleven specific issues determined from the three levels of questioning formed the basis of the questionnaire (see appendix 5) where they were grouped under the main area headings. Each specific subject was then given a scale of one to five with five being high and one being low. This scale was used for participants to express their views separately on both the achievability and the impact of each of the specific issues. This allowed a quantitative style of interpretation to be made of qualitative inputs. As previously noted, this type of interpretation is not conclusive although may be significantly indicative of opinion and understanding.

This numeric recording of the questionnaire results, from 59 completed questionnaires, allows the results to be seen for both perceived achievability and perceived impact for each of the specific identified subjects. However, through aggregation of these it also allows the creation of a combined value covering both achievability and impact. This combined achievability / impact value gives equal weighting to both of these facets. As the future emerges it may be possible, with hindsight, to apportion different weightings to these components. However, in looking to the future this project simply recognises that both are important facets. Importantly, as the results are also recorded separately in addition to the combined value, further interpretation in the future will be possible. The interpretation of these results in the project findings and conclusions sections of this report is at the first level relatively straightforward; has the research reached a clear conclusion on identifying the key issues as determined by the combined

value assessment? Further interpretation beyond the empirical and into the cognitive and conceptual areas of models is inherently much more subjective.

Creating Concept Summaries

From the questionnaire, the highest ranked (combined value) issues were established. These areas have then been turned into concept summaries which can form the basis of consortia negotiations for research initiatives beyond the scope of this project. These represent initiation documents for further development by consortia members and will require aligning to future calls for research if funding for them is to be sought. This is part of the project output providing influence and impact beyond the project. It is in addition to the development of a model of understanding and can be implemented as part of the dissemination and exploitation framework.

Having completed the first stage activity (empirical / bottom-up) I will now describe the second stage (cognitive / top-down).

Second stage – Development of a Model of Understanding

A general model of understanding was developed through the application of reflective judgment in relation to the empirical research in this project and the wider context and environment which it relates to. In its philosophical stance it is about an understanding, and development of intellectual views through the creation of a hypothesis or conceptual model; moving the empirical into a potential cognitive understanding of the environment.

Within the context of this project it is an explanatory model with potential to have implications for understanding and behaviour. This could have implications and impacts especially for policy and delivery framework owners. Such a conceptual model of understanding is argued by Stewart (1991) and Rudolph (1998) to involve a set of interrelated components which are the basis for knowing about and interacting with the world. Stewart further articulates that practice begins

with the recognition (mediated by the conceptual lenses provided by appropriate explanatory models) of some phenomena warranting explanation.

Hafner (1991), Stewart (1991) and Cartier (2001) all consider a model to be an idea or set of ideas that explains the causes of particular phenomena. They argue that models are complex constructions that consist of conceptual objects (e.g., alleles, populations) and processes (e.g., selection independent assortment) in which the objects participate or interact. The activity here is to develop an insight which in essence incorporates knowledge and professes a possible understanding. This is to recognise that sometimes things need to be seen differently in order to see them clearly. However, within the scope of this project this third stage development remains a conceptual model. Subsequent research would be required to test it, observe and study its effect in order to improve both its depth of understanding and validity to policy and practice.

Dissemination Exploitation Framework

The dissemination strategy is focussed on systematically distributing key information from this project to potential users or beneficiaries. To give structure to the approach a framework of activity will be created incorporating a number of target contact channels where there is a perceived realistic prospect of further engagement and development of the identified issues. The further engagement and development is to avail support for real additional understanding and consideration of concepts, and possible implementation of changes as an intended result of dissemination activities. Put simply, the strategy of this planned dissemination is to cause the continuation of utilization of the knowledge and learning achieved.

Chapter 6: Project Findings

Having described the project activity I will now consider the project findings.

The practitioner participant population in this project was made up of four participating groups. For a description of the groups see the setting-up the groups sub section in the project activity section.

The total number of participants was sixty three with the split across the groups as follows:

1.	ATG	12
2.	IE	17
3.	COIN	15
4.	FIC	19
Total		63

In collating and aggregating the results each individual has an equal weighting, therefore percentage figures are in relation to the total population of 63 and have not been adjusted to give equal weighting to particular groups.

The technical bias of practitioner participants should also be noted with fifty seven declaring their focus as being equally or primarily on technology development as opposed to a greater focus on business use. This type of bias was anticipated and has be covered in some depth earlier in this report. Equally, fifty four declared that Future Internet or hi-tech development was a key part of their work as opposed to being a small part of their work or just an interest.

There was an international dimension to the participants. However some were from different nationalities to the organisation they worked with and some organisations are cross-border in nature and operation. Therefore in assessing the international split, continental European countries were clustered and it should be noted that there is a reasonable margin for error in the assessment. As far as has been reasonably determined the international split of participants is as follows:

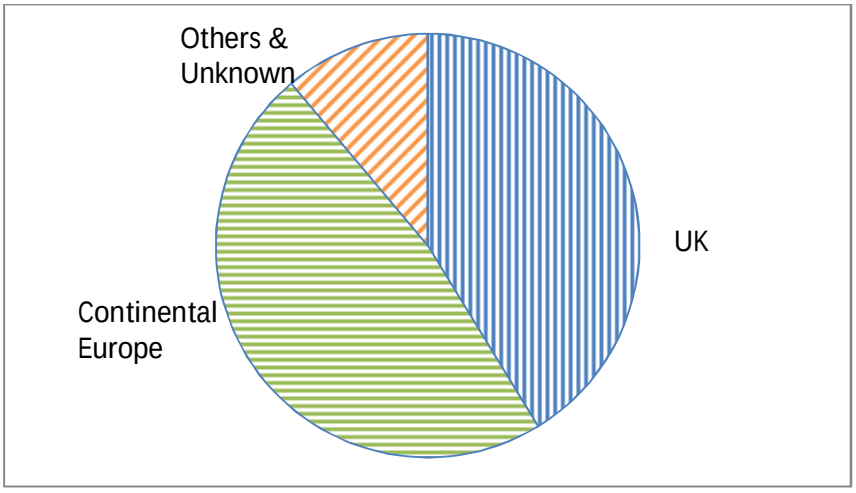


Figure 17: Geographic make-up of Participants

UK 26; Continental Europe 30; Others & unknown 7

Forums Findings

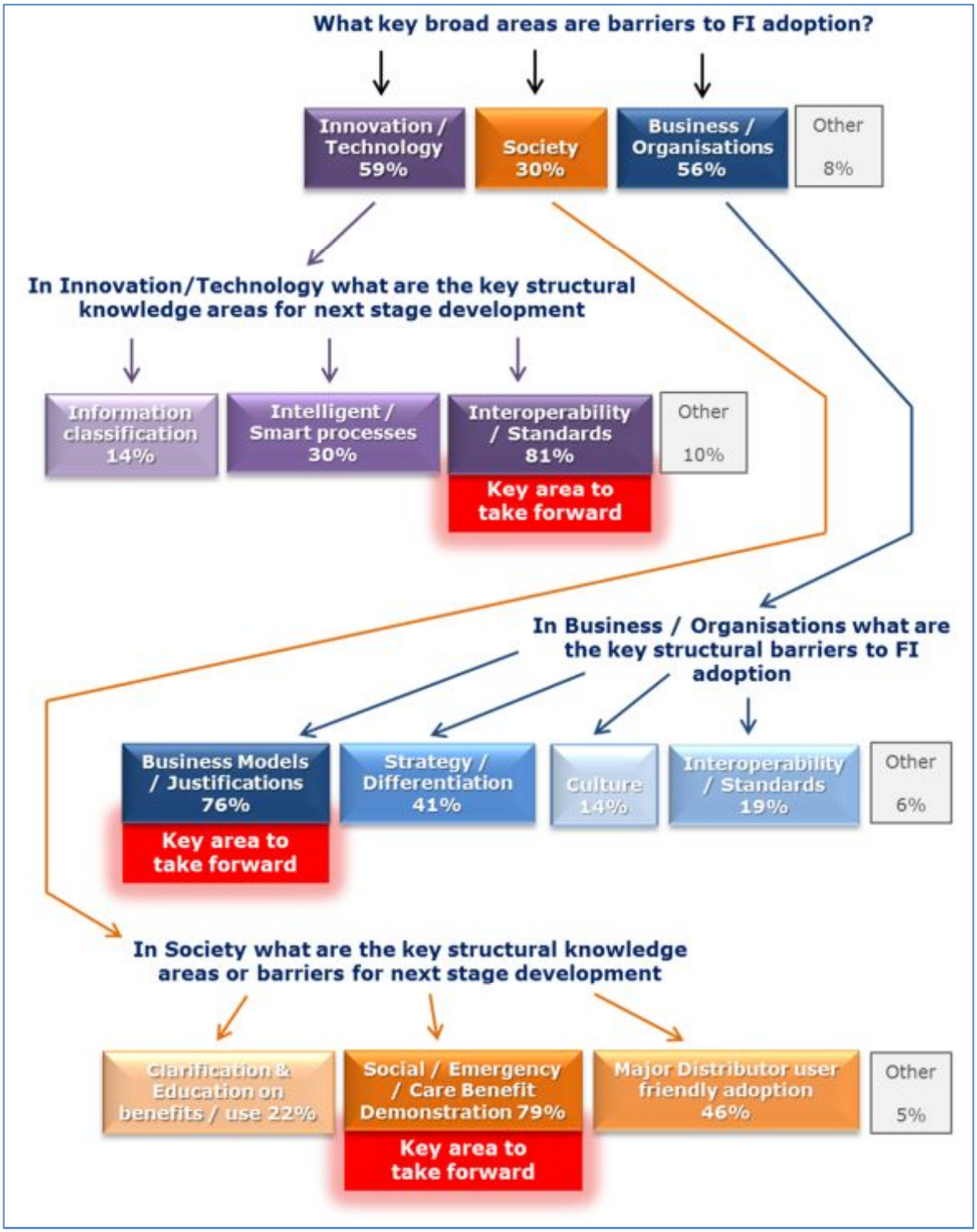
The forum findings are essentially at three levels. The first level is the establishment of broad key areas which are currently barriers to Future Internet adoption. The second level moves to a deeper level of establishing key structural knowledge areas for next stage development in relation to each of the areas identified at level one. The third level moves to more specific areas that are key in relation to short or medium term next steps. This third level of findings is then developed further, into a fourth level, through the issue of a questionnaire to assess perceived achievability and impact.

As previously described, the debate was monitored and recorded following the introduction of the first question, with clustering of terminology being applied into consolidated areas. This initially resulted in three broad areas being identified. The areas were 1) innovation and technology (59%); 2) society (30%); and 3) business and organisations (56%). The percentages will not necessarily add up to 100 as participants could contribute separately in each area, therefore in each case the percentage figures relate to the member participant population.

Within each of the three main areas the second question was then introduced in order to move to a deeper level of key structural knowledge areas for next stage development for each area. This resulted in the identification of three more specific key areas to be taken forward to level three. The areas were 1) in relation

to innovation and technology; interoperability and standards (81%); 2) in relation to society: Social, emergency and care benefit (79%); and 3) in relation to business and organisations: business models and justifications (76%).

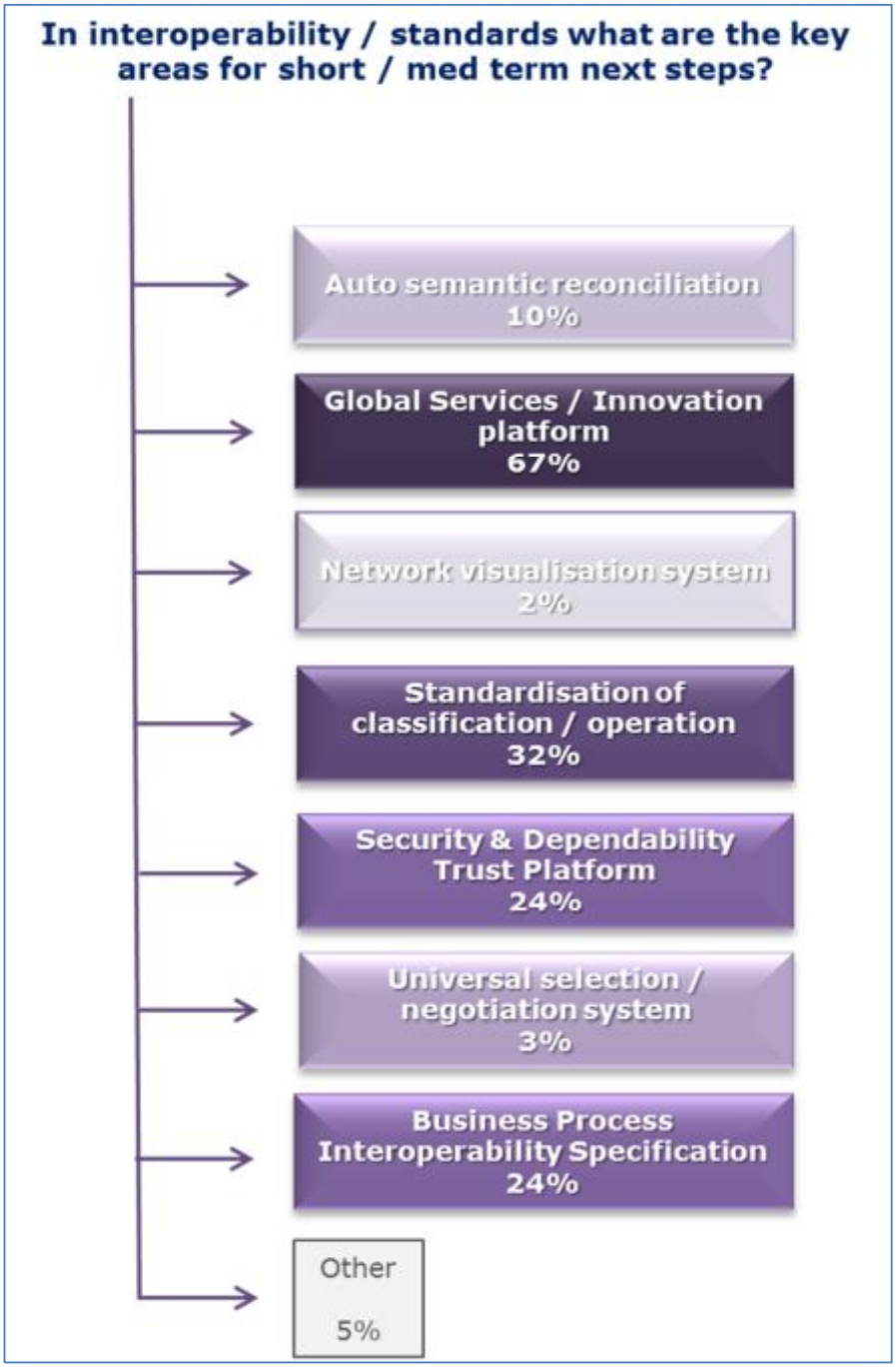
The establishment of levels one and two are illustrated as follows:



Within the three key areas established at level two, the level three question was introduced to identify more specific areas that are key in relation to short or medium term next steps for each of the three key areas.

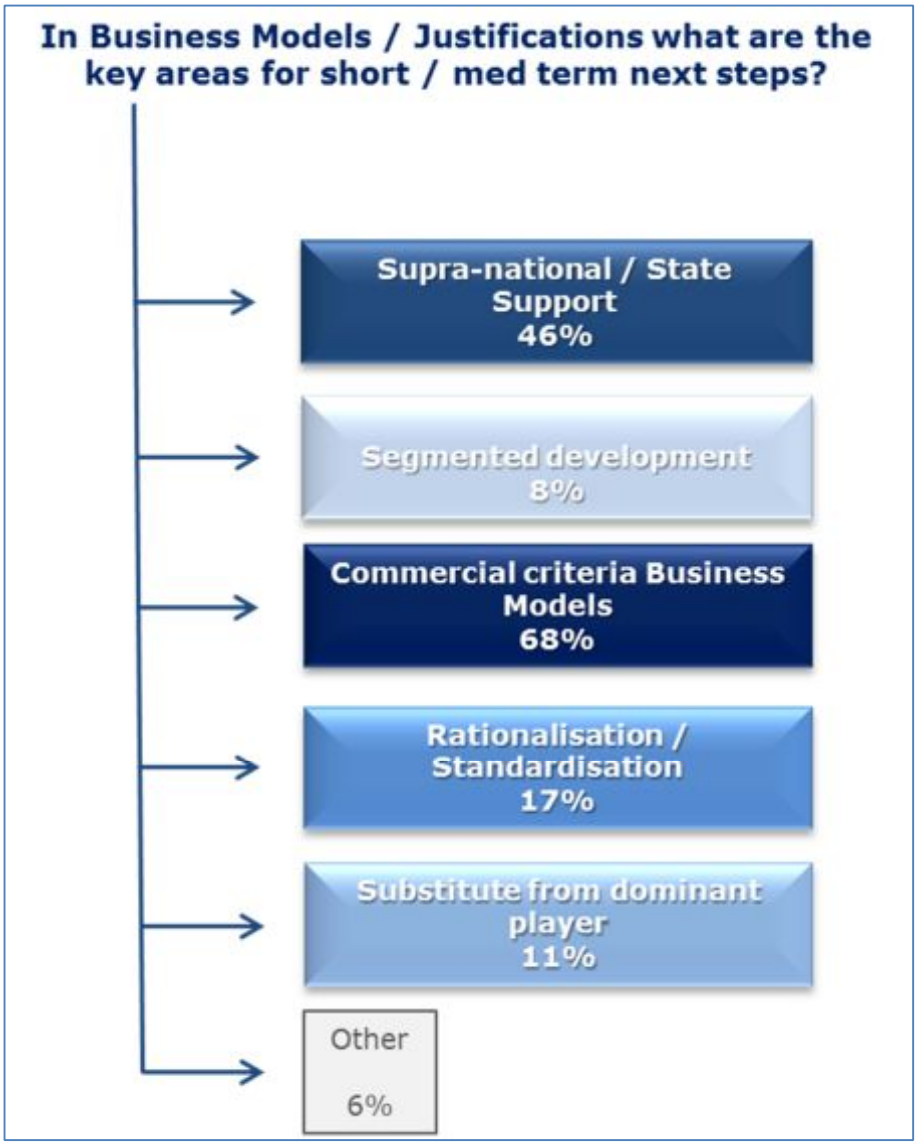
The level three results in the area of interoperability and standards identified four top rated issues. The issues were 1) global services innovation platform (67%); 2) standardisation of classification and/or operation (32%); 3) security and dependability trust platform (24%); and 4) business process interoperability specification (24%).

The establishment of level three from level two in respect of interoperability and standards is illustrated as follows:



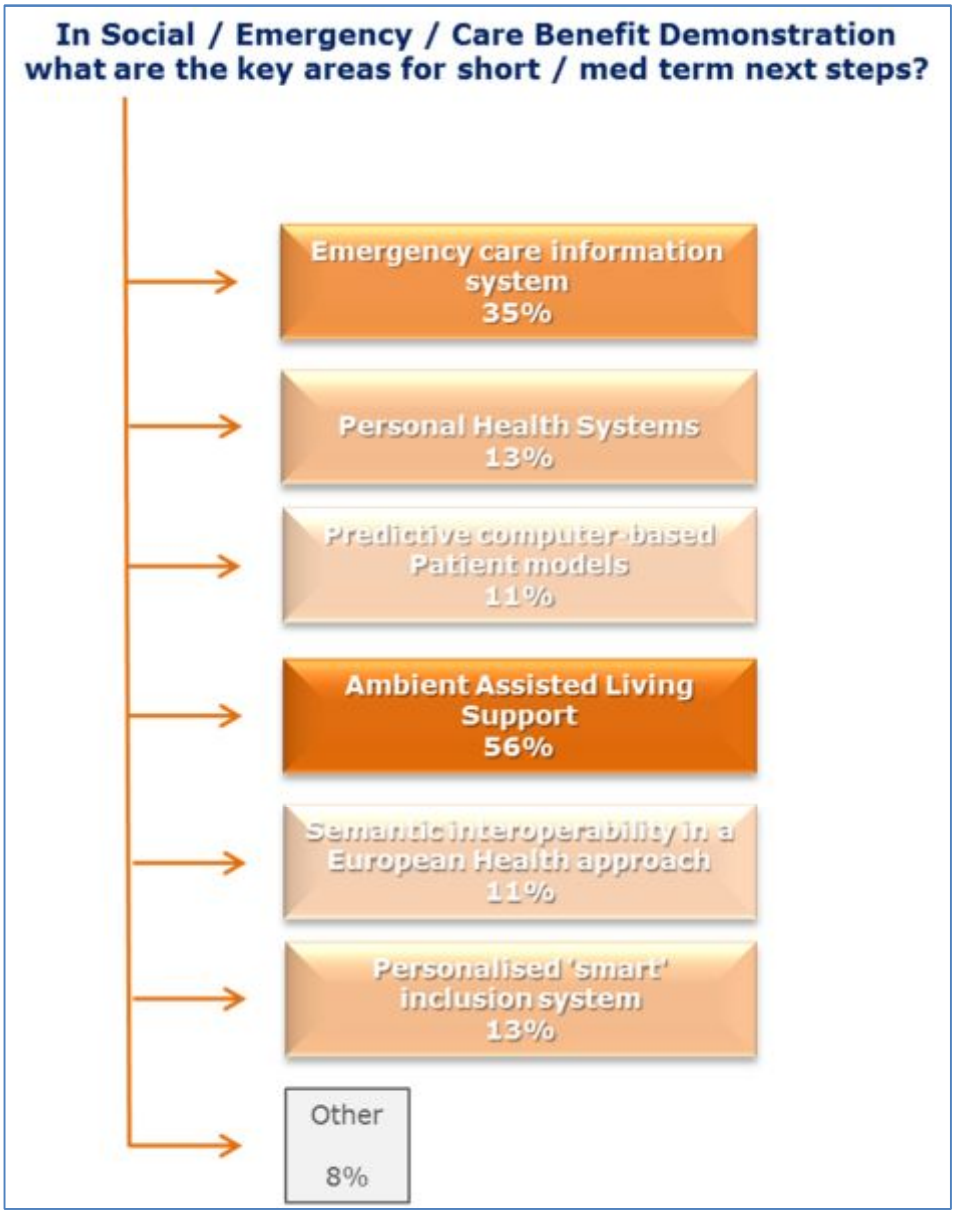
The level three results in the area of business models and justifications identified three top rated issues. The issues were 1) commercial criteria business models (68%); 2) supra national or state support (46%); and 3) rationalisation and/or standardisation (17%).

The establishment of level three from level two in respect of business models and justifications is illustrated as follows:



The level three results in the area of social emergency and care benefits identified four top rated issues. The issues were 1) ambient assisted living support (56%); 2) emergency care information system (35%); 3) personal health systems (13%); and 4) personalised ‘smart’ inclusion system (13%).

The establishment of level three from level two in respect of social emergency and care benefits is illustrated as follows:



At the end of the level three assessment eleven specific priority issues had been identified.

The issues identified had reached a level where they were consistent with the topic levels used, for example, within the research framework programmes undertaken by the European Commission. To go further in depth would take it beyond an agenda setting level which would be inconsistent with the strategic

aims of this project. Stopping at this point works well as it also keeps in place the prospect of further collaborative development of the issues with partners in the post project dissemination and exploitation action plan. Within the plan it is proposed to take the identified opportunities as the basis of further development within consortia responding to calls for research proposals. On this basis the identified issues / opportunities identified in this research will form an innovation agenda in line with the project strategic aims. This fit between project and post-project objectives means that it is the appropriate level at which to stop investigating deeper and move on to an assessment of perceived achievability and impact.

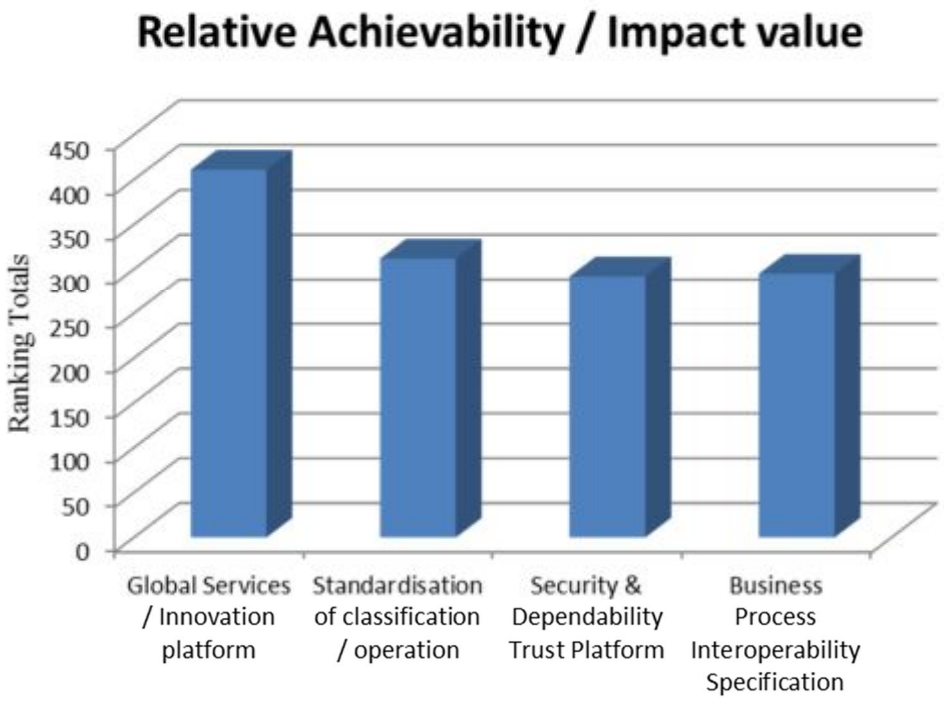
One of the key benefits this would facilitate is allowing the issues and concept summaries to be moulded to and developed further with specialist strengths of other partners in alignment with research framework opportunities.

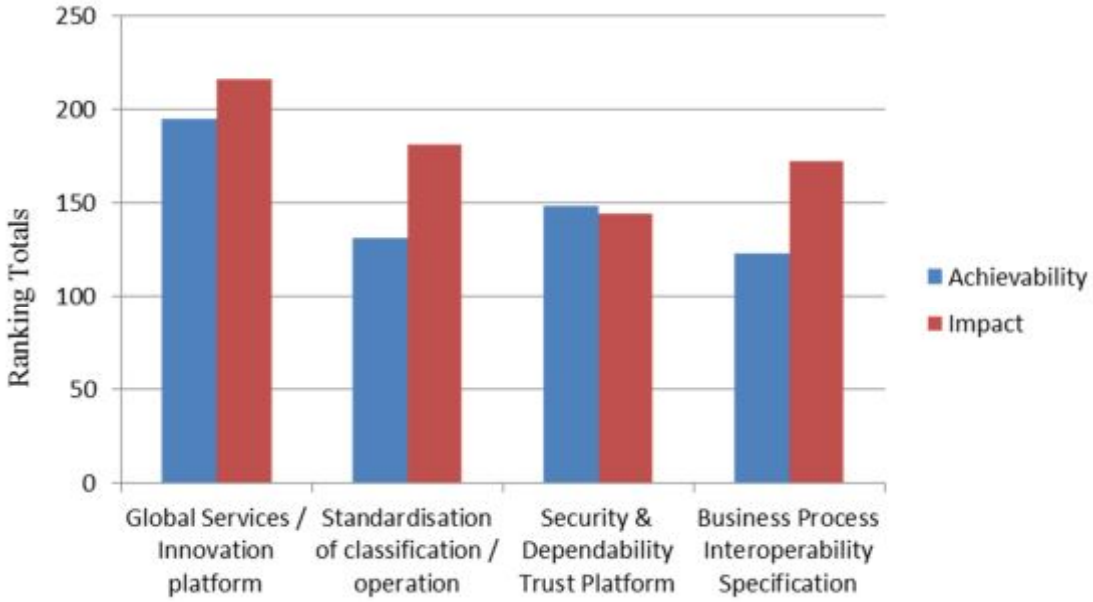
Questionnaire Findings

The eleven specific priority issues in the three key areas identified in levels two and three were used to construct a questionnaire intended to assess achievability and impact as perceived by the participant practitioners. The questionnaire was structured to allow identification of the highest rated issue for achievability and impact in each of the three main areas. The questionnaire is shown in appendix five.

Within each of the three main areas the questionnaire findings are summarised in chart form at three levels. The first level is the combined achievability and impact rating showing the combined relative positions. The second chart in each case shows the split between achievability and impact ratings. Thirdly there are charts showing the number of responders on each issue for each level of ranking (from 1 to 5). The side axis represents the number of responses and the base axis shows the split in ranking levels throughout the range from 1 to 5.

In respect of interoperability and standards the overall top ranked issue is that of a global services and innovation platform. This tops the result for both achievability and impact, and therefore also overall.


Relative Achievability / Impact value
Ranking Totals
450
400
350
300
250
200
150
100
50
0
Global Services / Innovation platform
Standardisation of classification / operation
Security & Dependability Trust Platform
Business Process Interoperability Specification


Ranking Totals
250
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Global Services / Innovation platform
Standardisation of classification / operation
Security & Dependability Trust Platform
Business Process Interoperability Specification
Achievability
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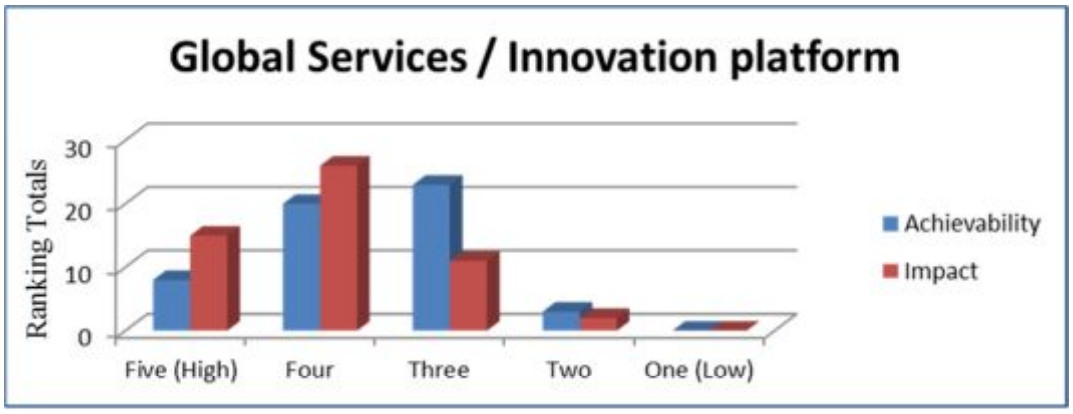
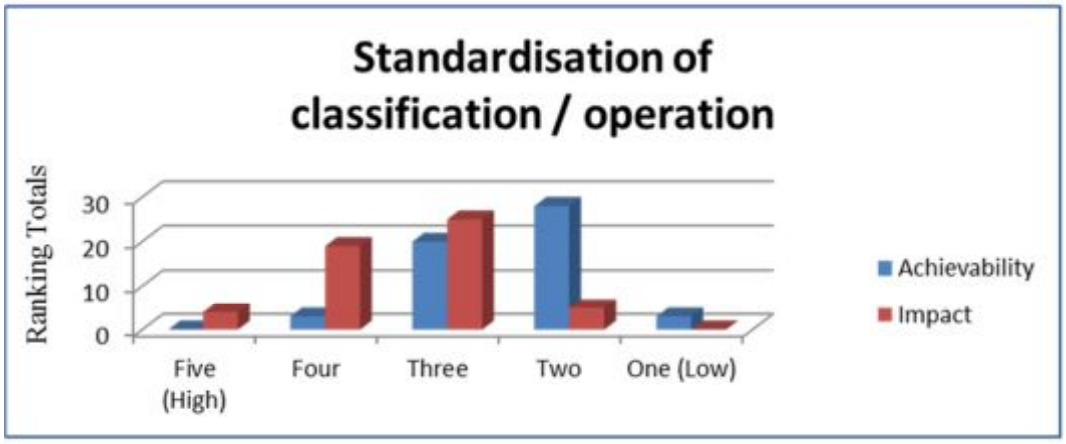
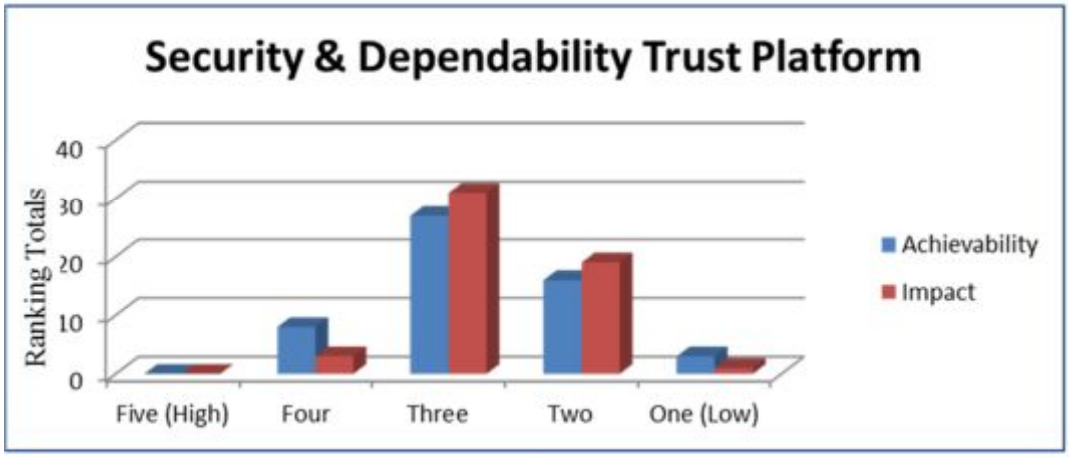
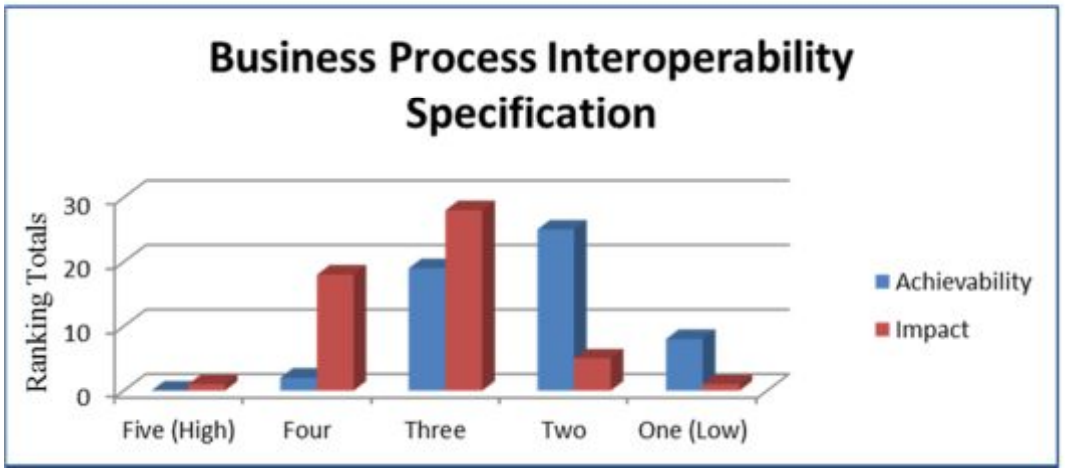
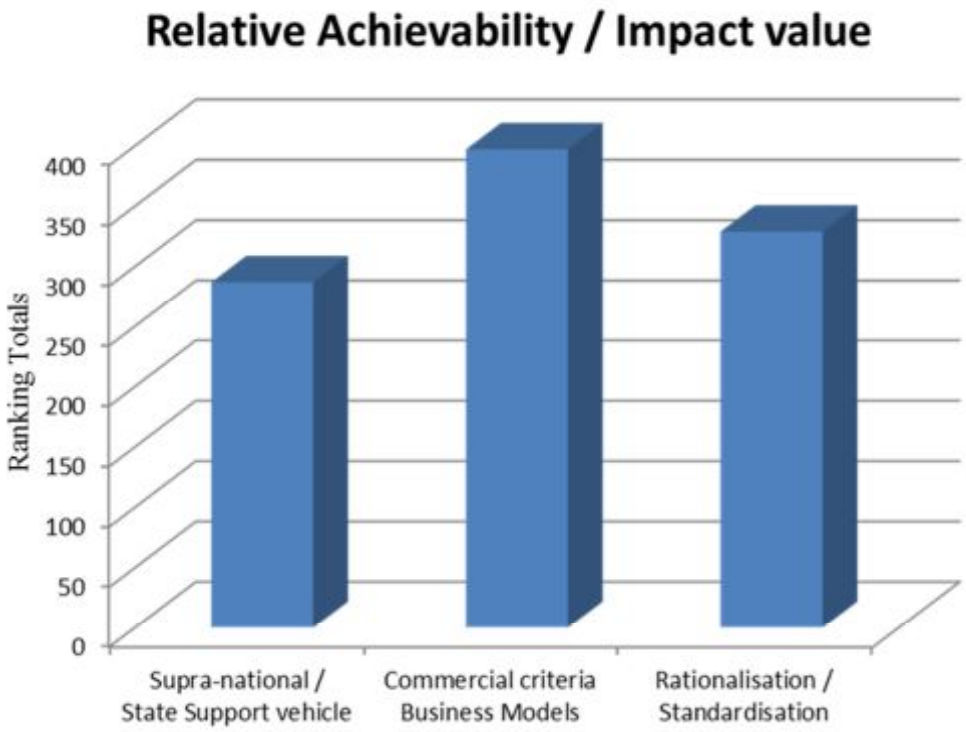

Global Services / Innovation platform
Ranking Totals
30
20
10
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact

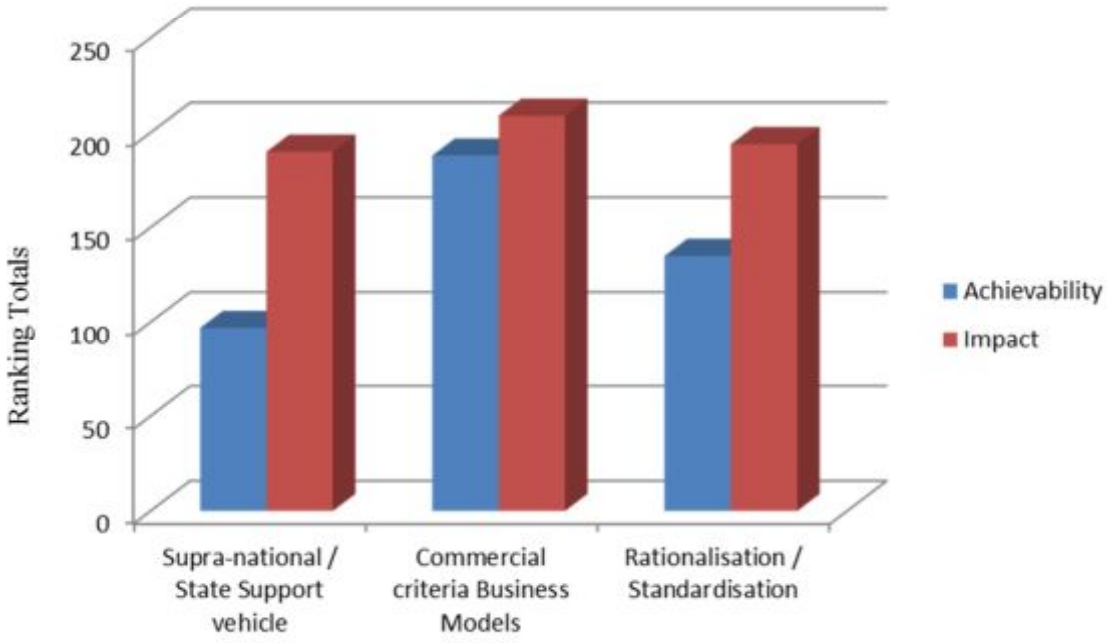

Standardisation of classification / operation
Ranking Totals
30
20
10
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact

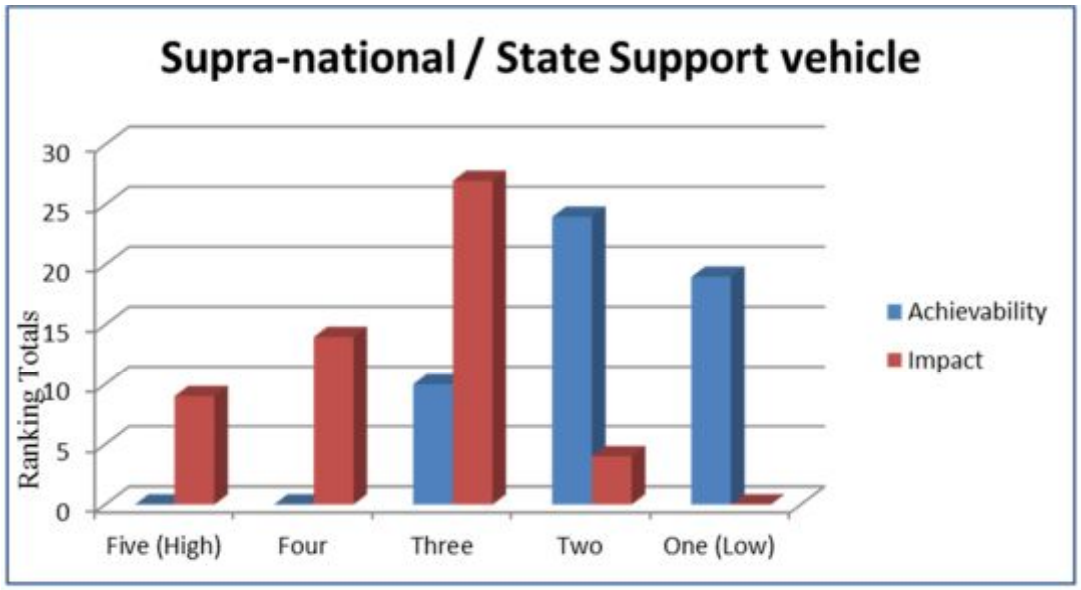

Security & Dependability Trust Platform
Ranking Totals
40
30
20
10
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact

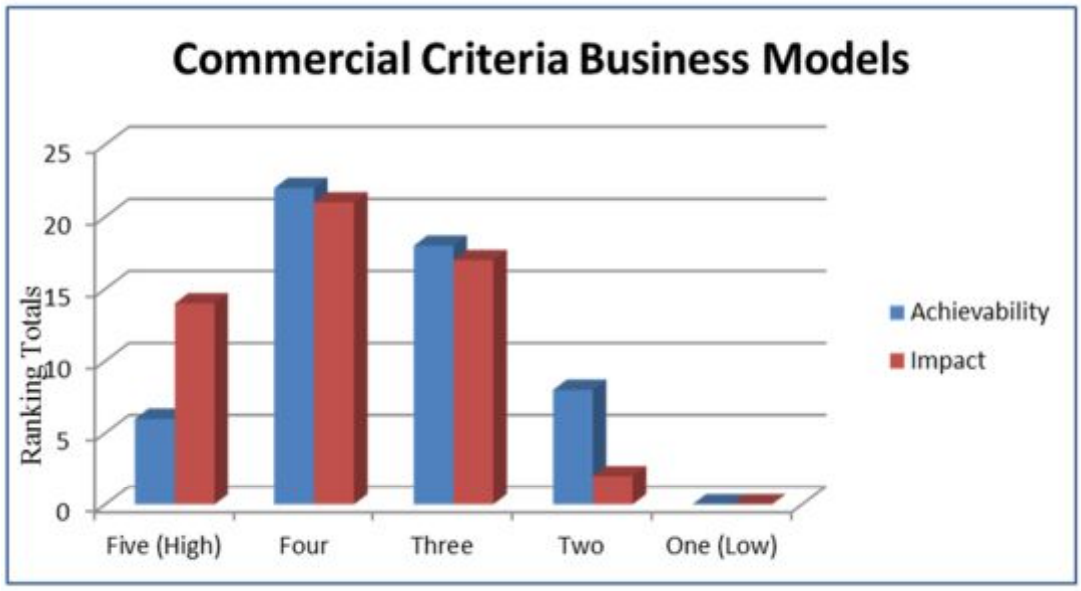

Business Process Interoperability Specification
Ranking Totals
30
20
10
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact

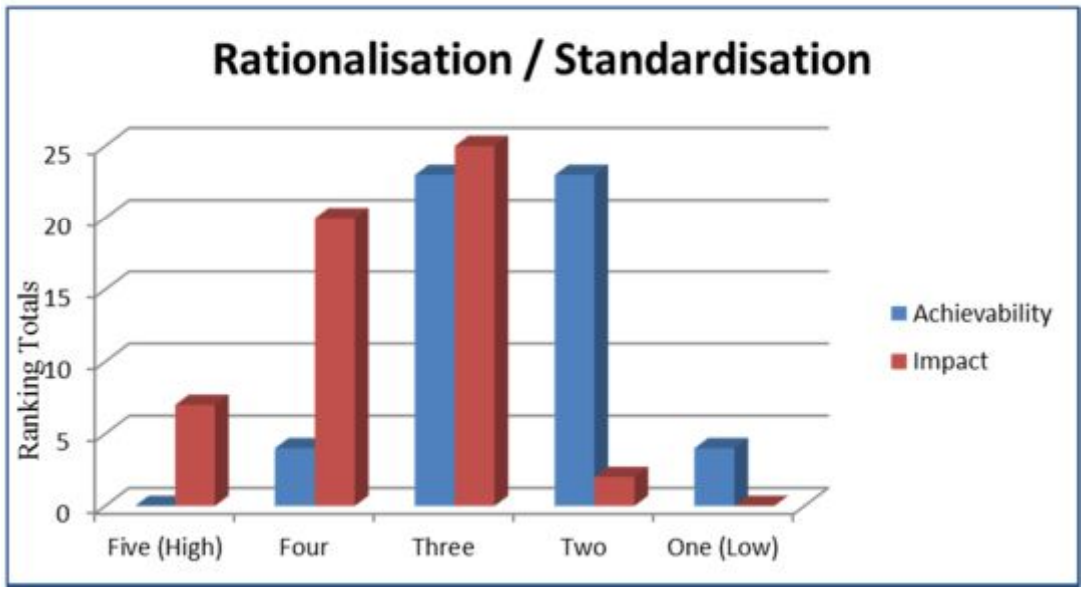
In respect of business models and justifications the overall top ranked issue is in respect of commercial criteria business models, with this also topping on both achievability and impact.



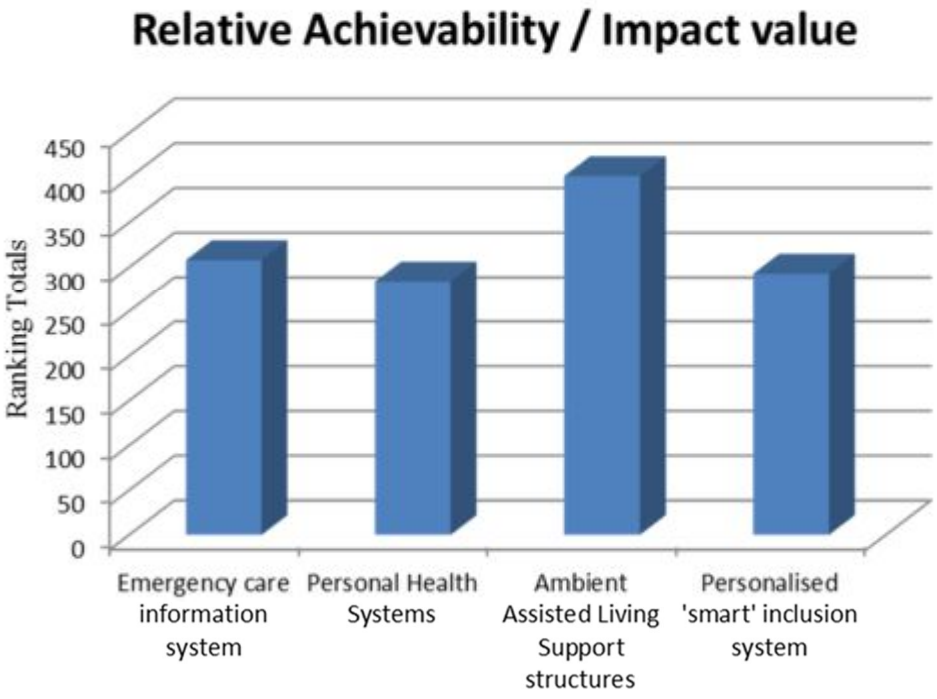


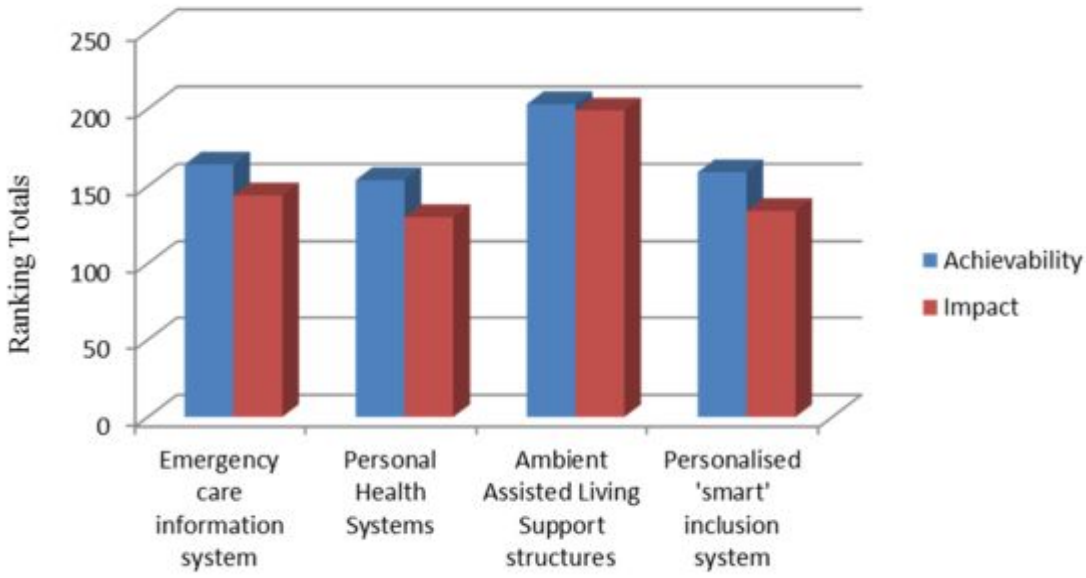

Supra-national / State Support vehicle
Ranking Totals
30
25
20
15
10
5
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact

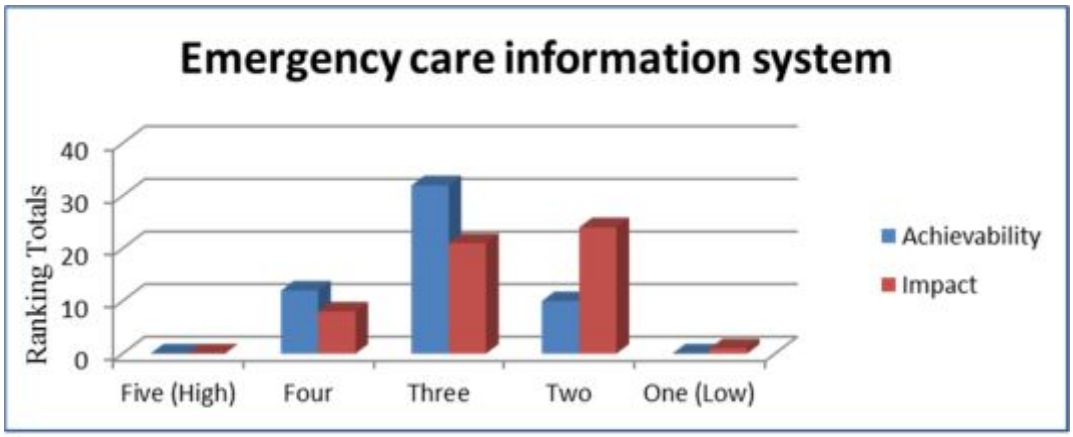

Commercial Criteria Business Models
Ranking Totals
25
20
15
10
5
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact

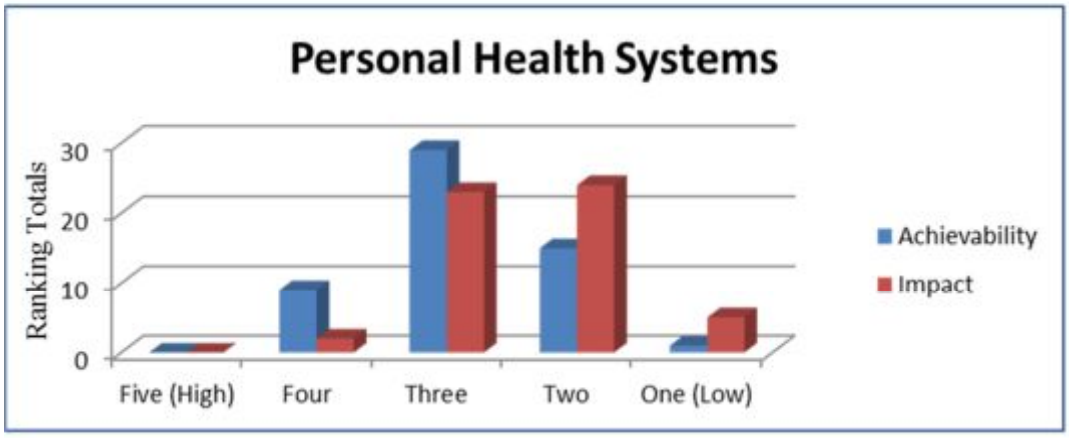

Rationalisation / Standardisation
Ranking Totals
25
20
15
10
5
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact

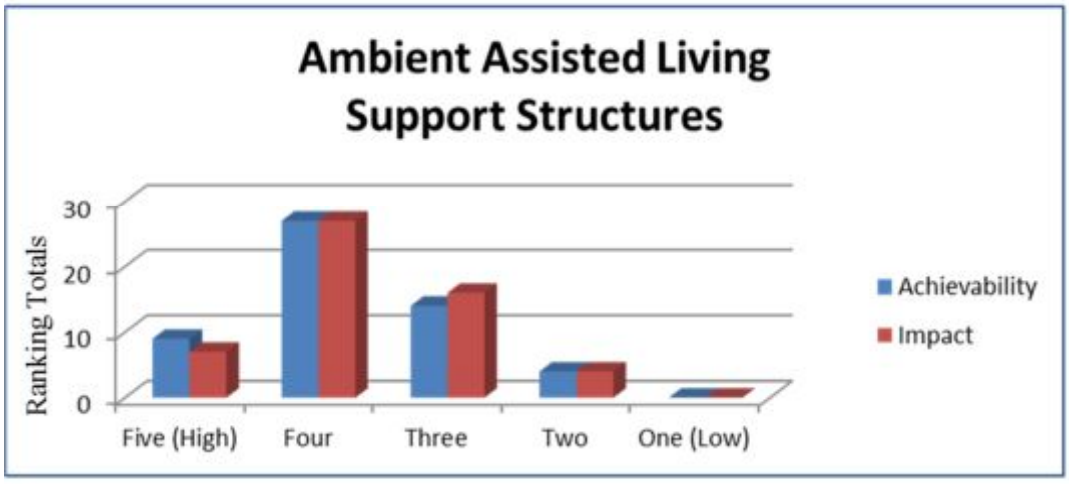
In respect of social emergency and care benefits the top ranked issue was ambient assisted living support structures, again for both achievability and impact.

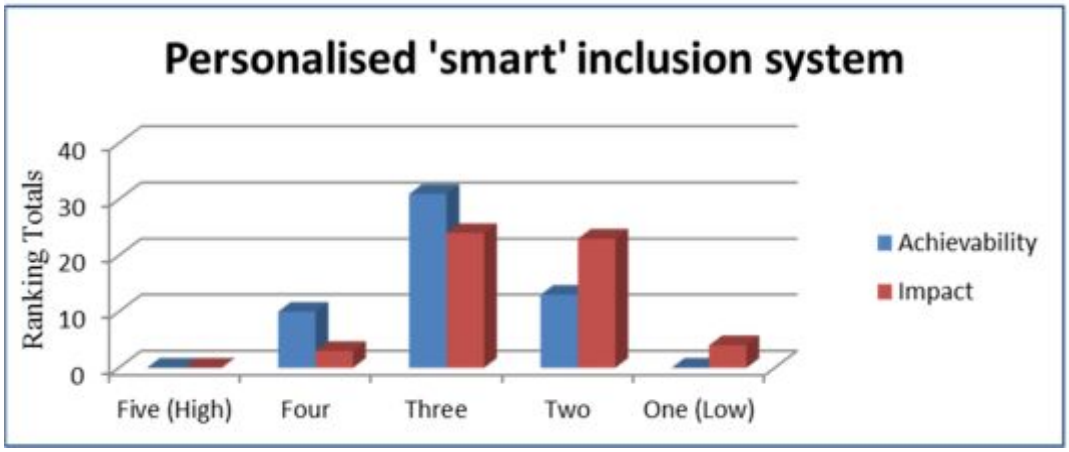





Emergency care information system
Ranking Totals
40
30
20
10
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact


Personal Health Systems
Ranking Totals
30
20
10
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact


Ambient Assisted Living
Support Structures
Ranking Totals
30
20
10
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact


Personalised 'smart' inclusion system
Ranking Totals
40
30
20
10
0
Five (High)
Four
Three
Two
One (Low)
Achievability
Impact

The outcome from the two stages of the research, the forum groups and the questionnaire, is the identification of the three top ranked issues to be taken forward as proposal summaries (see appendices 7, 8 and 9). The three identified issues are:

1. Global services / innovation platform
2. Commercial criteria business models
3. Ambient assisted living support structures

At this stage it may be helpful to outline a summary of each of these three opportunities.

Summary of Global Services / Innovation Platform opportunity

The objective here is to collaboratively develop a service platform that is open-source and business-pervasive. Open source in this context means universal access via free license agreement. This type of arrangement is widely seen through use of such products as Adobe Reader where it is open to all yet you have to agree to its license conditions. Business pervasive in this context means widely accepted and used by businesses.

This type of platform should be able to identify, compose, integrate and 'mash-up' existing, emergent and innovative issues which continue to develop and progress. Such things might include services for interoperability between systems, enterprise and collaboration management. Also, secure and adaptive capabilities would be necessary if the platform were not to become rapidly obsolete.

This whole process of providing leading-edge business services will involve the consistent application of business rules and self-adaptive decision-support frameworks if it is to represent an efficient combination of the needed services by businesses into the future.

This is a possible movement towards how the Information Technology (IT) vision of Software as a Service (SaaS) can achieve widespread adoption in the area of interoperability within enterprise collaboration. It will be necessary to support a number of key collaborative enterprising structures, from supply chains through to business ecosystems. Eventually a role may emerge such as a utility, or in other

words a commoditised service, this being the so-called Interoperability Service Utility (ISU).

Summary of Commercial Criteria Business Models opportunity

Future research here is predicated upon the proposition that the Future Internet may be extended beyond current broadband perspectives. It is based on the premise that there will be an additional service infrastructure on top of the communications infrastructure of the Internet. In other words there will be parallel infrastructures for communication and for services. This leads to the following three central premises based on the FI concept:

1. Economic argument: That ICT provision trends towards commoditisation (widely available and at low price), thereby continuously eroding the ICT cost base of providing more sophisticated or greater value added services

2. Public interest argument: That some services offered over the Internet are part of the fabric of the economy and society, essential for all businesses or for minimum "quality of life"

3. Competition argument: That there will be, and continue to be, a level playing field in basic service provisioning for advancing open competition, greater transparency and unfettered innovation through new highly expandable services.

This reasoning and scope has been further affirmed in the European Commission (2008) report on Value Proposition for Enterprise Interoperability, this being a key component of justification for development of the Future Internet. In particular, that report demonstrates that such services are essential for enabling business innovation and new or additional value creation. Moreover, Future Internet technologies will have to re-shape business and systems interoperability (ability to fully work together) as a real, active and reliable capability, leading to the need to reappraise current limited concepts of interoperability between enterprises. The report introduces the advancement of this concept into "Future Internet Enterprise Systems", which are described as being "very much part of the Future Internet paradigm".

This vision is premised upon and closely linked to the development of the Internet as a universal infrastructure (commonly and collaboratively used) for “value added” business level innovation.

Summary of Ambient assisted living support structures

Within the context of the EU research frameworks, ambient assisted living is related to comfortably keeping elderly, disabled and infirm people living in their home environments for longer than they would otherwise be able to.

There has been some research into remote communication and facilitation of ambient assisted living, wellbeing or residential monitoring through trials of systems using voice and video communications and integrating enabled remote support and care services. At the same time, ICT solutions which are able to provide early detection and adaptive support to changing individual needs in relation to ageing have long been reported. However, in practice many such reported systems seem to achieve little more than prototype and test, or limited adoption often on part functionality, for a number of effective delivery reasons.

The real challenge which remains and grows in importance is to actually assist so many of the population and relevant authorities/institutions in the EU , and wider, in breaking down barriers through adoption of a robust, highly usable and readily adopted integrated and expandable system. In other words, this is not only an opportunity just for healthcare and wellbeing, but about the opportunity to develop into an integrated home hub for ambient care and inclusion, and thereby prolonging independent living.

The main aim is to design, develop and test evaluate a smart and self-adaptive tele-assistance environment for elder people, with a robust video communication platform and the integration of different sensors able to provide early detection of changing individual needs, provide advanced reasoning functionalities which predict and analyse behavioural data, and interact with the surrounding of the user, enabling a holistic and adaptive support for independent living.

Having considered the findings and summarised the identified main issues I will now consider the framing and implications of the findings

Framing and Implications of Findings

Framing is about the way in which we look at things. Therefore if we look at things in a particular way there is likely to be the possibility of looking at the same things in other ways. Framing fundamentally poses the question of whether we can interpret or imply our view of things differently. A view of things can be described as a paradigm (as described in the sub section on Paradigms in chapter 4). Although reframing an issue can often be somewhat short of a full paradigm shift, it at least offers the opportunity of taking a somewhat different perspective to one already held.

Kaplan (2008) says that 'any model of action in these contexts would require an accounting for how certain frames come to predominate over others'. In this context he talks about accepted thinking being the predominant understanding (or frame) until you find something new to change it. For example if you go back far enough it was the accepted position that the sun and our solar system orbited the earth, until new thinking and examination gave a different view. Bogner (2000), Elsbach (2005) and Lant (2002) make a similar point in suggesting that acknowledgement of the situated and interactive nature of cognition is required if an understanding of cognitive mechanisms in such processes as strategy making is to be achieved. In other words we need to be mindful of our current established thinking and open to alternative views if we are to have a process of moving towards big and future strategic goals. Kaplan (2008) also suggests 'that actors, responding to their own incentives, shape agendas and control information flows to steer strategic choices in a preferred direction'. The issue is the capacity for participants to inadvertently or deliberately steer or frame a position to their own advantage. This potentially creates a certain level of ambivalence; on the one hand we are looking for certainty of a clear innovation agenda and yet on the other hand we should look at why it is focussed in that way and ask the question of whether it meaningfully moves us towards policy or meta-agenda objectives.

A strand in the Innovation Excellence blog (2013) noted that the one really important thing we need to get established within all our organizations, large and small is a "well-articulated innovation strategy. This is by far the most important constraint for companies to reach their innovation targets." These are the

conclusions from a joint study by Capgemini Consulting and IESE Business School, University of Navarra (2012) in their report “Innovation leadership study”. In the report they mentioned not just the lack of many formal mechanisms were missing but the total environment for innovation was missing this explicit innovation strategy. How can leaders expect innovation if they remain unclear of their role and function in facilitating and encouraging it? The study, which surveyed over 260 innovation executives globally, suggests that while innovation is an emerging functional area within organizations, limited organizational strategies for driving innovation are impairing growth. The report further says that ‘by their very nature organisations seek stability and predictability and will tend not to spontaneously drive innovation that destabilizes. This means that real disruptive innovation has to be driven by the leadership’. The strategy therefore needs to strongly influence people to make things happen but without necessarily the luxury of management or financial control. Critical to this is the development of political, leadership and influencing skills in order to motivate people to move towards this direction.

Within the forum threads it is at one level pleasing that clear results were achieved. However, when framing the process differently it can be argued that there appears to be a rush to solution mode with little consideration of wider and more radical options. From this perspective it raises the issue of how opinions are formed. Atkinson (2000) advised that much of the time, experienced professionals in both education and other fields cannot explain what they are doing, or tell you what they know; and students cannot articulate their learning. Yet professional development and practice are often discussed as if conscious understanding and deliberation are of the essence. There is an issue of the dynamic relationship between reason and intuition in the context of professional practice with the nature of intuition playing a vital role in the development of professional judgement and expertise. This is described by Bacigalupe (2002) as the notion of "intuition" and its impact in professional practice, which is generally (and there are exceptions) defined as a cognitive psychological strategy rather than a relational and cultural exchange.

When applying these perspectives or frames to this research the work of Gibbons (1994) has some relevance. He advises that the deeply held belief that if the

disciplines do not flourish then fundamental insights may be missed, or that foundational theoretical knowledge cannot be produced and sustained outside of the disciplinary structures may account for the persistence of the linear model of innovation in policy debates. What appears to have happened subsequent to Gibbon's book is the constraint on collaborative knowledge production and research resulting from the key funding criteria, for example, imposed by the European Commission and the national bodies cooperating with them in framework programmes and other similar programmes. Their agenda shows signs of being a leadership and catalysing role with the aim of innovation but with the more common achievement of limited knowledge production and much reconfiguration of relatively new yet established knowledge. The research results imply that in relevant communities the future issues are seen as sub sets of the pervasive funding frameworks.

Gibbons (1994) goes on to ask some pertinent questions of relevance here; does this represent a key part of the unpredicted institutionalisation of collaborative networks for knowledge production, research and innovation into an emerging convention of pattern? In other words, in this case, do the funding frameworks overly condition the actions of practitioner networks and constrain their innovation? New technology is a necessary but not sufficient condition for successful innovative performance and increasingly, technological innovation depends upon using specialised knowledge to develop technologies in directions dictated by competitive pressures. Kwon (2002) looks further at IT developments in the context of value framing. Findings from this work suggest that IT-derived business value can be characterized by competing tensions across diverse value frames that are paradoxically structured and change over time. The proposal from that work is that such a pluralistic approach will extend the vocabulary of IT-derived business value and will improve managerial capability for sense-making across multiple frames. This is supported by Walsh (1995) who argues that both individuals and organizations retain cognitive sense-making structures in order to interpret complex and equivocal phenomena. Kwon (2002) concludes that IT-based value perception and creation are highly dependent on the different motives and previous experiences of the IT managers involved in the interpretation.

In respect of this research the initial objective has been achieved of establishing issues to form an agenda for innovation in respect of the Future Internet. However, an alternative frame or perspective is to consider whether this has been driven by criteria such as funding and existing competence or whether it offers the prospect of radical and meaningful steps forward towards the strategy (meta-agenda or policy). Therefore each of the three identified topics will be considered in turn in this context.

First is the global services / innovation platform opportunity. As noted in appendix 2, with the inclusion of the 'COIN' initiative there are fifteen initiatives in EC FP6 and FP7 (Framework Programmes for Research) which have operated in one way or another across this area. Equally, a search of the EU Europa site reveals many more initiatives where this is part of, or at the heart of, the objective. Examples of this include the FI-WARE: Future Internet Core Platform[5] and the Service Platform for Innovative Communication Environment[6] initiatives. So, with all this previous and current activity in this area, are there reasons why participants should still see it as a key opportunity for an innovation agenda. One reason may be fairly obvious in that such a platform has not actually been achieved yet and therefore the opportunity to achieve it still remains. Although many of the initiatives have created knowledge on the subject and indeed on related subjects, none have as yet resulted in the breakthrough of the overall platform. It can be argued whether this represents creation of knowledge or to some extent incremental innovation on a range of related issues. However, it does not represent radical or disruptive innovation as envisaged by the objective.

A second reason could be that the subject represents an area of existing and established competence. Schön (1983) highlights that professionals do not in reality act according to a technical-rational paradigm. Technical -rationality emphasises the application of specific and known techniques to clearly understood problems, in order to solve them. However, Schön outlines that increasingly this type of approach is becoming inappropriate, particularly as the contexts of professional activity change from predictability and stability, to unpredictable and turbulent. Although the professional practitioner continues to

[5] http://ec.europa.eu/digital-agenda/en/content/fi-ware-future-internet-core-platform
[6] http://ec.europa.eu/digital-agenda/en/content/service-platform-innovative-communication-environment

face situations that are familiar, and in which proven approaches can be used to solve problems, more and more they will face situations that are unfamiliar, or where previously proven approaches fail to yield their anticipated results. Although activities to date have not delivered the bigger objective, the creation of knowledge around the subject could be seen as a core area of competence within the relevant practitioner groups. A third reason could be the influence of funding. As Galliher (1973) advised, without magnanimous support from patrons, large scale empirical research is nearly impossible. There is the reasonable possibility that issues and approaches are subconsciously or deliberately selected to be congruent with sources of significant or substantial funding. At a practical level it could be argued that there is little point coming up with significant issues where there is no significant funding.

A fourth reason arises from further consideration of the arguments above. This is the possibility of cross influence from members of the same practitioner environments contributing to the setting of agenda and the more detailed issues for calls for proposals within the policy issues. Equally, many reviewers of the proposals are, to some extent necessarily, also from the same practitioner environments. To complete the process key members of the same practitioner environments then also through the organizations they represent submit proposals for funding to complete the research. To some degree this could be seen as a self-fulfilling 'circle'. The third and fourth issues above raises the whole issue of the role of thought leadership and what influences there are on policy or meta-agenda setting in a high tech research environment. These issues are further considered and developed in later stages of this report.

The second topic will now be considered - the commercial criteria business models opportunity. Once again, as noted in appendix three, many initiatives related to this have been undertaken. Equally, a requirement for this type of modelling is increasingly being built into the dissemination and exploitation requirements of most research projects funded by the European Commission and informal verbal briefings indicate that it will become a more stringent requirement under the Horizon 2020 framework which commenced in 2014. This is important as the potential impact is immense. Manyika (2013) concludes that these technologies have significant potential to drive economic growth and even change

the sources of comparative advantages among nations. Manyika (2013) also advises that business leaders need to understand how the competitive advantages on which they have based strategy might erode or be enhanced a decade from now by emerging technologies — how technologies might bring them new customers or force them to defend their existing bases or inspire them to invent new strategies. The need for such models is understood and for relatively minor innovations business models have been created and implemented. However this remains at an incremental level rather than at a radical or disruptive level. The possibility remains that there may not be a commercial business case credibly created for the overall goal or meta-agenda prior to its achievement on other grounds. There is a precedent here being the initial development of the internet. A&E Television Networks (2014) describe this well; they advise that unlike technologies such as the light bulb or the telephone, the Internet has no single "inventor." Instead, it has evolved over time. The Internet got its start in the United States more than 50 years ago as a government weapon in the Cold War. This precedent model suggests that possibility that only a governmental or supranational body (or bodies) may be able to initially justify such large objectives as the Future Internet. There is as yet a lack of openly explicit specific intent to do so and the current programmes in this area are typically a series of discreet developmental (product and service development) initiatives. This situation leads to two rather different issues in interpretation, with one being the business models for individual product and service developments being incremental innovation. The second is a commercial justification for a more substantive part of the Future Internet vision representing radical or disruptive innovation with the potential for immense rewards to follow. It is therefore perhaps not surprising that this subject would be so highly ranked by scientific and commercially related practitioners. The influence of funding as described above may also apply to this opportunity.

The third topic is the ambient assisted living support structures opportunity. Even at a fairly cursory search level it can be seen that many calls for proposals on this subject have been made in recent years. Welcomeurope (2014) identifies eight calls in the last seven years from EC framework programmes for research alone, with a number of significant projects being commissioned within each call. The

subject remains part of the key theme of Health, Demographic Change and Wellbeing under the new Horizon 2020 framework where one of the main aims is to keep older people active and independent for longer and supports the development of new, safer and more effective interventions. Although there have been some incremental developments especially with mobility recognition they remain short of a less intrusive vision and an integrated radical ambient assisted living support solution remains elusive. A key step forward would be achievement of a self-contained solution not requiring environment rearrangement, the presence of specialized staff, nor prior information about elder users, where the focus is placed on the classification of human postures and the detection of related events. Users would be detected through a non-wearable easily-deployable device, overcoming the limitations of the wearable approaches (accelerometers, gyroscopes, etc.) for human monitoring as such devices are prone to be incorrectly worn or forgotten. Once again, the influence of funding as described above my also apply to this opportunity.

Across all three opportunities however, two consistent and clear trends arise. Firstly, whilst it is true to say that there are still opportunities for great progress in the identified areas, they are in reality focussed on and somewhat restricted to the participants existing areas of competence and leadership. This represents a somewhat structured developmental approach rather than demonstrating a more radical application. On the wider structural issues this wealth of research which has not so far been turned into applied innovation can still represent a bank of knowledge creation. Equally the apparent restricted nature of the issues being ‘championed’ by practitioners (and their organizations) brings into focus the difference between leadership and the potential ‘game changer’ of thought leadership. Secondly, the identified issues all follow well established funding routes and known funding themes for the future. In many ways these two trends are hardly surprising, but nevertheless they are quite profound when considering the establishment of policy or supra-national meta-agenda objectives, and in the development and acceptance of cutting edge positioning through the influence of thought leadership.

This has a fundamental importance for the setting of overall objectives or goals. Jasper (2010) concluded that goals are as central to strategic approaches as are

tactics, despite the common misconception that strategy is instrumental while goals reflect culture and emotions. Snow (2000) refers to movements clustering temporarily in a cyclical fashion and he talks of structural factors such as social networks, indigenous organizational strength, the structure of political opportunities and resource pools as the key explanatory mechanisms that affect the waxing and waning of social movements. In this context it is possible to view the Future Internet practitioner community as a social movement, and indeed possibly with much stronger influence as they strongly contribute to the development of framework objectives and the identification of specific call issues, with assessors and reviewers being pulled from the same community, and then they (and their organizations) bid to undertake the research work. It could be described as somewhat of a 'circular equation'. Bartunek (1993) advises that major change is said to be associated with reframing or changing the templates that shape interpretations. This is further supported by Schein (1996) who indicates that reframing involves a process of 'cognitive redefinition', as dissatisfaction with the status quo deriving from disconfirming information occurs. The issue is however wider than just information and includes influence. Hardy (1999) points out that the broader societal context is a source of resources for discursive activity in organizations, seeing the process of institutional definition as emerging from 'social construction growing out of discursive activity' allowing the development of 'common understandings and practices that form the rules and resources that define the field'.

In somewhat different ways the issues keep being focussed on what can be broadly described as knowledge creation (as opposed to innovation) and thought leadership (as opposed to leadership). Therefore, before moving to general conclusions and understandings it will be useful to examine further these two concepts.

Chapter 7: Discussion

Focus on the second primary objective

The focus in this chapter is aligned to primary objective number 2 as described in chapter 2. The research in this study so far represents a 'bottom-up' practitioner driven approach to radical progression of the Future Internet meta-objective. In order to understand how strategic pressure can additionally be brought to the progression of the meta-objective it is appropriate to consider key structural influences on the process. It is intended to provide context and balance to approaching the core issue. Here the challenge is to look for factors of influence as drivers of strategic transformation within agenda setting at a supranational level in high technology research. This includes the creation of a first level model and/or framework of understanding.

Depending on variables such as geography and functional relevance the terms 'model' and 'framework' can have different meanings and implications. Oxford Dictionaries describe a model as 'to devise a representation of a phenomenon or system' and to 'use a system, procedure, etc. as an example to follow or imitate' It also describes a framework as 'a basic structure underlying a system, concept, or text.' This can become more complex when cutting across modern, business, professional and academic disciplines. Krishnan (1997) refers to a 'model-based framework….. to manage the overlapping of coupled activities' and Bose (2000) describes a 'model predictive framework' for studying multiple dynamics. However, perhaps more relevant in the case of this study is Stepanov (2003) who sets out an approach of a 'meta-model that integrates elements in a framework.' The models or frameworks developed in this chapter can be seen in this context and therefore, whether they are called 'model' or 'framework' is in reality a somewhat semantic point. In this document a developed structure without a relationship flow between the components will be noted as a framework, and a structure with a relationship flow between the components will be noted as a model. However it is acknowledged that in academic convention the structures here may be viewed as only frameworks as they are open for further development

and additions, whereas a model may typically be viewed as more rigid where further work is to test the model.

Methods

Fundamentally the methodology, methods, ethics and risks used here are congruent with and an extension of those expressed in chapters 4 and 5, and so these will not be duplicated here. However there are two additional approaches applicable here which require consideration.

The first of these approaches is triangulation. Jankowicz (2005) describes this as ‘using some different technique and looking for compatibility.’ Verschuren (1999) outlines ‘triangulation of methods’ such as using questionnaires and interviews to support the same point, and ‘triangulation of sources’ such as using documents, specialists and subjects to support the same point. This has been further developed into what can be seen as a triangulation of approach by University of Florida (2014) which refers to a version of triangulation as ‘analysing a research issue or question from two (or more) perspectives.’ This triangulation of approach captures the essence of this study in applying a practitioner based generic empirical (bottom-up) approach and a cognitive theory development (top down approach) to the same fundamental issue. This can be illustrated as follows:

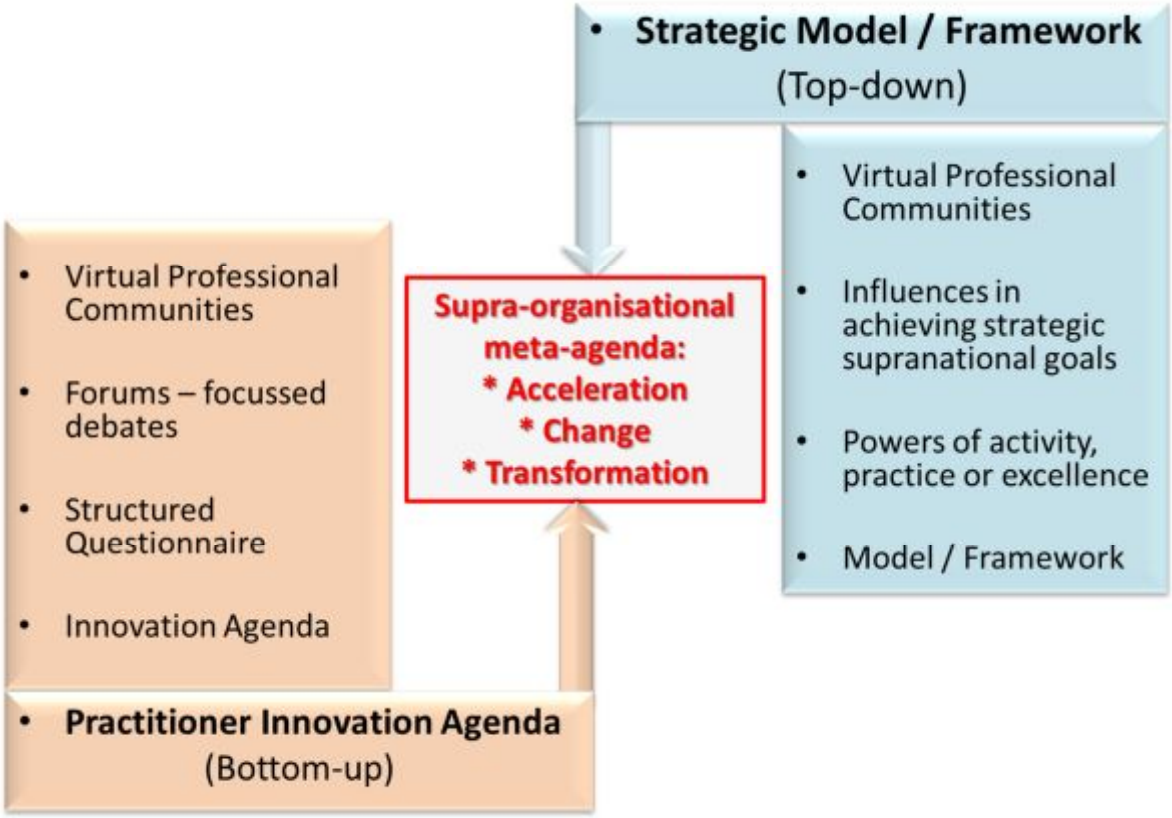


Figure 18: Triangulation of approach - One issue from two perspectives

The second of these approaches is grounded theory. Charmaz (2014, p1) advises that 'Grounded theory methods consist of systemic, yet flexible guidelines for collecting and analysing qualitative data to construct theories from the data. Thus researchers construct a theory 'grounded' in their data.' Bryman (2007) talks through various incarnations of grounded theory and illustrates that 'two central features of grounded theory are that it is concerned with the development of theory out of data and the approach is iterative or recursive.' It was described by Burgess (1982) as' involving a process of analytic induction.' In view of the limitations (see later in this chapter) in attributing ranking, weighting or other quantitative significance it is seen that grounded theory has not been applied here but could be the basis of the next stage development in further refining and testing the results. The approach here is one of extending a research approach, with elements of action research, into initial theory development which can be shown in the following (action) research spiral figure adapted from Thornhill et al. (2000):

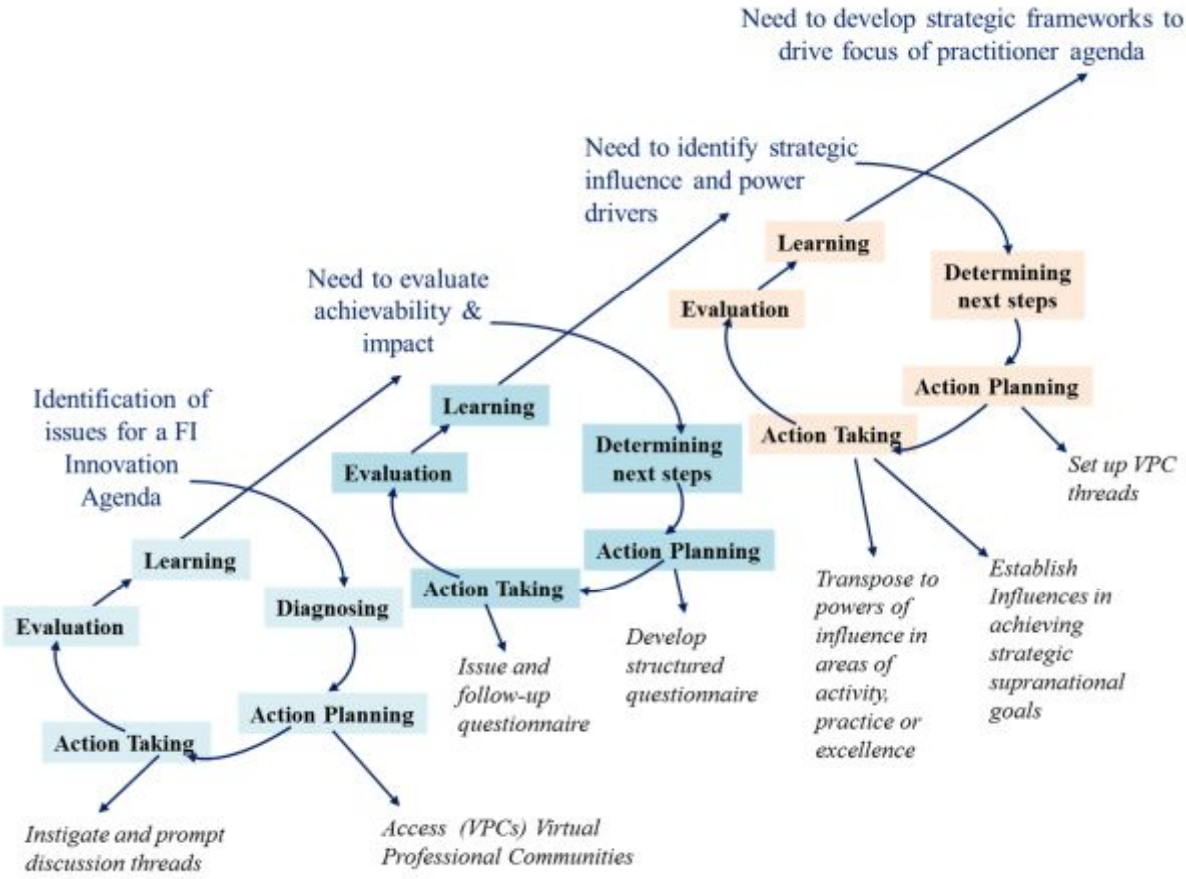


Figure 19: Research Spiral (Action) - adapted from Thornhill et al. (2000)

The Approach

In practice, following the forum threads and the questionnaire analysis, agreement was reached with the forum group controllers for the debate to be continued for a number of weeks for two lines of enquiry or discussion, these being:

1. What are the influences from a national or supranational body (e.g. the EU/EC) in achieving the strategic goals or meta-agenda goals of a major high-tech concept such as the Future Internet?

2. Subsequent to the first step to map the issues to areas of activity, power or excellence to form the components of a model of understanding with potential for use by relevant strategic management or leadership.

Additional Limitations

When introducing this phase into the practitioner groups, many became immediately predictive about the process. In the discussion threads, practitioner participants generally acknowledged that they had substantial background, experience, knowledge and skills in determining specific development subject matter and having considered views on its achievability and potential impact. Further, they were generally happy to consider influences that had affected them or which they deemed to have affected communities (such as user or contributor groups), however they strongly agreed that they had insufficient expertise to rank or weight the issues on importance or ultimate effect, or other effects as related to specific forms of measurement. This was acknowledged and it was generally agreed that while this study may identify a number of influences, and could then look to transpose these into areas of activity or power to aid use by relevant strategic management, it would not purport, portray or try to attribute any ranking, weighting or other quantitative significance to these findings. In other words, the findings would represent a first level framework or model of understanding which would require further validation and quantification in subsequent research activity.

The practitioner participants also generally agreed that their input would have gone as far as it could ‘expertly’ go with the influences identification and transposition into areas of activity or power at a strategic level. The further formatting or ordering of this into a first level framework would be and remain the interpretation and hypothesis of the author, and therefore require further validation beyond this study. It should also be noted that the clustering and semantic reconciliation approach noted in chapter 5 has continued to be applied here.

Constraining the Network Technology Revolution of Our Time

The project findings, and the framing of the findings, represents the empirical part of this study (primary aim number 1 in chapter 4) and brings it to the cognitive assessment and framing phase (primary objective number 2 in chapter 4) where related consideration is undertaken of some of the more intangible influences in achieving the strategic goals or meta-agenda goals of the Future Internet. This can be seen more as a wider cognitive framing in relation to the empirical results, or the possibility of applying pressure on the same strategic goal from two directions (bottom-up and top-down) at the same time.

This emerged in two main divisions, firstly the broader issues which are largely beyond a government or supranational administration. This included consideration of radical versus incremental innovation, the wish for certainty, the view of the future, the role of eminence in policy and evidence, protectionism and economic implications, the pressure to misrepresent, and control. Secondly, consideration was given to the less tangible issues over which a government or supranational administration can probably expect to have some reasonable degree of control. This included consideration of thought leadership, knowledge and evidence creation, appreciative enquiry and anti-creativity bias. The bringing together of these stages will be the background to putting forward a model of understanding and a consolidated view of the powers of influencing strategic change in this context. As Fuller (2014) said 'You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.'

> *You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.*
>
> *Buckminster Fuller*

The clustering of the data is at one level relatively straightforward, however the extent of the activity and the grounded nature of it deserve further articulation especially where there are not direct technical comparative terms. The period of this exercise was approximately four month, although as the starting dates for the different groups were staggered it was spread over nearly six months. There were hundreds of posts overall. The initial analysis was undertaken by capturing each post (comment) on a 'post it' sticky slip, laying them out on a big table and starting to group together those with similar content by key words. So, for example those referring to motivation were grouped, those referring to reward were grouped as were recognition and so on. This resulted in many small groupings. Then the meaning of the posts were considered and for example those on motivation, reward, recognition and others when viewed as whole comments rather than just key words were congruent with a theme of appreciation, and so were brought together under a combined group on a thematic approach. This progressed the analysis from episodic terms (individual, immediate) to thematic terms (collective, longer-term and issue related).

This clustering of issue can perhaps be illustrated by examining an example. If we take the cluster grouped under the heading of 'appreciative enquiry' many of the issues described are illustrated. Ten example comments are noted as follows:

1) We are motivated when they focus on and develop the good and value adding things that we have contributed to.

2) You train an animal to focus on issues that have been praised or rewarded – we are the same.

3) It is about building on success in sequential initiatives which brings its own motivation.

4) We are motivated by being selected to play to our strengths – building on to what we are best at.

5) Our capability of delivering the future is trusted so we have to respond

6) I develop stories reaffirming the common elements to past success and so giving us confidence for the future.

7) I respond to focuses of doing more of what is already working, rather than focusing on fixing problems – it confirms my progression.

8) It is the opportunity to express what I most value about myself, my work, and my organization. It is belonging and being appreciated.

9) Recognising our strengths is an expression of their gratitude and brings gratitude from us.

10) It is when they show they value the best of what there is in our team.

A common element in these is the sense of recognition, being appreciated or trusted. Of course a common cluster name could emerge out of these descriptions. However, this would miss the opportunity to link the findings into existing bodies of work in other areas of knowledge and research. The opportunity was therefore taken to cluster under headings which would recognise the link between existing established work and the emerging issues here, and use a thematic analysis/assessment approach. This was considered appropriate as the intended value here is in the emerging combination of clusters and potentially their interrelationships. This was considered preferable to inventing new underlying terminologies which could make the acceptance of the findings by management and strategic implementers somewhat more challenging than it would otherwise need to be. In this case the key words, phraseology and direction of theme were strongly recognisable in the existing body of work under the heading of appreciative enquiry. The meaning, intent and understanding in the body of work and the project analysis were so close that it was considered to have no advantage in understanding and application to use anything other than the established terminology for it. A similar clustering approach was adopted in respect of the other identified clusters.

Situating new findings across and within headings used in bodies of knowledge previously accepted potentially enhances the opportunity to facilitate acceptance in the professional practice community. Helping users see such form-function correlations is one way to "demystify" new research discourse and application (Huckin 1987).

The issues identified, in no particular order, ranking or weighting were:

1. Radical or Incremental Innovation
2. The Wish for Certainty
3. The view of the future
4. The role of eminence in policy and evidence
5. Protectionism
6. Economic implications
7. The pressure to misrepresent, and control
8. Thought leadership
9. Knowledge and evidence creation
10. Appreciative enquiry
11. Anti-creativity bias

Each of these areas of influence will be outlined and considered below.

1. Radical or Incremental Innovation

Initially it appears that the FI community has not delivered an Innovation Agenda – but rather a focus on existing research framework themes. These focus areas have been turned into summaries to create the research agenda intended for future collaboration and partner development into proposals. The agenda that has emerged appears to be consistent with and progression of the continued creation of knowledge and could play its part through the evolution and aggregation of knowledge. The findings also seem to support the idea that true hi-tech innovation and adoption (as opposed to knowledge creation and possibly invention) is largely left to large commercial and specialist organisations and possibly national/supranational bodies. There are some good conclusions in relation to the Innovation Agenda but in substance it does not appear to be fundamentally innovative, although arguably it is incrementally innovative.

The big meta-goals remain and in classic business and marketing, product concepts are developed, and then movement is towards a certain level of standardisation or codification which allows mass market exploitation. In the case of the Future Internet (FI) it is still at the product and concept development stage

with interoperability or codified search and selection being a big step to be achieved in the overall journey. However, as buyers and sellers become more internet based, questions become more important such as whether the traditional linear mind-set will be discarded with a resulting realignment of judgement calls. Mass data will be not only be presented at a top level but also summarily visualised encouraging decisions on breadth of possibilities rather than encouraging focus on depth. It also has implications on the pace of decision making and judgement calls for competitive advantage as you will be able to outsource an entire factory in a day with effective interoperability on the internet. It could be in effect the emergence of a new method of exchange. The key issue seems to be that of where the leaders and policy makers will direct activity.

It is becoming easier for everyone to find out what others are doing and how it is done, and with reducing barriers to entry it will keep pressure on utility pricing for competitive services. However, despite all the development and logic to date it is true that not many genuine internet companies have yet made a profit. Even Amazon only recently made a transactional profit, achieving this through becoming the dominant player with dominant volume; it was not strictly achieved because of any advantage of being on the web. Also, valuations of Facebook and the like are substantially based on intangibles such as perceived intellectual property, brand value/allegiance and levels of user interest.

In practice, a more radical use of what emerges can be greater than just additional use of what is there. For example, knowing that if a person buys one thing they are more disposed to buy certain others has long been used by Amazon, big supermarkets and others. However, the collation of massive complex data (big data) does not simply allow the connection of more ‘one-step’ product relationships. For example, you could envisage that if a 23 year old female living in Birmingham bought in April cocoa-butter lotion, a large carry bag, magnesium and zinc supplements it is possible to predict a very high probability that she is pregnant and that the delivery date would probably be sometime in late September. Being able to analyse complex massive data in real time creates new market and customer identification approaches and opportunities.

2. The Wish for Certainty

‘People make decisions based predominantly on intuitive, often unconscious criteria. Anyone who wants to make use of these soft factors must first uncover them’ (NextPractice 2014). Indeed, Kay (2013) argues that there is a craving for specific knowledge around evolution relating to complex systems saying that they will pay ‘good money for the services of clairvoyants and economic forecasters.’ However, the sought after knowledge is not often available and it remains questionable whether it would be useful even if it was available. Kay (2013) illustrates this by referring to work undertaken by physicists studying sport, noting that while many players are extremely good at ball catching, they are bad at answering questions such as where in the ground the ball will land. The interpretation assigned to this is that even excellent players do not rely on forecasting the future as they routinely adapt to it as it occurs; hence sayings such as ‘keep your eye on the ball.’ In this scenario the interaction between the flight of the ball and the manoeuvring of the player is in comparison to many scenarios, relatively simple as the bulk of information needed to analyse the flight of the ball and suggest optimal positioning is available. However the time for computation and communication is simply not available. Certainly with more complex situations it is more often the case that the required relevant knowledge and information may not be understood or even potentially knowable without considerable hindsight and analysis. The demonstrated ability of the sports person is not the conclusion of better knowledge of the future, it rather being a developed and practiced ability to deploy and deliver sound strategies for decision making in changing and complex environments. It can be argued that similar qualities characterise successful managers and leaders. However, if that is true then managers and leaders who purport to ‘know the future’ may more often be reckless and wasteful rather than great visionaries.

This could apply to the business world where management often strive for a position where decision making is without risk, because they have all the information about the exact outcome of the decision, before they make the decision. Perhaps the more realistic option is to use the information as intelligent risk management in setting the direction and course, yet rely more on management skills of adjustment and refinement as the application progresses.

Examples of really manageable certainty include the need to meet customer, contract or regulatory requirements. The outcomes or consequences of failure are known. As Free (2014) put it 'Uncertainty, Rumsfeld's "unknown unknowns" cannot be successfully met with the tools that are effective in dealing with certainty and risk. In 2008, many shops were in compliance with their banking agreements, yet found the bank no longer willing to support them due to unforeseen changes in the broad economy and automotive market. Controlling financial positions to stay in control on banking covenants did no good if the bank was suddenly finding itself "overexposed" to the bankrupt automotive sector in its lending portfolio.'

3. Leading the View of the Future

There still does not yet seem to be a coherent view of what future business could look like that may transcend the current product, service and technical developments. This include issues of how Collaboration Platforms can provide utilities for knowledge collaboration (e.g. repositories, search engines, up- down-load facility, classification) and business collaboration (e.g. workflow, workgroup and business process management services), and possible impacts if, for example, they are specialised to a domain, sector or country through ontology, multiple classifications or other methodologies.

There are a number of issues that have emerged in relation to leading the view of the future. The most notable detected from the practitioner forums is a rush to solution mode in forming opinions. This seems to be strong and, possibly inadvertently, largely directed by strong lobbies and/or eminence in the acceptance and practice of new ideas. However, especially in the high-tech environment change is a constant, arguably the only real constant, and therefore particularly in this environment context will be an absolutely critical component of achieving success in leading the view of the future.

Someone who is seen to be an outstanding leader in a particular situation often will not perform very well in a different situation. Academic studies support this and experience in McKinsey & Company is consistent with it (Gurdjian 2014). Gurdjian (2014) illustrates this through the case of a chief executive of a large

services business in Europe who had an excellent record within fast growing markets and times. However, during the more recent economic downturn he failed in giving clear direction or imposing necessary financial discipline across the business' divisions. Instead of dealing with the imperatives of the new reality, he maintained focus on innovation and new ways of thinking. These attributes were the cornerstones of the culture that had delivered success in the previous circumstances. This continued until he was eventually dismissed for underperformance.

The conclusion of Gurdjian's analysis is that along with a focus on the changing context is a requirement to move to leaders who are equipped with a smaller number of key competencies. Those competencies however must be those that will deliver a significant positive difference in performance within the current or emerging context. The heart of the problem here is that up-and-coming leaders, albeit highly talented, will often struggle to translate some of their strongest experiences into changed behaviour at the 'sharp end' to address significantly changed contexts.

In practice this could mean muchgreater emphasis in future on leadership as a team with different participants and areas getting more or less priority and resource as contexts change. In this scenario the CEO/MD becomes more akin to an orchestrator or football team manager using different skills, combinations and resource levels for different occasions. If the CEO is the dominant 'player' in the organisation then perhaps the Chairman/Board need to be more ready to adjust powers or perhaps even personnel as circumstances change. However, if the CEO is mor of an orchestrator allowing star/dominant players within the team then the CEO can more readily make the beneficial judgments of emphasis.

4. Eminence, Policy and Evidence

The influence of eminence is particularly intangible as it relates to due, or undue, weight given to professional 'elders.' Oxford Dictionaries (2014) describe eminence as 'an important or distinguished person', or 'fame or acknowledged superiority within a particular sphere.' Eminence implies experience and prior success over periods of time. However in a rapidly changing world this

experience may not be relevant for evidence and policy in significantly changed contexts. Murphy (2013) considers that there is confusion in the distinction between evidence based policy making and policy based evidence making. He refers in essence to the undue weight given to those in a position of eminence and he goes further in acknowledging the role of public incidents that changed the dynamic and increased influence. Perhaps more importantly he recognises the influence of campaigning ‘celebrities’ wishing to amend proposals. The term ‘celebrities’ is meant in this context to include peer fame and deference rather than a more populist definition. This is significantly about past work and the passage of time which has a relationship with age and established status.

It is interesting to further consider a relationship between eminence, and a perception or acceptance of position and status in relation to age and establishment. Fortune magazine published their list of the world's fifty greatest leaders (Fortune 2014). Although their criteria may be subjective, and to some extent populist, it can indicate some rather interesting, if unintended from its own perspective, insights into related areas such as age. A different analysis of the information presented reveals that of the top ten leaders listed, the average age is sixty six. Over the top twenty, the average age is sixty two. Over the top thirty the average age is sixty one. Over the top forty the average age is fifty nine. Over the entire top fifty, the average age is fifty seven. Although it includes some young leaders in their twenties and indeed a teenager, the figures overwhelmingly associates leadership with those who have been around for a long time and who over extended periods have achieved some degree of eminence.

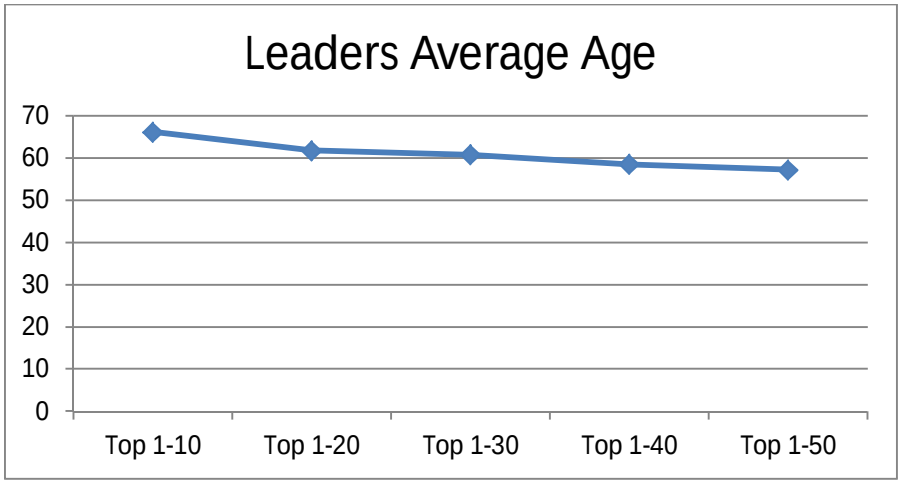


Figure 20: Leaders Average Age

Information compiled from Fortune Magazine, April 7, 2014 issue

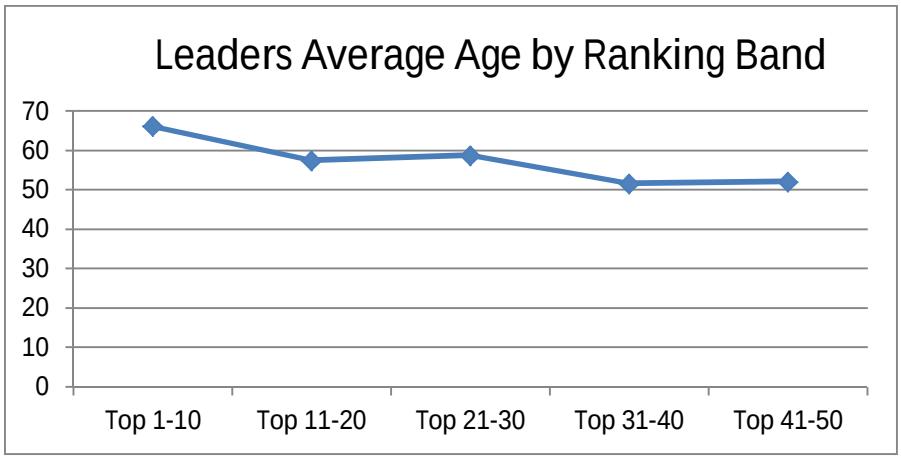


Figure 21: Leaders Average Age by Ranking Bands

Information compiled from Fortune Magazine, April 7, 2014 issue

Perhaps the appropriate analogy here is with the requirements of financial services regulators. The US Securities and Exchange Commission provides clear advice to the public stating that ‘past performance does not necessarily predict future results’. Perhaps this equally applies to the mixture of eminence and evidence in policymaking and its delivery.

Eminence can also be considered in terms of dimensions of influence and power, however these dimensions are inherently intangible. Despite being particularly intangible it is something widely recognised. As Bierstedt (1950, p 732) put it “Napoleon Bonaparte and Abraham Lincoln were men of both power and

influence. Genghis Khan and Adolf Hitler were men of power. Archimedes was a man of influence, but the soldier who slew him at the storming of Syracuse had more power." The position of eminence links across these two dimensions in varying proportions depending on the arguments and positions of the eminent individuals. Sometimes it can take quite some time before a new 'wave' of eminence occurs. It is linked to thought leadership and business/commercial leadership in driving strategic concepts and initiatives forward.

An example of this could be Richard Branson, who over the years has become an accepted business leader. However, while he has some clear business successes he has probably just as many failures. One could ask what happened to Virgin Cola, Virgin Computers, Virgin Student (a sort of Facebook before Facebook), Virgin Brides, Virgin Vie (cosmetics etc.), Virgin Clothing, Virgin Cars, Virginware (lingerie), Virgin Flowers and Virgin Digital (iTunes type), and others. The acceptance and attributed image belies the record that he is perhaps just as likely to deliver failure as success. The reality of eminence is inherently selective.

5. Protectionism

A related issue is the extent of protectionism in inhibiting innovation and whether such things as patents are an inhibitor or positive measure in this area. Simon (2013) states 'innovativeness is the most important strength of a company (and a country) in the medium and long term. A country may be competitive today, but if it does not respond to changes and continue to break new ground, it will fall behind in five or ten years' time'. He looks at one indicator to illustrate innovativeness being the number of patents. This indicator does not cover all aspects of innovativeness, but he uses it to reveal divergences.

The European Patent Office granted 62,112 patents in 2011. Of those, 13,382 were to applicants in the US and 11,649 to applicants in Japan. Europe accounted for 32,582 patents, of which 13,583 went to Germany, 2,531 to Switzerland and 1,491 to Sweden. However, Greece accounted for only 29, Portugal 26, Spain, a country with 46 million inhabitants, only 381!

Siemens are currently the largest patent registers in Europe, having applied for around six times more patents than the whole of Spain.

Simon points out that ‘it is unfair to compare absolute numbers of patents without considering the size of the population’. He goes on to look at the number of patents per million inhabitants. Switzerland emerges as the clear leader. ‘Per head of the population, the Swiss apply for 128 times more patents than the Greeks, and 39 times as many as the Spaniards’.

Simon points out that ‘taking a per capita index for patents issued with Germany at 100, France achieves an index rating of 44, Italy 23 and the UK 19’.

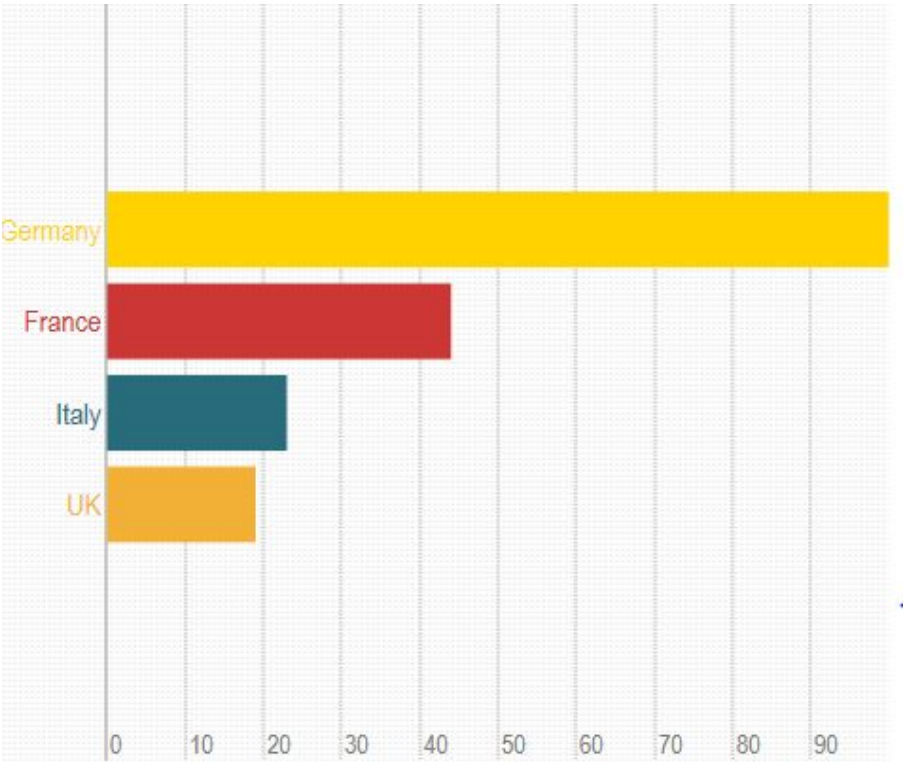


Figure 22: Patents Per Capita

However limited the validity of his simple analysis is, it certainly strongly indicates something. However, what it indicates is a little more subjective. Is it, as he implies, an indicator of innovativeness, or does it signify more of a protectionist approach to IPR (intellectual property rights)? Perhaps some cultures are happier with non-protective collaboration, looking to exploitation for advantage.

Keeping valuable information secret is perhaps the most effective way for companies to protect their intellectual property. This includes the results of their

research and innovation efforts. Although patents can provide some protection in this area, there are limitations on what can be patented. Many organisations are engaging small high technology companies, public sector laboratories, universities, international firms and competitors in ways which were not dreamed of even five years ago. At the heart of these collaborations is the necessity to share proprietary, commercial and intellectual property to meet the objectives of collaboration. Equally important is the potentially conflicting need to protect that information from unintended use.

The European Union will recognise the existence of background intellectual property, and intellectual property rights, if declared before the start of a European Union research project. Background rights are intellectual property, and intellectual property rights, which you bring to a project for use within it and within any exploitation from project developments. However the European Union do not promote the use of background IP and IPR rights, although they do actively promote the sharing, dissemination and exploitation of created foreground intellectual property and intellectual property rights. These are rights created within an EU funded research project. They write much on this and the EU IPR Helpdesk (2012) has even produced a factsheet entitled 'The plan for the use and dissemination of foreground in FP7'. Within this they declare six other publications which contribute to the publication of the factsheet, and these are listed in Appendix 12. The general themes are about how to deal with IP-related issues in transnational negotiations and IP due diligence in relation to assessing value and risks of intangibles.

From a policy point of view, they can be seen, as in the words of the Helpdesk 'to ensure a wide use and dissemination of the knowledge generated, thereby promoting further scientific developments, maximising the impact of the funding granted in the market and demonstrating the added value of projects'. However, once again there could be an ambivalence of effect. It is not entirely clear whether this encourages the realisation and declaration of intellectual property, and intellectual property rights within a project, or whether the incentive is just to create sufficient knowledge allowing for invention and innovation elsewhere.

Perhaps in practice you could envisage it working out as large global players such as Microsoft and Google being measured more by the number of patents they produce in emerging areas of technology and markets, and for most other organisations by the number of research and development (R&D) collaborations they have. This of course is only conjecture and only time will determine how we look back on it.

6. Economic Implications

The economic implications of innovation and its direction, and leadership are widely recognised. The World Economic Forum in Davos in January 2013 highlighted the role of innovation and its required leadership. Hobcraft (2013) points out that the term 'innovation' is used 47 times in the preliminary agenda and in his opinion in 'very specific ways that take it beyond the 'buzzword' into something that has substance'. Many different discussion prompters were used over the four days of the Forum which included the words innovation or innovations. Appendix 11 shows 34 examples of these. Hobcraft (2013) suggests that 'innovation is essential but it does need the dedicated focus within its understanding, structures and organization. As our leaders come down from the mountain, they do need to have an Innovation tablet in their hand and chiselled in their brain'.

However, the United Nations statistics division note that:

- 2000 businesses in 2011 controlled 51% of the total economic output/turnover of the world
- In nominal terms this represented $36 trillion where the total economic global output was $71 trillion
- These 2000 companies only employ around 180 million people worldwide
- The remainder of economically available workforce/people of the world, is around 3,200 million
- UN estimate world population of 10 billion by 2050

This concentration of commercial activity and economic power does raise questions of how much national and supra-national bodies can influence innovation or ensure benefit derived from it will fall to their represented peoples.

However, the economics of innovation remain open to ambivalent interpretation. Disruptive innovation usually leads to job creation local to a specific company or industry. That does not of itself imply net new job creation. It's entirely possible for a disruptive innovation to require far fewer employees than the industry/companies it replaces. They may be better jobs, but that still means a net jobs loss. For example, Netflix requires far fewer people than Blockbuster did. Radical innovation or creative disruption is neither positive, nor negative, nor neutral. It is in that sense agnostic.

There is a related aspect which is brought out in the GE Global Innovation Barometer survey (2013). It highlights the tension between the desire for globalization and protectionist temptations organizations sometimes tend to favour. It seems as our leaders are being pushed outside their comfort zones they are having this uneasiness with the pace of change and confusion over the best path forward.

7. The Pressure to Misrepresent

Strategic misrepresentation- originally used within the economics profession – describes scenarios that may result in a mismatch in interests between agents. Flyvbjerg (2007) has taken this theory and adapted it for mega-projects.

Some of the main problems in major infrastructure developments are pervasive misinformation in the early phases of the project cycle about the benefit, and risks involved. A consequence of misinformation is massive benefit shortfalls, and waste. Flyvbjerg (2007) explores the causes of misinformation and finds that optimism bias and strategic misinformation best account for the available evidence. In the case of strategic misrepresentation, planners and promoters deliberately misrepresent costs, benefits, and risks in order to increase the likelihood that it is their projects, and not the competition's, that gain approval and funding. This results in a negated Darwinism with "survival of the un-fittest,"

where often it is not the best projects that are built, but the most misrepresented ones.

This is to some extent demonstrated by the lack of wide-scale tangible impact evidence which the EU can find to claim, after many generations of framework programmes and other programmes.

8. Control

There are many social and wider impacts related to this research some of which are considered in the ethics sub-section in Chapter 4. However, as it is fundamentally consideration of a Futures nature it would be fair to say that we do not know enough about the social or ethical impacts on society. This of itself raises big questions not least of which is regulation and constraint. The issue of whether science and technology (and business/enterprise) should be allowed to pursue this (do this to society) or whether it should be restrained, paced or in some way regulated is a real consideration. The dilemma with regulation is that regulation itself normally follows innovation and practice. To try to regulate something in advance that you do not know the form/structure of is inherently problematical and probably ineffective as different terminology, technology and methodology can quickly emerge. A corollary question is of how or who can control internet type structures or the knowledge which is somewhere on or in it. Even if it could be effectively controlled the question remains whether there is an appetite to do so. The development of the Future Internet is heavily supported by the European Commission, the US Government and many others and is seen as potentially offering competitive advantage on, for example, collaboration benefiting communities such as the EU.

The potential of such national and supra-national support has the possibility of market distortion as initial business models within current EU projects at least question whether commercial organisations would pursue matters in the current way, or as fast. This is not to say that businesses would not accept and commercialise it once it is established, in a way somewhat akin to the original internet being created for military purposes – to ensure communication

Beyond Current-World Constraints

During 2012, Carl Bass, the President and Chief Executive Officer at Autodesk, began a key presentation on 'The New Rules of Innovation' by stunning attendees with a fundamental yet quite philosophical proposition that "innovation is the process by which we change the world" (Bass 2012). This probably expresses the idea of innovation in an effective conceptual form. Many examples of this occur in real-world enterprise that repeatedly progress our ways of life. Examples of this include Google- which is consistently developing the ways in which we use, and the ways in which we can potentially use the internet, 3M- which has no boundaries or limitations for what they look to bring forward. Their enterprise, according to Lehrer (2012), 'ranges from Scotch Tape to lithium ion batteries to dental fillings', and he goes on to say they are 'one of the most influential companies of current times'. Apple, which is a recognised vanguard of innovation the world over continuously bring new products to the market. It can be asserted that they create new markets such as the iPad and subsequently the iPad Mini, which according to Smith (2010) 'instantly become the dominant design'

In a Business Week interview in May, 1998 Steve Jobs advised "A lot of times, people don't know what they want until you show it to them."

Bass gives more insight into innovation when he describes that 'innovation is not a corporate phenomenon, but it involves taking risks and breaking the rules, exactly the opposite to what the majority of companies are good at'. When this is coupled to the trend of globalisation, it can be argued that this also extends the application of companies being exceptionally good at making rules and minimising risk. Bass further explains that lack of innovation 'is not down to the failure of companies but the result of prudent, well-structured management.

Management rigour can therefore understandably be seen as inhibiting radical innovation rather than increasing its chances. However we are now in an age where innovation is a focus. Janszen (2000) advises the requirement for innovation by stating that 'there have been a number of eras, each with a specific focus; Efficiency was the focus of the 1950's- 1960's, followed by Quality during

the 1970's- 1980's, which led to Flexibility just before the turn of the century, and now Innovation is the main driving force behind growth in today's economy'.

In current times, radical change is progressively seen as more normal, and continual innovation can be seen as a key for future survival and prosperity. Rigby (2005) advises that "Innovation is both a vaccine against market slowdowns and an elixir that rejuvenates growth." It may be an indicator why companies like Google, 3M and Apple will probably continue to prosper, with innovation remaining at their cores. The disappointment here, particularly at a policy level, for national and supra-national bodies is the lack of participation by such companies in truly collaborative research and open innovation.

Silicon Valley in the United States of America has an amazing reputation and is recognised across the world. It accommodates the Xerox Palo Alto Research Centre (PARC), Apple, Hewlett-Packard and IDEO, also including a base of the Ivy League school Stanford University. It is compelling to recognise the success of those in this location in continually pushing forward innovation. This recognition is supported by Kelley (2002). This does raise the idea that location may play a role in innovation, or perhaps it is the transferability of knowledge and skills through people moving to different organisations in a region of excellence. A different way of looking at this provides a challenging question for European national and supra-national bodies of whether this transferable excellence can be achieved through greater support of collaborative or open innovation/research or through encouraging greater inclusion of larger corporates into their collaborative research programmes. This of itself causes the need for consideration of the behaviour of such companies that have taken part in European national and supra-national bodies sponsored collaborative research and whether the semi-virtual involvement can go some way to address this. This issue is beyond the scope of this research and requires substantial further investigation it its own right, however its potential influence and effect is certainly noted here.

1. Thought Leadership

Hawkins (2006) argues that leadership is not just a role we inhabit – it is also an attitude to life and its challenges. Leadership begins when we stop blaming others

and making excuses when things go wrong. Leadership begins when we start to explore ‘How can I best make a difference’. Equally, leadership is an incredibly powerful attribute according to Belbin (1981) in his research and theory. Although more famous now for the description and use of eight team roles, an additional key finding is that leaders come in all shapes and sizes, from all sorts of backgrounds and from most ranges of academic ability. However, one clear factor which they all seemed to have in common was an ability to communicate an idea. For some this was with pictures, for some with written text and others through the spoken word – but in all cases of effective leadership the communication of concepts and ideas was positively achieved. There is no ‘formula’ for leadership success although there are myriad understandings, best practice and approaches which can help to reduce and avoid many of the negatives, and support the positives. However Belbin’s research was focussed on organizational leadership and does not really address a different side to leadership being almost ‘pure leadership’ outside of direct management, project or operational issues. This type of leadership is in developing and leading the thoughts and aspirations of others to establish and lead new concepts and ideas across organisations, national and supranational bodies and academia on an international or even global basis.

Albeit expressed in different ways, successful high level leadership includes some combination of communication of concepts and ideas, along with good levels of personal presence or as it is often described in business, gravitas. These are enablers for key individuals to drive vision, direction and momentum from a high level and with the enthusiasm and commitment for it to be effectively cascaded into wider structures. Ideas and visions need to meet with momentum and influence to be highly effective. The Cass Business School (2014) talks about thought leadership as being a leader in a field, able to give the world new and exciting ideas, products and services. Hochenson (2013) says that it’s one thing to be the most successful, most efficient, or most management-oriented leader in an industry, and it’s quite another to be a thought leader. Hochenson (2013) goes on to describe that there are effectively two sides to the thought leader coin: pushing the boundaries of a particular method or industry, and then using those ideas to leverage ubiquity on social or broadcast media. But achieving those two things

simultaneously is actually more difficult than it sounds. In some proportion there is a balance required to achieve thought leadership with one side being insight (challenge, questioning, new thinking, new ways, asking ‘what if’ etc) and the other side being engagement (framing the debate, creating ‘conversations’, engaging with target audiences, writing, speaking etc). This can be illustrated as follows:

Thought Leadership Balance

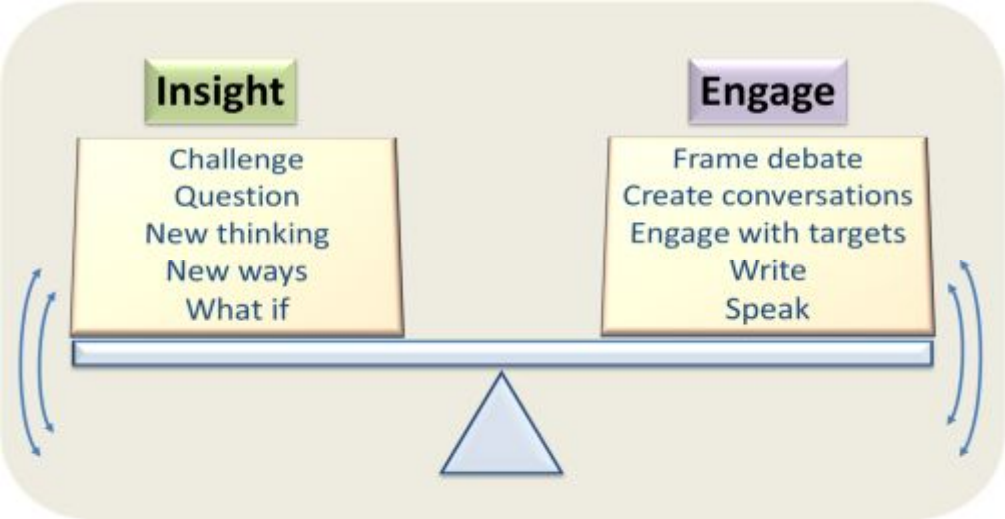


Figure 23: Thought Leadership Balance

Brossau (2014) opines that thought leaders do come in every shape and size, they do come from any background or community and they can be any age, gender or ethnicity. That said, not just anyone can be a thought leader. Thought leadership takes time (sometimes years); knowledge and expertise in a particular niche; a certain level of commitment and a willingness to buck the status quo or the way things have always been done. She goes on to say that thought leadership is not about being known, it is about being known for making a difference.

There is a question of whether leadership, and particularly thought leadership, is a systemic emergent pattern, or in other words the result of a process such as engagement. At the heart of this question is the intangible conundrum of when does an idea become accepted? At one level this is easy as it becomes accepted when it is acknowledged, built upon and given weight in argument or policy (or strategy). In other words it is accepted when it is accepted. However, what that

does not answer is whether it is more about the gravitas of the individual or organization over and above any insight, logic or challenge. If that is the case then for an idea to become accepted it may be necessary to wait for strong lobbies to retire or die, or at least fade to a level of irrelevance. This possibility could be described as being 'not evidence based practice, but eminence based practice'!

In order to bridge the gap between scientific evidence and practice, Grol (2004) suggests that we need an in-depth understanding of the barriers and incentives to achieving change in practice. He further advises that various theories and models for change point to a multitude of factors that may affect the successful implementation of evidence. When planning complex changes in practice, potential barriers at various levels need to be addressed. He concludes that planning needs to take into account the nature of the innovation; characteristics of the professionals ….. involved; and the social, organisational, economic and political context.

These wider contexts collectively create an environment and the question here is whether the environment creates a system based on insularity. Lussier (2010) says that the lack of leadership in encouraging and supporting…..initiative or new ideas destroys creativity. Low-performance cultures want to maintain the status quo; as a result, avoiding risk and not making mistakes become more important to a person's career advancement than entrepreneurial success and innovative accomplishments. The possibility of a system of insularity existing was outlined in the previous sub section on Framing and Implications of Findings where it is described as cross influence from members of the same practitioner environments. In respect of the Future Internet meta-agenda, the same environment of practitioners contribute to the setting of agenda, the more detailed issues for calls for specific research project proposals, submission of proposals for funding to complete the research, initial assessment and ongoing reviews of activities – a self-fulfilling or insular circle. This emphasises the need for originality or thought leadership to be injected to the agenda setting process.

However, Painter-Morland (2008) says that leadership is socially constructed, as the need for it arises within the complex interactions between individuals and groups within organizations, and can therefore not be described as a set of traits or

behaviours possessed by only certain individuals who occupy positions of authority. This type of inter-organizational interaction incorporating key individuals is generally referred to as systemic leadership. This is further supported by Brown (2006) with a proposal from analysis of leadership. In this work it is argued that there is a need for a more systematic and unified social scientific approach to the phenomenon of leadership as it is actually manifested in everyday business practice. The issue here is a degree on inseparability between the key individual (leader) and the organisations they operate within. In fact, Brown comes round to the view that leadership is the function of key individuals who occupy positions of authority. The two dominant components of leadership emerging from that work are key individuals and positions of authority. Unfortunately, this work as with a lot of research on leadership, fails to recognise the position of thought leadership as separate from organizational leadership.

Some have gone a little further, such as Maak (2006) who outline leadership as the art of building and sustaining relationships with all relevant stakeholders. This is somewhat wider, yet again in concept is organizationally based. Uhl-Bien (2006) goes a little deeper in recognising two perspectives within ‘‘relational leadership.’’ She sees both perspectives as complementary, with both having distinct implications for the study and practice of leadership. First is a perspective or entity which maintains a focus on identification of individual attributes of leaders while they engage in interpersonal relationships. Secondly there is a relationally based perspective which views leadership as a process of social construction through which particular understandings of leadership come about and gain ontological saliency. She goes on to argue that exchange-theory, which is study of charisma as a social relationship between leaders and followers, and the idea of ‘collective or relational selves’ can be seen as examples of a move toward a more relational conception of leaders. This relational concept can be extended into a meaning of wider influence both within and outside of an organization and so starts to correlate with a wider position of influence which is earlier described as the thought leadership balance. Some congruence with this can be inferred as from the relational perspective. Uhl-Bien creates a broader construct of leadership as a social influence process through which emergent

coordination (such as social order) and change (new approaches, value, attitudes, and ideologies) are constructed and produced.

Uhl-Bien (2007) in a later work makes distinctions between administrative leadership, adaptive leadership, and enabling leadership.

Leadership type	**Descriptor**
Administrative leadership	managerial roles and actions of individuals who occupy positions of authority in planning and coordinating organizational activities
Adaptive leadership	entails a ‘‘collaborative change movement’’ that allows adaptive outcomes to emerge in a nonlinear fashion as a result of dynamic interactions
Enabling leadership	Catalyst but requires some authority. Reliant on the dynamic between various agents

Figure 24: Leadership Type

Painter-Morland (2008) takes this further and says that since adaptive leadership refers to a dynamic, rather than to a person’s traits or behaviours, it emerges from the interactions of interdependent agents. Enabling leadership is what catalyzes adaptive leadership and hence allows for the emergence of adaptive leadership. She goes on to argue that the roles that enabling leadership play can be described as fostering interaction, supporting and enhancing interdependency, and stimulating adaptive tension in order to allow for interactive emergence of new patterns. This interpretation from Painter-Morland starts to resonate and reflect an integrated view of how a perspective of thought leadership could fit within a

wider context. Key components of a range of research seem to focus around independence of character, position (of power, influence or status), charisma and connectivity to different constituencies. It appears that for thought leadership to make a difference it requires formidable insight and engagement.

As it is not necessarily linked to a job title or position in an organisation or its hierarchy, leaders and influencers can be found everywhere. Leaders can emerge at all levels and undertake leadership actions when their working and professional life requires it or provides an opportunity for it. This is what many managers or coaches of professional sports teams mean when they talk of the need for leaders throughout the team. The need for "leaders at all levels" is one of the 12 critical issues identified by Deloitte (2014), and as it cannot in the majority of cases be through positions of power it needs substantially to be through influence, motivation and thought leadership. Canwell (2014) points out that leadership "remains the No. 1 talent issue facing organizations of all types around the world," with 86% of respondents to the survey rating it 'urgent' or 'important.' However, the fact that only 13% say they do an excellent job of developing leaders at all levels means that this area has the largest "readiness gap" in the survey (Canwell 2014). Trapp (2014) said "today's market environment places a premium on speed, flexibility and the ability to lead in uncertain situations. At the same time, the flattening of organizations has created an explosion in demand for leadership skills at every level." Pratt (2007 p.17) noted that 'when people are asked to draw a diagram of their organisation the shape is usually pyramidal and the lines which connect the parts denote delegated authority and accountability. When asked to draw a picture of how they really operate, the result is often a web of connections that is much richer than the official idealised diagram. Rather than accountability the flows along the connecting lines are of information (though not for scrutiny) and fair exchange. The implication is that both hierarchies and networks have always been present but network organising has been largely unremarked upon, until recently.'

2. Knowledge and Evidence Creation

Information is not knowledge, knowledge is not understanding, and understanding is not wisdom, but they are logically acquired in that order, albeit we need to do so faster and better than we are doing this now. In January 2013 in an open forum, Dimitri Corpakis[7] from the Directorate for Research and Innovation at European Commission, argued that information is not knowledge, but the mind boggling pace it is generated and diffused, blurs the boundaries between the two, as the context is created by the networks that normally should be viewed as the pipes. So here is a new reality about the evolving notion of knowledge which is increasingly shaped, diffused and re-formatted by the devices it goes through. Corpakis advises that this is a bit frightening and disturbing but very true and real. We have a role to play to mobilise, clarify and incentivise people to come forward with more innovative concepts, break with conventional wisdom and create new opportunities for growth.

There is a slightly different way of looking at it in the case of change and innovation. It could be viewed that firstly, the volume of information is one consideration and secondly, how we collate and use it constructively and innovatively are related, but possibly different, matters. It is arguable that fast processing of volume information can identify market opportunities and perhaps solve some incremental innovation issues. However, it may well still be the case that radical or fundamental innovation is more dependent on the spark of genius, 'left field' thinking or paradigm shift thinking. Thought leaders and innovators need to incorporate new methods of knowledge creation and evolution - but perhaps their 'spark' remains fundamental.

Nonaka (2003) says that today, knowledge and the capability to create and utilize knowledge are considered to be the most important source of a firm's sustainable competitive advantage (Nonaka 1991,1994; Nelson, 1991; Leonard-Barton, 1992,1995; Quinn, 1992; Drucker, 1993; Grant, 1996; Sveiby, 1997). He goes on to say that entities coexist with the environment because they are subject to environmental influence as much as the environment is influenced by the entities. However, he also points out that limited environmental interaction and

[7] Dimitri Corpakis, Head of Unit, Regional Dimension of Innovation, Directorate for Research and Innovation at European Commission, Directorate General for Research and Innovation

externalization of knowledge can lead to ontological ills and fallacies, because the whole complexity of given phenomenon may remain undiscovered. There is however the conflicting issue here of how firms keep their unique resources and resulting competitive advantages. The driver of this search for competitive advantage is confirmed by many (Wernerfelt, 1984; Barney, 1986,1991; Dierickx & Cool, 1989; Amit & Schoemaker, 1993; Peteraf, 1993). This conflict of competitive advantage versus supranational (or national) meta-agenda goals is often intangible in terms of specific empirical demonstration however as noted above its existence is well documented.

Knorr-Cetina (1999) examined knowledge creation with a focus on "epistemic cultures" (the arrangement and mechanisms by which we come to know what we know) in trying to understand how scientists make knowledge. Although Knorr Cetina focuses on two cultures -- molecular biology and high energy physics -- she argues that her findings are more broadly applicable to understanding the information culture most of us occupy today. She identifies a ‘post-traditional communitarian structure’ in which authority is distributed. She determines that in her subjects expertise confers authority. However Giere (2002) argues that as expertise is in reality distributed then authority must also be distributed. He argues that this distribution of authority and responsibility depends on a high level of trust and cooperation within the community and that the rewards would also be distributed. She concludes that contemporary Western societies are becoming "knowledge societies", which run on expert processes and systems epitomized by science and structured into all areas of social life.

There is an almost fusion in our culture between knowledge and evidence with expert opinion and theory vying with empirical and other research to demonstrate and justify a range of agenda. An issue may arise when an individual or body conceptualises evidence without necessarily demonstrating good decision making habits. There may well be a case for raising awareness of the different agendas being served through the pursuit of an authorised evidence-base. There is a seductive plausibility of evidence which is an inherently plausible notion. Even the word ‘evidence’ carries weight in our culture. There is something almost compelling about giving something a name. When we give something a name it seems to acquire an additional level of power. Examples of this could include

"The wall" in marathon running or "Writers block" in authorship where no wall or block actually exists yet practitioners in these fields commonly relate their experiences to the given name.

Additional 'weight' can be attributed to evidence when we apply numbers as in many ways we live in a numeric culture where the collective culture gives preference to rationality over creativity, and implicitly creates an acceptance that measurement implies credibility. In simply picking a handful of business or research papers and journals it can be seen that statistically significant results tend to be reported, but not statistically insignificant results, which thereby may well create its own bias in culture and acceptance. However this is very much down to interpretation and application as what we understand from knowledge or evidence changes depending on objectives or context. Knowledge for its own sake may not be enough for practitioners as there is generally a need to do something with it. Therefore, evidence is 'crafted' and contradicting interpretations can emerge with each one not being untrue insofar as they look at the overall 'picture'. A parallel can be seen in attempting a large jigsaw, where initially the relevance of only some pieces of the jigsaw can be related, however if you are starting to build the sky section then you perhaps look for the blue bits. The question it raises is whether information and evidence gathering can ever be decontextualized as in simplifying the question or answer we run the risk of losing the essence of the evidence. Equally though, there is a question of whether raw data or information is evidence or whether it does need contextualising, or indeed whether that amounts to contamination of the data or information. Knowledge evolves and aggregates over time and collectively knowledge impacts research and practice through an indirect 'meta effect' of selection and some level of inferred credibility where recommendations feed into the next cycle.

3. Appreciative Enquiry and Anti-Creativity Bias

When looking at thought leadership, and knowledge and evidence creation in a holistic or joined up way, Gardner (1990) describes a typical management approach as being increasingly engaged in a self-destructive "war of the parts against the whole." He describes a standard or traditional approach to change as

being by its nature a problem solving process. Usually starting from a negative perspective where there is something broken, or perhaps things could be done better; either way something needs to be corrected or made better. From this starting point the process broadly follows that of initial problem identification, then base cause analysis, the search for potential solutions through brainstorming or other identification processes, possibly a combination of strategy and tactics/action planning, and change implementation, and if it gets far enough then possibly an evaluation of results. To identify problems and rectify them is the basis of much of what executives and managers have been developed to do for a number of generations. Kotter (1996) has undertaken extensive analysis on achieving change through problem solving approaches and concludes that such approaches are notoriously difficult and often unsuccessful.

Bolman (1991) argues that resistance to change is a well-known and understood part of business and organizational culture; this being for a host of good reasons. It is argued that change inevitably involves degrees of uncertainty and often involves greater amounts of work. Equally, many note their experiences that change does not always result in things being better. There can be a feeling of incompetence for many when dealing with change, along with feelings of need and powerlessness. This can have the effect of creating unpredictability and confusion within organizations and their collaboration partners resulting in conflict, and degrees of loss of certainty.

Appreciative Inquiry as a term was first used in 1986 by David Cooperrider within his thesis (doctoral): 'Appreciative Inquiry: Toward a Methodology for Utilising and Enhancing Organizational Innovation.' Cooperrider (2000) defines Appreciative Inquiry as the cooperative search for the best in people, their organizations, and the world around them. It involves systematic discovery of what gives a system "life" when it is most effective and capable in economic, ecological, and human terms. AI involves the art and practice of asking questions that strengthen a system's capacity to heighten positive potential. It mobilizes inquiry through crafting an "unconditional positive question" often involving hundreds and sometimes thousands of people. In AI, intervention gives way to imagination and innovation; instead of negative, criticism, and spiraling diagnosis

there is discovery, dream, and design. AI assumes that every living system has untapped, rich, and inspiring accounts of the positive. Link this "positive change core" directly to any change agenda, and changes never thought possible are suddenly and democratically mobilized. Magruder Watkins (2011) advises that Appreciative Inquiry is a theory and practice for approaching change from a holistic framework. Based on the belief that human systems are made and imagined by those who live and work within them, AI leads systems to move toward the generative and creative images that reside in their most positive core - their values, visions, achievements and best practices. Cooperrider (2000) says that the positive change core is one of the greatest and largely unrecognized resources in change management today. The most important insight learned with Appreciative Inquiry to date is that human systems grow towards what they persistently ask questions about. The single most important action a group can take to liberate the human spirit and consciously construct a better future is make the positive change core the common and explicit property of all. Smith (2014) advises that when we link the positive core directly to a strategic agenda, changes never thought possible are rapidly mobilised while simultaneously building enthusiasm, corporate confidence, and human energy. Haas Edersheim (2007) captures an essence of this in saying that in a Lego world, the fluid design and ability to connect and reconnect provide a new agility that is a central element of the 21st century enterprise.

The evolution of theory starts with an established framework and perhaps Appreciative Inquiry is an alternative and innovative method or framework which can support or enhance strategic change and radical innovation. A question is whether it is particularly relevant at a strategic or radical level of agenda setting and leadership with detailed implementation relying more on knowledge and evidence? However, some consideration must be given to whether setting a more positive operating framework is enough for radical as opposed to incremental innovation. Mueller (2011) concludes that people will regularly reject creative ideas while at the same time putting forward creativity as a desirable objective. In two studies she argues that individuals can have bias against creativity and that such bias is not necessarily unconcealed. Such bias comes into play when individuals experience a motivation to reduce uncertainty. Within each study

negative bias toward creativity (as opposed to practicality) was demonstrated while subjects experienced uncertainty. In addition, the demonstrated bias against creativity was demonstrated to interfere with subjects' ability in recognising creative ideas. Mueller advises that these results reveal a concealed barrier that creative actors may face as they attempt to gain acceptance for their novel ideas. The dilemma that organizations, scientific institutions, and leaders seem to routinely reject innovative ideas although at the same time putting forward innovation and creativeness as an aim has been documented for some time now (Ford 2000, Staw 1995, West 2002). Perhaps therefore, one of the key aims of strategic leadership, policy and agenda setting in an innovation focussed national or supranational setting should be to provide a greater culture of positive attitude and certainty of priority in dealing with uncertainty and creativity. It is not clear that a developing EC focus on user demonstration and exploitation as assessment supports this, or indeed in academia that an almost overriding requirement for volume of peer reviewed publications makes it any easier.

Transforming Issues into Related Dimensions

The range of identified issues are interesting in themselves, although it leaves the question of how does it change the world, or more specifically the world of meta-agenda or goal setting in high-tech national or supranational research and innovation policy.

The debate on policy objectives in this environment has been very much shaped by an independent study commissioned by the European Association of Research and Technology Organisations (EARTO). The study reviewed the scientific literature on the links between research and innovation. EARTO concluded that the research community 'likes to imply that all innovation can be traced back to a scientific breakthrough and therefore that science drives all innovation' (Science|Business 2012). However it also concludes that 'the evidence is not there to support this case.' It finds that innovations do occasionally arise from new science, but mostly they do not. It appears to be more about the application and integration of existing science. In a press release EARTO (2012) advises that the European Commission 'needs to balance its spending on research and innovation

more towards problem-solving research and towards supporting post-research activities critical for enabling and accelerating innovation, such as pilots, demonstrators, first applications, etc.' In the press release the EARTO President said 'It is a reminder to our political decision makers that innovation is about more than just excellent science. It is about exploiting the whole stock of knowledge – existing technologies as well as new knowledge – to fashion practical solutions to our pressing societal problems and to exploit new economic opportunities.'

This is quite a narrow view focused on knowledge to innovation. The real challenge in trying to translate this into a wider framework of strategic transformation is the lack of existing research and analysis in this area at levels above the operational organisation. Throughout over one hundred papers and articles considered on strategic transformation and related issues, virtually all revert quite quickly to a traditional organisational context or focus on subject elements such as psychology and the like. It is rare to find one that genuinely embraces a supranational approach. An exception, to some degree, is Davisa (2010, p71). She states that 'strategy making must involve sets of individuals, institutions and operational processes working within the context of a complex network of interrelationships and their development (Mitroff 1993, Werhane 1999, Freeman 2006) to build strategic capabilities (Kee 2007). Strategy making also calls for an alternative view of leadership in a global economy, one that is less hierarchical, and does not depend on traditional leader-follower relationships but cross-boundary leadership involving stakeholders (Werhane 2007, Kee 2008). The strategy-making process must also be regenerative, continuous and anchored in understanding and enacting purposes of individual stakeholders / actors. Leadership frameworks for the future will have to rely on less command and control and more collaboration within organisations, and a greater reliance on the input and collaboration of organisational, industry and community stakeholders.' While this paper touches on the wider issues it moves to a process driven conclusion which does not specifically suggest the influencers, referring in general terms to issues such as forming a coalition of stakeholders. The paper proposes a model of strategic transformation process as follows:

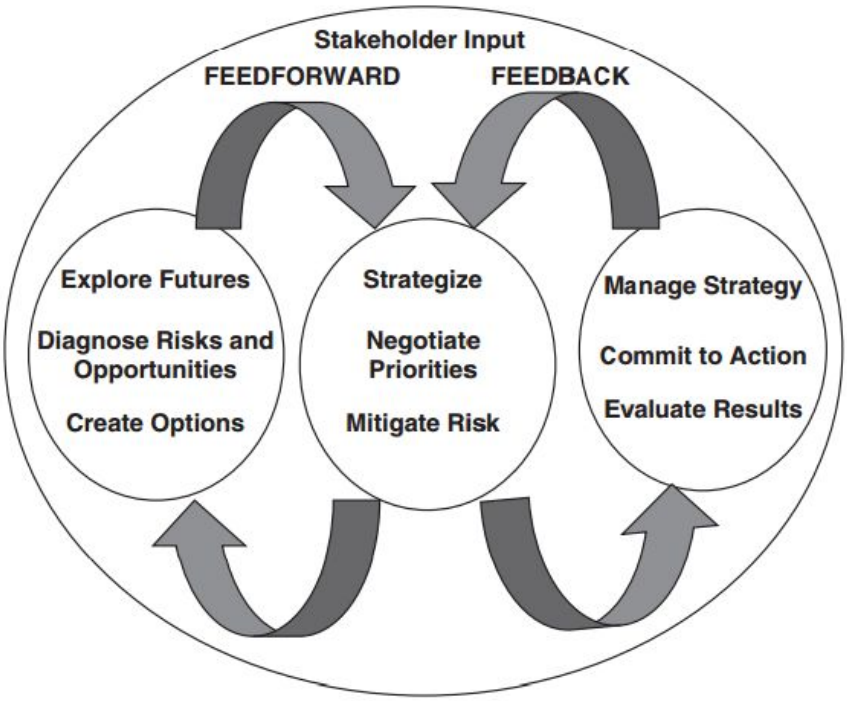


Figure 25: Strategic Transformation Process (Davisa et al. 2010)

The key point of the Davisa model of strategic transformation process is the interaction between feedback of actual information and progress, and the feedforward of possible futures, both into a strategic management position. The work of Öbergakes (2012) is also worth noting. It takes Chreim's concept of meso-level, that is the level at which institutional frames and discourses impact conclusions, however yet again in its application Öbergakes relates it to a focal company level (meso-level).

This discussion takes more of a view on the influences and influencers specifically at the agenda-setting or objectives level in relation to meaningful delivery. Therefore, in taking a view of what falls out of the findings and discussion issues of this study, the challenge is to combine the factors of influence in a meaningful manner which takes into account not just the perceived influences on research, but also the necessary areas of influence in engaging and cooperation with post-research activities and adoption in commercial settings. In looking towards building an initial model of understanding and a representation of key powers of strategic change in this area, the key influences need to be synthesised into a framework against which assessments of the position of actual and required

engagement can be made. The framework needs to provide practical areas to be addressed and assessed, and thereby reduce the role of hopes and fears. As Francois Duc De La Rochefoucauld, Prince de Marsillac (Gutenberg 2013) put it 'We promise according to our hopes, and perform according to our fears.' If the reasoning behind this is that performance closely follows fear, then there is real benefit in having a logical framework of action to alleviate fear and thereby offer the prospect of improving performance.

The dimensions or issues falling out of the project and considered so far within this discussion need to be synthesised into activity areas of powers or influence, prior to building a possible strategic management 'flow' or framework. This is necessary in order to give such issues a functional or positional 'home' and/or level of ownership within a process framework. The advantage of setting these in functional or positional 'homes' is in identifying intense levels of responsibility or perhaps even ownership. Parties are said to 'own' an issue when they develop a reputation of competence and attention in that domain (PoliSciZurich 2010). An important point is a distinction between two sides of ownership, these being associative ownership and competence ownership (Bélanger and Meguid 2008). In essence, associative ownership is about activity, interest or being affected by the issue whereas competence ownership is more about having the skills and abilities to engage with the issues. This description fits rather well in this context as there are many interested parties in the process and some of them have particular skills and abilities with which to potentially improve application related to the issues.

Coleman (2012) has written in detail on the subject of issue ownership. He argues that responsibility begins with development of a belief or habit of mind that amounts to accountability for both the quality and the timing of an outcome, even when working with others. It does not necessarily or always hold that authority is required over a project or initiative. Equally, it does not mean that you should not involve others. It does however mean you 'own' the obligation to take action and deliver progress or results. In this context Coleman (2012) offers three simple points of understanding. Firstly, there is a need for recognition of the difference between fault and responsibility. As Coleman puts it "there's a big difference between fault and responsibility. A leader may be responsible for a situation even

if it's not his fault. The blame doesn't matter." Secondly, is a willingness to allow this ownership of issues to free the key participants in driving the required progress or achieving results. He found that those who were most likely to succeed were proactive about finding and solving problems. Thirdly, through owning a problem and taking action, others can be helped. This is about the widening of distribution or dissemination in effects, or even merely the spreading of good practice. He concludes that in the current world where so many problems are becoming much more complex, it requires determination and innovative problem-solving, and living with such responsibility can increase personal strength as well as inducing more action-oriented engagement.

The next stage in the meshing process is to map the issues of influence to areas (powers) of activity, practice or excellence recognised in organisational management. During the mapping process, contributors made some minor adjustments to the list in order to better facilitate the process of mapping. These adjustments included most notably the splitting of pressure to misrepresent and control and the coming together of appreciative enquiry and anti-creativity bias. This mapping stage synthesis, as clustered from the participant contributions, is shown as follows, but without ranking, weighting or other quantification:

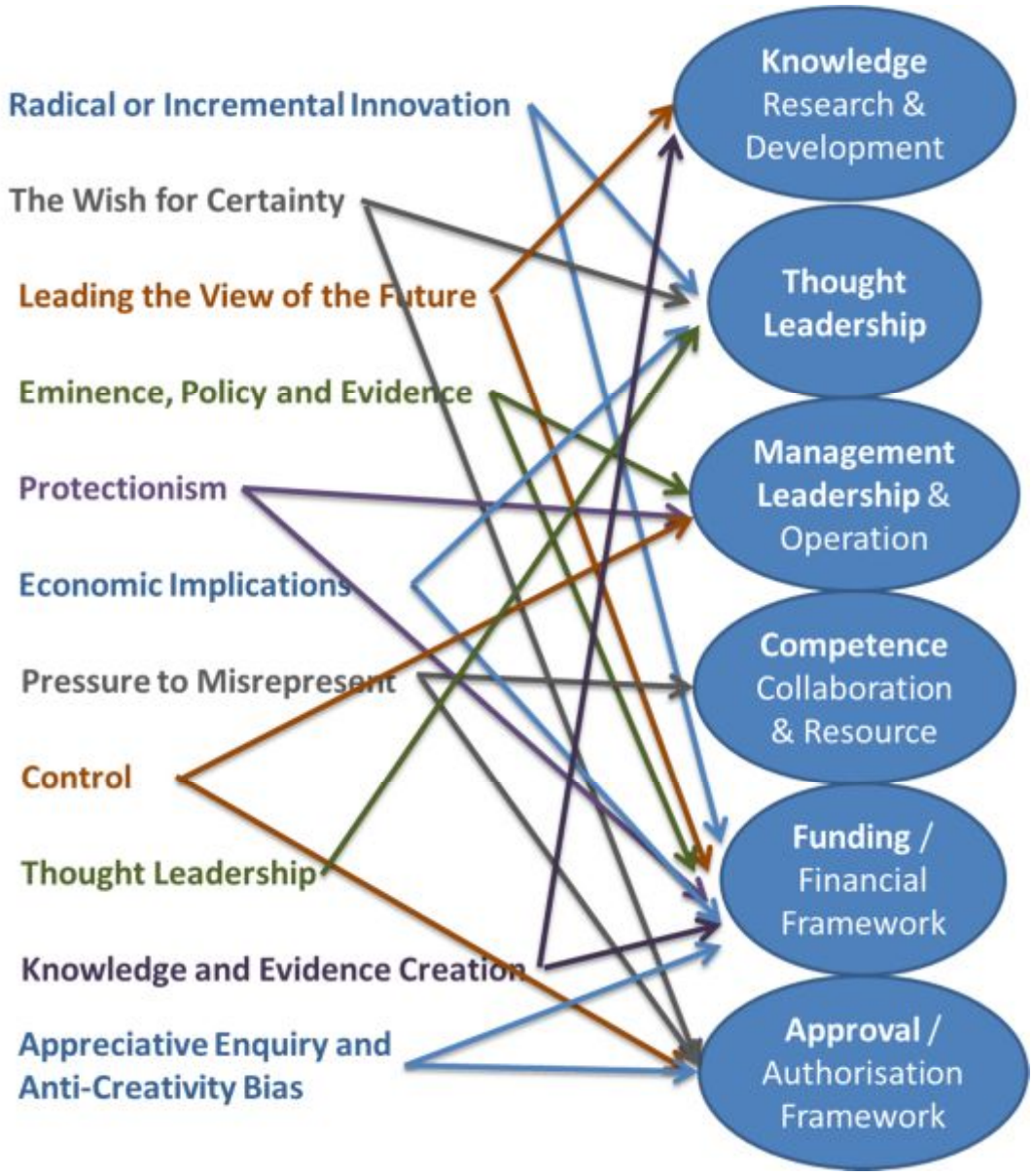


Figure 26: Mapping Issues to a 'flow' of Powers of Influence

A full list of the 'Powers' and their 'Issues of Influence' are shown in appendix 14.

This mapping process attempts to align the identified issues of influence with areas of activity, practice or excellence in management approaches which are capable of being represented in a flow of influence, power and process. The areas or powers of influence for this initial theory development of an overview framework are therefore listed as follows:

Name	Dimension	Brief Description
Knowledge	Research & Development	Investigative activities to make a discovery to develop new products or procedures
Thought Leadership	Interpretation & engagement	Authority in a specialised field through knowledge, application and engagement
Management Leadership	Leadership & Operation	Sound decision making, managing others and implementing change
Competence	Collaboration & Resource	Integration of internal and external resource in advantageous ways
Funding	Financial Framework	Funding requirements and processes to instigate, manage and deliver policy
Approval	Authorisation Framework	Assessment, approval and monitoring of third party proposals, action & delivery

Modelling Key Areas of Influence

This synthesis or meshing of issues is conducted here firstly by combining both the empirical research and the cognitive assessment of related issues, and secondly by mapping the issues to areas of activity and thereby practical power. The combining of the empirical and cognitive processes can be illustrated in the following diagram:

Figure 27: Meshing Empirical with Cognitive

This illustrates that from the empirical research the agenda achieved was fundamentally incremental rather than radical. It then illustrates that the agenda follows the current and known funding policy, and as it meets funding objectives and has potential for some innovation it is worth pursuing. All of this goes on to the practitioner network for proposal and action, and at relevant junctures the practitioner network has the opportunity to influence the funding policy. In essence it illustrates the circular nature of these events. Finally it shows the synthesis or meshing of the empirical and strategic influence approaches to

develop a framework of areas or powers for addressing in achieving more effective transformation.

In linking all the elements together a new framework is developed. At one level it is only about what is visible, however if it is used with the application of understanding of the supporting influences in these key areas then it has the capacity to go beyond the visible and be a new framework (and subsequently, model) for 'infra-red' spectacles in embracing intangible influences. It is about transforming knowledge beyond just arguing the individual points by assembling new frameworks which will require further validation and refining over time and with additional research on key components. This acknowledges that interpretation of professional knowledge into frameworks is initially somewhat deductive. It can be represented as powers for or of strategic transformation in such supranational (or national) innovation environments. This initial framework can be represented and is proposed as follows:

1. Powers of Strategic Transformation (POST)

Figure 28: Powers of Strategic Transformation (POST)

The POST diagram shows the areas or powers of influence in progressing or achieving strategic transformation in high-tech national or supranational research and innovation policy through meta-agenda or goal setting.

This can be further developed as an initial model which sets out a relationship flow across the powers. The next diagram illustrates this initial development of a 'flow' in a first level model of understanding, and potentially (subject to further validation) practice.

2. Model of Understanding

Figure 29: Model of Understanding

The model is deliberately stripped down to a symbolic level. However the relevant issues behind each area can be built up from those already identified through a reversal of the mapping process (see appendix 14). In addition, relevant related areas can be sub-divided, for example the area of funding or business case can be represented as a military, commercial or social demand supported through governmental, regional or supranational policy, or through various business case justifications. There are no directional indicators shown as it is envisioned that you can start anywhere in the process and look for the immediate connections in any direction.

In many ways the model and framework look like the type of descriptions that you often find in learning organisations (Maguire 2014[8]). This 'styling' is acknowledged and embraces this established approach. However in recognising this it should also be recognised that it is the application of it which is important.

In the overall context, the model and framework may only make the 'first part of the bridge' in further understanding meta-agenda or goal setting powers of strategic transformation in high-tech national or supranational research and innovation policy. Subsequent development could go well beyond its validation and, for example, into assessing quality data requirements for algorithms used for detailed management application

The identification of the three key topics forming the innovation agenda for post project activity, along with the development of the model of understanding and diagram of powers of strategic transformation in supranational (or national) innovation environments is as far as this study goes. However it is not the end of the journey as many further areas have been identified for validation and further or new development.

Beyond the Project

Wide scope is seen for engagement with and development in post project research areas including engagement with relevant research and innovation programmes.

[8] Dr Kate Maguire, in a meeting at Middlesex University, 21 July 2014

This activity has potential for widening a body of understanding, interpretation and application in related areas of research and practice. The summary papers become a ‘provocation’ or ‘agent provocateur’ for target groups. This can be achieved by initiating and catalysing proposals with potential research consortia partners such as universities, research institutes and/or agencies, technical developers and industrial or commercial organisations. Most of the European Union funded projects are collaborative projects with at least 3 organisations from different European Union Member States or Associated countries (EC Europa 2014) and the associated countries are shown in Appendix 13. However, large projects typically require many more partners for effective delivery of objectives and it is not uncommon for twenty or more partners to be involved in a consortium proposal. The European Commission makes open access to scientific publications a general principle of Horizon 2020 and this will help in widening a body of understanding, interpretation and application.

The initial development of the model of understanding and representation of the powers of strategic change are a basis for further research, validation and development within the wider community of interest and specifically through engagement in productive discussion with relevant policymakers at national as well as at European levels. The considered areas of influence here are particularly apt as Van Rompuy (2013), President of the European Council said "innovation is more than just research and development policies. Innovation is the ability of a system to produce new ideas, but also to bring them to the market, translate them into economic growth and prosperity." A big challenge here is to influence progressive regions to work together and align their regional policies with the policy dynamics of other levels of government. The combination of interaction with both research consortia and policymakers can provide a basis for professional consulting and interim management commercial contracts and thereby facilitate the spread of knowledge and practice in furthering innovation into the future. Many interim management assignments cover a period of transition, crisis or change within organisations and help lead business change, drive core business objectives and refocus management teams.

Another key area for activity beyond the project is in relation to wider additional and related research on the issues considered in the discussion and covered by

cognitive assessment. This is in part an extension of follow-up presentations and workshops at conferences and events on the issues falling out of this study. Relevant conferences may include PRO-VE which is organised by University of Amsterdam and New University of Lisbon and is the conference arm of IFIP (International Federation for Information Processing), also ICE (International Concurrent Enterprising) & IEEE International Technology Management Conference, and the ESoCEnet Industrial Forums (European Society of Concurrent Engineering Network). However the development of a wider research agenda will be covered in more detail in the conclusion.

Chapter 8: Conclusions

The general mechanism of this study started with a strategic general purpose based on how a supranational body, such as the EU, can drive forward the meta-agenda through an agenda setting framework and associated mechanisms for delivery of the Future Internet meta-objective. The first stage in this was looking at what has been happening to date (current state of the art). This was followed in the second stage by an empirical investigation to ascertain whether an effective innovation agenda from practitioners could be established. This was followed in stage three by a discussion following the implications and findings of stage two. The discussion was focussed on considerations of factors of influence and the creation of a first level model of understanding for the drivers of strategic transformation in high-tech national or supranational research and innovation policy through meta-agenda or goal setting. A general overview of the three stages therefore can be shown as follows:

Stage 1: What has been happening to date (current state of the art)

Stage 2: Empirical investigation to ascertain whether an effective innovation agenda from practitioners could be established, and research findings

Stage 3: Discussion of factors of influence as the drivers of strategic transformation in high-tech national or supranational research and innovation policy through meta-agenda or goal setting. This leading to the creation of a first level framework and model of understanding

The Journey of the Study

The plurality in the process of concurrent empirical investigation and cognitive consideration or analysis has been used for centuries. This approach provided an insight into a duality of mechanism through which micro and macro approaches can be aligned. It goes beyond content issues to connect cognition to strategic outcomes (Bogner and Barr 2000). In taking such a cognitive approach it helps to conceptualise strategic implementation strategy. The dual or concurrent flow of

the study can be illustrated at the next stage of detail derived from the three stages above and is shown in figure twenty-eight.

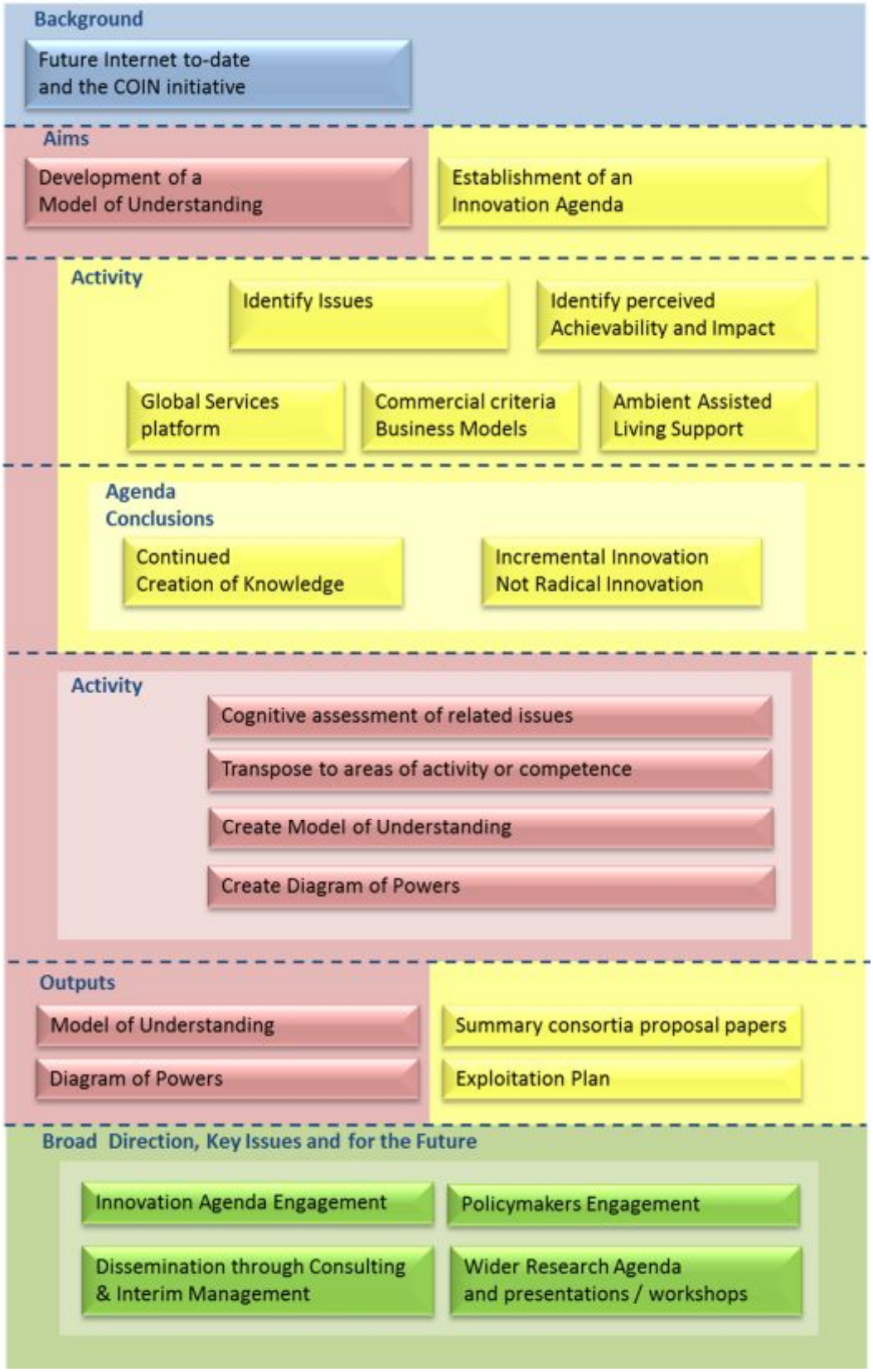


Figure 28: Flow of the Study

1. Background

In establishing the background an acknowledgement was made of the activities prior to this study and its inspiration from the EU 'COIN' initiative (COllaboration and INteroperability for networked enterprises). In reviewing relevant literature it was seen that although good work has been undertaken on the means to understand, (in EC FP8) there is still the need to build the means to change. It was apparent that there were a number of barriers to development and adoption/exploitation of the Future Internet including an emerging picture of a quite uneven technical maturity of the developed and developing potential components. Overall, although some progress continued to be made towards the Future Internet meta-goal, it was largely of an incremental nature rather than a more radical, fundamental or disruptive nature.

Very little existing work was found on managing and leading strategic change at a supranational level, typically it was focused back to the organisational level with the nature of such strategic change influences typically explained in an organisational context.

The need for change in innovation and the implementation of strategic innovation management was recognised.

2. Acknowledgement of Aims and Context

The overall context of this research is a focus on putting 'one piece in a puzzle' or in other words taking small steps in a big issue. It has been fully acknowledged that this study remains open to be built on, or indeed to be disproved, and in a fast moving environment such as high-technology it could even be out of date in 6 months, or a relatively short period.

The approaches often found in action research, which were used within this study, provides a form of evaluation and learning representing best practice at that time in looking at how the quality of the decision making process can be increased thereby optimising the use of the internet. The key point here is that a focus on technology alone is probably not enough.

Being congruent with the background and review of relevant literature, the objectives were detailed around two key areas:

1. Ascertain whether an effective innovation agenda from practitioners could be established
2. Creation of a first level model of understanding of the drivers of strategic transformation in high-tech national or supranational research and innovation policy through meta-agenda or goal setting

3. Activity

Activity focussed initially on what has happened to date (the current state of the art). This highlighted that although a lot of learning has taken place, coherent application and integration of that learning has substantially to be achieved. The next phase focussed on the virtual professional communities through practitioner forums to identify specific innovation initiatives relevant to progressing the future Internet and then to prioritise them in terms of achievability and potential impact. The conclusion of this activity was the establishment of an innovation agenda. Although this followed existing funding streams and did not appear to be particularly radical, it has a value at least as an incremental innovation agenda. The next phase of activity looked at the supranational strategic influences on achieving the meta-goal of the Future Internet. These were then transposed to areas of activity or power to aid use by relevant strategic management, and placed into a framework or model of understanding. However, further validation beyond this research will be required to confirm or develop this first level model, which at this stage is indicative rather than conclusive. Overall the approach facilitates the application of pressure on the meta-goal from two directions (bottom-up and top-down) at the same time.

4. Research findings

From the empirical results it was apparent that a step forward in establishing an innovation agenda required further definition. While we cannot be sure what will actually transform into effective innovation in the future, a key assessment of this

emerging agenda is in whether it adds anything new when compared to the existing innovation agenda of, for example, the European Commission? In this study it has been shown that while the Future Internet practitioner community has been willing to engage in formulating an innovation agenda, it has fundamentally followed the existing themes and streams of funding. Therefore it has been found that although an innovation agenda has been achieved it needs to be qualified as realistically an agenda for incremental innovation rather than more radical or destructive innovation.

In this case we have learned that there is a key problem in structurally moving towards a strategic objective of the European Union, the problem being the self-constraining of practitioner ambitions within the existing streams of existing programmes.

5. Outputs

Some key influencers of strategic agenda setting have been considered and arranged into a model of understanding and framework, thereby allowing a structured approach to influencing and catalysing strategic transformation in moving towards supranational innovation meta-objectives. It is recognised that the model created is an initial one and that further study will be needed to validate it and develop it further. In this respect a new way of looking at the problem or opportunity has been introduced and each of the components has been initially explored. Modern theory and practice in a number of areas has been combined, extended and synthesized into a framework which potentially is more strategic than the sum of its individual parts.

This framework can be used to increase the perception of key players to manage strategically at this level, and later validation can prove or disprove it in practice. It has been shown that there is need for change at practitioner and policy levels if there is to be a more structured approach to achieving strategic policy objectives and that in one way this represents a synergistic interaction. It has also been identified that the model of open innovation fits well in this area although in its nature it reacts to what emerges, which at times may not fit well with the timely

achievement of strategic policy objectives. These key elements form part of the contribution from this study.

Contributions

The contributions from this study can be clustered or focussed into key areas as follows:

1. Literature, Theory and Knowledge

The findings of this study add to:

a. The limited literature on supra-organisational strategic transformation through an additional framework of powers of influence (p 156-7, 159).

   The study contributes to the literature on the achievement of strategic objectives and on supra-organisational strategic transformation by giving a first level framework thus providing an additional level of understanding and a basis for further study and investigation to confirm or develop it further.

b. The literature on agenda setting at the supra-national level through the provision of a model of understanding (p160).

   The study contributes to the literature on agenda setting at the supra-national level by showing that a first level model of understanding is created thus setting an agenda for further study and investigation to confirm or develop it further. This relates to a large body of theory and knowledge at agenda setting level with the future potential for high level, wide ranging and profound impact. A contribution is also made to theory and knowledge in this area by infusing insights from a number of areas of influence, many being ‘soft’ or somewhat intangible in nature, particularly in relation to such issues as competence, leadership and thought leadership (p 127, 156). However the key differentiator here is combining them into a single model or framework of understanding. This differentiated approach also enriches the body of knowledge, future direction of study and elements of thought leadership by

offering an alternative mechanism that integrates multiple components in a new infused and meshed way in order to consider an overall effect.

c. The literature in both the above areas through more detail in making public the project report and related dissemination conference presentations & papers from, or based on, it (Appendix 6).

   This will be primarily achieved through presentations being sought in international forums and conferences, Invitations will also be made to a broad spectrum of stakeholders for participation in delivering and developing this area with relevant communities and collaborative consortia. Such engagement will include approaches to get additional support from national and regional policymakers, bodies and initiatives.

   The levels of these contributions can be elevated through this making public and dissemination activity with potential to enrich the debate. This can be portrayed as follows:

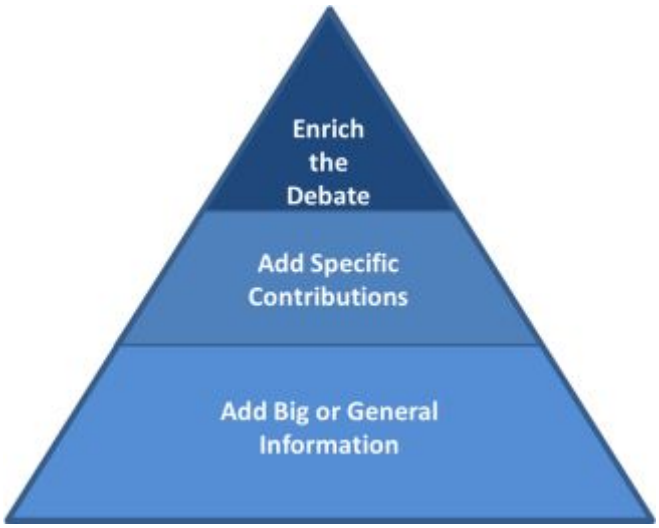


Figure 30: Example levels of contribution

2. Practice

The findings of this study add to:

a. Short & medium term activity through a practitioner justified innovation agenda for further collaborative development. Summary agenda concepts are ready for engagement (Appendices 7, 8 and 9).

   There is some addition of general information to a smaller body of knowledge. This is focussed on the effect of looking to the practitioner community for setting an innovation agenda in a specific high-tech supranational research area, in this case the Future Internet meta-agenda. It is argued that this follows existing funding programmes and therefore represents incremental rather than radical, fundamental or disruptive innovation, although a good level of more radical innovation is realistically necessary in order to meet the set meta-goals. It is well established that new (superseding) supranational research frameworks are developed substantially through practitioner input, however it is shown that the balance of this influence need to be carefully considered as a component of a much wider strategic agenda setting model.

   Taking all the innovation agenda summary papers together it can benefit the activity and progress towards the Future Internet meta-agenda. However it can specifically benefit user groups and communities in the area of ambient assisted living, and business communities, international and collaborative trade in respect of global services and business models.

b. Strategic practice through the model of understanding and the POST framework for planning and developing strategic influence in supra-organisational meta-agenda setting/delivery (p 159, 160).

   A contribution of this study is in respect of current, and near term, practice within EU framework research on the Future Internet. First of all the empirical approach allows us to show through results of a constructed data set where a range of practitioners believe issues have a high probability of achievability (the potential to be achieved within set timescales) and impact (The likelihood of making substantive change in business, society and communities). By integrating the outcomes of this empirical investigation I also show a focussed

agenda for driving and integrating activities of researchers, commercial developers and communities or user groups. This highlights a more focussed (less random) or dynamic approach to prioritising next generation professional and commercial practice.

One of the key contributions of this study is to start a process of applying strategic agenda setting considerations to the better achievement of supranational meta-agenda objectives particularly in relation to high technology research, development and wider adoption either through policy or through commercialisation. It considers and highlights the impact of thought leadership and knowledge creation as fundamental building and influencing blocks in the process. It integrates areas of activity and power in the same model.

The basis and value of this model is in its capture of the issues which a wide range of practitioners have identified as influencing them. Research noted in the discussion chapter has suggested that there is substantial merit to each of these issues separately; however the model draws attention to the related and combined effect of them. By studying this combined effect and creating a first level model I identified the otherwise omitted relationships where it is not evident that corresponding work has been done at the supranational level. It is however recognised that substantial work exists at the company or organisational level. Fundamentally it is recognition that interactions shape strategic outcomes. Certainly in the model it is the cognition of hypothesis, however the cognition is contextually based

Being a first level model or framework of strategic approach, it is a toe-hold or stepping-stone. Alternative frameworks can be put forward with this model being an ‘agent provocateur.’ In the initial framing of these practices it can prompt the bringing of new collations to the debate and can shape, reshape, or perhaps act as a step in reshaping, frameworks of effectiveness in strategic implementation at a supranational level. Of itself, the model is not a unified system that drives implementation in a consistent or wholly integrated manner, although it can enhance such implementation, management and motivation by skilful deployment. It has not yet reached a fixed state of developments but

starts to drive this development through purposeful actions by particular key people in the form of practitioners.

c. Post project continuation & development through the action plan aimed at development in business, professional and public communities through consultancy & collaboration (Appendix 6).

   The inclusion of an action plan in the appendices outlines a route for continuation of the study, particularly the innovation agenda and summary papers, into creating and developing adoption, impacts and exploitation opportunities. It also identifies key targets of influence for engagement from practitioners to key influencers of supranational policy.

Limitations

The present study has several limitations. The first key limitation is the self-selected practitioner base. This is inevitable in progressive development of high technology research areas where wider audiences are unlikely to have sufficient knowledge and may not even appreciate the nature of the investigation. For this reason the findings are inherently indicative rather than conclusive.

Validation and further development of the model of understanding will be required beyond the scope of this study. This may well involve the further vetting and interpretation of ideas, influences and subjects. In essence, the model of understanding aims at reasonableness rather than adequacy at this initial stage.

A wider limitation potentially exists beyond the objectives and implementation of the overall Future Internet. The European Commission may well use one strategic agenda to achieve, or partly achieve wider objectives such as breaking down national and cultural barriers through collaboration, familiarity and commonality. In this context each agenda is not a stand-alone issue. Although this should be recognised, it is beyond the scope of this study.

The sample size (number of participants in the analysis) in the study has been dictated to a reasonable degree by the type and nature of the research issue being investigated. From a true statistical point of view tests normally require a larger

sample size to ensure results are valid before being generalized or transferred. However, the highly technical nature required in participants and the 'futures' nature of it have already been covered earlier in this report and these more than anything have been a limiting effect in this context.

Suggestions for Further Research

This study opens up future avenues of study in a number of key areas such as strategic supranational research policy implementation in high-tech areas and validation of the model of understanding, in addition to specific initiatives in the areas of global services innovation platform, commercial criteria business models and ambient assisted living support structures.

Several extensions of this study are possible. Further explorations might, for example, focus on examining, first, the role of eminence in policy and evidence, second, thought leadership, third, the key mechanisms for catalysing innovation. In addition, some real questions seem to remain for the future about a psychological strategy in order to develop supranational strategic transformation models that go beyond the visible.

Such further research would further bolster our understanding of the interaction and relationships of and between issues in national or supranational agenda setting and strategic transformation within policy implementation.

Collectively, many of these areas listed below can be brought together to form a body of knowledge on strategic transformation, much with a wide ranging or general applicability, and part specific to national or supranational application.

Suggestions for further research can therefore be summarised as follows:

Suggested Further Research

Research Areas	Possible / Example Research Questions / Issues	Page No. in this doc.
1. Strategic supranational research policy implementation in high-tech areas	Can research outputs from major framework initiatives be correlated with timely and meaningful progress towards the stated strategic objectives?	62, 76, 170, 178, 180
2. Validation of the model of understanding and the POST model	Does each element in the POST strategic framework remain valid across wider hi-tech research areas and with a greater depth of participants?	97, 127, 165, 166, 180, 181
3. Global services innovation platform	Can general interoperability be achieved for operational platforms before standardisation in relevant software and systems is apparent?	102, 180
4. Commercial criteria business models	Are perceived operational and reach advantages of major concepts such as the Future Internet sufficient to build acceptable business models for real-world investment decisions?	110, 119, 239
5. Ambient assisted living support structures	How can social inclusion, wellbeing monitoring and emergency services be best integrated through a single user friendly interface?	112, 114

6. The role of eminence in policy and evidence	What is the relationship between age and recognised achievement in creating a position of eminence and influence within business and wider communities?	128, 135-137, 147
7. Thought leadership	To what extent is thought leadership fundamental conceptual inspiration as opposed to logical emergent progression?	38-40, 66, 119-122, 145-151
8. Key mechanisms for catalysing innovation	What are the most effective keys in catalysing the transformation of concepts into positive user impacts?	38-40, 179
9. Psychological strategy in developing supranational strategic transformation models	How can psychological strategy and positioning support the development of supranational strategic transformation models?	67, 114, 179
10. The link between knowledge and innovation	Is innovation bounded by current and emergent knowledge or does innovative vision drive the creation of new relevant knowledge?	70-71, 114-115, 151-153, 158

Reflexive account of Personal Learning and Professional Journey

Final thoughts on the project activity and findings

Looking at the study overall, perhaps it needs explicitly bringing out that the nature of the subject inherently lends itself to change and therefore this work is not about 'bucking the trend' but rather facilitating additional dynamism. It is acknowledged that within this whole area there will be ongoing change, including fundamental change.

Where this work is now can influence what is to come either through it providing a basis for challenge or in the acceptance, progression or adoption of even a part of it. Through engagement on research in the hi-tech developer community and with engagement in the business community through consultancy this work has the potential for business or real world impact. This impact is in relation to progressing the Future Internet and its adoption, and strategic management of supranational meta-agenda. However, the significance of this work will only become apparent through its dissemination, challenge, and in part or whole its acceptance and adoption.

A Personal Journey

Much has been learned at many levels during the process of planning, completing and writing-up this project. However one of the dominant things for me is the clarity of ordering my personal progress over the last five to ten years into a flow or journey of personal development, leading into the future. I previously had a general direction in which I intuitively understood what type of activities were adding to general development and what was a 'distraction'. Completing this entire process has caused me to reflect on how progress has developed so far and to gain an understanding of what intentions and activities will take this forward into the next phase. It is though more than the understanding, it is seeing the progression steps as conceptual positions thus freeing it from a particular role, job position or activity restriction. This conceptual positioning clarity is empowering

as there are multiple activities and pathways to achieve such positions. It is at the same time both abstract and yet concrete. This is conceptualised in the following diagram:

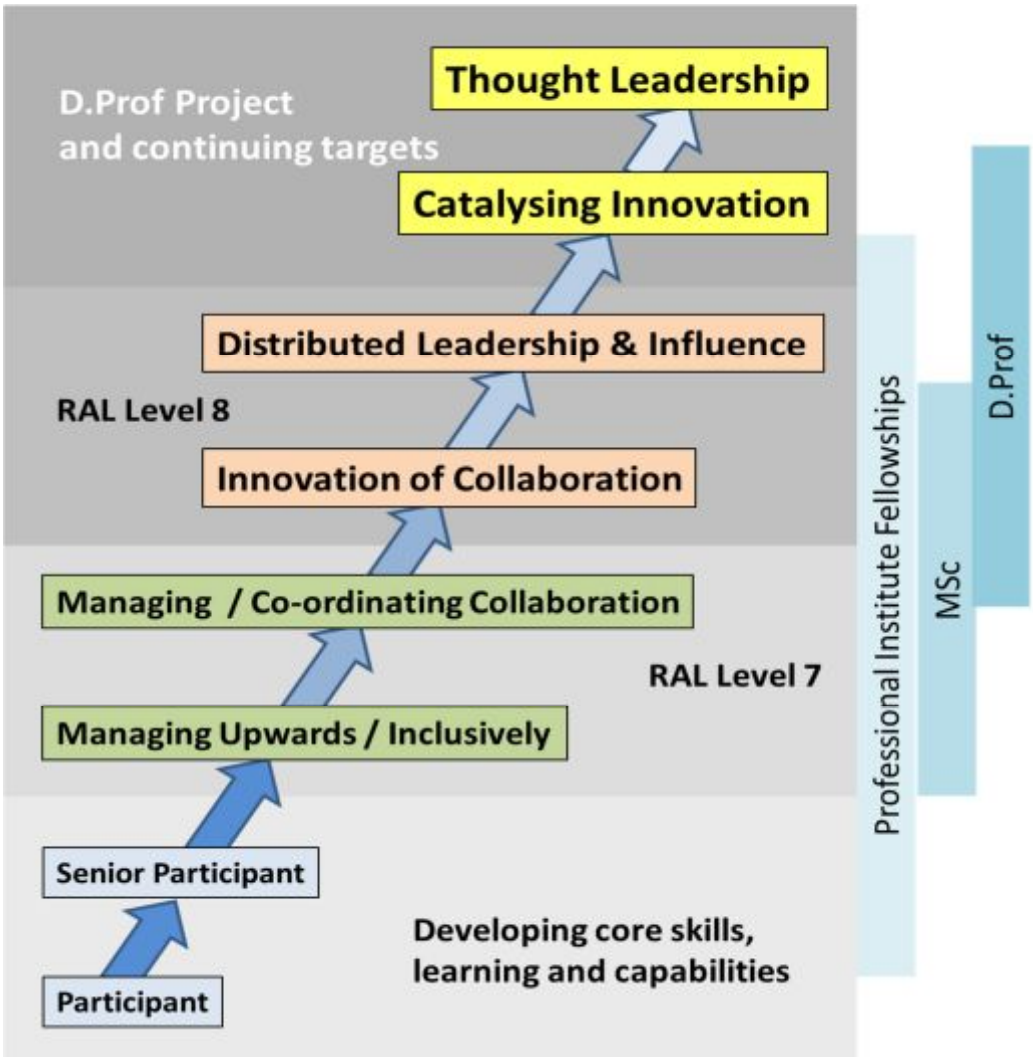


Figure 31: Personal Learning & Professional Journey

This activity has developed further, and allowed me take forward, a higher-level of critical and analytical skills. This is part of continuing development (continuing professional development or life-long learning) to enable me to better address complex and challenging issues within my professional activities and particularly in international research circles. I have reflected on and understood how my DProf activity builds on my learning related to achieving five Fellowships in professional institutes (2009 – 2014), my MSc (2008 – 2010), completion of the Leadership and Management certificate of the Chartered Management Institute (2010), and undertaking my DProf (2010 – 2014). This represents a highly active

life-long learning approach in recent years which I have found enjoyable and which I fully intend to continue. This understanding is in significant part from the disciplined reflection and writing for the planning, completing and writing-up of this project.

I have also had to consider what is meant by conceptual words. The most prominent example in my mind is ‘thought leadership’. We generally say this type of phrase without being particularly clear on what we mean by it, leaving great scope for others to interpret it in their own way and with relevance to their own context. I have become much clearer that it is about deep knowledge and engagement; sharing deep and expert knowledge used innovatively with others within and without your normal teams (direct or distributed). In many ways it is akin to leading by example. I have had to disassociate this from ‘management’ although ironically it could be done as part of a management role. However, management control is not necessary for thought leadership, and indeed it can be a barrier. I now more fully understand the extent to which attempting to move into catalysing innovation and thought leadership will be a major challenge for me in the years ahead.

There have been myriad points of learning throughout working on this programme and project. However, one of the best things it has done is help me to learn how to learn and understand, and relate activities to a bigger picture. It makes me look forward to the proposed and possible further activities. Equally, it has developed in me a much more ready ability to question the basis and interpretation of most things, including for example whether my stance and clustering of inputs allowed for objective or neutral interpretation. I find this brings ownership of a new level of accountability and responsibility where I regularly question how my own involvement has influenced or informed outcomes.

Considering the further research issues and bringing them together in the conclusion has caused me to picture a future research framework around a body of knowledge relating to strategic transformation as a core or overarching theme. Building components into something much bigger is invigorating, stimulating and exciting. This whole process allows for continuing development of my skill in

reflexive dialogue and an increasing ability to transfer such skills to professional practice.

Wider Development and Appreciation

One of the greatest paradigm shifts for me has come through a willingness to make challenges to my own competency, although in a positive way from the perspective of trying to be the best that I can be. Lincoln (2000) points out that the process of research itself leads to the researcher gaining self –knowledge. From this perspective the process benefits from, as well as demands reflexivity as part of the ongoing development. It can be seen as a synthesis of facilitating a greater understanding of firstly the phenomenon being studied and secondly of the research process itself. Glesne (1992, p13) captured it quite appropriately saying 'Learning to reflect on your behaviour and thoughts, as well as on the phenomenon under study, creates a means for continuously becoming a better researcher. Becoming a better researcher captures the dynamic nature of the process. Conducting research, like teaching and other complex acts, can be improved; it cannot be mastered.'

When I started out on this programme, the questions of what am I doing and why am I doing it seemed relatively straightforward, yet now I even question what is it that I am learning about? The bigger issue in question has become the conundrum of what I am becoming and through the process asking how I now connect with and relate to power and authority. An additional dimension is my readiness now to contextualise these relationships in respect of both history and the future.

In many ways this has become about a feeling of owning my own education, development and positioning, and connecting them (or at least trying to) to both my current and future life. This is an amazing and yet scary position.

A further and related paradigm shift is in appreciating that even relatively full answers are in so many ways still incomplete and that more questions may remain than answers achieved. But, in so many ways this is about the perspective, position or framing you apply. For example, in the course of this study the findings of the research on a practitioner based innovation agenda as an

incremental agenda rather than a radical or disruptive one was a big surprise and for a while I thought it was the undoing of this initiative. It was not what I expected at all and for a while caused somewhat of a hiatus becoming a bit of a 'cliff-hanger' in the process. However, after some good counsel, my perspective changed and I began to see it as a clear result which emphasised the importance of a more strategic approach to progression of the meta-aims. The principle learned is that it is not so much what the event is but rather the way in which you look at it.

There is one more key issue which I would wish to note, which is simply the effect of simplicity. At the outset of this programme I tried too hard to impress with technical complexity, and rather dense and intense writing, perhaps hoping that it would somehow impress the readers. In fairness, I had spent a number of years working with 'tekkies' in rather specialised areas where technical shorthand (jargon) and European technical project phraseology (to some degree, avoidance jargon) was the norm. Within rather restricted audiences you can probably get away with such an approach. The 'disconnect' comes when you look to engage with different or wider audiences where shorthand and avoidance tends to lose the desired engagement. It has been a profound learning that bringing complex and deep positions to a view with simplicity adds so much more to it. Of course the technicalities can be there to support it, but they should not detract from it or obscure it. Words attributed to four great people frequently now come to mind. These are:

"If you can't explain it simply, you don't understand it well enough" - Albert Einstein
"Complexity is your enemy. Any fool can make something complicated. It is hard to make something simple" - Richard Branson
"Simple can be harder than complex: You have to work hard to get your thinking clean to make it simple. But it's worth it in the end because once you get there, you can move mountains" - Steve Jobbs
"Simplicity is the ultimate sophistication" - Leonardo da Vinci

Source: Brainy Quote (2014)

This perception of simplicity has deeply affected how I try to engage in issues and with so many individuals and groups, and is something that I aspire to have attributed to me in the future.

So the remaining question after all of this is one of ‘so what?’ Where do I think all of this will go? The simple answer is that I do not know! But then I have learned to appreciate that there is never just the simple answer. Although I cannot define where it will go in terms of positions and results, I have an appreciation that it provides me with a platform to engage in more depth and breadth in understanding and driving forward processes, agenda and purposes. This might be in or across academia, research, consultancy and management or many more areas of activity, however, within these it is the relevance of my contribution and the difference I make which have become some of the new ways in which I fundamentally look at situations and opportunities. Equally I expect this to continue changing and developing as I continue the process of learning and growing.

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Appendices

Appendix 1: ‘COIN’ Universities & Research Institutes

The key universities and research institutes in the COIN initiative include:

- University of Innsbruck (Austria)
- Vienna University of Technology (Austria)
- University of Bremen (Germany)
- Jožef Stefan Institute (Slovenia)
- Fundación European Software Institute - ESI-TECNALIA (Spain)
- National Research Council - Institute for Systems Analysis and Computer Science (Italy)
- Associazione ESOCE Net [European Society of Concurrent Engineering] (Italy)

Appendix 2: Relevant EC Projects under FP6 and FP7

FP6:

ATHENA	Enabling seamless **interoperability of enterprise systems and applications** in order to support collaboration among networked enterprises during the entire lifecycle of the product • Product Data Management ("Aeronautic and Aerospace collaborative product development within networked organisation" and "Automotive Collaborative Product Design") • Supply Chain Management ("Automotive Inventory Visibility and Interoperability", "Automotive Outbound Logistic") • e-Procurement ("Furniture e-Procurement") • Product Portfolio Management ("Telecom Product Portfolio Management")
ECOLEAD	Enabling networked **SMEs to efficiently collaborate** and to meet customers' requirements while giving them the level of preparedness necessary to **trigger joint & collaborative activities** • AIESEC (PVC), ISOIN and CeBeNetworks, EDINFORM, IECOS/ITESM, Orona Innovation Network, Supply Network Shannon, Swiss Microtech, Virtuelle Fabrik • Creation and management of SME clusters and VOs • Cluster Bag of Assets and Profiles/Competencies Management • Virtual Breeding Environment creation and performance management
ABILITIES	Enabling interoperability among **organisations in SME networks** in Enlarged Europe, focusing on **procurement and using UBL** • Retail (LT), High-Tech (SK), Agro-food (TK), Wood-Furniture (RO), Tourism (HU) • Order Management: Purchase Order, Order Acknowledgement and Order Confirmation • Delivery Management: Delivery Advice and Goods Receipt • Invoice Management: Purchase Invoice and Credit Note
FUSION	Enabling **semantic fusion of heterogeneous service-oriented business applications**, based on semantic annotation of Web Services, including Web Service enablement, ontology engineering, semantic "uplifting" and process design and execution • Stock replenishment in retail (GR and RO) • HR scenario: international candidate search (HU and DE) • Student transfer process in education (BG and AL)
GENESIS	Enabling A "hybrid" approach for **SME collaboration** using server based functionality or P2P, with a document exchange & process execution platform for cross-domain/country collaboration, involving SMEs and micro enterprises in 8 countries • B2B: Catalogue provision, Quotation, Ordering, Invoicing • B2G: VAT Statement, Social Security Contribution, Employee Contracting • Business to Banks: Payment

PANDA	Development and demonstration of **interoperability among SMEs in the ERP/CRM value chain**, using Web Services and Web 2.0 technologies • Sourcing and scouting with customers (pre sales, sales) • Partnership and performance profiles, partner search and negotiation etc • Creation of dynamic multinational clusters of ERP/CRM value chain actors

FP7:

COMMIUS	Summary: to provide an easy and almost-zero-cost way for SMEs to electronically interconnect and collaborate, with email as the main interaction medium & primary user interface Business model activities • Analysis of market situation and business models (surveys & analyses) • Establishment of the Commius Community (community-based approach) • Objectives of those activities • Providing SMEs with the Commius Solution • Improvement of solution based on community feedback • Opportunities for commercial services Results and conclusions so far • First demo of main software components (prototype of full platform due July 2010) • Definition of overall business model for exploitation, based on an open source approach • SMEs are highly interested in the Commius approach (community expected to exceed critical mass) Main issues • Matching the user's expectation and needs • Defining a suitable & sustainable business model • Creating a Commius community able to support the Open Source approach, on which project exploitation relies
iSURF	Summary: to enable the collaborative supply chain planning across multiple domains for a flexible and dynamic environment and especially to facilitate European SMEs participation to collaborative supply chain planning process Project focus • Development of standards-compliant (notably W3C and OASIS compliant) specifications and tools for the "iSURF ISU" that will enable companies to exchange planning data seamlessly, although they may be using different the message exchange standards or proprietary formats of legacy applications • Relevant development • iSURF eDoCreator tool has a high exploitation potential (to be used by a number of OASIS subcommittees to generate the schemas of

	UBL 2.1 documents)
K-NET	Summary: to explore how different services to manage social interactions in a networked enterprise can be used to enhance knowledge and knowledge management (KM) services, with the key hypothesis being that the context under which knowledge is collectively generated and managed can be used to enhance this knowledge for its further use within intra-enterprise collaboration Business model activities • User Interest Groups (UIG), aiming at creating industrial communities for dissemination • Socio-Economic Study, for assessing the impact of the project results Objectives of those activities • Testing of project results • Benefits for project industrial partners in the short and long term • Opening up new business models for cooperation within the various networks for especially manufacturing SMEs Results, conclusions and issues • Early prototype of its services (monitoring of user interaction, context extraction and knowledge enhancing) has commenced, but too early to identify new business models • So far, partners have concluded that an adequate framework to support knowledge enhancing within a network can lead to the creation of more knowledge; this new knowledge, resulting from intra-enterprise collaborations, have the possibility to open up new business opportunities and represent added-value in products • The main challenge is to find the correct balance between the amount of information that can be acquired from the user in an implicit form (through monitoring how different systems are used), and what has to be explicitly requested from the user, to allow an adequate extraction of the context • Outlook: A wider test of the project results, involving the UIGs; socio-economic study to present conclusions about possible new business models enabled by K-NET's results
SPIKE	Summary: to research and develop a software service platform for the easy, fast and secure setup of short-term business alliances Business model activities • Market analysis of existing collaboration tools, open source strategy and possible business models and business plans • Competitive analysis of the SPIKE project and competing tools • Online survey on business models for collaboration platforms (600 companies contacted and 100 of those participated) Results, conclusions and issues • SPIKE specific results (ROI calculation, SPIKE platform licensing options & possible business models) • Huge interest in comprehensive tool support for inter-company collaborative projects, but current tool support is rather poor • The desired functionality significantly differs between different industry sectors and depending on the "IT maturity" of the particular

	company • Main issues: service orientation, especially across companies and sectors, is currently not yet as widely spread and mature as desirable; but awareness and the will to change is rising • Outlook: no single platform/tool that serves all needs; providing tools and operating collaboration platforms might be an interesting business model in the medium-term future; support and integration of these tools and platforms into companies' workflow will rise as companies switch to service orientation and "networked enterprises"
SYNERGY	Summary: to research the requirements for, and feasibility of, provision of services to support sharing of knowledge between enterprises collaborating in virtual organisations Business model activities • Establishing the feasibility and structure of services for knowledge oriented collaboration and knowledge sharing in collaboration (such services could be offered by any future ISU, regardless of business model) Objectives of those activities • To ensure a feasible exploitation path for SYNERGY research, particularly by providing a communication tool for potential users of SYNERGY services as well as potential ISU providers of these services (defining ISU business model design constraints and criteria is a collateral objective) Results, conclusions and issues • BM activity just commencing • ISU business models must make coherent offerings of services to support enterprise collaboration accessible to SMEs as well as to larger enterprises - accessibility in terms of: • Price structure, allowing pay-per-use for services, with granularity allowing progressive use • Up-front investment should be minimised • Enterprises without specialist ICT skills base must be offered a path to utilise ISU services with minimum education and training demands • ISU business models need to support both direct sales of services, and provision to value added orchestrators • ISU business models must recognise the essential contribution of service developers/providers with respect to open source business models
OPAALS	Summary: NoE to address the interdisciplinary theory of digital ecosystems, including a distributed transaction coordination model for run-time execution of complex, long-running business transactions & an Open Knowledge Space Business model activities - does not develop business models specifically, but has activities in the following: • Business modelling language SBVR (Semantics of Business Vocabulary and Business Rules) • Socio-economic theories that can provide a context for new business models related to ICT use & adoption, especially Open Source • A distributed transaction coordination model that solves the

	information asymmetry and the monopolistic dynamics currently prevalent in centralised transaction coordination scenarios (strong business relevance due to the cost reduction implications) • Distributed Accountability, Identity and Trust models that are essential for business transactions on P2P networks Results • Many interesting ideas on methodologies & architectures informed by social science and extremely strong theoretical results have been obtained in computer science • Conclusions • Dynamic instantiation of business workflows from declarative models will require more solid results from the mathematics of bio-computing applied to computer science constructs • Social dynamics and democratic processes are very important elements of economic sustainability • Distributed transaction coordination model over a Dynamic Virtual Super-Peer P2P network is feasible but challenging to implement • Distributed accountability, identity and trust have been implemented and being integrated in the distributed transaction and P2P framework for digital ecosystems Main issues • Insufficient resource allocation to research in the mathematics of bio-computing; SOA principles upheld successfully in DE architecture • Outlook: DE approach is gradually taking hold
DEN4DEK	Summary: a Thematic Network to share and disseminate knowledge, allowing regional and local governments to plan an effective deployment of DE technology and infrastructure Business model activities • Have not identified specific business models, so far (DEs methodology is suitable for those activities involving many partners sharing common needs, goals or infrastructure; adoption of DEs by potential user communities has been scarce up to now) Objectives of those activities • In spite of interest in DE approach, actual implementation is still disappointingly low (the main reason for conceiving DEN4DEK) Results, conclusions and issues • Deployment plans for target communities being developed • The potential structuring effect of technology was patently overestimated: it was expected that technological infrastructure itself could foster the economic development at different scales, but this has proved not to be sufficient • DEN4DEK is focusing more on the final impact of the deployment of the DEs; thus, fulfilling the specific needs of the target communities and providing a more comprehensive assistance within the framework of DEs • Outlook: Policy strategies that can be adopted for DE deployment; Socio-economic impact of DEs deployment; DEs adoption strategies, deployment and knowledge transfer plans

Appendix 3: Future Internet business-economic studies

Study on "Policy Options for the Ubiquitous Internet Society"	
Contractor(s)	RAND Europe
Objective	To identify challenges and developments in the area of future networks and Internet in order to offer policy recommendations, by: • Analysing emerging technology trends • Developing scenarios for the future • Assessing the impact of a combination of technology trends and scenarios, from an economic, societal and business model perspective
Status	Just completed
Relevant deliverables	Final Report on "Trends in connectivity technologies and their socioeconomic impacts" http://ec.europa.eu/information_society/activities/foi/library/docs/final-report-nosec-clean.pdf
Study on "Towards a Future Internet: Interrelation between Technological, Social and Economic Trends"	
Contractor(s)	Oxford Internet Institute
Objective	To explore what a Future Internet should be, by researching the possible social, psychological, technological and economic options for its further development and their likely socio economic impacts: • Explore the past – examine prior studies and analyse how the current Internet evolved to date, its main drivers and effects • Define possible future scenarios and assess their likely socio-economic impacts – investigate the interrelations between technological, social, psychological and economic trends and developments related to a Future Internet, verified using Delphi surveys • Produce a single preferred vision for Europe of a Future Internet, in terms of each of the four forces
Status	Ongoing
Relevant deliverables	State of the Art Report Part I http://www.internetfutures.eu/wp-content/uploads/2009/07/soa-pt1.pdf Part II http://www.internetfutures.eu/wp-content/uploads/2009/08/soa-pt2.pdf Part III http://www.internetfutures.eu/wp-content/uploads/2009/08/soa-pt3.pdf
Study on "Economic & social impact of Software & Software based Services"	
Contractor(s)	Pierre Audoin Consultants

Objective	To identify the economic / social impact of the European software and services industry on Europe and the elements that are determinant for its growth and competitiveness, by • Assessing the future market impact and expected market transformation due to the emerging Internet of Services • Deriving policy recommendations to remove barriers and foster the development of the software industry
Status	Ongoing
Relevant deliverables	Report on "The European Software Industry", which examines the potential economic and social impacts of software and software-based services (SSBS) in Europe ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/ssai/20090730-d2-eu-ssbs-industry_en.pdf
Study on "Enterprise 2.0"	
Contractor(s)	To be announced
Objective	To demonstrate the actual and potential gains for the information society in promoting the development and usage of enterprise 2.0, including: • Demonstration of evidence of the present and the potential future economic impact of enterprise 2.0 • Provision of best practices on how to implement and use enterprise • 2.0 (with special focus on how enterprise 2.0 can foster innovation and • disruptive changes) • Description of challenges for a wider deployment of enterprise 2.0 Provision of policy recommendations
Status	Under award
Relevant deliverables	-
Study on "The economic and societal impact future Internet technologies, services and application will enable in Europe and elsewhere" - Study in support to the definition of a Public Private Partnership on Future Internet	
Contractor(s)	To be announced
Objective	To identify the potential economic and social impact of a large-scale public-private partnership on the Future Internet, by providing the necessary quantitative and qualitative assessment, of the timeframe 2015-2020 Focus areas: smart energy grids, smart urban transportation systems and mobility, smart healthcare systems
Status	
Relevant deliverables	

Appendix 4: Invitation to Participate Slide

Appendix 5: The Questionnaire

Your input is needed!

Future Internet Research

Thank you for your participation through your 'virtual' professional group – or for your new participation at this stage.

Your participation in this next stage, through completing this survey, will be a valuable part of this research progress.

Your time in completing this survey is appreciated. When completed, or with any other queries, please return to me through the group forum, or if preferred at martineley.motra@gmail.com

NOTICE: Your participation in this research is welcome although you are in no way obliged to do so. Information submitted will be used by Martin Eley, a work based Researcher as part of his Doctoral research at Middlesex University. Within this research, individual, personal and corporate identifiable details are used only by the Researcher, in assessing the overall mix of people who have contributed, and are not passed to any other party. Any personal data will not be used in any way to identify you with any party beyond the Researcher. The findings (but not individually identifiable information) may be published or made public by the Researcher and/or Middlesex University.

Thank you.

Martin Eley

Researcher August 2012

Background:

- The Future Internet (FI) meta-agenda and emerging future business models appear to be showing emerging organisational adoption issues.
- There appears to be a lack of evidence for demonstrable business impact of the emerging Future Internet and quite uneven technical maturity of developed / developing components indicating this as a possible relevant barrier to adoption/exploitation.
- There appears to be missing a clear single vision, development route and exploitation path for the Future Internet.

The General Question(s):

- What are the effective issues and next steps for a FI adoption Innovation Agenda across research & business adoption organisations?
- Part of the gap or 'hole in the whole' appears to be relating technical development with impact and adoption issues in business /organisations

This Questionnaire:

This questionnaire is developing the threads/discussions that have taken place within the 'virtual' professional group forums. It is attempting to estimate perceptions of the prospect of achievability of meaningful progress and real impact in the short /medium term of a focussed activity in the identified areas

Your name & company/organisation	
Your position in the company/organisation	
Estimated number of staff in co/org	
e-mail address	
Telephone number	
Extension	

Is your focus on Technology development (T-High) or Business use (B-High)	5 T-High	4	3	2	1 B-High
Is FI/Tech development a key part of your work (W-High) or a small part / interest (I-High)	5 W-High	4	3	2	1 I-High

You do not need to fill in the above individual information unless you are happy to do so

In the following questions, please give your estimate of the prospect of achievability of meaningful progress and real impact in the short / medium term of a focus (focussed activity) in the identified areas.

All questions are related to Future Internet research development and are based on the leading points identified in collation of input from the threads / discussions that have taken place within the 'virtual' professional group forums

Please provide any comments in the final box.

Please place an X in the appropriate box

Interoperability / Standards

Interoperability in this context is the ability of many systems or components to exchange information and to use the information that has been exchanged through a 'universal' interpretive type of platform.

Standards in this context is broadly the development and adoption of grid, cloud and distributed (& similar/related) computing infrastructure (DCI) standards

Please give your estimate of the prospect of achievability of meaningful progress and real impact in the short /medium term of a focus in the following areas.

1	Global Services / Innovation platform ACHIEVABILITY	5 High	4	3	2	1 Low
2	Global Services / Innovation platform IMPACT	5 High	4	3	2	1 Low

3	Standardisation of classification / operation ACHIEVABILITY	5 High	4	3	2	1 Low
4	Standardisation of classification / operation IMPACT	5 High	4	3	2	1 Low

5	Security & Dependability Trust Platform ACHIEVABILITY	5 High	4	3	2	1 Low
6	Security & Dependability Trust Platform IMPACT	5 High	4	3	2	1 Low

7	Business Processes Interoperability Specification ACHIEVABILITY	5 High	4	3	2	1 Low
8	Business Processes Interoperability Specification IMPACT	5 High	4	3	2	1 Low

Business Models / Justifications

Business Models / Justifications in this context is the specification and substantiation of the business aspect of interoperability service utility (ISU) as captured by the concept of software as a service utility (SaaS-U) and assessed as specific commercial business models

Please give your estimate of the prospect of achievability of meaningful progress and real impact in the short /medium term of a focus in the following areas.

9	Supra-national / State Support vehicle ACHIEVABILITY	5 High	4	3	2	1 Low
10	Supra-national / State Support vehicle IMPACT	5 High	4	3	2	1 Low

11	Commercial criteria Business Models ACHIEVABILITY	5 High	4	3	2	1 Low
12	Commercial criteria Business Models IMPACT	5 High	4	3	2	1 Low

13	Rationalisation / Standardisation ACHIEVABILITY	5 High	4	3	2	1 Low
14	Rationalisation / Standardisation IMPACT	5 High	4	3	2	1 Low

Social / Emergency / Care Benefit Demonstration

Social / Emergency / Care Benefit Demonstration in this context relates to advanced ICT research testing for sustainable high-quality healthcare/emergency-care, demographic ageing, social and economic inclusion

Please give your estimate of the prospect of achievability of meaningful progress and real impact in the short /medium term of a focus in the following areas.

15	Emergency care information system ACHIEVABILITY	5 High	4	3	2	1 Low
16	Emergency care information system IMPACT	5 High	4	3	2	1 Low

17	Personal Health Systems ACHIEVABILITY	5 High	4	3	2	1 Low
18	Personal Health Systems IMPACT	5 High	4	3	2	1 Low

19	Ambient Assisted Living Support structures ACHIEVABILITY	5 High	4	3	2	1 Low
20	Ambient Assisted Living Support structures IMPACT	5 High	4	3	2	1 Low

21	Personalised 'smart' inclusion system ACHIEVABILITY	5 High	4	3	2	1 Low
22	Personalised 'smart' inclusion system IMPACT	5 High	4	3	2	1 Low

23	Any comments you would like to add in relation to your above answers	

Thank you.

Please return through the group forum, or if preferred at martineley.motra@gmail.com

Appendix 6: Dissemination & Exploitation Framework

Framework Strategy Objective

The dissemination strategy objective is to systematically distribute information and developed knowledge through a number of ways to potential users or beneficiaries with whom I can further engage. At the same time it is to avail support for real additional understanding and consideration of concepts, and possible implementation of changes as an intended result of dissemination activities. Put simply, the strategy of this dissemination is to cause utilization of the knowledge and learning achieved.

Expected impacts

The goals in this plan are to:

- Drive activity towards improved competitiveness of the EU and its industry through moving the next phase proposals into downstream RTD and/or innovation

- Strengthen potential for thought leadership in innovation towards the Future Internet meta-agenda, and influence next stage developments in the identified fields

In pursuing commercialisation which is necessary for sustainability, one of the key success factors will be a European wide approach which is much more likely to offer the prospect of driving the required economies of scale and application presence which can facilitate a structured business plan approach. This may quicker achieve efficient pricing models in moving towards a balance between cost effective wide-spread adoption and financial sustainability. This is especially relevant in difficult economic times, and is still relevant in more normal economic times.

The main objectives of awareness creation and promotion activities are:

- Building, managing and maintaining effective contribution to the progress of a knowledge sharing agenda

- Performance of engagement activities which will follow learned best practice in the area

- Seek potential incorporation of emerging models and technologies to support business case sustainable development and to engage in development of a relevant framework within which sustainable business planning can take place

Dissemination activities

Dissemination activities will focus on:

• Exploitable collaborative knowledge building and use opportunity generation, within an overview of how the knowledge can be used in the Future Internet research meta-agenda

• Dissemination of knowledge and the emergent knowledge itself

Promotion media initially envisaged are:

• Web-site: A short initiative presentation outlining the collaborative opportunities based on the identified areas will be compiled and highlighted on one or more organisational websites and also handed out or sent out at relevant events and to relevant contact lists in a phased and controlled manner

• Press releases: Press releases will be issued to mark key changes in public visibility such as the inclusion of key collaboration partners

• Presentations will be sought into international forums and conferences. Chosen academics and company representatives will be invited to give descriptions of complementary technologies developed. Where reasonably possible encouragement by invitation will be made to a broad spectrum of stakeholders for participate in this area of community building and collaborative consortia

An approach identified to maximize impact is mindful of the need to optimize any budgeted resource available. This approach will be fulfilled through engagement with a view to get additional support from national and regional policymakers, bodies, actions and initiatives. These can act as “agents” or “multipliers”, which can increase the volume of related influence and/or activities and also enlarge the contact reach within Europe and wider. The traditionally more regular approach of organising an interest group is considered to be over used in many quasi-technical environments and often too loose for effective delivery impact. Within this strategy, there can be a diversity of tailored approaches appropriate to the technical or structural issues, and further development of the agents will take place progressively according to the emerging needs of the represented constituencies.

In order to support the development of better networked application and services development, and to reinforce Europe’s strength in leading technology and industry, activity will engage with a view to establishing links and active collaboration with on-going significant and relative initiatives in the field. This approach to engagement is for the purpose of:

a. allowing a deeper engagement with and input of different categories of potential participants

b. promotion and dissemination of findings and results

c. obtaining feedback from the wider community

d. further developing the current state of cooperation between many of the significant actors in these areas within Europe and wider

e. expanding and enhancing the business and academic/technical bases that support these research fields

f. progressing distributed leadership in driving consensus and positive forward action among the stakeholders

Consistent with the greater research ambitions, it is proposed to have engagement with initiatives which have an implementation dynamic and/or which are close to market. This additionally facilitates progressive development beyond the state of

the art in a realistic timescale. This will involve activity to identify and pursue engagement with the most relevant initiatives with such market facing commitment

The real challenge which remains and grows in importance is to actually assist relevant authorities/institutions in the EU, and wider, in breaking down barriers through adoption of a robust, highly usable and readily adopted integrated and expandable approach, including wide accessibility and adaptability requirements. In other words, the opportunity is to develop into an integrated approach which can also be used in other user segments or in general application.

Specific Targets

The post-project target audience for dissemination will be threefold:

1. Leading and innovative universities, research institutes/agencies, technical developers and cutting-edge industrial/commercial organisations. The aim is to collaboratively lead the research and development agendas with them in response to appropriate funding calls.

The initial approach here is to engage with researchers and scientists from the Future Internet, Enterprise Interoperability and Collaboration domains, who are willing to collaboratively contribute to the evolution beyond the state-of-the-art in this area. This is likely to include:

a. Presentations in appropriate conferences, such as ICE (International Concurrent Enterprising). This conference brings together leading academics, researchers and practitioners in a common forum to stimulate the exchange of ideas, views and latest developments in the field of Concurrent Enterprising. It has become a proactive knowledge community, a community of practice and a lively and engaging meeting place for leaders in innovation in this domain.

b. Cluster member engagement within appropriate groups, such as the Future Internet Enterprise Systems (FInES) Cluster. This represents a leading Enterprise Interoperability and Collaboration Research Domain in Europe, and includes

experts and stakeholders from all over Europe, working in the areas of Enterprise Software, Enterprise Interoperability and Collaboration applicable to enterprises.

c. Direct contact to selected individuals on a ‘cold’ basis, a networking referral basis and on a personally known practitioner basis.

d. Possible creation of a number of video lectures. This has potential for world-wide exposure.

e. Possible creation of a network group to respond to a phased release of the conclusions. This has potential for world-wide exposure but needs to be clear on differentiation in a crowded arena.

2. Policymakers at national and supranational levels. Albeit slightly longer term, one way to influence the calls which come out of framework programmes is to engage with the policymakers forums and influence the direction of research calls before they are made. This has the effect of potentially aligning the calls with the researched findings and facilitating its further development into progression of research or into dissemination and exploitation. There is also scope for recognition of expertise in these circles through journal publications (as lead or joint author).

Equally, it may be possible to network relevant associations and policy groups instigated through e-mailing referring to the work completed. Such approaches may be able to achieve a listing in the EU Blue Book, a list of all policy people contactable in Europe; however this would be through highly targeted approaches.

It has been known for some others demonstrating relevant expertise to find a Mentor within the EC Policy Advisors where they give direction (concurrent with policy – i.e. right thing at right time) and concurrently influence Heads of Directorate (Commission). This would be best pursued as a representative of primarily a SME grouping. This will be considered through selected professional institutes, with a flexible approach.

The RDAs (Regional Development Agencies) have closed. They handed over during summer 2011 to LEPs (Local enterprise Partnerships). At this stage the

route into LEPs is not consistent or coordinated in direction, but as it potentially becomes appropriate this route may also be pursued.

Activity here is likely to include:

a. Direct communication with Cluster Heads in the European Commission. For example, e-mail correspondence has already been exchanged on related matters with Cristina Martinez Gonzalez, former Head of Future Internet Enterprise Systems cluster, European Commission - Information Society Directorate-General. This and other such activity will be expanded

b. Responding to, and proposing widening of, views sought from European Commissioners. For example, views on how the EU funds research and innovation was previously sought by Máire Geogheghn-Quinn, Commissioner for Research, Innovation and Science, European Commission (e-mail 28 April, 2011). This type of communication prompts the opportunity to raise other related issues directly and outside of any formal responses to the request.

c. Communication and responses to national and regional bodies such as the Department for Business, Innovation and Skills (BIS) and the emerging Local Enterprise Partnerships (LEPs)

d. Pursue the possibility of Policy Advisor mentoring

There are however some big implications for policy, including the big unknowns! A key problem with assessing policy implications currently is that until we better understand what extensive interoperability will look and feel like, assessment of its policy impacts could well be very wide of the mark. As most current phase demonstrations of interoperability tends to be at a sub-level of integration, any assessment could be as wide of the mark as considering the impact of introducing a CD encyclopaedia (Encarta) when the generally effective development with wide reaching impact was the Google search engine. The substitute effect is usually unknown until it happens. This should not stop or restrict policy development, but the likelihood of there being as yet not understood answers emerging should be borne in mind, especially in strategy development.

3. Potential or existing commercial consulting or interim management clients. This also includes businesses interested in new opportunities enabled by the Internet, and public authorities. Future and change strategies can be more persuasively promoted with the understanding of cutting-edge issues and association with leading bodies involved with them.

Activity here is likely to include:

a. Approaches to IT industry, willing to collaborate and contribute to implement new professional organizational management concepts and innovative approaches

b. Direct contact to selected individuals/organisations on a ‘cold’ basis

c. Approaches to suggested individuals/organisations on a networking referral basis

d. Direct contact to selected individuals/organisations on a personally known professional basis

There is also scope for additional and wider engagement and dissemination through, for example, identifying opportunities to be proactive, as opposed to reactive for academic staff & student training, school leavers and vocational education. There are related implications for job design and anticipation of how employees, employers and unions would react to such emerging practice implications.

The overall scope for post project dissemination impact is immense. This initiative is therefore not only progress its subject matter and direction, but additionally empowering of engagement and progression with leading research organisations, policymakers and commercial organisations.

It will potentially enhance knowledge, understanding, collaboration and appreciation of the emerging requirements and issues in this fast developing area, providing a route to leadership and direction on directional, economically and societally important development.

Moving to downstream RTD, innovation, leadership and exploitation

There is a need to support a demonstration of a process for return on investment during and after key developments. It is therefore proposed to take a tactical approach to development towards exploitation, alongside development of a strategic longer term collaborative positioning on one or more commercial support approaches. This will involve an approach of incrementally exploiting the technical assets that are developed (including prototypes and demos) at an early stage.

Subject to initial progress it is propose to set up a Commercial Advisory Board to advise on what type of assets are marketable, and how to market them – what type of assets can be run through which mechanisms. This will be positioned taking account of the EU 2020 Roadmap – a more strategic longer term approach.

This combination of tactical and strategic approach gives opportunity for constructive future development into exploitation, while recognising the benefit of showing progress in exploitation where possible at earlier stages.

Appendix 7: Summary Initial Paper – Ambient Assisted Living Support

There has been some research into remote communication and facilitation of ambient assisted living, wellbeing or residential monitoring through internet protocol voice & video communications and enabled remote services. At the same time, ICT solutions able to provide early detection and adaptive support to changing individual needs related to ageing have long been reported. However, in practice they seem to achieve little more than prototype and test, or limited adoption often on part functionality for a number of effective delivery reasons.

The real challenge which remains and grows in importance is to actually assist so many of the population and relevant authorities/institutions in the EU , and wider, in breaking down barriers through adoption of a robust, highly usable and readily adopted integrated and expandable system. In other words, this is not only an opportunity just for healthcare and wellbeing, but about the opportunity to develop into an integrated home hub for ambient care and inclusion prolonging independent living.

The main aim is to design, develop and test evaluate a smart and self-adaptive tele-assistance environment for elder people, with a robust video communication platform and the integration of different sensors able to provide early detection of changing individual needs, provide advanced reasoning functionalities which predict and analyse behavioural data, and interact with the surrounding of the user, enabling a holistic and adaptive support for independent living.

3D range vision system

The abnormal behaviours recognition can be realized according to a three-level features hierarchy for the characterization of the body position, moving speed and posture dynamics frame-by-frame.

There is a plethora of sensors and actuators, each using its own communication means, protocol and data formats. Thus, an important objective for any sensor/actuator network is to address heterogeneity and interoperability, i.e. to be able to recognise these heterogeneous devices and be able to use them optimally

in a combined manner. This is especially important for sensors, as they can vary greatly but their information must be combined, aligned and fused in order to infer high level data. Hence, the sensor fusion process in a sensor and actuator network is a paramount process since:

1. it will validates the measures obtained by the sensors
2. it will complements the information obtained by a 3D range vision system
3. it can infer higher level information from the primitive data obtained by the sensors.

Likewise, sensor data will be consumed by different actors, each with different needs and access rights. When dealing with privacy-sensitive data about users (location, activities, ...), it is important to clearly define the data access permissions of each actor. Consequently, sensor data must be processed in a way that allows different levels of detail (i.e. a location can be given by its specific coordinates, or a containing room, a floor, a building, a street, etc.) and different permissions for end users.

Modern sensor (and actuators) networks are usually based on efficient wireless communication mechanisms. Still, batteries are bound to discharge with time, so the problem of recharging those devices arises. Street-level devices can use solar cells to recharge slowly, hidden sensors can be connected to a power surge, but the vast majority of in-building sensors or body-worn sensors run with batteries and those must be recharged manually. Then, a great concern in these systems is making the batteries last as long as possible. Consequently, a requirement for any sensor/actuator middleware to be devised will be to be energy-efficient.

Each deployment may need to have a PC that will control the associated sensor/actuator network and serve as a proxy to the different functions components of the deployment; carers and relatives may access this system via their web browser, configure it and analyse logged information that may be useful to detect problems.

Advanced reasoning system

There will be a requirement for an advanced reasoning system to provide early detection and adaptive support to changing individual needs related to ageing (e.g. increased risk of falls, depression, sleep deprivation, or cognitive decline). The system will need to promote better prediction, prevention and support through long-term trend analysis of basic daily behavioural and physiological data, building on unobtrusive sensing and advanced reasoning with humans-in-the-loop. Self-learning solutions building on open platforms will be needed, which can share contextual information with other artefacts in the surroundings of the user.

The advanced reasoning system will need to be comprised of at least the following modules:

1. Pattern recognition. A repository of pattern recognition based on the data coming from the video and image signals and the sensor network, to describe the independent living of the elder user, with their usual behaviour in different times of the day.
2. Training. At runtime, when the system is active, data should be collected from the video and image signals and the sensor network, and compared to the pattern repository, in order to train and update the pattern description and best describe usual behaviour of the person during the 24 hours of the day, providing the long-term trend analysis of basic daily behavioural and physiological data.
3. Decision making. A decision maker will need to be developed to find real time abnormal situations, using advanced reasoning with humans-in-the-loop, that will trigger either automatic and self-adaptive responses or emergency or support calls to relatives and carers through a V²oIP (voice and video over internet protocols) platform.

Gathering information from vision systems is an important activity in many applications nowadays. The aim should be to gather as much information as possible from the environment under surveillance. The fact is that the data storage is not the only way of getting information; there is an urgent need for advanced video analysis techniques that can systematically interpret and understand the

semantics of video contents, within the application domains of security surveillance, intelligent transportation, health/home care, video indexing and retrieving, video summarization and highlighting, and so on.

Many researchers have studied human appearance and motion recognition in the field of computer vision. For example, studies detecting specific motions using surveillance cameras have increased with the number of crimes and instances of terrorism, or in the field of robotics. This needs to be built upon.

A human moving around within a room has almost an infinite amount of possible movements, but it can be deduced from the resemblance with facial recognition that those movements can be organized in groups. These groups make the study of human motion easier in the room. For instance, a man lying on the floor (it might be an elderly person who has fallen) is then easily distinguishable from another who is sitting on a couch or a chair.

The communication of gathered information will increasingly rely on advanced V²oIP technology. VoIP has grown rapidly and has become a mainstream telecommunication services, not only because of the lower cost compared with traditional PSTN (Public Switched Telephone Network), but also because of it being a convergence of technologies of data and voice communication. This success has built the basis for the further technology enhancements concerning communications over IP networks. V²oIP applications have already achieved great success as stand-alone communication technologies.

V²oIP (Voice and Video over Internet Protocol) applications can treat voice, video, data, which may be packetized and transmitted in real-time over IP networks [3].

V²oIP technology is now widespread in business and other environments. But in an ambient assisted living detection and communication scenario, the use of a V²oIP tool reaches further. The user interface will necessarily be completely adapted and suited to the care and assistance of elderly people and other target groups.

The possibility of providing video and voice communication perfectly suits the requirements of an application related to e-health and wellbeing, due to the fact that visual communication provides a more realistic contact between an elderly person and some of their relatives or carers than a merely phone call. This means that the elderly person can have an immediate link with those people; therefore a first assistance can be provided by this mean to the person who is under surveillance.

Appendix 8: Summary Initial Paper – Commercial Criteria Business Models

Future research here rests upon the rests upon the proposition that the Future Internet may be extended beyond current broadband perspectives to a service infrastructure on top of the communications infrastructure of the Internet. This leads to the following three central premises based on the FI concept:

1. Economic argument: ICT trends towards commoditisation, continuously eroding the cost base of providing services
2. Public interest argument: some services offered over the Internet are part of the fabric of the economy and society, essential for all businesses or for minimum "quality of life"
3. Competition argument: a level playing field in basic service provisioning for advancing open competition, greater transparency and unfettered innovation through new highly expandable services.

This scope has been further affirmed in the European Commission (2008) report on Value Proposition for Enterprise Interoperability, this being a key component of the Future Internet. In particular, that report demonstrates that such services are essential for enabling business innovation and value creation. Moreover, Future Internet technologies will have to re-shape interoperability as a capability, leading to the need to reappraise interoperability between enterprises. The report introduces "Future Internet Enterprise Systems", which are "very much part of the Future Internet paradigm".

This vision is premised upon and closely linked to the development of the Internet as a universal infrastructure for "value added" business level innovation.

Using Scenarios to Support Business Model Development

Scenarios are attempts to describe in some detail a hypothetical sequence of events that could lead plausibly to the situation envisaged. They serve to call attention, sometimes dramatically and persuasively, to the larger range of possibilities that must be considered in the analysis of the future. It is considered

that scenario development should be adopted as a centre piece of business modelling methodology.

For each set of business models to be investigated, fundamental key questions should be identified as well as key input variables and output variables for building scenarios to drive business models. Within this three general scenarios should be applied for each business case:

1. a disruptive scenario to optimise innovation and impact
2. an evolutionary scenario from the as-is situation
3. a mid-way scenario between the disruptive and evolutionary

The Future Internet is a highly generic service infrastructure and does not itself prescribe any specific way for exploitation in a business context. However, its regulation and method of supply can create relevant financial scenarios as became the case for the original internet. Ironically, if this approach is, or has to be, repeated then there may not be an initial business case, only subsequent ones. This would nonetheless be a valid conclusion.

The definition of the Internet economy is a subject of debate globally. Cattaneo (2011) defines the "Internet Economy" as the totality of the business and consumer transactions carried out over the Internet, such as eCommerce, eBanking, Social Networking, Online Media, etc. This definition is seen to be consistent with the OECD (2011) Guide to Measuring the Information Society, which is concerned with the demand and supply of Internet infrastructures, products and services. However, unlike the OECD Guide, the definition of the Internet Economy needs to take into account the economic and business impacts of the Internet, and many would argue the social impacts as well. Various impact assessments of the Internet are currently underway and their findings are expected to further influence the accepted parameters.

Appendix 9: Summary Initial Paper – Global Services Platform

The Objective

The objective is to collaboratively develop a business-pervasive open-source service platform. This should be able to identify, compose, integrate and mash-up in a secure and adaptive way existing, emergent and innovative interoperability, enterprise and collaboration services.

This will involve applying business rules and self-adaptive decision-support guidelines to formulate an efficient combination of the needed services. It is likely to be subject to the business context, as industrial sector and domain, size of the companies involved, openness and dynamics of collaboration.

This is a possible movement towards how the Information Technology (IT) vision of Software as a Service (SaaS) can achieve adoption in the area of interoperability within enterprise collaboration. It will be necessary to support a number of key collaborative enterprising structures, from supply chains through to business ecosystems, and adopting a role such as a utility, a commoditised service, the so-called Interoperability Service Utility (ISU).

There will be a supporting purpose in defining services for competence management and business opportunity management and in studying, designing, developing and prototyping an open, self-adaptive, generic ICT integrated solution to support business-pervasive open-source service platform. This should be able to expose, integrate, compose and mash-up in a secure and adaptive way both existing and innovative yet-to-be developed services, by the application of intelligent maturity models, business process rules and self-adaptive decision support guidelines to achieve the best combination of the needed services in dependence of the business context.

Limitation

It is debatable how far this can go in compiling a delivery consortium, or ‘virtual factory’ without a detailed understanding of the position and condition of potential delivery partners. The detailed understanding for this would be around the ‘3 Cs’:

- Competence
- Capacity
- Cost

It will however be necessary to pursue the development of a new business model incorporating the SaaS-U (Software as a Service-Utility) vision where the developed open-source service platform will be capable of integrating free-of-charge and chargeable, open and proprietary services subject to the requirements and business guidelines or policies.

Appendix 10: Example non-UK Data Protection 'Rule-sets'

These include:

- Argentinian Personal Data Protection Act of 2000
- Austrian Data Protection Act 2000
- Austrian Federal Law 1999
- Australian Privacy Act of 1988
- Belgian Data Protection Law
- Bulgarian Personal Data Protection Act 2001
- Canadian Privacy Act 1983
- Czech Republic Protection of Personal Data Act 2000
- Danish Personal Data Act 2000
- Dutch Personal Data Protection Act 2000
- Estonian Personal Data Protection Act 2003
- Finnish Personal Data Act 2000
- French Data Protection Act 1978
- French Data Protection Act 2004
- German Federal Data Protection Act 2001
- Greek Protection of Individuals with Regard to the Processing of Personal Data Act 1997.
- Guernsey Data Protection (Bailiwick of Guernsey) Law 2001
- Hong Kong Personal Data Ordinance
- Hungary Protection of Personal Data and the Publicity of Data of Public Interests 1992.

- Icelandic individual Data Protection Act 2000
- Irish Data Protection (Amendment) Act 1998
- Irish Data Protection Acts 2003 Indian Information Technology Act 2000
- Italian Data Protection Code 2003
- Italian Data Protection Act 1997
- Japanese Personal Information Protection Law
- Japanese Administrative Bodies Protection of Computer Processed Data 1988
- Jersey Data Protection (Jersey) Law 2005
- Latvian Personal Data Protection Act 2000
- Lithuanian Legal Protection of Personal Data Act 1996 (being updated)
- Luxembourg Processing of Personal Data Act 2002
- New Zealand Privacy Act 1993
- New Zealand Privacy Amendment Act 1993
- New Zealand Privacy Amendment Act, 1994
- Norwegian Personal Data Act 2000
- Panamanian Habeas Data Act 2002
- Romanian Processing of Personal Data and the Free Circulation of Personal Data Act
- Polish Protection of Personal Data Act 1997
- Portuguese Protection of Personal Data Act 1998
- Russian Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data 2005
- Russian Federal Personal Data Act 2006

- Singapore E-commerce Code for the Protection of Personal Information and Communications of Consumers of Internet Commerce
- Slovakian Republic Personal Data Protection Act 2002
- Slovenian Personal Data Protection Act 1999
- Spanish Protection of Personal Data Act 1999
- Swiss Federal Law on Data Protection 1992
- Swedish Personal Data Protection Act 1998
- US Video Privacy Protection Act of 1988
- US Wireless 411 Privacy Act
- US State Data Privacy Regulations (i.e. 2010 Massachusetts Data Privacy Regulations and 01 CMR 17.00: Standards for The Protection of Personal Information of Residents of the Commonwealth, California Online Privacy Protection Act(OPPA) of 2003, Nevada Revised Statutes 603A-Security of Personal Information)
- US Social Security Number Protection Act of 2005
- US Identity Theft Prevention Act of 2005

Appendix 11: World Economic Forum, Davos 2013 - Discussion Prompters

These include:

- Unleashing Entrepreneurial **Innovation**
- Financing **Innovation** and Entrepreneurship in China
- Unlocking **innovation** through social media platforms
- Delivering biotech **innovations**
- Fostering growth and social **innovations**
- Leapfrogging **innovation** in developing countries
- Breakthrough research and **innovation**
- Fostering anti-disciplinary thinking for breakthrough **innovation**
- Creating 600 million new jobs and what **innovation** will be needed
- Collaborations with universities spurring **innovation**
- Fostering entrepreneurial **innovation**, in low growth environments
- New research, technologies and **innovation** on the cusp of solving some of the world's major global issues
- Shaping digital norms by assessing a framework that allows **innovation** and rewards creativity
- Scaling social **innovation** for greater impact
- Funding corporate growth by unlocking long-term capital through **innovation** and infrastructure
- Restoring Europe's vibrancy by sparking and sustaining **innovation**-driven competition
- Embedding **innovation** as a growth engine
- Navigating today's vast network of **innovation** and knowledge,
- Unleashing entrepreneurial **innovation**
- What new funding models are driving **innovations** for growth
- Collaboration and **innovation**
- How we need to leverage social technology for **innovation** for the next generational workforce
- Build local capacity and **innovation** ecosystems

- Foster scientific and technological **innovation**
- Build on past IP to gain the **innovation** dividends
- What needs to be done to ensure intellectual property regimes will boost **innovation**
- Investing in sustaining **innovation** for competitiveness
- Push the global **innovation** frontier and meet the innovation imperative
- Prioritize **innovations** for human development
- Managing in a world with decentralized **innovation**
- Finding new centres of **innovation** as the next labs
- Exploring the global **innovation** heat map for philanthropy
- How technological **innovation** are transforming industries
- Building new national **innovation** capacity to promote sustainable, inclusive and resilient prosperity

Appendix 12: EU IPR– Factsheet Support Publications

• “Introduction to IP Rules in FP7 Projects”:

http://www.iprhelpdesk.eu/sites/default/files/relateddocuments/Factsheet%20IP%20rules%20FP7%20June%202011.pdf

• “How to manage IP in FP7 during the proposal stage”:

http://www.iprhelpdesk.eu/sites/default/files/newsdocuments/IP_management_in_FP7_during_the_proposal_stage_0.pdf

• “How to manage IP in FP7 during the negotiation stage”:

http://www.iprhelpdesk.eu/sites/default/files/newsdocuments/How_to_manage_IP_in_FP7_during_the_negotiations_stage_0.pdf

• “How to manage IP in FP7 during and after the project”:

http://www.iprhelpdesk.eu/sites/default/files/newsdocuments/How%20to%20manage%20IP%20in%20FP7%20during%20and%20after%20the%20project.pdf

• “Strategic Guide to Successful Use and Dissemination of the Results of Research and Development Projects”:

http://ec.europa.eu/research/sme-techweb/pdf/use_diffuse.pdf#view=fit&pagemode=non

• “Exchanging Value – Negotiating Technology Transfer Licensing Agreements: A Training Manual”:

http://www.wipo.int/sme/en/documents/guides/technology_licensing.html

Appendix 13: EU Associated Countries

European Union associated countries for Horizon 2020 funding as at 26 February 2014.

• Albania

• Bosnia and Herzegovina

• Faroe Islands

• Former Yugoslav Republic of Macedonia

• Iceland

• Israel

• Moldova

• Montenegro

• Norway

• Serbia

• Switzerland

• Turkey

Liechtenstein does not intend to associate from the start of Horizon 2020 but is likely to do so later in 2014

http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h2020-hi-list-ac_en.pdf

Appendix 14: Management 'Powers' and their 'Issues of Influence'

Management 'Powers'					
Knowledge	**Thought Leadership**	**Management Leadership**	**Competence**	**Funding**	**Approval**
Research & Development	**Insight & Engagement**	**Operation**	**Collaboration & Resource**	**Financial Framework**	**Authorisation Framework**
'Issues of Influence'					
Leading the View of the Future	Radical or Incremental Innovation	Eminence, Policy and Evidence	Pressure to Misrepresent	Radical or Incremental Innovation	The Wish for Certainty
Knowledge and Evidence Creation	The Wish for Certainty	Protectionism		Leading the View of the Future	Pressure to Misrepresent
	Economic Implications	Control		Eminence, Policy and Evidence	Control
	Thought Leadership			Protectionism	Appreciative Enquiry and Anti-Creativity Bias
				Economic Implications	
				Knowledge and Evidence Creation	
				Appreciative Enquiry and Anti-Creativity Bias	

Appendix 15: Notice shown at the start of discussion Threads

NOTICE: Your participation in this thread/discussion is welcome although you are in no way obliged to do so. Information submitted is open to the Group and will be used by Martin Eley, a work based Researcher as part of his Doctoral research at Middlesex University. Within this research, individual, personal and corporate identifiable details are used by the Researcher, in assessing the overall mix of people who have contributed, and are not passed to any other party. Any personal data will not be used in any way to identify you. The findings (but not individually identifiable information) may be published or made public by the Researcher and/or Middlesex University.