Service Innovation
Yearbook
2009-2010

Foreword

Dear reader,

I welcome this first edition of the Service Innovation Yearbook.

ICT is the cornerstone of future EU growth and is a key element in generating tangible improvements in the areas like health, education, public administration, business, accessibility and social inclusion.

It is very important to highlight the importance of services, comprising now more than 70% of the European GDP. More important is however to see that flourishing service industry is also the critical enabler for sustainable societal development, the well being of citizens, and at the time ensuring sustainable economical growth at the economy, too.

The Service Innovation Yearbook focuses on new ICT enabled innovation paradigms for services, notably on knowledge intense services in various fields.

User-centricity in service innovation means new type of playing field in the services landscape. Innovation is faster and more multidisciplinary than ever before. How do we capture the potential of all stakeholders to contribute? How do we ensure that the services developed are fast taken up, and scalable into different contexts, be it on individual, cultural or geographical level?

The Open Service Innovation can be one of the keys to engage the users and all the stakeholders in a PPPP; public-private-people partnership, which is necessary to fully capture also the societal capital for services development. Those companies who can build their innovation on win-win relationship with stakeholders will also capture the societal change for benefit to their own development but also to the citizens' best.

The public sector is undoubtedly one of the drivers to the service society. Using large scale pilots and precommercial procurement the innovation can be brought to the real world environments, thus highlighting the co-creative nature of the service society, and also the empowerment of the users to configure the preferential services themselves, in a secure environment.

The trend to compose services along the lifeline of the individuals, having services integrated around events citizens encounter (birth, death, marriage, moving residence, schooling etc) lead to the need of new kind of thinking also in the public sector. The composition of these integrated services will be that complex that we really need interoperability and common architectures. The open innovation platforms can be one of the keys to achieve that.

We are facing the challenges of sustainable society and our duty is to turn that into possibilities for the citizens, public services and business ecosystems. I hope that this yearbook will give a strong stimulus for that development, and can bring us forward both in thinking and action towards a healthy citizen-centric society, enabled by the next generation of ICT solutions and knowledge intense services.

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Director
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DG Information Society and Media

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A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (http://www.europa.eu).

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The Many New Faces of
Innovation

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Craig Berrett, Intel's former CEO is reported to have said: You can't save your way out of a recession, you have to invest your way out. In a crisis ridden environment, where most companies see cost cutting as the panacea, this is something to think about. The clear message is – if we want to have a future we need ever more value creation and innovation and we need to be ever smarter in how we do it.

In the post-World War economic boom research and development have been regarded as critical to a company's success and thus have been kept tightly integrated as protected as part of its "core capabilities". In the last 20 years this has started to change. With accelerating globalization and exacerbating competition the locus of innovation has increasingly moved beyond the companies own boundaries. Procter & Gamble was a pioneer in this field and moved its credo from in-house R&D to a new enterprise mantra – "connect and develop".

By tapping the idea and creativity pool outside a company it can widen its development foot-print while reducing cost at the same time. Increasingly, companies are discovering the advantages of collaborating with a range of external entities for novel ideas – from suppliers to universities to business partners and customers. In some instances, they rely upon these external entities to autonomously produce innovation and in others they actively collaborate with them.

However, it would be wrong to claim a wholesale change of innovation in general – it is rather the addition of new innovation models which oftentimes are being blended with the traditional ones. There is no one-size-fits all model, it all depends… Information and Communication Technologies have provided new capabilities that enable new models beyond the borders of companies, countries and continents. This portfolio of innovation approaches and methods has literally exploded during the last decades. Inherent to these new models is a high degree of complexity, which requires fundamentally different management skills and competencies that the old well guarded model, where everything was "under control" of the company.

Open innovation has emerged as a new mantra. Yet it may mean different things to different people. On the one hand it is about looking outside the company for innovation ideas. This can happen through "Crowd-sourcing" as with open innovation marketplaces such as InnoCentive, conceived in 1998 by three scientists from Eli Lilly. However, it can be directed to employees of companies, its business partners and their family members as practiced by IBM in their famous innovation Jams which had more than 100 000 people participating during a 72 hours Jam period.

However, it also may be an opening up to those to whom the value should be provided – i.e. to the users. Eric von Hippel and his world-wide research community have provided deep insights into these new "user driven innovation" models. The European Network of Living Labs (ENoLL), announced under the Finnish presidency in 2006 has benefited from Von Hippel's seminal work.

While openness is "in" it should not be considered the answer for all situations and markets. The German export boom during the years 2000 to 2008, when exports basically tripled was fuelled by companies who are relying on rather closed innovation approaches. Hermann Simon has described those in his book "Hidden Champions of the 21st Century". These mid-sized companies have established themselves as world leaders in highly specialized products and solutions for specific industries. Their names are not known by a broader public but they created enormous value and jobs around the globe. In his deep research on this phenomenon Hermann Simon uncovered that usually these companies are very secretive and protective about their R & D. They outspend corporation in their relative R&D investment and they outperform them in patent ratios by a factor of five per employee. Yet, another characteristic of these companies is a customer knowledge and intimacy far beyond the average corporation. Their deep knowledge about potential customer value is held by "lead users" as described by Eric von Hippel as key drivers for user-centric approaches. However they sit in the provider organization and come up with solutions that the average end-user has not been dreaming about.

Whatever the way may be how innovation happens, it is not a function of technology. Endowing technology assets with value is the key to innovation. It is first and foremost a function of management. As the academics Michael Mol and Julian Birkinshaw point out in their new book *Giant Steps in Management,* the most important innovations in the busi-

ness world concern how we think about and do management, how we organise, solve problems, make strategy and lead people. With choices between closed and open innovation approaches and the need to adapt models according to the situation, the complexity of managing innovation is sharply increasing. Hence we must become better in the way how we manage innovation. Innovation in management itself is "open" by definition. What is finally needed is a new focus on the locus of value creation i.e. the management of innovation. Innovation funding needs to be directed to the management discipline itself. To use a Clintonesque proposition – "it is management, stupid"… maybe we'll finally innovate the way how we are looking at research in Europe.

Reference

Birkinshaw, J. & Mol, M. (2007) *Giant Steps in Management. Innovations that change the way you work.* 224 p. Prentice Hall.

Views of Open Service Innovation

1.1 Open Innovation as Critical Enabler for Knowledge Intense Service Industry in Europe

This chapter deals with policy and research papers focusing on open innovation. We hope that these contributions lead to intense discussion and action fostering innovation in services.

The understanding of critical innovation factors in knowledge based society and economy is in change. The industrial paradigm changing towards the intangible economy, the control moving to incentives and leadership, and the shift from vendor centricity to user centricity is obvious just by looking at the newest services and platforms on the Internet.

Important is to notice that the societal change, some could even say revolution, is enabled by the strong networking and web technologies development, enabling our actions to be parallel in time and in space – for the first time in the history of the mankind.

This fundamental change will affect all areas of life. Work, private life, and roles in the society. All will be affected.

We are now shaping the future society we are all living in, and what we know so far is that the change will be more profound than we ever can imagine.

Societal innovation changes the power structures, interconnections, and also empowers much stronger value communities to be established, live their lives and die. All this affects fundamental as well the policy making, where the big challenge is to achieve societal robustness at the same time as the bottom-up process is reinforced. The same applies of course for the societal and economical dimensions of life, too.

This paper looks at these changes in the merging societal and technical innovation ecosystems, and highlights the importance of open innovation as the possibility to create the user-centricity and at the same time the innovations needed for a flourishing value-based knowledge society.

In the text I will call for wide consensus on the directions we want to go together, but also how to build the information society for us all; with full participation right of everyone, in his/her all roles, whether private, professional, whatever!

Open innovation at its best can build not only on the collaboration, but also on the creative commons, societal capital there is available, and catalysing the spill-over effects of the innovation back to the creative commons, increasing the success rate but also improving the conditions for new innovative actions in the creativity context.

Finally I will shortly address the need for sustainable societal and economical development, simultaneously. How will open, participative innovation be the base for the new European innovation ecosystem for services?

It is important to notice, that already in the Lisbon treaty the political consensus was based on the vision of knowledge being the key for sustainable economical and societal development, and that growth and environmental sustainability are not excluding each others.

In knowledge industries and services this is even in higher grade true. Competitiveness is based on a win-win game, aggregating knowledge to value.

This article is inspired by discussions and actions from the context of Living Labs and Open Innovation in my work and represents my personal views on the "real European challenge" for the future, for our sustainable society both in economical and societal terms.

The article tackles the changed networked society, and the possibilities empowering citizens to innovate bring, but also addressing the challenge for the businesses to take advantage of the new ecosystems for innovative user-centric service society. Future is not what we extrapolate from the past; future is what we create, all, together now.

When setting the various elements together we can immediately see that the window of opportunity is now, in the middle of the crisis to shape something essential for the future. The European opportunity can be based on *participative innovation for service convergence. The challenge of Europe is to catalyse the Single Market for knowledge intense services in Europe to be a reality in the fastest pace possible.*

The Technical Revolution – Affecting Industries and Society

I draw your attention to the very interesting graph from C. Perez. She has, like many others set the technology revolutions, industrial revolutions and societal revolutions in time perspective. What is interesting to see is the cyclic nature of revolutions, and seeing that all of them have been following the trace from technology, industrial structures and finally throughout society. C. Perez however highlighted the collision between the innovation and deployment phase which we all can well also observe in the current crisis.

The current age of telecommunications needs to be seen as even more radical than the previous ones, as we are overcoming the distance and time barriers – the society is moving from a sequential and local society to a parallel and glocal society, with new structures and behavioural models. Due to this radical change we can not have any smooth transition to the new (like we did not have in the previous revolutions either) but it is likely that the clash will be unprecedentedly hard.

This communications and interactivity revolution changes the world towards an open world. The trends are clearly visible throughout the society. The new dichotomy reflects the philosophy of openness, and is affecting the societal attitudes, but moreover also the service innovation and business ecosystems behaviour in a radically new way.

The importance of developing participative innovation environments is well discussed e.g. by von Hippel in his book Democratizing Innovation, Surowiecki in his book Wisdom of Crowds as well as in the A.W Page report on Democratizing Channels of Communication.

Authoritarian	**Individual Freedom**
Top Down	**Bottom up**
Central Planning	**Participation**
Command & Control	**Collaboration, Self Organization**
Bureaucratic	**Common Sense**
Rigid	**Flexible /Adaptable**
Monopolist	**Competition + Innovation**

The technology change will bring even more radical features to the nature of connectivity. Today the Internet is mainly used for mail-type communication and information retrieval. However when looking at the next generation Internet we will have an Internet which is inherently truly broadband, mobile, actively interactive and personalised.

This "future Internet" creates tremendous opportunities for innovation, but also for new service ecosystems comprising of all actors in the services developing open service platforms on pan-European basis, and even beyond. The big strategic question is if a new service industry ecosystem

	Installation		Crash	Deployment	
	Irruption	Frenzy		Synergy	Maturity
1 The industrial Revolution	1771	**Panic** 1797		Formation of Mfg. industry Repeal of Corn Laws opening trade	1829
2 Age of Steam and Railways	1829	**Panic** 1847		Standards on gauge, time Catalog sales companies Economies of scale	1873
3 Age of Steel, Electricity and Heavy Engineering	1875	**Depression** 1893		Urban development Support for interventionism	1920
4 Age of Oil, Automobiles and Mass Production	1908	**Crash** 1929		Build-out of interstate highways IMF, World Bank, BIS	1974
5 Age of Information and Telecommunications	1971	**Dot.com collapse** 2000		**Period of Innovation and Prosperity**	

Source: Perez C., "Technological Revolutions and Financial Capital", 2002

can be built by the various stakeholders working together, co-creating and building value.

Societal and Behavioural Change

First time in mankind we are moving to strong parallelism in time and space; breaking the traditional constraints. Value aggregation based on intangibles and extended products and services will be increasingly based on **glocal** thinking, on crowd sourcing, and building on societal capital, creative commons.

What is important to notice the increasing power of value communities, and their potential to be an integrated part of the technical, societal and market innovation? People will be connected locally and globally, in various contexts driven by their personal interests and competencies.

Those companies capturing this potential of crowds will be the winners, as both the dynamics and complexity of the competence spectrum needed for breakthrough innovations is increasing rapidly. Following MIT studies it is evident that the heterogeneity of the research groups correlate directly with the innovation probability. If the group is too monolithic, there is a likelihood of progress, but not innovative breakthroughs.

Thus it is imperative for the public sector to catalyse interdisciplinary interaction, but also strong interaction between all stakeholders in the knowledge society. Too often the people component, the societal innovation component is undervalued in the service innovation process.

New management challenges for enterprises mean leadership, preparedness to try, and make corrections is highly dynamic environments. One tool for this is in the 2006 created European Network of Living Labs concept where innovation is brought from laboratories out to the real world, to happen in the real society, with real people.

At the moment the network has expanded to approximately 150 sites all over Europe (and even beyond) covering practically all the regions in Europe.

How to Turn the Societal Capital to Wide Asset for People and Business?

Open innovation for services calls for entirely new types of partnerships. The usual PPP collaboration doesn't take into account the crowd-sourcing or societal capital properly. Hence we need to add on the *people component* to the partnership, bringing it to public-private-people partnership PPPP.

The public sector has a driving role for services development as it by nature is responsible for providing/guaranteeing services of public interest, but also as it is responsible for the legal and policy framework and is a key player in functionalities needed across all services, like identity management. Moreover the public sector is a significant procurer of infrastructure and services, inclusive technology. The concept of pre-commercial public procurement is one of the powerful tools boosting the service economy, if it is used to bridge the innovation gap, i.e. to shorten the time from innovation to take-up.

The risk of failure can be reduced by having the user communities strongly involved in the service development, going far beyond the digitalisation of services as we have seen now. The whole service process including the back-office functions have to be redesigned to take the full advantage of the new partnerships.

The public sector has also a significant role in designing from its part the modern open service infrastructures, and driving in the procurement processes modern solutions, like Ipv6 throughout. No new legislation for procurement is needed, only new ideas in implementing the procurement in collaboration with the users and industry.

As when the new industrial sector of mobile telecommunications was created the private sector and the public needs to come together to specify the common service platforms, enabling modular and interoperable service functions beyond the technical interoperability. The right time to build these partnerships is now, when we are moving the Internet to the next generation enriching us with widely more opportunities to interact, communicate and build competence and interest communities, both professional and private.

European Network of Living Labs, ENoLL

Now few words about the Living Labs, and their role as innovation environments:

Helsinki Manifesto from 2006 says: *"The European Network of Living Labs establishes a European platform for collaborative and co-creative innovation, where the users are involved in and contribute to the innovation process. This approach should ensure that common methodologies and tools are developed across Europe that support, stimulate and accelerate the innovation process. The European Network of Living Labs has a strong regional growth and development impact by facilitating and fostering regional*

innovation as interlinked with a European Innovation System with a global reach."

The ENoLL network has developed from the original 20 sites to wide 150+ sites covering well all regions of Europe and even beyond.

The ENoLL network creates a common innovation infrastructure, on which it is possible to drive the user-centric and open service platforms, provided that the various Living Labs can agree on common areas for collaboration, beyond usual benchmarking and information exchange. What would be very important is to *agree on common functionalities* in selected service sectors, creating together interoperable and reusable modules on common open infrastructure. This is extremely important when we see the opportunity (and also necessity) to create a single market for services in Europe, using fully the technology developed beyond the current applications.

Open Innovation

The new user-centric view highlights the need to capture the creativity of users in a participative way to the innovation process. This participative and co-creative innovation builds on simultaneous technological and societal innovation creating a parallel mash-up of ideas, development and deployment. The innovation moves towards a continuous process

of ideas and solutions, where different technologies, in their different maturity levels meet, very much focused around the user; whether the user is a citizen or organisation.

This cross-fertilization to be effective has to be supported by the right framework, environment and tools enabling the value added to be aggregated both in the business ecosystem and the society as societal innovation. The latter is extremely important to drive the participation and co-creation processes built on creative commons and openness.

Open user-centric innovation in collaborative setting has the potential to speed up the service innovation by developing the market simultaneously with technology. The process nature increases as well the probability for innovation success, as it is easier to adjust the development throughout the participative process. Thus one can say that open collaborative innovation leads to many small corrections avoiding the fundamental mistake in the development.

The role of users empowering them in the innovation process highlights their multiple role, also being the creators for the future. We simply can not afford to loose the valuable and instantaneous contributions from the users in the innovation process.

When speaking about innovation in real world, like those in Living Labs it is however very important to notice that

○ First Wave Living Labs
◉ Second Wave Living Labs
● Third Wave Living Labs

The connectivity and Internet has changed the world. More than 2 B people are connected in the Internet, leading to new groups, communities, connectivity throughout the world

the "real-world" innovation is not linked to deployment phase only. The ideation and development stages are equally important in the holistic understanding of participative and co-creative innovation we now speak about.

Interlinking Innovation for Action

The same need for understanding the nature of change and the difficulty to adapt to it has also been highlighted in European high-level strategic documents, like the Hampton Court report where the need of demand-side innovation as well as the Lead Market initiative is presented to bridge the gap between technology and full scale take-up.

The same was also highlighted in the Helsinki Manifesto from 2006, jointly elaborated with the Finnish EU Presidency and the Commission.

It highlights the user-centric collaborative innovation as key for European growth, supporting the ideas presented by the IST research programme Advisory group ISTAG in its report in 2004, where EAR (Experimentation and Application Research) concept was presented, to have the innovation happening in the real world.

European Drivers for Growth

The technical and media convergence we have seen in recent years has brought to us a set of various devices to store and handle information, to provide communication and also to acct as personalised devices providing rich media content, entertainment and services. As example these devices can be the new generation multifunctional PDAs, mobile phones, portable computers etc. This together with the rapidly developing broadband infrastructure has led to the ICT world we now see around us.

However the development has happened very much from the technological and vendor perspective.

Thus it is important to realise that user-centricity in service development will be critical to develop the user-side demand for the next generation broadband and technical devices. The user has to have similar experience using the whole set of services, whether public or private. It is important to see that in the near future the user will either her/himself not only use the services, but also make the composition of the services he will use. Based on the time and ability of the user she/he will configure the service portfolio by her/himself or by using agents, virtual or real, to do the task on her/his behalf.

This user-centric approach creates also a new business opportunity for the whole service sector. Service convergence around the user leads to the need of building the service infrastructure and offering on open interoperable and modular architecture, where instead of the traditional technical approach the functionalities the user meets in all the applications is the starting point.

We need to analyse the services more carefully from process perspective, to identify the modular reusable elements common to multiple services, use them on an open platform and integrate them to services.

I take the analogy of LEGO building blocks: By the reference architecture we define in an open way the principles of the building blocks as well as the dimensions. Then, based on this software companies and service providers construct the actual building blocks following these principles. The blocks are interoperable, all fulfilling certain module of functionality. When combining these modules together we end up to the full service. Like in LEGO community, the builder (user) her/himself can use pre-designed configurations of the modules, use experts/consultants or if he wants build the personalised configuration of the service her/himself.

Very much similar thinking has been used in manufacturing industries, where the business process engineering led to interoperable approaches and later software offerings in manufacturing enterprises. Also the RosettaNet approach can be used as a model for establishing a functional architecture and thus creating a widely used open approach to manufacturing process management.

In the context of services we can see the direct link between functional reference architectures and *service process engineering*.

The service process engineering approach could be tackled e.g. very much in the same way as was the industrial process approach in the RosettaNet approach: The manufacturing industry processes were decomposed to generic sub processes, and standardised based on their functionalities. Where applicable, industrial international and de facto standards were used, but where no such standards were available, the RosettaNet consortium developed best (common) practise sub processes to cover the whole process chain.

To illustrate the user-centric functionality thinking and the decomposition to sub processes e.g. the following functionalities can be seen in most of the services.

Identity management is related to every service process usually both from the user and vendor side. Likewise the trust building process between the parties is crucial, as e.g. **service personalisation** is very often related to the **trust** between the actors. Financial transactions are present in most of the services, and especially now when we have the Single European Payment Area SEPA pan-European **financial transactions** are easier. Mobility is related to most of the services, too. We want to have the service irrespective of our location, e.g. in health related services this is essential. Thus **mobility** and **natural interactivity** become some of the essential user-near functionalities, too.

Service roaming across different equipment is needed to provide the services in a context sensitive way, but also the **context management** is important when we move towards per in services.

All this requires also the right competitive framework to emerge in Europe. The EU Service Directive is a step toward the right direction, but still we are quite far from the Single Market for Services in Europe. Pan-European legislation needs also to better grasp the opportunities the present technological change is offering for businesses.

Too often we do not see that by having a catalysing legal and policy framework we can boost the innovation and create favourable conditions for sustainable economical and societal development.

The new "future Internet" is an opportunity for Europe to become a leader in service economy. Industry has already come with a PPP on the topic, which proposal is now been elaborated together with the Commission. This industrial action needs to be combined with the new approach of user-centricity and Single Market for Services, as these all are together needed to create the service industry in Europe.

The new "beyond i2010" strategy as well as the new ICT research is taking shape. In these actions the future technology development for next generation Internet and web based applications are addressed very strongly. The development programmes need at the same time also supporting actions more on the policy side, as well as on the legislation side. Here I take the example of the GSM story again, where the general framework of mobile communications were developed at the same time as the technology. Both the public and private sector worked very closely together to create the mobile industry and services.

It is also not to be forgotten that the initiative to develop mobile communications networks came form the public

sector, first procuring the Nordic NMT network. As it was based on open specifications it fostered the creation of the industry worldwide, based on European approach. Furthermore when the analog technology was to be digital (GSM) we by close PPP developed a worldwide standard positioning the European development well in the global scale. This would never have happened if the chosen approach would have been a closed one.

It is sad to see that despite our strength in communications and mobile technologies we in Europe have no strong global players on Web-based services! Why? One reason might, again, be the quite fragmented market. It is straightforward to develop a service in one of the Member States, but when up scaling the service to larger markets we in Europe face 27 separate markets. The closest single market for up scaling is the US market, so many of the best services are moving over there, being bought by US companies, and then sold back to Europe. We are becoming instead of inventors and business developers in to high extent only a market area for advanced products.

Single Market for Services in Europe?

As stated before the Single Market for Services is an important goal for the European sustainable development.

It creates open platforms for service providers to come with their offerings, and empowers the users to combine the best one for them. At its best this approach creates a new service ecosystem where we see a clear role for larger companies providing the platforms and also integrated solutions, where smaller companies provide special offerings, and their expertise, often on more local basis.

The development of the Single Market requires close collaboration between the Member States and the Commission to see beyond the current paradigms of service provision. The societal challenges we face e.g. due to the demographic development suggests new ways of service provision, which can be solved only by increased open collaboration across all actors, setting the individual in focus.

There is a clear win-win game in this:

The advantage for the citizens is to receive affordable service provision borderless, and with high grade of personalisation. The new industrial and service cluster boosts the European growth after the recession. The public sector can rely on open platforms and modular solutions, not locking them in to any single vendor, and making the changes in the service processes easier and faster. Moreover having this

pan-European approach enables effective joint development and exchange of best practise experience making services more affordable and inclusive for all.

The common platforms together with the broadband infrastructure makes the market interesting also for large global companies to invest in Europe, and to build solution based on our reference approach.

Conclusions

The time to react is now, if we want to create a strong user-centric business ecosystem in Europe – the ecosystem which is contributing to the sustainable growth both economically and societally in Europe.

We need to react now, as the crisis we are now facing is reflecting the fundamental changes in the societal and economical structures and behaviour, but also suggests us to move towards a more open innovation environment, leading us to service society for us all and with us all. Inclusiveness means not only services for us, but also full participation right in the creation of the future. No good idea is lost, but this requires also a very deep understanding of the interaction processes in the development of our knowledge society.

Open innovation which is based on creativity in the society and societal capital and experience captures value better for new business and service development, enabling all sizes of

entrepreneurship flourish in the service ecosystems. But, all this needs to be an action stemming from the ideas of user-centricity and pan-European actions working together, towards a true Single European Market for Services.

The foundation for the Single European market is well set in e.g. Single European Payment Area, the emerging telecommunications legislation, developments towards eIdentity etc, but so far the common drive towards user-centric common functional reference architecture is missing.

Shouldn't we now bring our act together to shape the Single Market, in having technology and societal innovation meeting in real-world environments, having true PPPP. We can have a new success industry in Europe, if we just join our forces.

Public sector can be a valuable driver like it was in creating the mobile industry, the industrial players by agreeing on global open platforms and the people by adding the societal capital and innovation to the development of the services. The legal and policy framework creating a single European market for services is a prerequisite for the boost as well. Can the success story of the GSM and mobile communications sector be replicated by bringing the actors widely together?

The window is open for us, for open innovation platforms for the user-centric knowledge intense service industry.

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→ Open innovation captures creativity of **users** for business and better services

→ Open innovation increases the **social and intellectual capital**

→ Open innovation enables scalable services and fast innovation cycle, even continuous innovation process

→ Open innovation sites (e.g. Living Labs) foster **creative commons** capital

→ **European Network** of innovation environments enables development of **functional interoperability** of eServices

→ eServices „best suited" for open innovation environments in real world settings:

  • Need for high **dynamics, multidisciplinarity**

  • Different maturity levels of technology and society merging

  • New **co-creation processes of eServices**; user- drive configurations

1.2   Service in Perspective in Knowledge Society

The service logic has been refined during the last 30 - 40 years. Today we see more and more of the impact of this service evolution in terms of the Knowledge Economy. But still we are suffering from the industrial paradigm and its taxonomy. Is it that service is an Invisible exchange and we lack the refined taxonomy and metrics to describe and capture the emerging "soft" value economics of Knowledge and Service? Many new tools are however emerging, among others related to capturing the Intellectual Capital value. The next challenging step will be in the area of Service Science and Innovation. Therefore this article ends with some tentative questions for that agenda.

Notice or to See the Service

Just look, think and consider when you listen to the song "Dancing Queen" or "Money, Money" .

It is from the song group ABBA. And as such it is a part of the Entertainment Service Sector. But it is more to it…

There is the music, the lyric, the CD&DVD, the Global Shows, the infrastructure, the Mama Mia Show, the Mama Mia Film, and soon to come an ABBA Museum in Stockholm, Sweden. So from the music service has evolved a whole list of packaged services, as well as trade on the service, based on the packages and repackages as well as the evolving Intellectual Property Rights.

Today this might be called the evolution of Knowledge Economy, just to differentiate it from the industrial era. But it is a deeper dimension to this evolution, related to the interaction logic between the actors.

So what is it in the Service perspective that makes it so different? Is there some kind of Black box or Mystics in it? In Universe less than 5% is said to be visible materia. Is it that service is an Invisible exchange and we lack the refined taxonomy and metrics to describe and capture the emerging "soft" value economics of Service?

Service Logic

This Service logic as described by among others Gummesson [1], Spohrer and Maglio [2]: essentially says the following: Service or value is the expected outcome of all economic activity. There is not a manufacturing, an agricultural and a service sector.

Companies offer service propositions which can be composed in many ways, according to Gummesson. Customers of a restaurant do not meet the service sector; they meet all sectors: goods (forks and knives), agriculture (food), and service (a waiter). Customers see all this as service, not as different sectors. To say that the service sector is growing is too narrow. Current terminology, metrics and statistics are mainly production and supplier centric, with an input/output perspective.

Customers, suppliers and others co-create service. So the roles of supplier and customer have to be redefined. For example, the service of a dishwasher only exists if the customer takes action uses it, says Gummesson. The customer is as much a resource as the supplier is. The supplier has a value proposition; the customer is responsible for *value actualization*. This will call for an extended way, of looking at our economy and value creation, both regarding roles and stakeholders as well as over time.

The value logic is both in the interdependent vertical dimensions, but most of all in the lateral dimensions. This is very much illustrated by the ongoing transformation of enterprises like Ericsson, from once being a mechanical industrial producer, to become a network service provider on a global scale. Today it is said that 75% of the value added of Ericsson is in the space of customer interaction, and not in the factory. This transformation has taken place in less than 10 years. And today a major proportion of the 64 000 employees are very qualified knowledge workers or researchers.

Evolution

Already in the late 1800 there were National Accounting problems in UK. They experienced a deficit in the Foreign Trade reporting. To solve this they called it the Trade of Invisibles. A special Committee on Invisibles Export was even formed. It still is in existence and produce valuable statistics for the UK.

In the early 1980's this phenomena was observed in Japan. They therefore had a debacle on the statistical data to describe the emerging new economics. So as a consequence Ministry of Finance together with major Financial Service

House formed a think tank called Softnomics Centre to address the need for a better mapping of the Soft Economics and the growing importance of the Service Sector, as well as basis for Policy making.

At the same time in the USA the major financial enterprises formed the Coalition of Service Industries. The administrative office was located to Washington DC, but the chairmanship was with the big insurance group AIG, in New York, and Mr Greenburg. Among the members were IBM, VISA and several other large global enterprises with growing service content.

In Sweden the Foreign Ministry of Trade saw the same, and called for a new mapping approach in 1982, in which I was very much involved, as special advisor. This initiative resulted in several outcomes. First an official report was published labeled, Trade in Service [3]. This highlighted among others that the Swedish economy since long had already shifted from Industrial to Service orientation. The foreign trade at that time was however still dominated by the industrial sector. The statistics did not capture the evolution and thereby did not give the relevant mapping platform for policy making by the Government.

Then in its extension a special grouping of service enterprises was shaped 1984, called Tjansteforbundet, or The Swedish Coalition of Services industries. The founders were SEB- Skandinaviska Enskilda Banken, Skandia Insurance, Enator Computer Services and Consultus Management Consulting Services. This became a much acknowl-

edged counterpart to the Swedish Government to shape the suitable Policies for the Service Sector. It attracted a lot of enterprises, such as Securitas in security services, EF in education services, as well as SAS in flight services. It also took initiatives to shape among others research on the Service Sector, which led to shaping CTF-Center for Service Research, Karlstad University. The Swedish Coalition of Service Industries also created knowledge sharing alliances with other countries, the European Commission as well as its fore runner CSI in the USA, for among others the regulation, and regulation and policy making for the global trade of service. Similar bodies were consequently shaped in many countries.

Today we see the impact of the evolution. A major proportion of large economies are in the services sector. The Federal Reserve in the USA together with the Maryland University presented the investment map as of below. However many neglected and still neglect this major shift in the economics, or value creation.

Metrics

In the USA the major investment growth areas are in education, software and advertising or in other words Intangibles or Service. The amount of this annual investment only in the USA is in the magnitude of more than 1000 billion USD or around or beyond 10% of GDP.

For the evolution of investment into intangibles in the USA during the last 50 years look at the curves below [4].

Investment: in the US, Intangibles are as important as Tangibles

— Tangible Business Fixed Investment
— Intangible Business Investment
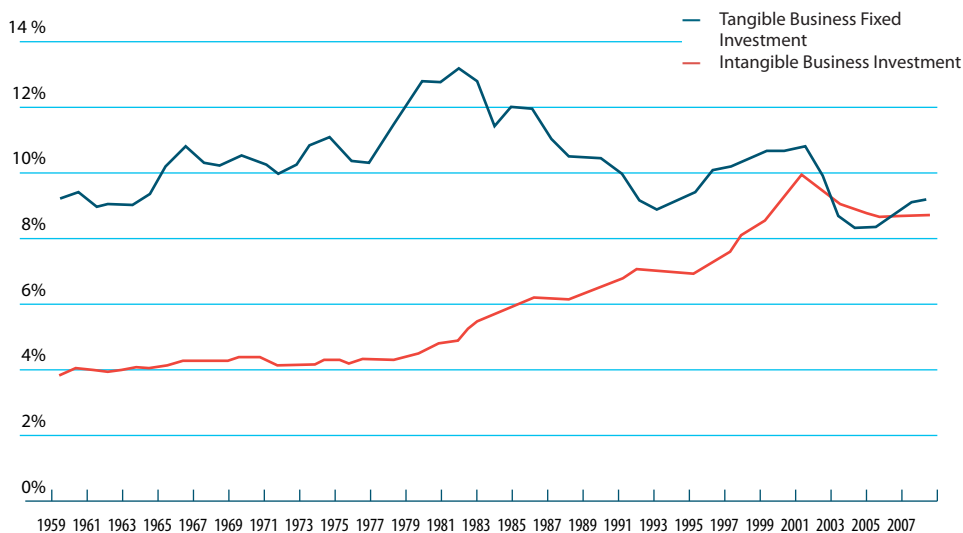
Source: Nakamura, Intangible assets and national income accounting 2008

In most countries the official investment data do not capture the growing soft investment. So the figure would be some 50% higher if including all the soft investment, besides education, software development, and customer relations development. The service sector today represent in major economies beyond 60-90% of the economy , as major employment areas, as well as growing trade sectors. One of the largest cross sectors areas is Tourism. Just for Sweden the export of services is reported to be grown annually with 9% since 1995, and now representing 16% of GDP. Without a good map of these intangibles the Policy making is often based on distorted data.

So we need to go beyond the traditional distinctions of goods and services, as well as look for the new indicators. Therefore president Sarkozy of France recently appointed a special committee to look into this. To the committee he appointed the well acknowledge Noble Laureates professors Joseph Stiglitz, and Amartya Sen plus Professor Jean-Paul Fitoussi.

The Commission on the measurement of economic performance and social progress was created at the beginning of 2008 on French government's initiative.

Increasing concerns have been raised since a long time about the adequacy of current measures of economic performance, in particular those based on GDP figures. Moreover, there are broader concerns about the relevance of these figures as measures of societal well-being, as well as measures of economic, environmental, and social sustainability.

Reflecting these concerns, President Sarkozy has decided to create this Commission, to look at the entire range of issues. Its aim is to identify the limits of GDP as an indicator of economic performance and social progress, to consider additional information required for the production of a more relevant picture, to discuss how to present this information in the most appropriate way, and to check the feasibility of measurement tools proposed by the Commission. Commission's work is not focused on France, nor on developed countries. The output of the Commission will be made public, providing a template for every interested country or group of countries.

The Commission is chaired by Professor Joseph E. Stiglitz, Columbia University. Professor Amartya Sen, Harvard University, is Chair Adviser. Professor Jean-Paul Fitoussi, Institut d'Etudes Politiques de Paris, President of the Observatoire Français des Conjonctures Economiques (OFCE), is Coordinator of the Commission. Members of the Commission are renowned experts from universities,

governmental and intergovernmental organisations, in several countries (USA, France, United Kingdom, India). Rapporteurs and secretariat are provided by the French national statistical institute (Insee), OFCE, and OECD.

The first report has just emerged, in September 2009 [5]. They are arguing for a shift in perspective of metrics from industrial output factors to more of indicators of Social Progress, and well-being such as Quality of Life factors. Perhaps it should be a perspective of competences, knowledge or Intellectual Capital? Anyhow it is a shift towards more and more intangibles and service.

Drivers or Value Dynamics

However the core understanding of service might be in a different value dynamics. Late professor Richard Normann started early to write on Service Management [6]. The value delivered is often intangible, and the in the eyes of the holder. So this is really a soft economy. And the value chain is broken into pieces, and replaced by what might be called a value constellation. Furthermore the power shift is from the producer to the user, calling for among others an inverted value chain perspective [7].

In the terms of Knowledge Economy one of the key pioneers has been professor K-E Sveiby. He already in the late 1980's wrote about another type of Knowledge Enterprise [8] highlighting that the value is in the intangible Knowledge dimensions. He also defined then Knowledge as the capacity to act.

Already in the 1970's one of the founding partners of Consultus, B. Molin, a colleague of mine, also started to see this and developed a concepts and approaches for Service Business Development, later on also summarized into the New Bottom Line (see www.bottomline.se). It is based on a perspective of hidden values beneath the traditional balance sheet. It is about nourishing the values and the culture for a sustainable value creation. And it is about a co-creating leadership based on images. Or as the present CEO of Ericsson, Mr. CH Svanberg says, the leadership challenge is to hedge the service culture of the organization of tomorrow.

The hidden values are also today referred to as the Intellectual Capital [9], which are the hidden values for future earnings capabilities or the roots for the fruits. Those are often provided as interactive services. The value creation is then in the dynamics of the interaction. This value dimension can be viewed in another perspective than input/output. It might be better understood as a systems dynamics perspective, as developed and described already in the 1970's by Professor Jay Forrester, MIT, USA. This

A process view: Generators and Time Flow

Source: © InCaS Consortium
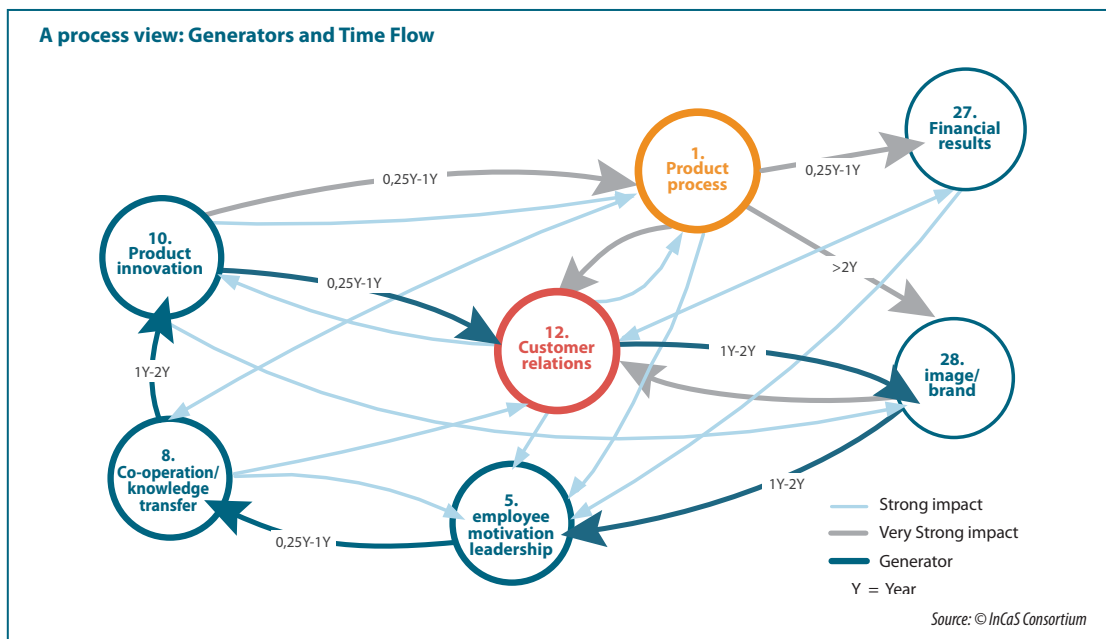
holistic view of interdependencies of different drivers for the aggregated value creation can then be visualized by looking at the 3 major intangible dimensions of Human Capital-people inside, Relational Capital-people outside and then the Organizational Capital-the bridge between people inside and people outside.

A special European Commission project that finished in 2006 was called RICARDIS- Reporting on Intellectual Capital to Augment Research, Development and Innovation in SME's. this was very much the basis for an extended process transparency project, from EU, called InCas, described more in detail below.

In Germany started a special now very successful project in 2004 called Wissensbilanz Made in Germany, under the leadership of BMWA - BundesMinisterium fur Wirtschaft unt Arbeit. It has now evolved to incorporate small as well as large German enterprises, both public and Private Service enterprises. It has resulted in open software to download on www.akwissensbilanz.org, today done by more than 20.000 enterprises in Germany.

This work is a pioneering work, close to systems science perspectives, as Wissensbilanz is going from reporting of IC as a position to a *process* view of the non hierarchical interaction and interdependencies between the IC components to shape value. It has a lot of benefits from Leadership viewpoint. This systems dynamics approach is also described in articles and research papers, among others, *IC or Wissensbilanz Process – Some German Experiences* [10].

As a follow up on these was launched 2007 the EU project called InCas-Intellectual Capital Statements made in Europe, to which I was appointed senior advisor. It is focused on expanding the learning from the German Wissensbilanz project and expands it to 5 countries with a target for 50,000 EU SME's to be using InCaS knowledge tools and techniques by the end of the project dissemination phase . In this project is also now a "Wiki", or special InCapedia emerging since Spring 2008, being developed at LSE – London School of Economics, within the InCaS project. It provides an emerging interactive encyclopaedia about everything to do with Intellectual Capital and Intellectual Capital Statements. See www.incas-europe.org where it might look like above for enterprise service value creation over time.

It is a systems dynamics approach for the driver of the outcome and impact over time. This is also a kind of Longitude value, or a third dimension. See www.corportelongitude.com and the book by Edvinsson [11].

InCaS is now being followed by another European Commission project called CADIC – Cross Organizational Assessment and Development of IC, with a strong focus on IC Flows.

Professor Paul Romer, Stanford, as well as professor Brian Arthur, Santa Fe Institute early observed some of these interactive dimensions. They called it the Law of Increasing Marginal Utlity. This is fundamentally different to the traditional economics Law of decreasing marginal utility, on which most return on investment calculations are based.

IC is not a zero sum system, but rather an exponential growth systems, or in simplified terms 1+1=11. This is due to the Relational Capital multiplier effect. Practically we see this new value dynamics in the explosion and growth of internet based service such as Wikipedia, Google, as well as Spotify, as so called Social Media services.

The core of this systems dynamics approach is to see and understand the interdependencies, as a kind of eco system, for benefit of the stakeholders to grow sustainable value creation. The powerful value resides in these hidden dimensions, to be extracted, visualized, cultivated and leveraged by service innovations. This calls for a special Intellectual Capital Leadership Agenda and also design of new brain friendly spaces for the service interactivity.

Service Organization

For the interplay in this systems dynamics over time, between the acting parities there can be different kind of organizational systems. Those are usually given by the purpose. For example is it to produce a book, deliver a lecture or to share ideas? Depending on the purpose it will be a product, a service or a common good.

This interplay is very critical for the value creation. Professor E. Gummesson has since long been researching this, and seen that there are much more than the traditional famous 4 P:s as proposed by professor Kotler. The critical dimension is the space in between the parties, and how to organize for that to shape value. Professor Gummesson refers to this as Relation Marketing [12].

This space can in the taxonomy of Intellectual Capital be called Relational Capital. This focus is interesting to compare with our cultural values. In the Western perspective by tradition we are focused on input-output, often as an object. This incarnation of services can be illustrated by looking upon knowledge delivery, as a book, i.e. object, or lecture, i.e. service or interaction e.g. Wiki.

In Asia there is much more focus on the relationship and long term impact. They have a special word for this called **Guanzi.** And the value creation emerges in this relationship [13]. In France they talk about a culture of donner-

donnant. And in Scandinavia we talk about give and be given. These transactions of trust honor the mutual benefit and are a very intangible but important bridging dimension for the economics of Service.

The delivery organizations of Mc Donalds and Ikea are however very pedagogical illustrations that this space in between can be systematized, organized and leveraged on a global scale, as successful Service Enterprises. This co-creation of trust based services can be illustrated by for example Micro credit services of Grameen Bank and its Nobel Prize awarded founder, Dr Muhammed Yunis.

Furthermore this organizational design can be speeded up. Like in Formula 1 the transaction of shift of tires can be systematized and optimized, to be done in a few seconds. How do we speed up or transaction processes of Health Service, Educational Service or even Science services? Some work is in progress on this, but much more will emerge. In the industrial paradigm it was the rationalization of goods production. But in the Service Economy we need a much more holistic perspective of different stakeholder's views as well as perceptions for the – and new service innovations.

A deeper and more intangible eco system dimension of the Knowledge Era is presented by culture and values. Is culture and values the soil or context for value creating activities as well as standard of living? What culture or context will then shape future well being and sustainable wealth? What would be a link to systems science on these intangible drivers?

City as Service Organization

Development of our knowledge cities is a complex task – it is more than developing a plot of land. We have to adopt the spirit of a learning service organization to respond to the signals and demands of many different groups and manage the allocation of resources between different claims. To grow the City and its urban capital means to handle the people, processes and property in a coordinated way to achieve maximum impact value and sustainable ecological value creation.

From the work of Knowledge Cities we can learn about the importance of the context for the knowledge worker. A relevant and attractive City service will give Quality of Life for the Talents and so called Creative Class. It has been described by research of R. Florida and C. Melander [14] as well as described in Monocle on the Most liveable Cities. This urban planning of the context for the knowledge worker is a tremendously important service function for

Urban Capital

Human Capital

Relational Capital

Social Capital

Structural Capital
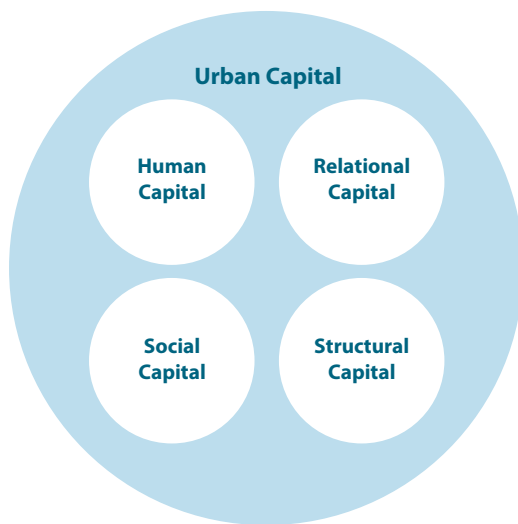
Cities, Regions and Nations. This is often Pubic Service space and responsibility. It is also a kind of platform for the organization of interactivity between citizens. We see this among the rapid innovation growth of Social Media. But how about the Innovation thrust for City Services?

Whom and How do we shape this service of Urban Space for the optimal value creation? It is a long way beyond the physical architecture. In a work of the City of Helsingborg, Sweden, this has been called MINDZONE [15]. A MIND-ZONE is a special concept for is both a way of thinking and knowing and a way of supportive design/gestalt for the interactivity to reach quality of living through quality of place and space. It is the space in between in the larger concept URBAN CAPITAL, and its interacting components Human Capital, Relational Capital, Structural Capital and Social Capital.

The purpose of MINDZONE is to support and cultivate the Urban Capital of the city. It is a holistic service approach to urban development and renewal, based on a perspective of Intellectual Capital and specially the dynamics of intangible assets. Regardless of scale, MINDZONE takes in consideration the local culture of a place or a city and strive at renewal of itself and its surroundings. The aim of MINDZONE concept is to create an urban service management and design that can contribute to more rewarding and well remunerated knowledge workers and faster growth in community income and wealth. This can only be achieved by collaborative efforts, sometimes called Triple Helix or even Penta Helix.

The MINDZONE concept focus on developing and transforming urban settings and services to support, nurture and value knowledge development and sharing between people, as the creative and innovative power embedded in human talent.

This is also a starting to shape another understanding and consciousness of the spaces and its services of also Knowledge intensive Nations, Regions as well as Cities. The old paradigm was that the City was a place for exchange of goods, and trade. Today it is becoming more and more a place and space for exchange of contacts and interactivity. This is also referred to as Knowledge cities. See more on www.worldcapitalinstitute.org In November 2009 there was a 2nd Global Knowledge City Summit organized in Shenzhen. See www.kcsummit.com to address many of these issues.

We can today see the emergence of Mega Regions and *Intelligent Regions*, such as Öresund as the Borderline Zone between Sweden and Denmark, as well as the new Innovation Region between Hong Kong and Shenzhen. Such an Urban Capital space is characterized by Societal Renewal based on Social Innovation, Futurizing and engagements of Volunteers and Global Digital Commons. Special Economic Zones are being upgraded by Knowledge Innovation Zones. See www.inthekzone.com

In those a key role is emerging for Societal Entrepreneurship and their innovation of services. It might have started in UK with initiatives from among others the government of Tony Blair. This resulted in among others the shaping of NESTA with the aim to transform the UK's capacity for the Innovating of Public Services, see www.nesta.org.uk . A similar set up was done in Denmark with the very successful MindLab for the innovation of public services, see more on www.mind-lab.dk. Now the Swedish Governmental Knowledge Foundation has since 2008 a special program on Societal Entrepreneurship. See www.kks.se.

Service Science Research

In its beginning Service Science was, according to professor Gummesson, as expressed at IBM seminar 2008 technologically-focused. It was first called Services Science based on the idea that there is an identifiable service sector which grows. After further research and gained insights the **s** in services was dropped.

This is also one of several outcomes of IBM's research to new knowledge of service science. Today the evolution of robot systems for services, such as bank systems like ATM, or stock exchange software, or cleaning robots, will be interesting challenges. There is a desire to innovate efficient service systems and to reduce the gap between theory and practice through multidisciplinary coopera-

tion, by engaging academy, the public sector and business. This IBM initiated global service project has been in progress since 2007, under leadership of J. Spohrer [16]. The project is both revisiting as well as forward looking and might offer important contribution to business and several service related management disciplines in the current and future economic reality.

One pioneering researcher on service marketing is Professor Christian Grönroos, Swedish School of Economics, Helsinki. He has been very active in publishing and was launching his PhD work on this already in 1980 [17]. Very much of the early taxonomy on Service Marketing was shaped by Grönroos and Gummesson, and together we formed the Nordic School of Services Marketing in the early 1980's.

The very first Professorship on Services was shaped in Sweden, 1985, as well as a special research unit – called CTF – Center for Service Research, 1986, at University of Karlstad, on initiative by the Swedish Coalition of Services. The very first professor was Dr. Evert Gummesson, then followed by the CTF pioneering professor Dr. Bo Edvardsson.

CTF- Service Research Center (CTF – Centrum för Tjänsteforskning) at Karlstad University, Sweden, is one of the world's leading research centers focusing on service management and value creation through service. CTF now has 50 researchers and research students who are variously involved in business administration, working life science, sociology and psychology. And one of the very early research reports on Service Intenraitonalalization was published in 1991 [18]. See more on www.ctf.kau.se

AMA – American Marketing Association with many of its pioneering researchers were also early on to Service development in the early 1980's.

Professor H. Chesborough from University of California, Berkeley has also recently looked into the Service Management, mainly related to his pioneering research on Open Source Innovation. This revisiting might however still carry much of the perspectives of input/output economics.

Service Science has still a lot of challenges to address. That is among others related to the paradigms of services, and so called Innovation Capital opportunities. Examples of new paradigms are among others related to Social Media, and Service Innovation. The innovation exploitation is related to Intellectual Property dimensions, as well as the shaping of delivery processes such as for example Spotify

for music downloading from internet. New legal innovation platforms also emerge such as Creative Commons.

Then we have the very soft dimensions of the Brain processes to learn about. Professor Kawashima at Tokyo University is now researching on how to build brain training services both for students as well as seniors in collaboration with Nintendo games.

To elaborate service innovation and prototype the interactions among different stakeholders, Skandia Insurance Company pioneered development of shaping a Future Center, 1996, under my Leadership. The core of a Future Center is the experiential knowledge exploration, by rapid prototyping. In other words it is about shaping an organizational approach to reduce the space of unknown as well as reduce the fear of the unknown. It is about innovation capital building. Today this has resulted in a whole variety of such different labs for the development and innovations of both private as well as public services. See www.future-centers.eu. Look at for example www.thedialogueshouse.nl initiated by ABN Amro Bank, with its service development incubators. Look at forthcoming Innovation Nest at the Hong Science Technology Park www.hkstp.org.

Another similar successful track has been the development of a European Network of Living Labs. Living Lab is a concept for R&D and innovation to boost the Lisbon strategy for jobs and growth in Europe. The approach is a human-centric involvement and its potential for development of new ICT-based services and products. It is all done by bringing different stakeholders together in a co-creative way, mainly by the technology platforms for service developments. See more on www.openlivinglabs.eu.

However the big area for service innovation might be in the organizational systems for public service, such as Health and School service. This sector represents a big part of the Economy in Europe and many other areas of the world.

Service design will also be a challenging area, of how to design the intangible experiential perception by tangible as well as intangible interactions. This will call for more cross disciplinary work for example by antroplogists as well as network systems simulation models such as provided by IBM.

Furthermore important and growing attention of the Research and Development sector, called the Lisbon Agenda, is in itself a very qualified service area for Service Science Innovations.

Outlook Quizzics

At Lund University we have a special approach called Quizzics, emerging from late professor Stefan Dedijer. He is among others famous for the work on Social Intelligence, as a basis for Social Innovation. Quizzics stands for the art and science of questioning. In our case of Service Science it might mean the phrasing of some questions on Future Service, such as:

- What are the major differences in the future outlook for service design between the USA, Europe and Asia?
- What will be the cultural impact of values perspective on future value creation of services?
- How can important service activities be industrialized or robotized, but still keep the customized human perspectives?

- What is in the value creating process of services that can be operated by computers and robots?
- How does an Annual Report look like for the transparency of interactive services?
- How can Science (R&D) be speeded up for a more rapid value creation, or reduced opportunity cost, e.g. Health Service Innovations
- What new Public and Societal Service Organizations can be prototyped already, without conflicting with traditional political institutions?
- What usage and benefit will there be by Talented services from old brains and Seniors?
- What can Neuroscience add to the enjoyment design of services?

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Professor Edvinsson is a key pioneering contributor to both the theory and practice of Intellectual Capital. As the world's first director of IC in 1991 he initiated the creation of the world's first public corporate Intellectual Capital Annual Report 1994, and inspired the development ever since on IC metrics. He was parallel to that prototyping the Skandia Future Center as a Lab for Organizational design, one of the very first in the World in 1996, and inspired many to be followed. In 1998 he was awarded the prestigious award Brain of the Year from the Brain Trust in UK. He is since 1999 Honorary chairman for the Henley Management College KM Forum, UK. He was in 2001 appointed Adj. Professor at Lund University as well as Visiting chair Professor in 2007 at the Hong Kong Polytechnic University and in 2009 at the Jiatong University in Xian, China.

1.3 Hidden Wealth: the Contribution of Science to Service Sector Innovation

The Royal Society, the UK's national academy of sciences, recently published the findings of a major policy study on the role of science in service sector innovation. Entitled *Hidden Wealth: the contribution of science to service sector innovation*, the report highlights the contribution of science, technology, engineering, and mathematics (STEM) to the services sector, now and in the future, and identifies ways in which this can be strengthened.

Services are extremely important for the UK economy, accounting for around three quarters of UK Gross Value Added (GVA), and 81% of all jobs. The rise of services in the past 30 years has mirrored a corresponding decline in manufacturing. However, the UK economy is in flux. The financial turmoil of recent years, and the resulting recession, has injected fresh urgency to debates about the structural mix of the economy and future sources of wealth creation. Yet services will certainly continue to dominate economic activity for the foreseeable future.

Innovation plays an important role in these sectors yet it is widely accepted that traditional innovation models and policies tend to focus on a narrow conception of innovation, mainly the support of R&D in manufacturing industries. Though the distinction between services and manufacturing is blurred, and becoming ever more so, other approaches are required to support innovation in services.

The Society's work shows that STEM is deeply embedded within the UK service sectors and that its impact on service innovation processes is extensive and widely diffused. For example, STEM capabilities are often internalised within service organisations – mainly in terms of 'human capital' or embedded technology, which underpins high levels of innovation. STEM is also integral to the infrastructure that enables and supports innovative services. Computing, communications, IT, the internet, massive databases and the mining of them, and large-scale computer modelling and visualisation underpin many areas of service innovation. Services also rely significantly on external STEM capabilities to support or stimulate innovation.

Many scientific and technological developments with origins in the science base have precipitated major transformations in services industries and public services. Examples include the technique for DNA fingerprinting, invented by Sir Alec Jeffreys FRS, which is now widely used in health, policing, security, and environmental services; the game theory and mathematical modelling by UCL economists which underpinned the UK government's auction of 3G radio spectrum and raised £22.5bn for the taxpayer; and the search algorithm that was the initial basis of Google's success.

The report shows that STEM will also be essential to future waves of service innovation. Many services are on the cusp of a transition to more personalised and interconnected systems, which will require significant advances in STEM. Recent advances in the physical and life sciences will open up completely new service possibilities (e.g. reduced cost of gene sequencing allows for personalised genomics). The advent of ever more personalised and ubiquitous services, the increasingly globalised nature of service industries and supply chains and the development of service-based responses to many of the major social, economic and environment challenges facing society represent both opportunities and challenges for UK organisations, government and policymakers.

One result of these developments is that the economic value of STEM will increasingly be realised through services – a change which will require researchers, innovators and policymakers to fundamentally re-consider the relationship between science and wealth creation.

An important question then is 'how well prepared are we for all this? Our work revealed a number of issues which, if not addressed, will undermine the ability of firms based in the UK to develop and maintain leading positions in highly competitive and globalised service industries.

Firstly, the full extent of STEM's current contribution to services sector innovation is often hidden from view and is not easily visible to those outside the process. Consequently, the contribution of STEM to service sector innovation is under-appreciated by the service sector, policymakers and the academic research community. This 'blind spot' threatens to hinder the development of effective innovation policies and the development of new business models and practices in the UK.

Critically, service innovation (and especially the role of STEM in these processes) is poorly understood by policymakers, researchers, and funders. For example, there is a relative dearth of academic research, case study, and statistical information available for analysis.

An issue of great importance is skills. Though STEM-trained personnel are highly valued by services firms in many different sub-sectors some employers are dissatisfied with the quality and quantity of STEM skills available to them. We were particularly struck by the importance attached to multi-disciplinary skills and by the strength of criticisms of a 'silo mentality' in UK universities. This is of concern given anticipated developments in services and the role that STEM is expected to play in creating value from increasingly complex service systems. This will require teams of people who combine deep knowledge of particular STEM subjects with abilities gained from disciplines such as economics, social sciences, management, or law. The ability to take account of the 'human dimensions' in complex systems will be critical.

To address these issues, we make several policy recommendations.

1. Build research agendas and communities

At present, the academic services community is fragmented and engagement with services firms is patchy. Greater convergence is required in order to:

- Establish international research communities in services innovation
- Develop collaborative international research agendas in services-related fields
- Ensure that opportunities to exploit STEM in services are properly recognised
- Align research and market opportunities
- Ensure parity of esteem between services-related research and other forms of academic research

The UK's Technology Strategy Board and Research Councils should initiate services-related Grand Challenges, using the established framework of Innovation Platforms and cross-Council themes or develop new mechanisms if appropriate.

2. Develop multi-disciplinary capabilities

We recommend a large-scale exploration of STEM skill needs in service sectors to be undertaken by Sector Skills Councils. Research Councils, Higher Education funding bodies and universities should also consider ways to make existing courses more relevant to the service sectors. It is crucial to retain a mix of approaches to higher education provision, in which there is a role both for specific STEM degrees and more multi-disciplinary courses.

Grand Challenges should include provision to develop and align cross-cutting theoretical and intellectual competences in areas such as managing uncertainty in modelling and simulation, service design, quantitative data analysis, data security, standardisation or validation of data sets and dynamics in human-systems interaction.

3. Increase the scale of knowledge exchange

Service companies are, on the whole, not well connected with the academic STEM community in the UK and the results of two major surveys, strongly suggests that barriers to collaboration are actually increasing.

There is much potential for improvement here: various organisations made clear to us their desire for closer working relationships and many others demonstrated the benefits that flow from such collaborations. We recommend that the Technology Strategy Board reviews the Knowledge Transfer Partnerships (KTP) programme for its accessibility to services and to KTP associates with STEM backgrounds. Universities and funding bodies should support the exchange of senior academic and research staff into services and vice versa, via Fellowship schemes or other means.

4. Improve understanding of services and service innovation models supported by STEM

Underpinning all of the above is a need for a better understanding of services and service innovation models, which remain poorly understood by policymakers, researchers, and funders. Unless policymakers develop an improved understanding of increasingly distributed 'open' innovation processes in services it is unlikely that innovation policy will be able to support innovation practice. This knowledge gap needs to be addressed as a matter of urgency. We urge research funders to develop the body of academic research into services innovation. The findings from this research should be promoted to knowledge exchange professionals whose role it is to facilitate industry–university links.

Given the economic importance of the banking and public sectors in the UK and the significance of innovation in these settings, we also looked in detail at the distinctive role of STEM in these domains.

Banking

The UK has enjoyed a huge competitive advantage in financial services over an extended period, bringing substantial advantages to the UK economy. Developments in ICT and financial modelling have fostered particularly rapid innovation, enabled by STEM-trained staff, notably computer scientists and mathematicians.

However, vast imbalances in capital funds between countries, the mispricing of risk, and the collapse of the US sub-prime mortgage market, triggered a global banking crisis in Autumn 2007 that led to a sudden, massive, and ongoing reduction in credit availability with dire consequences for governments, taxpayers, consumers, companies, and banks world-wide. This

financial crisis led, in turn, to a near-global recession in 'the real economy'.

There are a wide range of opinions on the causes of the crisis, but some commentators have attributed at least some blame to the inappropriate use of mathematical tools whose properties and consequences were not properly understood by those responsible for managing their exploitation. It is clear that many and various flaws in the banking sector culminated, ultimately, in systemic failure. Aside from a cavalier approach to risk, these flaws included the reliance on apparently complex (but, in some cases, actually simplistic) tools and financial products, low levels of understanding and oversight by senior management, and the inappropriate regulatory and geopolitical framework that underpinned global financial systems.

We make several recommendations for enhancing the role that STEM might play in ensuring greater stability of the financial systems of the future including the creation of world-leading centres of modelling and risk assessment relevant to and engaged with financial services institutions like banks. In addition, the Research Councils, the Bank of England and the UK Financial Services Authority should explore ways for the science base to contribute to more effective modelling of systemic risk in financial services.

Public Sector Innovation

Some UK public agencies have recognised the role of STEM in delivering high-quality public services and have successfully engaged the STEM supply chain in their innovation processes. But these examples are the exception to the rule – initiatives to foster innovation within Government have mostly ignored STEM. In view of the importance of the public sector to national prosperity, we recommend the establishment of a team, drawn from central and local government in the UK and from the science base, to undertake detailed work on how STEM can be exploited more successfully to foster public sector innovation. We urge funders to emulate the success of the schemes which support business-university collaborations with partners from the public services and the science base.

We were made aware of problems arising from public sector competition with the private sector in regard to the exploitation of the government's information holdings. We urge the Government to move towards a situation where there is one model for the supply of government information, thereby simplifying matters for commercial organisations and facilitating innovation.

We also recommend to the UK Research Councils that they should explore with the Confederation of British Industry

and other relevant bodies the scope for freeing commercial data for academic and other research.

In Conclusion

Innovation policies have tended to focus on the support of R&D in manufacturing industries. But it is now recognised that other approaches are required to support innovation in services. Many of the findings of this study are, however, also applicable to aspects of manufacturing. As the boundaries between manufacturing and services continue to blur, we expect to see greater convergence of innovation models, particularly around 'high value manufacturing' and the 'servicisation' of products. Traditional forms of innovation and R&D policy for manufacturing may become rapidly outmoded and there may be as many lessons here for that sector as for services.

The main message of this study is that the contribution of STEM to service innovation is not an historic legacy, nor simply a matter of the provision of 'human capital' — important as the latter may be. STEM provides invaluable perspectives and tools that will help to nurture emergent service models and define future generations of services for the benefit of businesses, government, and citizens.

The success of the UK Government's innovation strategy will rely on a broadening of its perspectives. The Government must develop a more sophisticated approach to studying the relationship between knowledge creation and economic impact, and give greater coverage to those parts of the economy that have thus far been relatively neglected, namely services and much of the public sector. But ongoing attention to the supply of knowledge and skills — and particularly the role of science — must be central to the innovation agenda if success is to be assured.

Hidden Wealth: the contribution of science to service sector innovation can be downloaded from:http://royalsociety.org/Hidden-wealth-The-contribution-of-science-to-service-sector-innovation/

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1.4 An Open Innovation Approach as an Enabler for New Business Models in Telecomms

The consolidated market of many network operators is under turmoil, on one side the Internet technologies are challenging the way operators create and deploy services, on the other side new Internet business models are eroding the margins of the telecoms market. This situation creates a deep uncertainty and a set of network paradoxes that the operators have to cope with. As a strategy to exit from this paradoxical situation and aiming at compensate the losses, many operators are seeking to enter into adjacent markets. This strategy is not easy to implement. The paper suggest that operators should use an Open Innovation approach by creating OpenLabs that leverage the telecom assets and could be used to bring innovation into new targeted markets.

Introduction

The world of ICT is constantly innovating and transforming. It is changing so fast that "Internet speed" indicates how rapidly services and technologies appear, are used and consolidate. This fast pace transformation is bringing to users and companies a lot of innovation and, often, the disruption of consolidated beliefs, modes of operations and business models. An example of the mutation of the status quo is the case of the telecomms industry. In the past, before the advent of the "mass Internet", new technologies were introduced after a long process of standardization, testing and deployment. Today there is not too much time for a long and structured approach and also the most traditionalist network operators have to speed up in order to catch up with users and the market requests. This is more evident if the service realm is considered. Here the competition is so strong and it is using so many different business models that even the more powerful users are puzzled off by the rich offering of services and the possibility to get many of those almost for free. Operators in this area have to compete with more and more "fast" (i.e., they work at the speed of Internet) Service providers. The offering of applications is so overwhelming for the users that a new problem arises: how to choose the best and right one? How can a user decide which application is the best one for him when there are more than 50 thousands applications to pick from (e.g., Apple Applications Store or the Facebook repository of applications). Operators are used to manage large repository of services, but they are mainly standardized services and the number of them is in the order of hundreds and not thousands.

Internet is not anymore focusing on the single customer. In fact, applications are usually chosen with a sort of "social afflatus": they allow the user to easily interact within a social network and so the community itself usually determines the communications means (e.g. Twitter and the 140 character messages). Consequently services are built around the communications needs of groups of users.

The success of social networks has given importance and value to large communities. Networks do have a value that directly relates to the number of participating users, the famous Metcalfe's law [1]. Many providers of Social Networks are striving to find a way to monetize this value. In doing so, they sometimes touch and trespass acceptable (from regulatory and/or users perspective) limits of privacy and security [2]. The phenomenon of Social Networks comes with the need to understand the social implications and effects and how to provide services that are effective to users and that generate revenue for the providers. There are technical and profound social challenges that require special attention in order to grasp the evolutions trends of community services and how people hang together. The simple one to one communication (the phone call) has been substituted by a more complex communication environment: there is a whole universe behind it made of human relations, habits and affective links. Studies about communities have focused on the social aspects of communications figuring out that, on the average, a satisfactory relationship between a user and its community friends is 1 to 150, i.e., a user can maintain rich, individual and satisfactory relationships with up to 150 people. This is called the Dunbar number [3]. Exceeding that limit the quality of the relationship decreases to a more formal one or the user is not able to catch up with its correspondents. Consequences of this sturdy transformation are still to be understood and governed in order to smoothly move from the current market and value chains to more advanced forms of market and relationships between stakeholders. Network operators and service providers have to focus on these social issues if they want to monetize the value of personalized communications.

To a certain extent, the concept of community is also applicable to relationships among companies operating in the market. In fact, more and more the value of open and large ecosystems is emerging as an engine of transformation. An example is the success of Google Maps: it started out as a sort of experiment aiming at introducing in the Internet geographical information and it ended up creating a totally new market (the one of geo-referenced information) and it has still to show all its potential. Many services and companies have exploited Application Programming Interfaces (APIs) and the Google infrastructure in order to create new services and applications (spanning from simple games for kids to more complex services). This has created an entire new ecosystem of relationships and links that loosely couple new companies to Google.

Another well know example of ecosystem is the one created by Apple with the iPod products and their derivates. It has grown so much that there are now thousands of products devoted to Apple devices that Apple itself does not even know and control. In addition the iPod ecosystems has brought important disruption into the music's market (with iTune) and into the mobile world (with the Application Store). From a technical perspective the ecosystems revolution in ICT have been possible because of two major openings into the traditional approach of technology providers: open data and open APIs. These two features have nurtured the mashup world. The availability of information and the possibility to compose it in order to create different personalized services has also enabled different business models: from the pay per use of difficult to find information (the so called "long-tail" model) to the explosion of the advertising over the Internet. Richness in the business models yields sometimes to the disruption of existing and consolidated ones. This seems to be the case for the long-standing business models behind the telecommunications. Many operators are striving in order to keep the revenue from voice calls to the current levels, but calls are cheaper and cheaper and users can also "switch" to the Internet or their preferred Social Network for free or low cost communications services.

In the next section of the paper, the transformations and disruptions brought in by the adoption of IP technologies and new Internet business models are briefly analyzed with respect to the consolidated telecoms environment; then the need for the ICT world (and especially the telecomms one) to enter into contiguous markets is analyzed with special attention paid on how a disrupted environment can bring innovations and enable new value chains into adjacent markets; finally some ideas are presented on how to promote and consolidate innovation into new markets

by means of an open innovation approach. The analysis carried out is devoted to a precise environment (ICT and specifically the communications environment) and a single market (mainly the Italian one), nevertheless it is possible to derive general consequences and insights valid for other technological domains and markets.

A world in Transformation: Network Paradoxes

Many operators are facing the problem of the obsolescence of their network infrastructure. This problem rises in a new context dominated by the possibility of substituting a consolidated technology (the circuit switching) with a new one completely based on the IP connectivity (packet switching). The so called All-IP Networks (AINs) allow for lower infrastructural and management costs and promise to be the basis for building a seamless service platform able: a) to provide a myriad of new services for the fixed and the mobile environment; and B) to intercept the Internet evolution and its increasing market. However this transition to an All-IP infrastructure has inside the seeds for an important transformation: the consolidated way of providing communications services is going to be fundamentally challenged. This is due to technical, market, and social reasons that do create a new situation that can be described by a set of network paradoxes.

One of the foundation of the IP communication (and consequently of the Internet) is the **"end to end argument"** [4], which dictates *that "mechanisms should not be enforced in the network if they can be deployed at end nodes, and that the core of the network should provide general services, not those tailored to specific applications"*. This principle has been well expressed and stressed out by the **"stupid network"** [5] **paradox**. It juxtaposes a slim, simple and cheap IP core network (dominated by abundance of connectivity capacity) to the centralized and expensive infrastructure of the Intelligent Network.

Over the years, the Intelligent Network has been the means for operators to provide added value services to their customers. A large array of solutions, infrastructures and equipment devices has been deployed according to the principle of a centralization of intelligent functions within the network under the control and management of the operator. In this context, terminals and end points heavily relay on functions and services provided by the network. Terminals are generally simple and scaled down in terms of functionalities. This is in sharp contrast with the current trend of moving all the intelligence at the edge of the (IP) network. This move is mainly exerted by means

of two major computing paradigms: the client-server one and the more recent peer to peer approach. They mainly diverge in the distribution of "power" at the end-points. In the first paradigm there are, generally speaking, two different classes of end-points: the simple, ubiquitous, and numerous clients and the few and powerful servers; while in the second one all the end points have, in principle, equal power, functions and capabilities. The champions of the client server paradigm in the IP communications are giant companies like Google, Yahoo, Microsoft and others. They are capable of deploying at the edge of the network huge data centers made out of hundreds of thousands of general-purpose computing nodes organized into complex datacenters infrastructures [6]. These operators of the Web (WebCos) are able to use these massive platforms in order to rapidly creating new services (the famous Web 2.0 trend) that make use of the intelligence in terminals and in the powerful servers. As a distinctive approach of Web 2.0, WebCos are less concerned (with respect to network operators) of the deployment of stable and well consolidated services in favour of a fast deployment of new functions (this approach is well characterized by the concept and usage of beta releases). Services are released to the public even when they have not completely and deeply tested. People are both users of the services and testers of them, providing insights, suggestions and critics in order to tune the services according to the users needs. The advantages and the disruption of this move of intelligence are appalling for the operators: the rich and costly deployed network functions and services are not anymore appreciated by customers that do value services and applications offered by servers at the edge. In this way the network is progressively emptied of functions and all the value moves to the edge. On the long run, operators could be forced to play a less significant role, the one of Bit Pipe Carrier and not the desired role of service provider. And this could happen in spite of the significant investments in existing and new service infrastructures (like the IP Multimedia Subsystem, IMS [7]) intended to position operators as services and platform providers also for the Internet market. This has disruptive impacts on the telecoms industry: the rich market of value added communication services is not anymore under a strong influence of operators; the existing and the scheduled service infrastructures are rapidly aging or are not fitted for competing with new solutions based on emerging Internet technologies; the telecoms service equipment market is radically changed yielding to a strong reduction of investments in the area of service platforms. This course of action has far-reaching effects on the service delivery telecom market as a whole:

- Service Delivery: services cannot be anymore deployed in long cycles (sometimes up to 18 months); they have to be much shorter in order to find a potential market and to compete with the WebCo offering;
- Interworking: services offered by operators have to be readily interoperable and run on different networks. Long standardization periods for new solutions have to be dramatically cut down in order to come out with simpler and quicker deployable solutions;
- Vendor relationships: Vendor lock-in has to be limited; operators have to be able to really integrate different solutions. In addition operators should be able to enlarge their ecosystem of vendors sometime favouring the entrance in the telecoms markets of new vendors form emerging countries;
- Equipment costs: the foreseen huge investments in new networks and services require a contraction in costs of equipment. Costs cannot be anymore those of the past but they have to be aligned to Internet prices.

All the disruption introduced by the "end to end argument" has a heavy impact in strategies and deployments of operators. But there is even more: **"the best network paradox"** [8], in its concise definition states that *"The best network just moves bits and the best network is the hardest one to make money running"*. If the network is stupid then it provides simple services that make it a commodity. It is therefore difficult to make money from network services and the only viable possibility is to reduce investments on it providing just the essential functionalities.

Alternative networking capabilities are becoming highly available (from community networks, to municipal networks, from WiFi to Wimax and the like). They could provide connectivity at a much cheaper price than traditional operators offering. Emerging networking techniques (e.g., mesh networking, peer to peer, opportunistic networking and the like) are able to adapt, optimize, and share network resources within communities and they can scale up to many users (in the case of P2P even millions). An example of this adaptation and sharing capabilities is given by FON [9]; the idea is to share the connectivity that a user pays to a provider also for allowing other peers (members of the FON community) to access freely or for a low fee to the residual bandwidth of the hosting user. Other examples are given by hotels, bars, coffee shops that provide connectivity for free in as a competitive means to attract more customers to their premises. In the long run connectivity could be provided for free by many different providers in exchange for the "attention" of the customers. This is the phenomenon of decrease of the "value" of the bandwidth. This gives way to another important fact, the **pervasive communication paradox**:

it states that *"the more the communication is available and cheap, the more it is pervasive"*. This is another way for saying that communication is becoming a commodity. Many users will take the availability of a cheap network for granted. The rich availability of connectivity, the cheapness of networking devices for home networks and the always decreasing price of public network connectivity will allow a great availability of cheap and ubiquitous bandwidth that will be used by pervasive applications that will be "always best connected" both in term of maximum bandwidth and of price.

This bears to the most important inconsistency, the **revenue paradox***: "the more the network is used, the less it produces revenue"*. Currently, users can take advantage of very interesting bundles of service offerings. Many operators are providing bundles in the shape of "all you can eat". This means that users pay upfront a fixed amount of money and they can make unlimited national (but for certain plans also international) calls. Also for the data connectivity there is a trend towards flat rates, and in this case too the price of megabit per second is declining very rapidly. Any investment in the network is going to provide little "ROI" (return in investment) because users do not perceive too much value on any network improvement. An example is the continuous increase in the bandwidth provided to users by xDSL. Any further increase in bandwidth can require huge investments in the network in order to augment its capabilities (i.e., moving from xDSL solutions to the fiber to the home one), but for the end users there is no reason for paying more the additional capacity (even if the bandwidth doubles). In other words users are not going to pay proportionally any increase in bandwidth and the price for any megabit transported is going to progressively decrease (while keeping the ARPU stable or even decreasing). Figure 1 depicts this situation.

In this context many operators are called to invest on new (and expensive) access networks for providing broadband connectivity (the replacement of the copper with fiber, for fixed network; and the Long Term Evolution [10] mobile broadband). In this paradoxical situation it is hard to make decisions and planning for the future.

Peer to peer networks (and in general fast downloading technologies such as youTube and the like) pose another set of paradoxes. The first one can be termed the **bandwidth paradox:** *"the cheaper the content, the greater the bandwidth request"*. This takes into account the trend of many users (especially those that are heavy users of peer to peer applications) that tend to subscribe to flat rate offerings of operators in order to have high bandwidth without limitation all day round to use for downloading multimedia content (sometimes infringing copyrights). The P2P or download heavy users are also named "bandwidth hogs" because (even if they count for less than 10% of the total number of users) they are the bigger consumers of bandwidth (they are responsible for much more than 60% of all the data traffic). In other terms it could be said that people tend to invest into bandwidth as a means to collect a lot of content, more that invest directly on the content. A corollary of this paradox is the **storage paradox**: it states that *"the cheaper the content (e.g., because of file sharing), the greater the mass storage request"*. Simply put, this paradox states that users will not invest anymore on the content (that is cheap and can be downloaded in big "quantity" from the network) but on the means to store it. Even considering the more convenient offers from the "legal" market there is a considerable gap between the value proposition of the offerings and the reality. Nowadays there are portable media player devices or hard disks with huge memory capacity (up to 80 Gbyte for mobile devices and in the order of Tbytes for the HDs). If a user would fill the memory up of legally downloaded and paid for content, those devices would store in their massive memories items whose global value (e.g., for portable devices 40 thousands songs or even more at one euro per

Figure 1: the Revenue Paradox
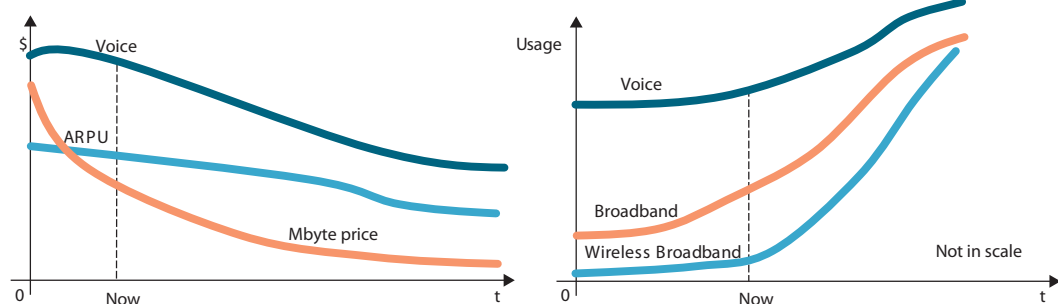
song) would be much greater then the one needed to buy a luxury car (and usually users do prefer luxury cars!).

These two paradoxes are specializations of a more general **content paradox**: *"the value moves from the content to means to deal with it"*.

The availability of huge communication capabilities was favorable for the rise of new global service providers. They have focused on data and useful functions related to those data (e.g., Google with search functions wants to be able to index all the information in the world). These Web Service providers (WebCos) do use the end to end argument to their advantage, but in doing so they introduce new network paradoxes to take care of:

■ the **Business Model paradox:** it states that *"what is a valuable (and billable) service for an operator, is a service given for free by WebCos"*. Many service providers are earning their revenue from advertising; actually the major business model of the Internet is advertising. In order to make this business model the most effective they need to do two things: attract the users with interesting functions and services, and to get as much information as possible about the users. For these reasons they provide free services by means of subscriptions. Example of these free services span from voice, IM, to free access to networks. Those same services are instead offered for a price by the operators. There is a strong impact on the consolidated operators business model. Operators are seen as "old-fashion" and greedy, so users swarm towards the WebCos that are perceived "no evil". But the real price for these services is a more deep and profound customer knowledge: WebCos store and use a massive amount of data related to users' preferences and habits. One of the major differences is that users that do not pay for a service are less demanding about the functions of the service itself and in addition they could even help the provider to tune up and improve the service. This approach lessens the burden of providing well formed and tested services and the WebCos take advantage of it.

■ The **Span of the Business paradox**: it states that *"the services provided by an operator are locally universal, but regional at a global level"*. This wording means that regionally operators do (have obligation to) offer a universal service, but even the biggest network operators do not have a worldwide coverage of the communication market. The major mobile operators [11] are based on a single large market: China. Even the most global mobile operators are not operating services all over the world. On the contrary any small Internet startup can exploit

the real universal reachability of the Internet: the www.example.com company can be reached almost universally and its services used from all over the world. Any startup has the world as a potential market; there is not an equivalent for the consolidated operators.

■ The **Standardization Paradox:** it states that: *"operators use standards for guaranteeing the operation and the interworking of their networks and services, while WebCo use standard as a means to impose to the market their technical solutions and services"*. Since any WebCo is potentially able to reach all the market, it does not need to worry about standardization of services or their interoperability with other providers. Instead they use the technology to differentiate from other providers. Even the mashup phenomenon is largely dominated by open but proprietary interfaces. This situation is a consequence of the previous paradox. WebCos can try to enforce de facto standards and do not need to spend time, resources and people working towards standardization and interoperability. This makes possible a "winner takes it all" strategy (think to the dominance of Microsoft in the Operating System market or the Google's one in the rich search and advertising markets). This approach is not possible in a market highly regulated and fragmented as the Telecoms one. Here standardization and interoperability are a must. In addition national regulators try to provide a fair competition environment (again locally) to all the stakeholders. Costs for guarantee interoperability of services between operators are huge and in addition the interworking issues slow down a lot the deployment process of services because of the need to converge towards an acceptable level agreed by all the involved parties (vendors and operators) and because of the extensive need of testing.

These paradoxes lead to a situation in the telecom world in which the major business (voice calls) is still relevant (it counts for 80% of the total revenue of many established operators), but it is constantly and perhaps irreversibly decreasing. However it is decreasing so slowly that it is quite difficult for operators to decide when to give up with the traditional business model and jump on other new ones (and maybe this could be another paradox).

Looking for new Business Models

During the years, the Internet has extended the number and types of business models that can be applied and exploited. According to [12] some viable Business Models for the Internet fall in the following categories:

- Brokerage Model, in which a broker puts together buyers and sellers providing some guarantees on the correctness of the transactions;
- Advertising Model, in which the provider offers for free or at lower price services sponsored (and paid for) by advertising;
- Infomediary Model, in which a provider collects information about users or about producers and their goods and then monetize this information (through a fee or other) by linking end users and other providers;
- Merchant Model, in which a provider is wholesaling goods, products, services, information and/or data;
- Manufacturer Model, in which a producer directly reaches the customers cutting through all the intermediary chains;
- Affiliate Model, in which a providers exploits its relationship with producers or other service providers offering discounts to final users and bringing in many customers (and so earning a percentage from the final providers of goods);
- Community Model, in which users and customers are strongly related to a brand or its sites that they contribute to them providing content or even money (e.g., open source products);
- Subscription Model, in which user do periodically pay a bill for using a service;
- Utility Model, in which users pay the services on actual usage of the service itself (metering usage).

The traditional business models adopted by operators generally fall into the two latter classes: the subscription model (with its variants like the pre-paid model) and the utility model. It is difficult for operators (because of the factual state of things or because of consolidated thinking and practice) to move to different business models. Some of them could be precluded (e.g., the Manufacturer Model) or difficult to apply (e.g., Merchant or Community models) because of the regulatory framework or because of the assets and internal organization and processes. From the operators perspective there is an increasing interest in those business models that exploit the knowledge of the customer base, e.g., the Broker Model. In principle this would leverage the rich set of information the operators hold about their customers (the user profile). Actually operators could know even more about their customers if they were using a holistic approach: the triple and quadruple play offerings could for instance provide a whole set of valuable information about preferences, habits, and choices of the customer. The analysis of the "phone social graph" (the set of relationship created by a specific user and its phone and messaging correspondents) could provide a great deal of profile information about the specific

user and its links and relationship within a community (this is quite important and informative). However there is a regulatory framework that hampers operators to take this approach to the full consequences, while leave WebCo freer to pursue such a strategy. These approaches refer to the "customer ownership" and have to be carefully studied and applied in order not to impact on the privacy and the security of users. Actually the provider that is playing extensively the role of broker (and it is doing so by monetizing its knowledge of customers by means of advertising) is Google [13]. Google is the broker of many data available in the Internet and it has been so good in promoting a strong and positive company image that its prevalent business model is enforced also by a Community Model (users are loyal and attracted by the brand). Recently Facebook [14] has announced to be willing to monetize its knowledge about users (causing some strong reactions by customers), it is however evident that they tend to apply a business model that can be considered a combination of the Infomediary and Community Models. The recent agreement between Amazon and some operators about the free surfing of Kindle customers on Amazon web sites leads to a business model for the operator not too far from the affiliate one, in which the operators earn money if the provider sells goods to the final customers.

In recent times, the Telco 2.0 initiative [15] has proposed the "two sided business model" in which operators do not sell connectivity and services only to final customers, but instead leverage their capabilities making them available to intermediate providers and "resellers". The proponents of this initiative think that this approach can be very promising and could be a means to increase the revenues. It should be noted, however, that operators are already operating in a similar fashion since years. Free-phone and Virtual Private Network services are examples of successful applications of this "two-sided" business model. The two mentioned services are the "killer applications" of the Intelligent Network. Unfortunately, even in the more traditional business market, there are not too many other successful examples of services adopting the two sided business model approach. Moreover, it is not certain that they will show up in the future. Even approaches like the one proposed with Amazon's Kindle could be framed into this two-sided business model strategy. It is questionable if it will be so good to revert the negative trend of the voice and communications market.

The operators can also opt for a business model (between the broker and the community ones) that leverages the operator knowledge of the user in favor of the user himself. In the future years the problem of privacy, security and profiling will become more and more relevant and users

will look for companies to trust for dealing with Internet intricacies. The operators have already in place reliable relationships with customers (the billing and the subscription). They should exploit them in order to provide to users Identity Management Services encompassing personalized security, privacy and billing services. The users should be enabled to personalize the network experience according to the level of security and privacy they feel appropriate and according to their willingness to pay for privacy and security functions. Also in this case, it is difficult that this approach could alone compensate the losses in the residential voice market, while it could be a valuable add-on in the more traditional business market. Likely a combination of business models could be applied in order to compensate for the current losses, but such a mixed strategy requires a lot of effort and a clear vision by the operators.

Residential and the business markets are profoundly different: on one side the former one is less concerned with the concept of "Quality of Service" and therefore it is more prone to use free services even if they require to give up a considerable amount of privacy and information; the latter one is more concerned (upfront to a clear economical convenience for the service) about Quality of Services and is seeking a continuous contact with the service provider. The relationship is instrumental to a progressive improvement of the QoS, to solving problems, and to the tailoring of services to actual customer needs. For these reasons it is important to consider the impacts of a new business model on the residential and on the business markets. It should be clear that something that works for the mass residential market not necessarily is going to work for the business market and vice versa.

Innovation, Disruption and Vertical Business Models

As seen in previous chapters, the global situation for the telecoms market is quite complex and dominated by uncertainty. One thing is evident so far: nearly 80 % of the revenues of operators still comes from the traditional market. This introduces even a more complex element to the awareness of the situation. The current business is too big to consider it marginal, but still it is not easy to prevent the declining of it and reverse the trend.

In the literature, there have been attempts to define methodology to understand future market trends, to discriminate relevant uncertainty factors, and to develop consistent strategies. According to [16], there are four levels of uncertainty to cope with. They span from a clear picture of the future (e.g., in growing markets) to a very ambiguous

situation (in distressed market under a strong disruption). Unfortunately, for the telecom market there are multiple trends going on simultaneously, the degree of turmoil of the communications market differs from country to country. Operators doing business in different markets are facing different situations sometimes contradicting each other. As a simplification it could be stated that there are different "waves of turbulence" depending on the consolidation of the market. Developing countries still show very favorable growth (especially in the mobile market) while in OECD countries the trend is toward consolidation and decline. A global operator has to understand and cope with these different waves exploiting the emergent markets in order to compensate for the mature ones. It is not possible to determine a single and stable strategy to cope with these "waves of turmoil", but, reasonably, for each individual market a possible vision on its future has to be elaborated, and a related strategy applied. In any case, the global tendency is clear and it poses a big dilemma to operators: "if, when and how to move to different business models"?

Operators running businesses in mature markets are forced before of others to rethink their business models for slowing down the losses of the traditional market. A predominant idea is to try to enter into adjacent markets in order to maintain or even to increase the level of revenue and profits. The assets to leverage are the communications capabilities that can reshape or transform these target markets. Figure 2 graphically summarizes the problem domain.

Entering into consolidated markets is difficult and it requires good strategies in terms of pricing models and technological capabilities. The TV market can be used as a good example of several applicable approaches. Many

Figure 2: Leveraging communications capabilities for entering into adjacent markets
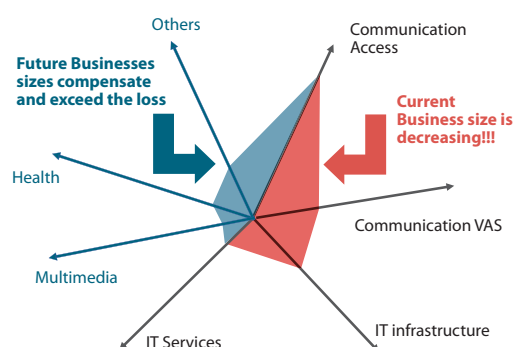
operators are pushing the "IPTV" model; the idea is to provide TV services (broadcasting and video on demand) leveraging IP devices and broadband connectivity. Different markets have responded and will respond in distinctive ways to this attempt: in certain areas the net effect of a new competitor in this market is just to bring a harsher price competition between existing and new actors (dropping even more the market margins). In other markets the operators offerings could be appealing and convenient because there are external factors that favor the IPTV service proposition (e.g., strict rules for installing antennas on the roof). In general the IPTV proposition could bring innovation by tying together the TV with the user generated and possibly high definition content. Users could leverage the IPTV infrastructure as an open platform in order to create and manage media communities. In this case the operators bring in disruption in the market and the service proposition could be perceived by users as innovative and rewarded as useful.

Another well regarded market for operators is the health sector. In many countries health is a consistent part of the budget at the national and regional level. ICT technologies can be an important factor in order to lead to substantial savings and improvements in services offered to citizens. But it is also true that this market is quite consolidated and existing actors are reluctant to open up to new ones. This yields to a typical situation in which an operator enters into this market offering medical equipments bundled with connectivity packages. The real impact of this offering is marginal for the entire health market and, from the operator point of view, it is ineffectual in generating new revenue streams (operators already offer connectivity to health market). In order to be effective in this market, operators should introduce new approaches and new functions, for instance from mobile data it could be predicted how some diseases will spread among the population [17]. By leveraging these unique data, operators could differentiate their offering and create a breach in the consolidated market that can revolutionize the status quo. If those data are offered by means of open interfaces there is the possibility to clearly differentiate the service proposition from the one of consolidate health market actors and enabling a totally new market proposition.

A general insight from these examples is that in order to successfully entering into new markets and making a difference the new entrants should bring in substantial disruption at the level of business models, services/functions offered, and technological solutions. In other terms, the new solutions have to disrupt the market and push for a new equilibrium in it. Otherwise the revenue generated
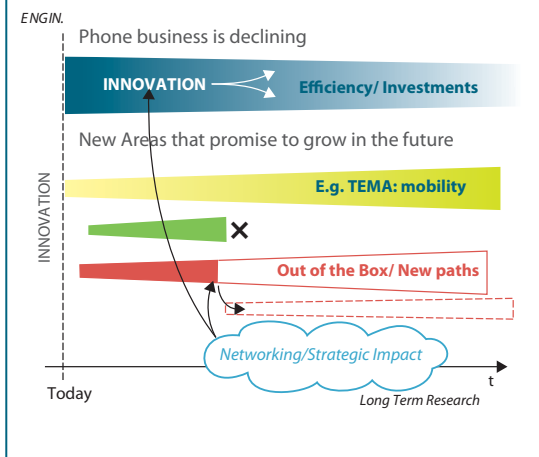
from the targeted market will be marginal and not to much different from the one generated by a plain and traditional approach. How to bring innovation and disruption into new markets is a difficult issue to deal with. As a rule of thumb, a more open approach that enables the creation and the redistribution of value into new value chains has to be enabled by new technological platforms and solutions. Operators really willing to compete in new markets should keep in mind these lessons.

A New Approach to Telecomms: Using the Communications Platform as an Enabler for the Open Innovation

So, what should the operators do in order to create new opportunities, new value chains and successfully move to new businesses? All the major operators have in place either research centers or big testing labs. Operators research has usually being used for introducing innovation in the network by developing its own products or, mainly, enabling the operation part of the company to become an intelligent buyer and driving the relationship between operators and vendors to products more respondent to specific operator and market requirements. Nowadays the research suffers the same problem that the telecom market is going through. The technological vision is mainly focusing on the defense of existing approaches by means of new technologies and platforms (e.g., IMS and in the near future LTE-SAE) and opening up the existing service layer functions for creating new services. This approach does not take into account the real goal that research should achieve in order to facilitate the operators to find a way through the "critical paradoxes" introduced by the All-IP Networks. Operators should have a double agenda [18]: on one side to use innovation and research to consolidate and defend as much as possible the current business; on the other side operators should unleash their research potential in order to figure out how new technologies could be fruitfully used to introduce genuine innovation (and disruption) in adjacent markets leveraging the capabilities of communications. This double face strategy is represented in figure 3.

Operators should invest also in potentially interesting but risky projects and be ready to stop them if they do not lead to new businesses. A "start up" approach should be used: small groups of researchers and innovators should initially work aiming at the creation in the medium/long term of new revenue streams. They should be fast and free from the usual processes of big corporations. And they should give enough time to exploit and enforce their ideas: it is not

Figure 3: Strategy for a change

of the operators should be involved from the inception of the work into these activities in order to guarantee the correctness of the approach to a new market, the "selling proposition" of the results within the company, and, even more important, the creation of a viable ecosystem able to support the technological efforts and the business innovation. It is not possible anymore to have an Operator be able to create new business opportunities alone in a new market. There is the extreme need of cooperation and openness between different stakeholders willing to "make the cake bigger" (and not in finding new way for splitting it).

This approach to new business propositions and research should follow the dictates of the open innovation [19] [20]: different stakeholders should strongly cooperate and share knowledge and intermediate results that even others can use and bring to the market. The innovations will find an ideal terrain to grow if the operators and the other cooperating stakeholders are able to offer robust technological networked platforms that internal and external developers can use for creating new services and business. Operators (especially for new target markets) cannot think to fully "control" the entire value chain, they instead have to well position themselves into the strategic business and technological knots of the enabling platform and environment.

realistic to identify from the launch of a specific research activity a multi-millionaire business. More pragmatically research and innovations should aim at enabling small but enduring increases in new markets that have a high business potential for the future (for example the Internet of things). Entering very early in new markets offers the possibility to be a major player and drive the business model. However this should not be a classical methodology, technological research and innovation has to be backed up from the start by a marketing analysis. People from the market divisions

Figure 4 depicts the global picture for a strategic research into new businesses.

Figure 4: an Open Innovation Approach for new ICT opportunities
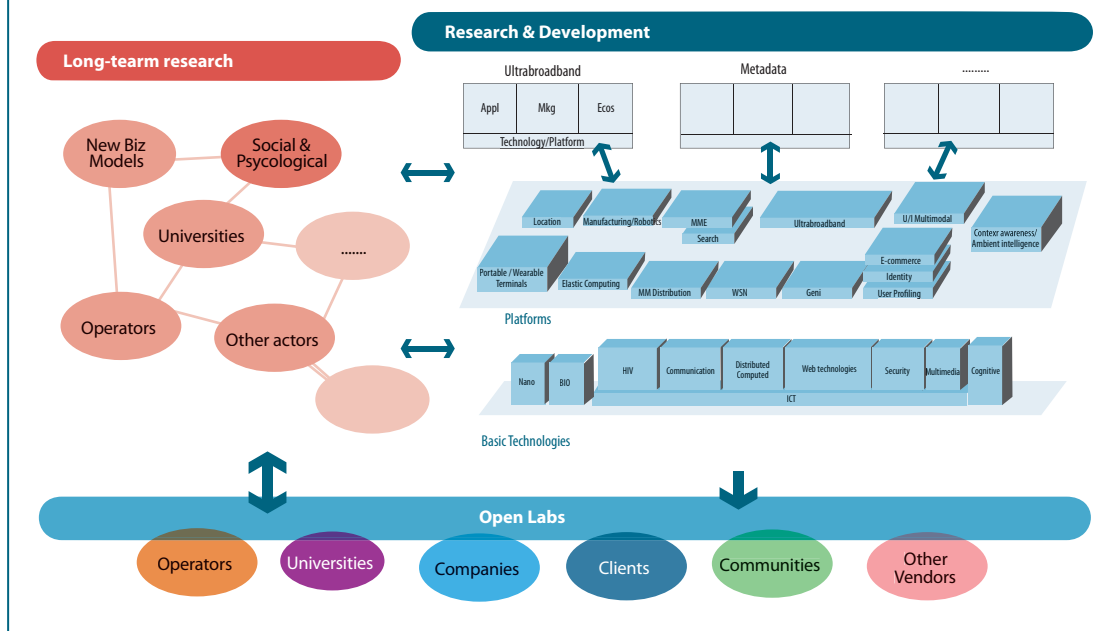
From a technological perspective, this organization privileges the development and innovation at the platform and service levels in which the operators research can contribute the most. These levels are also the most promising ones from a business perspective and mastering the related technologies and solutions is a key point for any service provider [21]. Basic technologies are introduced and monitored in order to increase the capabilities of the platform, but generally speaking are out of scope of this approach (see next chapter). From an ecosystem point of view the approach opens up to many different stakeholders either at the level of long/medium term research (fostering a cooperative approach to it), and at the level of usage of intermediate and not consolidated results. The approach is very open, cooperative and holistic aiming at fully understanding technical, sociological and market challenges of new business models.

The approach leverages three major stages of innovation:

- **Long term research**, whose aim is the early identification and comprehension of technological and business disruptions by means of a Positive Dilemma approach ("what can be done with this technology?", "How can it be used at Users advantage?"). Typical projects should be "short" (6 months – 12 months) and "dense", i.e., trying to grasp the essence of a technological disruption and to understand if it opens up new ways of doing business. Many other stakeholders should be involved in this phase: from leading universities to other operators, from marketers, to sociologists, to the final customers and communities. This ecosystem should aim at comprehending technological and business perspective, as well as impacts and implications on business and networks of the future. The ecosystem should also identify and promote participation (of vendors, providers, operators and users) in potentially rewarding new ecosystems. The main results will be evaluations and possibly proposals for consolidated Research and Development Projects.
- **Research & Development**, it aims at consolidating, creating and driving in the medium period the technological and market conditions to start and successfully conduct a new business. Activities will be carried out as projects two or three years long that work towards prototyping, development of platform solutions in areas supposed of high interest, priority and potential for the "new" operator. They need to have an internal sponsor (a Telco's division willing to be involved, that foresees a successful future and promotes the new business perspective). The major goal is the demonstration

of the platform capabilities and implications and the creation of a viable exploitation plan of the platform. The activities integrate technical and marketing people plus people able to create an ecosystem involving all the relevant parties. This should ensure the capture of real user requirements and the development of useful solutions.
- **OpenLabs**, they have probably the most difficult task: i.e., to ensure the openness and the fruitful usage of enablers and platforms made available by research and development projects. In other words they aim at making visible and usable/used the solutions developed by the center creating, nurturing, and consolidating a large community of developers and companies that extend, modify and reinforce the solutions. Users of the OpenLabs are: other operators, user communities, universities, other stakeholders (e.g., international partners of European projects). OpenLabs should be a playground for operators and new ecosystems. It is also a facility for seeking cooperation between stakeholders, they can use the OpenLabs to see the transformation introduced by new technologies, to understand and proof it; to improve and engage in it moving towards a real usage.

The Open Labs will be a sort of catalyst for opening up new initiatives and new businesses.

OpenLabs and Possible Impacts on Innovation

The role of the OpenLabs is central to the success of innovations activities leading to the creation of new business ecosystems and the exploitation of new opportunities. An OpenLab requires consistent investments in terms of people, management effort and equipment, but it could provide a very useful return of investment in terms of insights, solutions, products, business models and related ecosystems.

How to use the OpenLabs. The idea is to provide functionalities, prototypes and even access to network deployed solutions for other to use and experiment. For instance, new and small vendors, university groups, or independent developers with bright ideas could demonstrate the soundness of their products/solutions by integrating them in the OpenLabs infrastructure. Developers could readily take advantage of these new capabilities in order to create advanced functionalities, services and applications; customers could help by providing feedback in order to tune up, improve or reshape the functions offered.

Several interesting projects could find in the OpenLabs the right environment that enables a progressive and continu-

ous development. Some major interesting topics could be: Atoms and Bits, Digital Environments, MicroMachinery, Resource Aware-networks, Extended Digital Identity, Meta-content creation and exploitation, Virtual Computing. For a detail of some of these activities see [22]. Each one could benefit from contributions and support from different communities and research groups.

OpenLabs could even be used to facilitate the business (in term of acceptance and comprehension) of the operator in developing countries that are of interest. The interests could be various: the operator is operating a business in that country and OpenLabs is a way for catalyzing solutions that are tailored for that specific environment; the OpenLabs can be built in a country that has a relevant knowledge base on specific technologies or it allows easy access to skilled and low cost competences; OpenLabs could be a means to prepare to enter into a specific market acquiring competences, requirements and grasping hints on the expected behaviour of users.

OpenLabs could be part of international Networks of Excellence making available to national or regional markets the innovations being developed elsewhere in Europe or in the world (and vice versa, solutions developed for a regional market could find their way into a wider market). The operators could also learn how to nurture and exploit a community of developers and users.

The potential benefits of OpenLabs for an operator. The impact and the benefits of OpenLabs from an operator perspective are many. They are essentially in the access to a much wider portfolio of advanced solutions and innovations that do not necessarily stem from the specific area of

telecommunications. It also provides a means to access to and experiment with wider collections of new products that small vendors could be willing to propose and let the operators use. The OpenLabs could be a means for researchers to expose their results and for the operators to put an eye on new interesting ideas and results of the basic research and exploiting them since an early stage.

Generally speaking the need to enter into new markets raises the need to investigate and be able to understand some emerging basic technologies. Many developments are going on in the promising integrated field of NBIC (nano, bio, information and cognitive technologies). OpenLabs could be a means to promote and acquire knowledge and experiences in that realm. Figure 5 shows as an example the span of new technologies that can have an impact on the evolution of the ICT business.

As said, the operators should not usually perform basic research, instead they should monitor it and readily integrate it into the network platform for challenging and figure out new opportunities.

Obviously there are costs associated to OpenLabs in terms of personnel allocated to the lab, availability of a large platform providing services to research ecosystems, the management of demanding communities of skilled developers. It is however envisaged that the benefits could rapidly pay off the costs of the infrastructure and its management.

The potential impact of OpenLabs in the Italian context. The OpenLabs initiative could have a strong impact also at a national level. The Italian R&D expenditure is generally below the OECD and EU spending. This is usually seen as a

Figure 5: some emerging technologies in the context of ICT
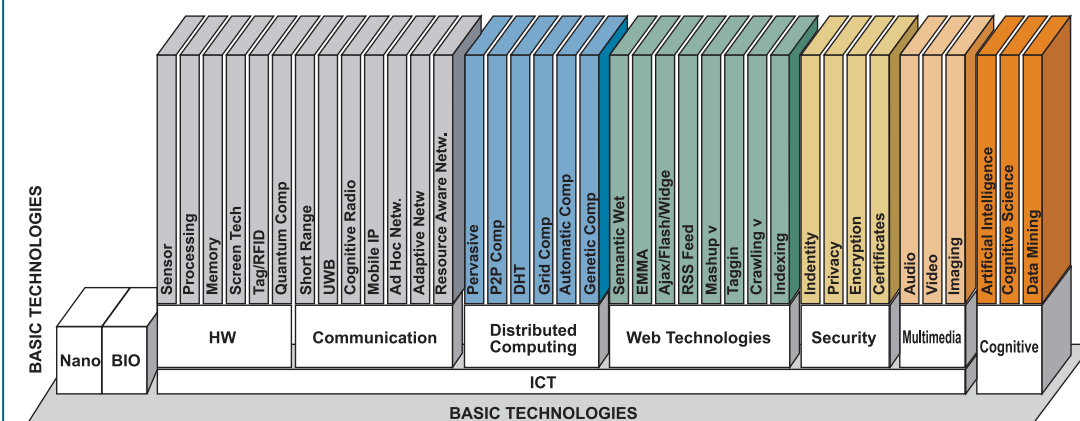
consequence of two facts: many Italian industries are competing on consolidated markets and products and there is a strong prevalence of small and family owned companies. In addition there is a huge diversity between the north and the south part of the country. On the other side there are areas that have developed into "industrial districts" [23] showing a strong interrelation between (competing) companies operating in the same market segment. They are characterized by a clustering of similar activities plus a set of supporting companies providing services and facilities. The proximity facilitates the sharing of experiences and of technologies and approaches. These areas seem ideal for experimenting new approaches to innovations and technology transfer. On another side, the research at universities seems (sometimes) to be far from the needs of these industrial districts as well as those of the big Italian corporations. There is a clear need to find a common ground (i.e., ICT platforms such as OpenLabs) to be used for allowing the introduction of innovations that do help the industrial districts and the large part of Small and Medium Enterprises.

OpenLabs could act as bridges between the different actors of the national research environment closing the gap between the humus of SMEs and the big research players. OpenLabs could help Industrial districts to break the border between them and share solutions and enablers and start-ing a path towards a closer integration. SMEs can also find solutions usually available only to big corporations enabling them to grow in size and importance. Also the public sector can be part of this environment stimulating the development of specific solutions foe e-government and the health sectors. In addition OpenLabs could give an impulse to the national software industry especially in growing sectors like open source.

At a national level, the federation (maybe promoted by the activities of the Italian employers' federation, Confindustria) of OpenLabs made available by big players (such as operators, but also power companies and the like) could create an important infrastructure to be used for creating and integrating solutions spanning several markets and really fostering a greater innovation and integration within the national industrial environment.

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Country Reports
of Open Innovation

This chapter is focusing on service innovation trends in some key Member States, in light of service innovation paradigms.

2.1   United Kingdom

Overview

The UK has one of the most dynamic knowledge intensive service (KIS) sectors in the world today, with particular strengths in financial services including insurance, IT services, advertising and marketing, legal, accounting and management consultancy as well as architectural and engineering/environmental services. This capability and growth has been developed on the back of deregulation (not least of financial services), improved outsourcing of services by Government (such that outsourced public sector services account for almost 6% of GDP), an open policy towards the inflow of people and firms, and the growing availability of high level skills.

In London and the SE of England there is a concentration of talent across a range of service areas which offers a combination of design, composition, management, financial and contracting skills for projects and services, that is second to none. Importantly, this is complemented by a legal system for restitution which is renowned for its fairness. With easy access to transport hubs this global capability has a global reach, which is reflected in the export statistics below.

Value[1] of exports of selected services (current prices), 2007
£ million

Pink Book Services Product Category	Government Office Region (GOR)										UK
	North East	North West	Yorkshire & The Humber	East Midlands	West Midlands	Eastern	London	South East	South West	Rest of UK	
Table 3.4											
Communications Services	*	30	10	*	80	230	2 275	1 465	55	105	*4 260*
Table 3.7											
Computer and Information	45	130	105	55	145	525	2 645	3 115	110	205	*7 080*
Table 3.8											
Royalties and Licence Fees (part[2])	*	620	65	225	75	335	1 385	2 525	*	145	*6 260*
Table 3.9											
Other Business services (part[3])											
Merchanting and other trade related services	25	195	40	40	50	55	2 060	320	20	95	*2 900*
Legal and accounting	20	*	35	*	50	55	3 420	180	60	125	*4 420*
Business management and management consulting	130	205	115	50	125	275	3 395	1 035	355	320	*6 005*
Advertising and Market Research	5	45	45	10	60	60	1 775	305	25	40	*2 370*
Research and development	95	665	110	345	45	1 330	450	1 650	165	350	*5 205*
Architectural, surveying and construction[4]	20	75	70	80	25	70	300	460	20	255	*1 375*
Engineering and technical services[5]	180	260	75	125	45	560	1 635	1 685	215	700	*5 480*
Services between affiliated enterprises, n.i.e.	40	135	40	70	80	285	1 690	870	115	300	*3 625*
Services not Regionalised											101 665
Total UK Exports of services											**150 645**

1   Figures are not National Statistics and may not be accurate to the level shown. Regional data and UK totals are rounded to the nearest £5 million and are adjusted to be consistent
    with Tables 3.1, 3.4, 3.7 3.8 and 3.9 in the 2009 Pink Book
2   Excluding Film and Television Royalties and License fees, see Table 3.8 in the Pink Book.
3   Excluding Other Miscellaneous Business services, see Table 3.9 in the Pink Book
4   Construction figures from Table 3.1 in the Pink Book have been combined with figures for Architectural and Surveying from Table 3.9.
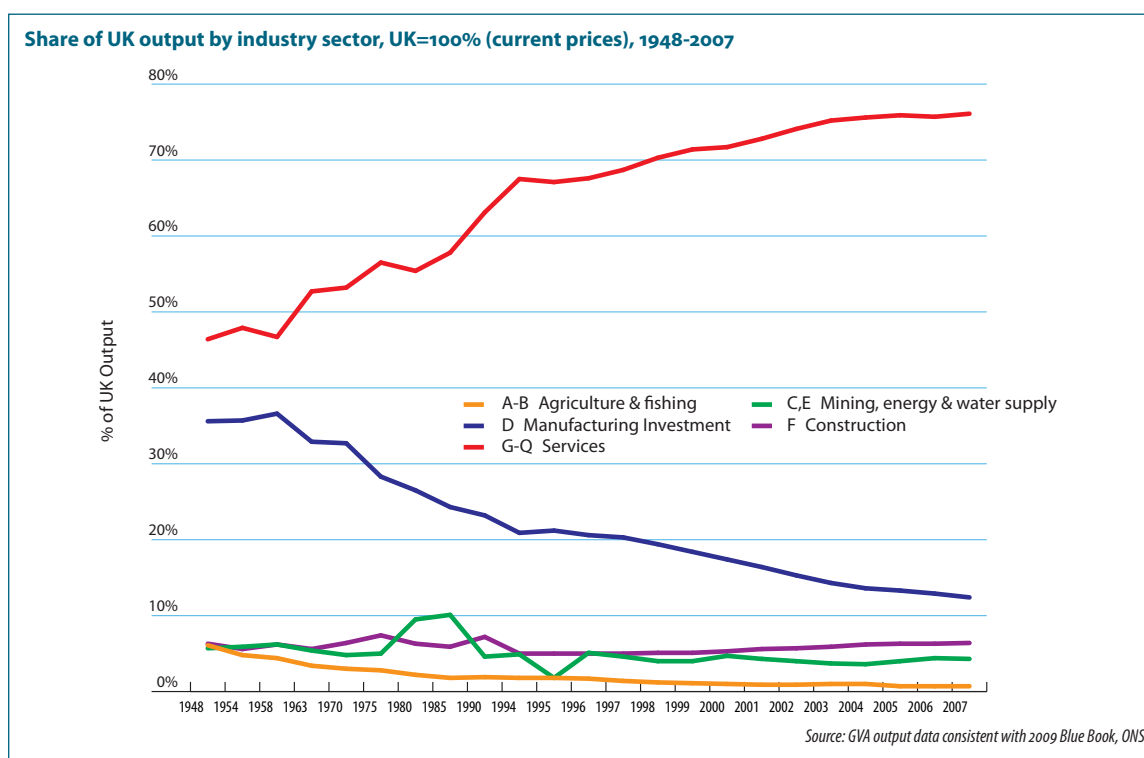5   Also includes Operational leasing and Agricultural, mining and on-site processing
*   Disclosive data, not available

Source: BIS analysis of the ONS International Trade in Services (ITIS) Inquiry, adjusted to Pink Book totals

Developments in the Service Economy [1]

As the Table illustrates, services have occupied a steadily growing share of GDP since the late 1950s which is similarly reflected in the employment statistics. Over the more recent period, 1996-2006, employment in services overall has increased by around 20% while manufacturing jobs have reduced by a quarter. Knowledge intensive jobs in the private sector defined as the financial, real estate, renting and business services sectors increased by almost one third, while in public administration, defence, education, health and social, the increase has been around the overall average of 20%.

Share of UK output by industry sector, UK=100% (current prices), 1948-2007

Source: GVA output data consistent with 2009 Blue Book, ONS

Growth in Workforce jobs in Service industries, 1984-2009
Per cent

Section	Industry	1 year 2008-9	5 years 2004-09	10 years 1999-2009	25 years 1984-2009
A-B	Agriculture & fishing	-2,2	13,0	-4,3	-19,6
C, E	Mining, quarrying, electricity, gas & water supply	-3,5	7,9	-10,7	-27,9
D	Manufacturing	-8,1	-18,7	-34,2	-33,8
F	Construction	-4,0	5,6	17,0	16,2
G-O	All Services	-1,2	3,3	13,9	23,6
G-H	Distribution, hotels & restaurants	-3,1	-3,7	1,9	8,4
I	Transport & communication	-1,0	0,9	9,2	17,9
J-K	Financial, real estate, renting and business activities	-4,0	6,6	19,6	44,1
L-N	Public administration, defence, education, health & social	2,4	7,5	22,2	24,1
O	Other social & personal	0,0	3,8	15,4	30,1
A-O	All Industries	-2,1	1,0	6,4	12,6

Source: WFJ series, ONS

Public Initiatives

With services accounting for such a significant proportion of GDP and employment, the UK Government is conscious of the need to continue to develop this capability. Four reports are relevant.

Supporting Innovation in Services

In 2006 it commissioned an economic analysis of Innovation in Services [2], followed up by a business led analysis of the policy framework "Supporting Innovation in Services" [3] (SIiS). In its conclusions the report identified four main areas of focus for Government policy:

Openness and Flexibility of Markets: Innovation is driven by competition to meet the needs of well informed customers with a capability to engage actively in the development of the offering, indeed, to co-create services. It is substantially influenced by new firms bringing new ideas to the market. Government therefore has an important role in ensuring that markets are as open and flexible as possible. Aside from promoting a liberal international trading environment and pursuing an active competition policy, business identified three important levers where, it felt, Government could focus greater effort:

- Where Government is an important actor in the market, as procurer or regulator, strong leadership in the form of clear, consistent, objective oriented policies, and a shared perspective of the policy challenge, gives business the strong market signals it needs to offer innovative and sustainable solutions.
- Information is the raw material of an "Information Society" and business believes that Government has an important duty in making data, which it collects, as accessible as possible.
- Markets also require a framework for defining and comparing offerings, and delineating quality and performance over time i.e. a standards framework which is interoperable. This is particularly important for the new models of advanced manufacture and for PFI contracts, where firms are seeking to service assets over a very long period. Given the global nature of value chains, business considers it is important to ensure that the international standards framework provides opportunities for UK firms.

The Importance of ICT: Innovation in services is being driven by rapid developments in ICT, specifically the ability to capture, store, analyse/manage and exchange massive quantities of data. Knowledge based services need early access to knowledge based tools and an ICT infrastructure which can handle media rich services. To remain competitive, UK firms have to be able to tap into the technology and talent which will drive the next wave of internet development.

Leadership and Management Skills: The development and delivery of complex services, and the ability to respond to the rapid evolution of service markets, places a considerable premium on leadership and management skills. Leading UK service firms consider the UK to be a source of such talent but there is no room for complacency: service firms will migrate to locations where young professionals have the requisite all round skills.

Access to Finance: Access to finance remains difficult for some innovative, high growth service businesses and the report identified sums below £2 million as particularly difficult to raise.

The report is being implemented, in particular:

- the Shareholder Executive has carried out a review of Trading Funds, such as Ordnance Survey, which sought to improve the accessibility of public re-useable data
- the regulations governing employment agencies are being reviewed to ensure that they do not inhibit unduly the emergence of online services, such as Job Boards;
- a pilot programme has been developed with Regional Development Agencies to assist small and medium sized firms (SMEs) to transform their business processes, business models and management information systems through the innovative use of ICT.

Digital Britain [4]

In June 2009 the Government published its Final Report on how to develop a modern communications infrastructure based on new digital technologies, while ensuring that the legal framework enabled the creative industries to capitalise on their content, that Government itself modernised its own services through digital procurement and delivery, and that the community at large had the skills and "literacy" to engage fully in a digital society.

Report highlights included measures to strengthen and modernise the UK's Digital Infrastructure, including:

Infrastructure

- Universal access to today's broadband by 2012, creating equal access for all and a fairer digital future

- A fund for investment in the next generation of super-fast broadband to ensure it is available to the whole country, not just some of it
- Digital Radio Upgrade by 2015
- Accelerating current and next generation mobile coverage and services
- Proposed new role for sectoral regulator Ofcom to carry out a full assessment of the UK's communications infrastructure every two years

Digital Participation

Steps to ensure that everyone can share in the benefits of Digital Britain include:
- A three year National Plan to improve Digital Participation
- A programme of Digital Switchover in public services
- A new Digital Inclusion Champion: Martha Lane Fox
- A revised digital remit for Channel 4 and key role for the BBC
- Guaranteed funding for three years for targeted marketing and outreach

Digital content

Steps to make the UK one of the world's main creative capitals include:
- A robust legal and regulatory framework to combat Digital Piracy
- Digital Test Beds to promote innovation, experimentation and learning around creation and monetization of digital content
- The TV Licence Fee: a consultation on contained contestability, primarily to secure news in the nations, regions and locally
- A new direction for Channel 4, championing new talent across all digital media
- A guidance note and clarification on the media merger regime and an enhanced evidence role for the regulator in local mergers
- Support for Independently Funded News Consortia

The report provides a coherent framework for further policy development.

The Public Services Review
by Dr DeAnne Julius

This examined ways to improve the outsourcing of government services to the private sector, which now account for approximately 6% of GDP. Critical factors include:
- clear joint objectives between the Government organisation and it erstanding between the parties
- developing ongoing relationship between the partners

- appropriate risk sharing
- opening opportunities for innovation and
- flexibility

Professional Services Global Competitiveness Group Report [5]

The Group was formed under the co-Chairmanship of Sir Michael Snyder, Senior Partner at Kingston Smith LLP, and Lord Myners, Financial Services Secretary to HM Treasury and reported to a High Level Group, Chaired by the Chancellor of the Exchequer, in March 2009.

The Group was asked to consider the medium- to longer-term trends impacting on the competitiveness of the professional services sector in the UK, taking into account London and UK-based factors and the sector-specific opportunities and challenges in overseas market liberalisation and regulatory/ standards dialogue. The group was asked to produce a practical analysis on the basis of its examination of these issues, and a range of considerations that ought to be addressed.

Its summary conclusions set out the following considerations for both the Government and the professional services industry:
- Ensuring effective regulation without discouraging international businesses from basing operations in the UK, by:
  - considering the impact on international competitiveness when drawing up regulations; and
  - considering new guidelines for carrying out post implementation reviews of regulation, including enhanced consultation with stakeholders.

- Maintaining a well designed taxation system by:
  - proposals to offer partnerships a more level playing field with corporates in terms of tax; and
  - the extension of the successful HMRC approach for large businesses to smaller partnerships.

- Safeguarding the UK's attractiveness as a major international business hub by:
  - encouraging small and medium sized firms to grow in order to maintain a competitive market; and
  - promoting physical connectivity through world-class infrastructure and attracting talent and business with a high quality built environment.

- Nurturing and attracting the best skills by:
  - increased investment in tertiary education;

- professions working with academic institutions to ensure new entrants and existing members possess the right technical knowledge and skills; and
- professional services firms promoting career opportunities to a wider range of students.

- Creating a professional services industry with a strong international outlook by:
  - positioning the UK as a natural base for expanding into emerging markets; and
  - building on the high standards of UK professional services as a platform for promoting the UK abroad.

The report set out specific recommendations in relation to the specific professional business service sectors examined.

Research and Development
Specific policy initiatives include:
- a strong Digital Economy research programme led by the Engineering and Physical Science Research Council [6] (EPSRC)

- a new focus on services and the creative industries by the Technology Strategy Board, and its challenge based approach in areas such as Assisted Living, Network Security and Intelligent Transport also has a strong service emphasis;

The Digital Economy Programme
The Digital Economy Programme is a Research Councils UK programme, led by EPSRC and working closely ESRC, MRC, AHRC and TSB [7]. The EPSRC defines Digital Economy as the novel design or use of information and communication technologies to help transform the lives of individuals, society or business. Research will help understand these technologies and why change is needed, what the impacts will be and who will benefit. The programme brings together the underpinning technologies, with all the elements required to deliver transformation, and is focused on understanding the impacts of the research and will be driven by users.

In its first phase, the programme will focus on engagement with the transport, creative industries and healthcare sectors, but will aim to build engagement with other sectors where the use of information can have a transformative effect.

The aims of the programme are to:
- Deliver research that is driven by a real need with the ability to have impact.

- Create a community of new researchers who understand the technology and how people use it and what the impact is.
- Provide a focus for the interaction between researchers and key stakeholders.

Programme Budget

Research:	£46 million commitment for 2008/09 £18 million commitment for 2009/10 £19 million commitment for 2010/11
Training:	£34 million commitment for 2008/09 (five-year commitment for centres for doctoral training

The Technology Strategy Board [8]
The Technology Strategy Board is the government body that exists to promote business innovation in technology. It contributed to the Digital Britain Report and has been assigned the role of leading the technology and innovation efforts required to ensure that Britain has a successful digital future. The organisation's vision is that all participants in Britain's digital economy should benefit fairly from the creation, distribution and consumption of digital content and services.

The Board's role is to focus on 'next steps'; the actions that Britain needs to take now to ensure that it takes a sustainable and business focused approach to the challenge of growing the digital economy. The main objectives outlined by the Technology Strategy Board in the report are plans to:
- Create a digital test-bed online, allowing business and users to explore the effects of alternative network operating models, business models and service platforms
- Apply a secure and holistic approach to infrastructure, technology and business models encouraging all participants in the digital 'value chain' to innovate together and devise profitable solutions

In support of these activities, the Technology Strategy Board will invest £30m.

Key Policy Contacts, Representative Organisations and Centres of Excellence

Advanced Institute of Management (AIM) [9]
Sponsored by the ESRC and EPSRC, AIM works with academics, business, public sector and policy thinkers across more than 110 institutions in order to develop and deliver management research of world class standard. Recently, AIM appointed 6 Service Fellows who will be exploring topics such as innovation in services – the creation and pricing of new

service business models, entrepreneurial behaviour in services and gender and diversity in the sector.

Centre for Service Research, Exeter University [10]

The focus of service research is a focus on the customer, the process, the people and the environment working together towards the service experience. Over 70% of the UK GDP is now contributed by services, research and development is necessary in this area to assist UK companies in becoming more competitive. The centre organises the Service Science Forum* which brings together practitioners from government and organisations to address the challenges a service orientation might bring, to encourage dialogue between academics and professionals from industry to share knowledge and develop an agenda for the provision of education in Service Science.
*(http://centres.exeter.ac.uk/cserv/business_linked_activities/service_science_forum.php)

Centre for Service Research, Manchester Business School [11]

The Centre for Service Research combines the expertise of all the service-related disciplines in Manchester Business School with business partnerships in order to develop a shared understanding of goals and opportunities for research, education, and practice. The Centre focuses on the key multidisciplinary research themes of service design, service delivery, service marketing and service innovation.

Complex Services Innovation Research Network, University of Glasgow [12]

(CSIRN) examines how complex organizations can analyse current and future needs in developing, and driving, both effective and efficient service orientated supply chains. In particular, the CSIRN focuses on helping organizations to meet the following challenges:

- How to identify and develop a responsive and flexible service delivery organization for the future
- How to develop a responsive organization that can compete in a dynamic global market
- How to maintain effective performance through changing work practices
- How to maintain effective performance through changing labour and skills demographs
- How to identify the need for, and drive performance related knowledge creation and innovation
- How to identify and manage barriers to inter/intra organizational cooperation

International Digital Lab, WMG, Warwick University [13]

The Digital Lab is a multi-disciplinary research centre combining WMG's expertise with that in underpinning sciences including psychology, medicine, computer science and mathematics.

NESTA (National Endowment for Science, Technology and the Arts) [14]

NESTA's Policy and Research Unit aims to shape innovation policies that will help the UK meet national innovation challenges of the 21st century. Specific objectives include:

- Increase the quality and quantity of research in innovation
- Develop outstanding innovation policy
- Build a national network of leading thinkers in innovation

Service Systems Initiative, Cambridge [15]

A forum to draw together a range of research activites including service system design, service information systems, industrial support solution strategies and service organisational issues.

SSMEnet UK (UK Service Science, Management and Engineering Network [16]

SSMEnetUK is a network of UK researchers interested in Service Science Management and Engineering (SSME), the network is funded by EPSRC and actively supported by BT, HP and IBM.

UK Innovation Research Centre (UK~IRC) [17]

Joint venture between the Centre for Business Research at Judge Business School, University of Cambridge and Imperial College Business School.

The UK Innovation Research Centre will explore the relationship between innovation and business performance and how this affects the national economy and the individual organisation. This will feed directly into both innovation policy and practice, for example in helping to open companies up to new forms of collaboration and policy makers to develop new instruments and strategies to promote innovation and knowledge exchange.

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2.2 Open Innovation in The Netherlands

Services and Innovation

In Western and newly developed countries the service industries contribution to GDP amounts to approximately 70% (OECD, 2005) [1]. European economy is highly dependent on services innovation for their growth and employment. Services are becoming a driver of productivity and are then only sector of the European Economy that has resulted in net job creation in the last two decades. An important driver for economic growth is, therefore, the development of new, innovative services. Bringing new services to market successfully is one of the great challenges that many companies and organizations face today. Technological developments in information and communication technology act as drivers and enablers of many service innovations. Services are more and more enabled by information and communication technology. Services that were previously considered non-tradable are being increasingly codified, standardised, and suitable for delivery at a distance (EC, 2007) [2].

Service innovation is complex because it requires simultaneous consideration of multiple interrelated changes such as organizational innovation, involvement of multiple actors in the process of innovation, and codification of knowledge for innovation [3]. This multi-dimensional complexity is also clear from the widely accepted definition of service innovation of Den Hertog [4], i.e. "a new or considerably changed service concept, client interaction channel, service delivery system or technological concept that individually, but most likely in combination leads to one or more (re)new(ed) service functions that are new to the firm and do change the service/good offered on the market and do require structurally new technological, human or organizational capabilities of the service organization." Service innovation typically involves a combination of structural changes that together lead to new service functions. Services are found to innovate in a different manner than manufacturing [5]. However, a sound knowledge of service innovations and service innovation approaches is lacking. Policy makers are considering how to stimulate service innovation, but have limited knowledge of service innovation practices. Service companies are looking for new methods and approaches to service design and service innovation that would make their service innovation process more effective [6].

Service innovation joins four trends that currently shape the western economies: the growing importance of services, the need for innovation, changes in consumer and business markets, and the advancements in information and communication technology [7].

The role of the user in services innovation is crucial. The individual user influences the way new services are created and incorporated into their day-to-day routines. Service innovation is to a large extent user-driven, and directed towards providing a specific user experience. Service innovation is an interactive process in which multiple actors, including consumers, play a role. Service innovation is about co-creation, i.e. users providing feedback with regard to existing services and suggesting alternatives, or even developing their own services or content. Intensified interaction with users will improve the effectiveness of service innovation.

Importance of Service for The Netherlands

The Netherlands is an open economy, with a long standing tradition of international trade and services. For many years the services sectors have been hardly affected by the advances of new technologies. Now Internet and ICT allow us to reach quality improvements and productivity growth in many parts of the service economy, be it in health care, finance or entertainment.

Challenges of the Service Economy

The Dutch services economy accounts for 70% of the total Gross Domestic Product (GDP). Almost the entire growth in employment during the last decade stems from developments in the service economy. Sectors such as media, finance, business services, health and service/product combinations are pillars of our service economy.

After agriculture and manufacturing, the services economy accounts for the third wave in GDP growth. Higher productivity as a result of development and use of new technologies and knowledge was one of the main drivers for growth during the earlier waves. The future growth of the service economy is enabled by new innovative services, developments in ICT (Information& Communication Technology), increased productivity, the launch of start-ups and accelerated growth of Small and Medium sized Enterprises (SME's) and new organizational arrangements. For the future wealth of the Netherlands a highly competitive and fast growing services economy is crucial.

Although the important (future) role of the service economy is widely recognized we need a deeper understanding of how to advance and innovate in services. Creating additional customer value, improvement of productivity in services and mastering the consequences of technological advances and internationalization are essential for future economic growth in the Netherlands.

Examples of challenges in the (international) services economy are:

- the changing roles and needs of the consumer,
- the inclusion of slow adopters of new technologies,
- the new international division of labor,
- the creation of free traffic of services and the strengthening of the internal European market,
- upcoming legislation and changing institutional arrangements.

In comparison to other countries the Netherlands has a high level of productivity. In terms of connectivity and ICT-infrastructure, the Netherlands can be regarded as a gateway to Europe. In the Netherlands, excellent opportunities exist for advancing complex and intelligent ICT services. This is because broadband backbone infrastructures and in many situations also broadband and wireless access infrastructures are available as base layer on top of which to build intelligent application environments. Furthermore, public acceptance of internet is very high and people are open minded, efficiency driven and early adapters of new technology. Research in the Netherlands is highly competitive in an international context. There is a strong tradition in initiating and managing public-private consortia.

On the downside, the services industry in the Netherlands is poorly connected to research and education. Moreover, innovation in services requires collaboration over the borders of different sectors, bridging existing gaps in culture and connections. Many of our partners indicate that this is difficult to organize without external pressure and support. Finally, leading ICT companies traditionally pushed innovation. Their role in the Netherlands is decreasing.

A practical definition of innovation may be formulated as the creation of new value by doing something new, something in a different way, or approaching the market in a new way. This suggests that at a high level innovation is independent of market sectors of the type of innovation that is considered. Literature commonly surpasses the point of specific characteristics of the topic of innovation and remains at the level of organizations and innovation approaches for individual companies. ICT is an important enabler of innovation. The question arises whether innovation with ICT is different from innovation in other sector or regarding other types of innovation as e.g. the creation of a new combustion engine. In the following we highlight the specific characteristics of ICT and the possibilities this presents for innovation with ICT but also where ICT may speed up other types of innovation.

The Role of the ICT in Innovation

As mentioned earlier ICT is an important enabler of innovation.

ICT and innovation are linked together in several ways. First of all intrinsic ICT innovation takes place in dedicated ICT sector such as telecom, consultancy and software and hardware supplier. In these sectors ICT plays a key and catalytic role in the innovation [8]. The importance of ICT in innovation is related to the characteristics of ICT and the opportunities that these present. Although these characteristics in many cases have a technical nature, in combination with other innovations they lead to new products and services and thus new value by [9]:

- the connection of people and systems,
- the possibility of remote access to resources,
- the combination and integration of ICT with existing services,
- the offering of a generic platform,
- the personalization of the services offering.

These intrinsic properties of ICT influence the definition of services, products, processes, business relationships, business models and even the innovation process itself.

ICT highly supports the involvement of end-users and suppliers in the definition and execution of services.
Among other things you find this involvement in the possibilities that ICT brings for so-called self-services such as Internet banking and e-government. Recent examples in The Netherlands are the request for child support by means of the Internet Channel, or the support that ICT brings for chronically ill people to stay, changing the control from caretaker to the patient himself. End-users can personalize and adapt ICT supported services according to their own wishes depending on their context. Interaction between supplier and customer becomes 2-way drastically changing the position of the end-user in this favour.

Also governments use the Internet and ICT to streamline their public services via different electronic channels. In the Netherlands submitting the yearly tax-form by Internet has advantages for both the tax-payers as well as the tax receiver. ICT enables this and future more personalized and pre-filled tax forms will further reduce the error rate and missing data.

ICT enables simple and scalable composition of services and value.
The whole ICT that is adopted and used by companies and consumers offers an infrastructure that can be used as a platform for all kinds of innovation. In the financial sector for example, SEPA system opens the market and based on generic infrastructures such as E-invoicing new parties enter the market. The process industry virtual laboratories connect people, knowledge and other resources changing the way of working and offering the possibility to extend the service offering to customers by using external resources. An example in The Netherlands is the National Pension Registry which will be accessible in 2011 by all individuals to have the overview of their pension. An ICT platform is being developed which will be a virtual organization for all Dutch pension funds.

ICT enlarges the availability and codification level of information and knowledge optimizing processes, generating new services and shifting roles in the value chain.
ICT supports the codification and sharing of information allowing a better alignment of processes within and between organizations. Important examples can be found in the logistic and health sectors. Codification also forms the basics of services that require transparency or monitoring such as tracking and tracing services. We can now see directly where food comes from and how long it can be stored.

A heavily debated example also can be found in the Electronic Health Record. Registration of medical data follows a strict protocol, which enables a useful sharing of data between caretakers. Moreover, the EPD standard itself can be viewed as platform that enables new and yet unforeseen new services like e.g. evidence based medicine or online medical advice generation.

ICT offers a high degree of refinement possibilities in the service offering. Small market segments can be approached in efficient way with low transaction costs.

ICT also supports the transition form products to services, so-called servitization. Hardware and product suppliers are turning their business and offering services as their main thing. Intelligent printers are cheap and signal when ink is low. Companies are starting to offer mobility solutions instead of selling a care, and so on.

ICT offers always on access to services and resources.
The availability, proliferation, robustness and price-level of fixed and mobile Internet are improving, resulting in a 24/7 economy. Customers, suppliers, underlying ICT systems continuously connected sharing services, knowledge and resources. New market parties arise that offer Web based applications and software as a service instead of selling application and software in boxes. Pay per use instead of

Pay per ownership. The resulting flexible ICT solutions enable outsourcing in at a scale that we could not think of before. The low distribution and transactions costs further speed up this process.

The combination of ICT platforms and the high level of connectedness provide completely new ways of providing and influencing services. Consumers share their knowledge and together make a fist towards suppliers in social networks. Crowd sourcing techniques connect companies with professionals speeding up problems solving and thus time-to-market of products, services and bug fixes and updates. Flexible work process arise that enable a better balance between work and private life and that allow distributed collaboration. Further advances are expected that increase efficiency by aligning back-office and front-office.

ICT changes the innovation process itself.
Next to the new service and innovation that can be realized by means of ICT, ICT also changes the innovation process itself. The promise of Open-Innovation is fulfilled by ICT. Access to knowledge and the use of third-party technologies is simplified.

The wisdom of the crowds of crowd sourcing makes use of the collective knowledge. Large companies such as Google, P&G, IBM already use this technique in their advantage. This is only affordable because of ICT. Moreover, consumers themselves become important competitors for companies. Nowadays open source software competes with software offered by professional companies. Also Wiki's are important and easy accessible sources of information sometimes outcompetes professional information sources.

Co-development, beta-versioning are ways to direct involve customers using the expertise, eliciting their requirements and integrating them in the core innovation process. The boarders between usage and development are fading.

ICT offers the possibility to simulate complex environments in a more and more realistic way. Living Lab technologies allow companies to follow users in their daily live. Virtual reality or virtual worlds are used to test new services or large process re-designs. In this way ICT supports decision making by offering advanced design, development, simulation and even gaming methods and techniques.

Open Innovation

Henry Chesbrough is the guru when it comes to open innovation. In his book *Open Innovation: The new imperative for creating and profiting from technology* H. Chesbrough stated: "Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology" [10]. The boundaries between a firm and its environment have become more permeable; innovations can easily transfer inward and outward. The central idea behind open innovation is that in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead buy or license processes or inventions (e.g. patents) from other companies. In addition, internal inventions not being used in a firm's business should be taken outside the company (e.g., through licensing, joint-ventures, spin-offs) [11]. Open Innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively [12].

Logica's Approach to Open Innovation
In 2008 Logica Management consulting conducted a survey and published a document on the results of the survey: "The Road to successful open innovation – A little like being in love" with support of ECOLEAD (European Collaborative Organisation Leadership) FP6 project (2004-2008) [13]. *Selected parts from the survey is taken and shown in this chapter* [14].

We are now seeing the rise of the concept: 'open innovation'; innovation through cooperation with other parties. Not at the final stages of innovation, during the implementation of the idea, but right at the start and in complete openness.

Innovation, openness and cooperation. It all sounds nice and politically correct, but what can open innovation really offer? How open innovation actually works, and when it is successful?

A great deal of scientific research has been carried out into open innovation. In Logica's survey, the emphasis is on practice. Logica investigated examples of cooperation that give an idea of how organisations tackle innovations together and what does or does not work. How people look back on the cooperation and lessons learned.

However, nothing is as practical as a good theory. Against that background, Logica's survey starts with a number of key points from academic literature about open innovation. What is it that brings researchers out of their laboratory? Why do businesses share their secrets and why does cooperation work where internal laboratories fail?

For a long time, the Research and Development departments of the world's largest corporations have been the flag

carriers of innovation. Over the last few decades however, innovation within the confines of a single organisation, even the largest one, is becoming less effective. This research investigates the critical success factors of 'Open Innovation', innovation initiated and realized by mutually cooperating organizations. Such cooperation requires more than a positive business case, it asks for inspiration, for a spark. This led one of our interviewees to state that, in order to be successful, organizations need to be 'a little in love' – an analogy proving useful in formulating some of our findings.

In selecting their innovation partners, organizations may be bound to look for 'the usual suspects': dominant players or organizations with unique resources. At the other side of the spectrum, organizations can coincidently find opportunities enabling them to complement each other's assets. Value chain analysis is the rational way to source partners with complementary skills and assets. Logica's research indicates that whatever the approach to partner selection, organizations strongly prefer an organization of comparable size to partner with. Corporate cultures then tend to be similar and this greatly facilitates cooperation. However, despite all the evidence linking corporate size to innovation skills and pitfalls, we think this finding cannot be entirely generalised. Some larger organizations go against the grain and take initiatives to facilitate start-ups and benefit from their creativity and drive.

Particularly when multiple partners cooperate, it makes sense to act as mutual innovators from the very start. Early cooperation maximizes the chances of partners enhancing the innovation concept. At the same time, joint development increases support for effectively bringing the innovation to the market within all cooperating organizations.

Our hypothesis that a successful open innovation project requires the organizations involved to show a strong drive and a constant action-orientated focus did not come true. In many projects partners were surprised how long it took to get started, only to state that even with hindsight they did not recognise the opportunities to have accelerated this process. On the one hand, effective cooperation needs time and cannot be forced; on the other hand, at some point projects must become action focused. Project managers should consciously manage this shift from talk to action and mark the project's transformation. Here, timing is everything.

Strategic alignment is an important issue in open innovation. Most partners will encounter potential conflicts of interest due to initial agreements being overly vague or to changes in an organization's strategy or simply as a matter of circumstances. In the absence of the internal coordinating mechanisms of an organizational hierarchy, strategic alignment in open innovation projects might be experienced as problematic. Our hypothesis that at the outset partners should directly tackle potential conflicts of interest, as they will appear anyway, was not confirmed.

The success of some cases was achieved by avoiding such hot issues because up until the point of the issue materialising the partners had so much invested that they were fully committed to see the joint innovation being realized. Strategic alignment in open innovation therefore requires continuous negotiations and a wide gamut of negotiation strategies might be applicable.

Our research shows the crucial role of an innovation director. Interestingly however, for the same project, various people identified different people as being the innovation director. In our view, the role to manage, stimulate and orchestrate the project is essential at various levels. At a minimum, an innovation project requires a project sponsor at management level and a project manager at operational level. The latter is particularly relevant, also at the outset of the project, when most project members' involvement is likely to be part-time.

A number of our research hypotheses concerned preconditions for successful open innovation. We postulated success would be helped by partners being equally involved, by partners investing in their cooperation early on and by investments being made in cash rather than in kind. These hypotheses were not validated. In hindsight, these hypotheses are evidence that leaving behind the old paradigm of closed innovation with its emphasis on 'control', is not easy. Control has in many respects become an illusion. Open innovation suggests to focus much more on value creation than on control. Many of the cases we describe in the annexes to this report illustrate the opportunities that open innovation entails to create significant value.

Finally, people are an obvious key success factor. Not surprisingly, entrepreneurial spirits can contribute greatly to the success of open innovation projects. Our research however indicates that it is equally likely that success depends on organizational talent, individuals whose stamina can keep innovation projects alive and eventually move them beyond the bureaucratic hurdles of their respective organizations.

The Road to successful Innovation – The Survey

This survey concentrates on the practice of open innovation. How do you 'do' open innovation? What does man-

Figure 1: Open Commercialisation (Chesbrough, 2003)
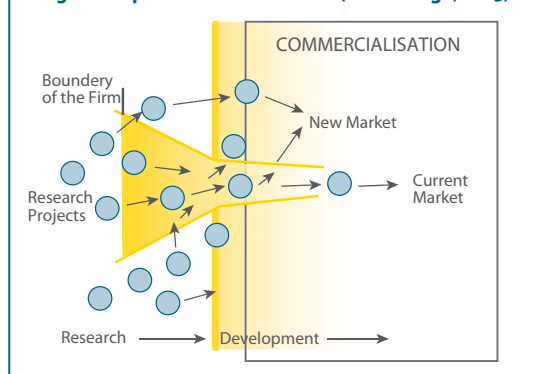
aging an innovation project outside the hierarchy of the business structure actually mean? What have companies learned in their open innovation projects? In particular, we will consider the phase whereby innovations are placed on the market: the commercialisation phase. As consultants, we are most involved in this phase. That is why we have most experience in this field.

The analysis of ten cases of open innovation forms the basis for this survey. The table provides a brief description of these examples.

The survey is exploratory and qualitative in nature. Cases were selected on the basis of the insight they seemed to be able to provide at first glance. Not all cases have been successful. Some have not yet succeeded. A number of cases have become bogged down. In line with the nature of the survey, we have made no attempt to quantify the (potential) success of the cases. The fact that this survey is not merely a brightly-lit showcase of success stories in our opinion makes the analysis even more valuable.

In advance, a number of statements were formulated in the form of success factors.

Partner selection:
- Potential partners must be explicitly selected.

Start:
- Partners must be involved in the innovation process at an early stage.

Project implementation:
- The approach must be highly focused on action / doing.
- Innovation parties must specifically harmonise their own motivation and objectives and continue to do so during the process.

- An innovation director/driver must be appointed.

Conditional parameters:
- The contribution by the partners must be approximately equivalent.
- At the start, investments must be made in cooperation.
- All partners in the chain must jointly profit from the value created by innovation.
- Cooperation must not be strictly laid down in contracts.

By drawing up these success factors, we specifically aimed to assess the idea that by preparing your work well at the start, the eventual result will be achieved far more quickly. After all, everyone knows that a good start is essential, since repair costs increase exponentially over time. According to our hypothesis, therefore, success demands a logical selection of partners, the laying down of a clear course, guarantees of involvement, decisiveness and good overall control during the project.

Although we have no academic pretensions, we do consider objectivity important. The starting point for the survey was that in the collaborative ventures, the partners at all times retain their own perspective. With that in mind, for each case in the survey, a number of different interviews were held. In as much as we ourselves played a role in the cases, as a partner in the cooperation, as innovation director or as consultant, the survey was not carried out by anyone directly involved. Our intention was to analyse these projects as objectively as possible.

All the interview results were submitted to the interviewees for verification. Responsibility for the conclusions drawn and the description of the cases, however, lies exclusively with the survey team.

Survey Conclusions
The era of control is coming to its end. Innovation is increasingly calling for cooperation with others, and continuously looking over the boundaries of your own business. We observed ten examples of open innovation, and drew the following conclusions:

The power of opposites
Businesses have a clear preference for working together with similar businesses, comparable in terms of size and culture. They have the greatest likelihood of rapidly understanding one another. Large organisations rarely manage to quickly commercialise innovations. If a cooperation between widely-varying organisations is wellmanaged, it provides a special boost to larger organisations.

Project	Partners	Concept	Project Launch
Biblioservicebus	Zeeland library, Rabobank, Logica, Raaf, Province of Zeeland, various municipalities in Zeeland, and service providers including NS railways and TNT Post.	Additional services in the mobile library, including services from TNT Post, a (wireless) ATM from Rabobank, sale of train and theatre tickets and information services.	2006
Cell Broadcast	Government (Ministry of Interior and Kingdom Relations and Economic Affairs), KPN, Vodafone Telfort (until takeover), SPMM, Logica.	Simultaneous information/ alarm call to everyone within a specified area via mobile telephone.	2004
Cooljuice	Provalor, TNO, one raw material supplier, two appliance builders.	Producing vitamin-enriched juice from residual flows from the food industry.	2003
DAG	PCM and KPN.	Combining Internet, television, mobile and newspaper.	2006
Funda	NVM and Wegener.	Online marketplace for real estate.	1999
Guardian Angel	The Dutch Red Cross, Achmea/EuroCross, Vodafone.	Emergency service for care recipients; combines voluntary and professional assistance.	2007
NFC/Mobile payments	Schuitema, KPN, Rabobank, NXP, RFID Platform Nederland, Logica.	Investigation into uses of RFID technology, resulting in trial with mobile payments in supermarket.	2004
New Combinations	KPN, De Telegraaf, Sara Lee, Ericsson, Randstad.	Structured innovation programme for (large) businesses.	2001
Notabox	TNT Post and Rabobank.	Platform for digital payment giros that integrates mailbox for invoices in electronic payment.	2002
PICNIC	Municipality of Amsterdam, Ministry of Economic Affairs, Media Republic, Waag Society and various others including Sanoma, Rabobank, KLM, Postcode lottery.	Conference offering possibility for experiencing new multimedia; facilitates interaction between speakers and visitors.	2004

Joint development improves the innovation concept and creates support

Jointly elaborating ideas still in their earliest stages not only improves the ideas but also creates support for implementation. For partnerships with large numbers of parties, this takes much longer, but it is an essential element in creating involvement.

Timing is everything (do not push, but work faster)

Starting cooperation always takes time. As a result, in the majority of projects there is a major discrepancy between the nature of the start-up phase and the implementation phase. We identified seven factors that have a major influence on the amount of time it takes to establish cooperation. Timing is strategy. The right timing is above all determined by people and power. There is no blueprint. Nonetheless, there are useful tips for moving forward without forcing the starting process. It is useful to create a point that symbolically marks the end of the start-up phase.

Negotiation replaces hierarchy

Partners can have very different objectives and a very varied contribution, and yet still be fully in line and effective. However, it is often difficult to set a harmonious course, and it may demand constant negotiation. A strict focus on action is often but clearly not always the most effective approach. The nature of the partnership determines the best negotiation strategy. Whatever the case, do not begrudge the other parties their victories.

A director at every level

The way in which it is directed can make or break open an innovation project. The same applies for the startup phase. Within our projects, various different people were identified as the director. The role of director at least calls for an active administrative sponsor and a project manager who, whenever necessary, will push and pull the project forwards.

Look at value creation and let go of control

The control perspective proved difficult to leave behind. However, formal measures aimed at guaranteeing involvement – equal contribution, money, contracts – have little effect. What does work is the desire to achieve something positive – idealistic or commercial – combined with the space and obligation to achieve. Value creation inspires, the rest is symbolism.

Cooperation is a human work

Undoubtedly the most important conclusion. But it was one you already knew.

Novay's Approach to Open Innovation

The Networked Innovation principle

ICT offers a lot of possibilities but also introduces a lot of interdependencies. This requires a strong cooperation in the innovation process across companies. Innovation capabilities, ways of thinking, technologies and processes have to be aligned in order to effectively innovate together.

Innovation with ICT offers specific possibilities for innovation but also poses certain challenges as outlined in the previous chapter. The nature of ICT invites for collaboration on the development of platforms, composing services, or connecting people and resources. This is unique for innovation with ICT compared other innovations. Therefore we introduce a new way of open-innovation specific for innovation with ICT based on collaboration called Networked Innovation. Networked innovation is defined as:

Innovation with ICT by connecting organizations, knowledge en resources in well-defined collaboration and consortia

Many business sectors face similar challenges regarding the design of services, ICT systems and required similar solutions of infrastructures. By means of collaboration knowledge can be shared, risk can be mitigated and investments minimized. Specialists from different sectors can develop together new and accepted design tools.

By bringing together specialists from different fields, user and suppliers networked innovation realizes impact across different market sectors and provides grip on ICT design. Through partnerships across sectors and connecting resources possibilities for new services and new value offerings arise. The Networked Innovation approach is ideally suited to join parties with complementary products and services and achieve mutual benefits and collaborate towards markets or standardization fora.

Typical results that can be achieved with Networked Innovation are the development of models and tools for ICT design, optimizing processes, business roadmaps and new ways of working. However, working together and sharing risk is not easy. From an extensive case study we derived some guidelines for implementing Networked Innovation in a successful manner.

- There has to be a need and willingness for open and transparent collaboration,
- Availability of multi-disciplinary teams and knowledge,
- A strong leading and monitoring party responsible for the realization of a joint project proposal and execution hereof.
- ICT forms an important part of the innovation or innovation process.

Collaboration within a Networked innovation context doesn't come easy. It requires specific competencies of involved parties and in most cases requires an innovation mediator. In knowledge intensive collaboration the intermediary must possess a thorough knowledge level of ICT as well. Continuously new sources of knowledge have to be found and inspiration from other market sectors outside the collaboration circle has to be included. This is the responsibility of the intermediary. Moreover as the spider in the web he is responsible for managing and organizing the innovation network. From this extensive network the intermediary initiates new and concrete collaborations. Managing the collaboration and the IPR has proven to be of the utmost importance for the success of these types of collaboration projects.

The Novay implementation of the Networked Innovation paradigm

In the picture below we present the Novay Model of Networked Innovation. Collaboration and open innovation form the hart of

Figure 2: Novay Networked Innovation
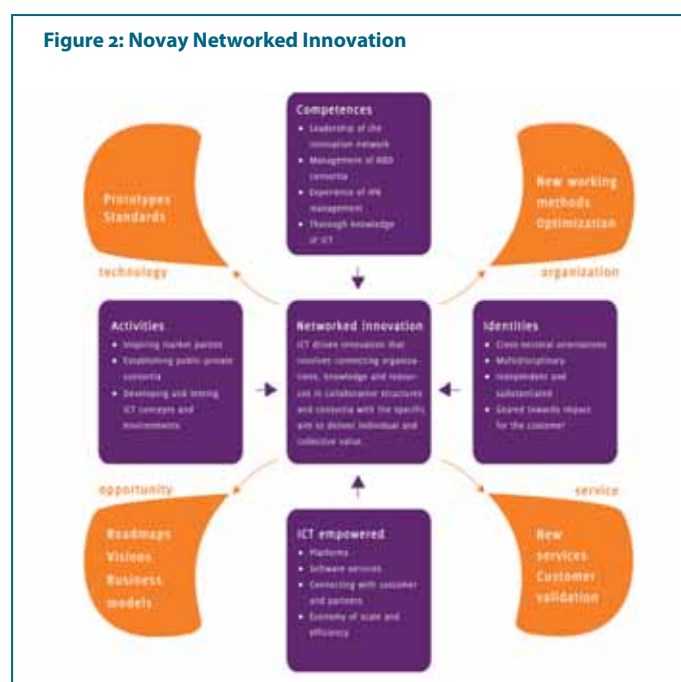
Networked Innovation and thus has it has a central place in the model. Starting from a sound knowledge base and a joint vision, inspired by other companies and market sectors, breakthrough results with ICT are achieved by means of an open and constructive collaboration.

Novay realizes that the openess in collaboration depends strongly on the fact whether the innovation at hand is core to the service offering of a company. Networked innovation therefore focuses on innovation where parties need each other. Typical examples are the development of joint infrastructures (EPD, E-Invoicing, Context management platforms, etc.) on which at a later stage each company develops it's own distinghuising service, or the creation of new services that require a certain composition of integratin in the value chain. This is empowerd by the specific characteristics of ICT.

Bringing parties together and creating collaboration in consortia with clear agreements is a core part of the service offering of Novay to realize impact. From years of experience Novay learned that for succesful innovation with ICT looking at technology is not enough. Business aspects as well as sociological and people aspects have to be taken into account as well. This cannot be done without the use of multi-disciplenairy teams. Therefore Novay employes over 70 experts from different research fields

As an intermediary, Novay manages a large and active open network consisting of companies and knowledge institutes in area of ICT and innovation with the goal to learn from each other, get new ideas and form new collaboration partnerships.

Typical products that arise from these types of collaborations are presented in the outer parts of the model and among other things are: business roadmaps for future service and technologie development, business models for new services, prototypes of new services and technologies, new service concepts, customer validation and the design and implementation of optimized processes.

Philips's Approach to Open Innovation

Some ten years ago the vision of Ambient Intelligence was coined to deal with the user side of services and ambient devices (which are the terminals in the Future Internet). Over a period of more than ten years we have learned a lot and the vision still stands strong but has changed markedly because of the many insights gained. For instance, the first application domains will not be the homes of people but the public spaces, which has become apparent from the many business models that have been developed. So, as one of the launching departments, you may want to consider to incorporate an evaluation and update of the vision of Ambient Intelligence in the yearbook. The subject would be very timely.

The notion of service innovation is not very inspiring to a broader audience. Many ICT practitioners would love to have a new paradigm, taking away the attention from the technology-push supporting service innovation to the user benefit-pull substantiating service innovation needs. In this respect many of us are inspired by the concept of the Creative Industries, and especially for the major urbanized European regions (the Blue Banana) this is e very compelling topic. Consequently, you may want to consider to include a major section on this topic in the yearbook covering the recent developments in this domain together with some of the corresponding challenges.

Open Innovation and the Future of Philips Research

While there is a clear trend in manufacturing companies to focus increasingly on their core activities and rely on partnerships to secure their non-core needs, innovation is something that many continue to do in splendid isolation. Fearful as they are of giving away their best ideas too early, eager to gain a head start on others, to own value chains or build strong patent positions. Moreover, they are often driven by the belief that the smartest people work for them, and are usually reluctant to cooperate with others at an early stage in the innovation cycle.

The concept of Open Innovation is a radical departure from the traditional model of closed, in-house innovation. Open Innovation embraces the idea that there are a lot of clever people doing clever stuff outside your own company, and tapping into that increases the effectiveness of innovation efforts by allowing the company or individuals to concentrate on the things they excel at, while opening new outlets for R&D efforts alongside the company's own business goals. Open Innovation helps in setting widely accepted standards and preparing the 'landing ground' for new technologies in the market.

At Philips, we have adopted Open Innovation as our method of working six years ago. With our focus on Healthcare, Lifestyle and Technology, we team up with academic and industrial partners who have competencies and interests complementary to our own, join forces with industry peers on standardization and create momentum in the future directions of technology we jointly aspire to, and are active

in establishing strong local networks of leading industries and research institutes that help top technology regions to grow. As part of this policy, Philips has opened up its High Tech Campus in Eindhoven to external companies, offering them a highly innovative infrastructure, as well as active engineering support. MiPlaza, for example, offers world-class facilities and services in the field of microsystems, nano-technology and electronic systems, and the Life Sciences Facilities house multi-disciplinary research for molecular diagnostics, imaging and therapy.

We are stimulating entrepreneurship with an increasing number of lab ventures and incubators - new commercial channels in which we allow our technology to become the basis of new business ventures - taking more risks to bring innovations to the market faster. Furthermore, we are also on the lookout for emerging markets that require specific solutions, carefully targeted at the needs of consumers.

Increasingly, Research is becoming an ecosystem that nurtures the organic growth to drive Philips forward. And with our labs in Europe, North America and Asia, we are ideally positioned to expand our innovation ecosystems on a global scale. Open Innovation is an inspiring and rewarding way to go for modern research.

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2.3 Openness as the Way Forward to Competitiveness and Wellbeing in Finland

"In open societies, government is responsive and tolerant, and political mechanisms are transparent and flexible. The state keeps no secrets from itself in the public sense; it is a non-authoritarian society in which all are trusted with the knowledge of all. Political freedoms and human rights are the foundation of an open society." [1]

Open Society

Open society with high level of public participation contributes to modernizing the practice of representative democracy within established constitutional frameworks. In a democracy, public participation has intrinsic value by increasing accountability, broadening the sphere in which citizens can make or influence decisions and building civic capacity. It further offers also instrumental value by strengthening the evidence base for policy making, reducing the implementation costs and tapping greater reservoirs of experience and creativity in the design and delivery of public services [2].

Open society promotes collaboration of people, firms and public agencies for creativity and innovation that contribute to wellbeing and quality of life of people, communities and the nature. This incorporates collaboration in creation of solutions for climate change, energy efficiency, environment, public governance and eDemocracy, social and participative media, sustainable construction, smart and sustainable urban and rural development as well as renewal of social and economic structures and processes.

This implies also a renewal of production and consumption patterns based on ongoing societal and economic trends such as globalization, sustainable development, and aging population. This may lead to new service, business and market creation. This includes new socio-economic activities, social entrepreneurship and even new industry creation.

These developments challenge our fundamental assumptions regarding welfare state and quality of life. However, the open society development provides new opportunities for collaborative problem solving that involves public and

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China has not only met but exceeded its targets.

In the US, President Obama – who promised to run the most open, honest and transparent administration to date – is using his charisma to change the country.

"

private sectors alike and mobilizes people to participate in co-creation and co-innovation.

Based on open society development, people expect new levels of transparency and openness in public sector leadership and governance, and are willing to actively contribute to the development of new structures and collaborative processes for open governments [3].

The business sector can have an important and instrumental role in this development. It has widely acknowledged this paradigm shift recognizing that the autonomous activities of single organizations cannot produce the much needed radical, cross-disciplinary and architectural innovations required for structural changes [4]. A more collaborative, open and human-centric approach to development is needed for.

Public sector should find a more proactive and dynamic role in promoting this development.

Engagement of People as Citizens of Open Society

While the US and China are taking interesting steps in their renewal process, the European Union (EU), which in 2000 ambitiously announced that it would "become the most competitive, knowledge-based economy in the world by 2010," has not managed to implement necessary reforms to reach that target. However, there is an urgent need to develop new solutions for creativity and innovation based renewal of public and private sectors and their value creation dynamism. That may be done through collaborative knowledge creation and innovation that benefits also from the wide usage of modern ICT.

EU's i2010 policy (2005) boosts single and lead market development through research and innovation in ICT towards more inclusive society where people do participate

in new service, media, business and technology development that provides easy access to information, communication and related services for everybody at any time from any place. The i2010 policy has emphasized new waves of innovation in networks and Internet as well as more comprehensive user involvement in innovation [5]. However, the implementation of this policy has been very slow.

The US and China are engaging citizens with different strategies. Top-down strategies are supported by bottom-up participation. In China the emancipation of the minds – principle releases people's energy and strengthens their self-esteem. In the USA, Obama has used the internet as a successful vehicle for increasing participation in the election process. In both cases people will stand on their own feet to contribute to the process of transforming the country. Also the governance system engages both the leadership and citizens in creating interplay between top-down principles and bottom-up demands – they seem to work together to strengthen the whole.

Europe has made good strategic initiatives but lacking in implementation. Europe may loose the opportunity to take the forerunner position in this race for the most open society, revitalizing democracy with cultural diversity and democratic heritage.

Enabling ICT Technologies

Open society needs open innovation and communication technologies (ICT), since democracy requires access to information and dialogue [6]. Increased use of ICT in democratic processes is expected to increase transparency and pluralism, and thus to contribute to the overall democratization of societies. Developed information and communication technologies have enabled users to demonstrate increased power and influence over the content of products and services [7].

ICT enables more transparent and efficient society with increasing digital social capital and participation. However, the first generation of e-government tools focused on administrative-burden reduction within the existing governmental processes and structures rather than structural reforms, and innovative engagement processes and management models.

By exploiting the potential of advanced ICT technologies and community based social production by self organized social communities Europe can transform public policy making and service creation environment to democratic citizen-driven, open innovation. This, however, would require maximizing synergies between the various stakeholders in explorative cross-border collaboration in the development and provision of the next generation citizen-centric services as well as related development platforms for improved competitiveness, openness and well-being.

Case Finland

Introduction to National Challenges

In Finland, the open society development is prioritized. The Finnish Knowledge Society Policy [8] emphasizes human-centric approach to the societal development; this includes also open innovation, public-private collaboration and engagement of citizens in co-creation and co-innovation. The Finnish National Innovation Strategy [9] consists of demand and user-driven innovation in parallel with technology-driven innovations (supply-side). This Finnish innovation policy is recently discussed in Evaluation of the Finnish National Innovation System [10].

The policies reflect the major challenge: what is Finland's competitive future in global economy as an open, human-centric welfare society? There is a concern of both structural renewal of public sector for productivity gains and structural renewal of private sector in order to renew the eroding industrial base. The Finnish innovation strategy aims to tackle both of these renewal processes through open RDI activities that also involve citizens. This development may bring about major socio-techno-economic structural transformation that benefit of public-private collaboration.

The role of ICT may be instrumental in public and private structural transformation

Public Sector Innovation

Finland has some important building blocks in place to face the major challenges of structural renewal of public services and administration. However, implementing this 'strategic intent' may require much more.

The core problem of our current service provisioning system is that it consists of two separate 'top-down verticals'; one providing public sector services and the other providing private sector services – without collaborations with each other or citizens nor 3rd party involvement. Furthermore, the public sector services are developed and delivered in various national and local 'silos' without any transparency – and with huge duplication of resources.

Innovative solutions: Focus on the customer centricity and systemic efficiency

The only way out of this 'systemic inefficiency' is to put human beings – or customers – at the center – and start developing solutions together. This may mean even that the service is designed and the delivery system organized around people or citizens. The service system needs to be reliable and efficient – not only from the viewpoint of provider – but also from the viewpoint of receiver: a citizen. This arises many issues of personification, user-centric service profiling, identity management, trust, security and confidentiality. It also brings about the question: who owns the information? This, again, calls for a 'new deal', or governance innovation, among the public, private and third sectors – together with the citizens.

According to Finnish law, the public sector is responsible for arranging basic public services – but it doesn't need to develop and run all of them. Instead, the public sector should first and foremost concentrate on providing the basic architectural standards, guidelines and quality controls for the private and 3rd sector service provision - in addition to providing those public services not economically viable for private sector.

By enforcing open interfaces and by allowing easy access to public data, the public sector could speed up and improve the quality of new service creation enormously. Besides improving the well-being of citizens and productivity of the public sector, these new principles would open up a whole new market for innovative businesses.

We already have many excellent examples of new internet and social media based services – for instance for the elderly people – developed by private sector, 3rd sector and citizens together.

Finnish Innovation Fund (Sitra) develops, with around 20 Finnish cities and their service providers and citizens, shared ICT-services for public administration and services. This implies changes in operational processes of cities, including shared architectural solutions and standards and even shared ICT-capacity. Traditionally, all the cities and communes in Finland have had their own ICT policies, solutions, capacities, services and processes. The joint operation is a major transformation in the ways of how the public services are produced and delivered. It brings about major efficiency and productivity gains – however it seems also to inspire new of service innovations and structural renewal; i.e. the systemic innovation is in place.

There is a need for courage to mobilize large-scale dialogue, experimentation, piloting and risk-taking across the "system"; i.e. there is a need for conscious systemic change in RDI that involves all the relevant player's needed for public services and administration renewal.

Some cases indicate that the structural challenges have already grown to require moving from piloting phase to large scale implementations.

Industrial Reform

Finland has traditionally been reliant of export-oriented, raw material and resource-intensive industrial production. With globalization, the paradigm shift towards more knowledge and less labor-intensive sectors have become inevitable.

The Finnish innovation policy promotes major industrial reforms trough parallel demand and supply-driven innovation strategies. The idea is that the new market creation – even new industry creation – may benefit of open, demand and user-centric, ecosystem-based dynamism that brings together all the relevant players for future services and manufacturing. The underlying assumption is that the innovation cycle of new services, businesses and technologies - even markets and industries - can become "compressed" and short if the RDI collaboration involves all the necessary partners of the emerging "value constellation". This is needed especially now in order to meet the challenges of climate change, energy and environment, democracy, wellbeing, participative social media and eDemocracy etc. While the challenges are "burning" and systemic; they call for efficient collaboration modes for systemic innovation. This implies participation of relevant players, even citizens. This may also lead to new forms of social entrepreneurship that "kicks out" new types of start-ups and spin-offs.

As a small, well-educated, tech-savvy and collaborative country, Finland could take a leading role in addressing some of the 'wicked problems' facing of the world, and create lead markets for new types of sustainable networked innovations and development platforms.

Based on the initiative of the Finnish Science and Technology Policy Council (2006) the Finnish government introduced a new collaborative funding instrument (Strategic

> *Finland is already quite transparent and for us to move citizen-centric architectures with open data principles and collaborative applications is quite a challenge, but doable with our technology-savvy population. In order to accomplish this, parties, public, private and education sectors must evolve their roles and start to build up a sustainable human-centred world. Finland's success will surely continue to rely on its age-tested cultural values of self-honesty, common sense and a deep appreciation for rational, considerate and steadfast civilization that thrives in intimate relationship with nature.*

Centre for Science, Technology and Innovation, SHOK) to put the new innovation strategy into practice. This implies that industry and academia, with public and private co-funding, establish consortiums for strategic RDI collaboration around the future challenges such as energy and environment, wellbeing, sustainable construction, renewal of forest industry and machine construction. The SHOKs are run by the Finnish Funding Agency for Technology and Innovation (Tekes). The ICT-SHOK (Tivit, established 2008) is for open, user-driven services and technology development. It challenges the structures of web of services. The flexible services are developed along the mobile cloud, ubiquitous environment with consequent machine-to-machine interoperability and Future Internet. ICT-SHOK benefits of user-driven open innovation and horizontal approach to the development of underlying technologies that support the service systems.

As an instrument, ICT-SHOK reminds of the European Technology Platforms or Joint Technology Initiatives; however the Finnish ICT-SHOK has an emphasis on parallel demand (pre-market service business development) and supply-side innovation (technology development).

Consequently, promising new approaches are being experimented in private, public and civic sectors. These include the increasing participation of users and citizens in product and service development, the use of foresight in strategy and policy making processes, internet-based open innovation and problem solving "jams", participatory development of shared visions, strategies and values, cross-sector cooperative networks, Private–Public–People-Partnerships, etc. However, these new solutions cannot be fully deployed until the old governance structures and institutions give in [11].

Governance structures and new leadership

Finland has the strength of consensus driven top-down policy making. That is based on wide informal dialogue through horizontal networks across the sectors and institutional boundaries. In rapidly rising global challenges this is a good asset that needs further improvement. Finland as a small country should and can be mobilized – even with the help of ICT and new forms of interactive social media – to, live up with the open society principles in solving the problems for the future development in Finland – and even for the world.

However, our thinking used to be institution based. The welfare state established many institutions. But current cost structures, efficiency and the agility to respond to individual needs cause challenges. Therefore, we should redesign our society from a human-centered point of view. In order to succeed in the huge paradigm change needed, we need more diversity, distributed production and interaction efficiency to apply the wisdom of crowds more effectively.

By now it should be clear to all of us that the governance structures and steering mechanisms developed for the 19th and 20th century organizations and societies do not suffice anymore in our world of increasingly fast change and complexity. We know that traditional hierarchies cannot cope well with the complexity and fast change of our time, thus we need to adopt new organizations. But what else do we need?

We certainly need more strategic agility at the societal level both in Finland and globally – if and when we want to cope with the forthcoming challenges. The other reorganizational alternatives cannot meet the challenge for following reasons:

- The model of continuous improvement/operational excellence only works well with a slow-changing, simple environment
- Conventional strategic planning can deal with complexity in stable conditions but not in today's dynamic environment, and
- 'Bringing Silicon Valley inside the company'-alternative works fine in a dynamic environment without interdependences and synergy opportunities.

Strategic agility is not only a challenge for countries and organizations but also a major opportunity for a smart, quick and committed actor – such as Finland as a country.

With newly modified, more integrated, and open governance principles we could simultaneously improve our public sector productivity and create new growth areas for business.

Do we need a new settlement between individuals, communities and government – new ways for people to get involved in determining their lives in a meaningful way? This could support a human centric systemic change enabling people to flourish and bring their dreams alive. Leaders could become involved in this dialogue through social media for openness sake and to gain an understanding of how to develop in a way that enhances our competitiveness. Openness gives the opportunity to collect partially-formed notions which would never be commonly accepted as formal ideas. For a business of this type customer collaboration is vital. Social media has proven

a fantastic way of creating openness between customers and companies. Citizens and their governments could reap the same benefits.

But implementing this 'new vision and governance model' requires also new leadership approach. Henry Mintzberg [12] proposed that we should replace the concepts of leadership and management with something he calls 'community-ship'. In his words, "community-ship" certainly makes

use of leadership, but not the egocentric, heroic king that has become so prevalent in the business world. We make a great fuss these days about the evils of micromanagement but far more serious is 'macro-leading': the exercise of top down authority by 'out of touch' leaders. Community-ship requires a more modest form of leadership that might be called engaged or distributed management. A community leader is personally engaged in order to engage others, so that anyone and everyone can exercise initiative".

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2.4 Guerilla Innovation, or Why Your Ecosystem is Your Best Innovation Driver?

Talking about innovation is a strange exercise. Being invited to do so is even more disturbing. Jacques Brel's song starts ringing in my head. "Les Bourgeois". As it is the case when dealing with musical tastes, for which it always seemed silly to me trying to convince teenagers that "back in our days" the music was better, dealing with innovation, and therefore its openness and its dynamic aspects, is a challenge. Especially when everything is on the move and all the interesting models are the ones that are emerging and we are yet to know about.

Whereas Jacques Brel, who mocks *bourgeois*, eventually became a mocked notable by his younger peers, I carefully ask you, dear reader, to read and sense in the following statements the humility it requires. We have carefully seen to it that we make emerge a method, our own method. As it is pointed out in our name, it is about "making", *faber*, the new. It has worked in convincing fashion, and its presentation is justified in this context of sharing and this emergence period that still define it – so many things, projects, remain to be achieved – and that make up for our cardinal values.

It would be vain and presumptuous to try to talk thoroughly on my own about open innovation issues and their evolution in the field of IT. Indeed, in an almost organic manner, every single actor of this industry, past or present, has contributed to it, but no one has ever mastered it in its whole. Each company holds a piece of the puzzle, of the story, and fades before the common work. As founder and manager of an innovation company, endowed with the role of conductor of these open innovation operations, I can only grant you with our little piece of the story, and our vision of some of the other pieces of this movement. From faberNovel's young childhood to today, it has been as much our apprenticeship of open innovation practice as the extension of this operation to companies and markets,

which used to be hermetic, that we have been proposing to you [1].

The year 2003 was a particularly important period for our work in delegated innovation. Firstly, regarding us, it is the year faberNovel was created, in Paris, in France. But above all, it was around that time that Henry W. Chesbrough's book Open Innovation: *The new imperative for creating and profiting from technology* [2] was published, and gave an academic support to a certain number of our convictions and statecraft. Until then, we were fed with the idea that the large majority of recent innovations in the field of IT (Google, Sun's latest products…) all had in common an open innovation strategy. The latter held, according to us, some intrinsic and too rare virtues in the field of IT, which are:

- The ability to assemble, around a very simple and user directed vision, a team that brings together "geeks" and businessmen. This vision can be sometimes simple in terms of technology and company strategy, but it has the great advantage of providing a common language to people who often speak together without understanding one another. No use talking about the encounter between Brin and Page, Google's creators, and Andy Bechtolsheim, their first investor. However we can tell you about the discussions held between the founders of MobiVillage [3] and leaders of the public transportation group Transdev [4] during the conception of Mobitrans [5], the first mobile service for real-time traveler information. Some people imagined "an XML flow transmitted by a mobile network" while, on the other end of the table, some probably had in mind a fleet management and AVL (Automated Vehicle Location) issue. However, everyone focused on only

Stéphane Distinguin

one topic, traveler information, with one simple question in mind: "How to inform passengers of possible train delays".

- Give more room to doing than to thinking. Successes build themselves in parallel to their markets, by improving and constantly correcting the product according to its usage. By giving the rest of the world access to a "technological brick" or by looking outside for the solution to an inside problem, we multiply and we speed up the trial-error process that is essential to any innovation.

- The possibility of quickly seizing opportunities, even if it requires changing the initial plan. The company's actions, the launched prototypes, the opening of technologies… are as many signals describing the state of a market or technical barriers to interpret. Appointing to these constant market studies an ability to act quickly (partnership with a start-up, integration of a "technological brick" … therefore reducing the development process) and, above all, the right to make mistakes, gives the companies a strong way of developing organically, in every meaning of the word.

- The ability to work on a low-cost basis, by allowing oneself the opportunity to add a service model to its activity. Since innovation, in essence, is not solvent in its early stages, for a company, it is about, proposing adjustable technologies, which are easily adaptable to other companies' issues, and starting to generate a flow of activities from this service business. In Europe, and particularly in France, we have a better ability to obtain the support of B2B clients than of banks, investors and especially eventual users. Whereas big companies often envy the dynamism and the creativity of start-ups, they still have market access and control over time: two unthinkable things for a small business. This complementary nature is the basis of an eventual collaboration between start-ups and big companies. This strategy, which was used for the launch of the first internet mobile services, allows us to develop a technology and product concepts without being hit by the too common "time to market syndrome".

In addition, our experiences as entrepreneurs, consultants and venture capitalists had convinced us that innovation should not be run from the top but should now be encouraged by working conditions. Furthermore, regarding IT, we had to realize several times that, from now on, only the marketing of an innovation can enable you to validate the concept, to learn as you walk ahead and to allow the product or the service to evolve at the same rhythm as the company.

And, last but not least, the recent memory of the internet bubble has showed us that there wasn't any room for economic fatalism in the field of IT and that one would have to fight against this incongruous belief. Indeed, some companies, although recognized for their dynamism and considered as benchmarks in excellence, often adopt a passive posture regarding the evolution of the market. Acting like the good pupils that they are, executives have perfectly incorporated the rules governing their business. The growth or the stagnation of a sector, the consumer's preferences, the organizations to be put in place, the assets to be acquired, everything is determined according to some mechanisms, which are well known by the professionals operating on a specific market. The latter have understood the rules of the game they are taking part in so well, they have incorporated them in their thoughts and their behaviors so deeply, that they have come to consider them as natural laws, immutable and exogenous. Strangely, managers tend to forget that they are the ones who made up the settings in which their companies' lives. The habit, combined with a slight short-sightedness of their leaders, lead the companies to agree to some very complicated situations. The leaders do what they can, in regards to the constraints they have imposed on themselves. The technological start-ups, and more generally the entrepreneurs, were, at the start of the millennium, the proof in the eyes of big companies that the rules of this market could be broken. Implemented to the concept of open innovation, this optimism results in a belief in the ability to innovate, to encourage innovation, and more generally to profit from everyone's progresses. A major company cannot be content with defining itself as "genetically non-innovative", as some of our clients have admitted to us. Regarding open innovation, it can't come down to begging developers, which are far too often considered as the Dr. Goethe's of the digital era, for ideas in a laboratory, or a garage if you're in the Silicon Valley.

Having come up with this analysis, we chose to play a part in innovation management in order to serve big companies and start-ups and build on some of the best practices we identified. Therefore, it seemed essential for us to redirect innovation towards the making of things, whereas this discipline, operated by consulting firms, is usually directed towards thinking. In this respect, we still admire companies such as Ideo [6] FrogDesign [7] or Adaptive Path [8], which manage to deal with innovation through its most concrete aspects, without ever being superficial. One also needed a structure capable of operating innovative projects through a tightened team, or maybe even turning the latter into companies. The company format appears clearly to be the only one capable of isolating an innovation from the constraints of a big company or a simple "in-house"

project's context. If the consumption of resources related to administrative issues can be reduced to its minimum, the teams can then solely focus on their core activity, which is the evolution and development of innovation. An open and bottom-up vision of innovation also implies a re-value of the teams, of the individuals in relation to the structure. One must be capable of luring talents showing willingness or an entrepreneurial experience. It will be these men and women that will be able to produce in-house innovation, to find a way out for their projects or take from the best of what's done elsewhere for their own purposes. The goal is then more to try and match the aspirations of these talents to the employer's interest than to define a career plan for those high potential employees. Finally, being inspired by the commercial success of open source companies, and having been close to some of the first French success of the communal web (Caramail in particular), we have quickly become conscious of what can come out of making projects evolve in an *early adopters* ecosystem. This is not about creating artificially an ecosystem surrounding a service or a product, it is about adapting the latter to a dynamic, demanding and, above all, already existing environment. The logical extension of this observation is a permanent relationship, maybe even an immersion into these ecosystems: one cannot take profit from a universe without having bathed in it. Such a thing as part-time open innovation doesn't exist.

Considering the nature of these various elements, sometimes contradictory and often at odds with the standards of their era, clearly no company wishing to be "the missing link of innovation" should also have to innovate regarding its economic and operating model. The answer to this specific need had yet to be found. Lots of time and many quarrels will have been necessary in order to refine and polish our model.

Nevertheless faberNovel had been given birth and was taking its first steps…

faberNovel's first major realization was the validation of the principles of open innovation and bottom-up management of innovation. In 2003, following up to an opportunity study, the Transdev group decided to test a solution for dematerialized transport tickets on mobile phones. faberNovel played the part of business project management support, developed a platform prototype and tested the service in real conditions, in the station of Bourg Saint Maurice. The technical solution, as well as its utility in the framework of public transportations, was validated. However the market settings led to believe that this ticketing solution was not destined to become anything more

than an additional service. This service would be a "nice to have" rather than a "must". It is around that time that a faberNovel intern had the idea of adapting this service to show tickets, an almost oligopolistic sector in France and whose standard services remained particularly penalizing for small and medium size halls. Retrieving a project which had become non strategic for faberNovel and its client, he decided to go and canvass, on his own, the people who could agree to test this product during an event. After a trial during the annual Paris-Dauphine University Ball, the company digitick [9], a faberNovel subsidiary, was born and became, in a few years time, the third biggest show ticketing operator in France.

Around the same time as this first achievement, some other assignments on the behalf of major companies were fulfilled, often by relying on the expertise of other start-ups from Paris. It is precisely by keeping close to these two worlds, and by staying a small business, that we became conscious of how important it is to contribute to the ecosystem in its whole, and not only remunerate the start-ups with whom we collaborate. It is not about maintaining good relations between faberNovel and other technological companies, it is about creating a framework for all the relations that can be entertained between companies of a same, and often protean, sector. This framework could not have been conceived in another way than a public property, fuelled by everyone and property of every person. By taking the presidency of Silicon Sentier [10], association of the start-ups from Paris, and by taking part in the competitiveness pole Cap Digital, faberNovel is trying to play the part of the engine in the French ecosystem and is trying to make it evolve favorably. Working in an open innovation system resides, for us, not only in feeding "contents", that is business, research projects, partnerships, subcontracting and co-development, but also by contributing to the "container", that is the technological, juridical, commercial circles, in which these relations are made. A developing potential partner, an expanding technology or a competitor that shows us the way: these are all good news for faberNovel. But the strength of a dynamic and united ecosystem resides, above all, in the ability and speed of the deals it allows you to do and, once again, in the non-lethality of mistakes it enables you to make.

This involvement in associations and the benefits we have been able to drag out from them were the confirmation of some of our intuitions regarding open innovation. As we suspected it at the beginning of our adventure, it is way easier to adapt your projects and confront them with an already existing ecosystem (in this case, Silicon Sentier or the French open source community) than to try and cre-

ate your own ecosystem *ex nihilo*. Only some rare heavyweights manage to do so, and in debatable fashion: Google, them again, was born in the Silicon valley and relied on the Stanford ecosystem, not the other way around… Orange created the Livebox Lab [11] but quickly became a major partner of Silicon Sentier… Procter&Gamble launched its well-known open innovation program Connect&Develop [12] by relying on the Innocentive platform [13]. To all the big companies who could feel like getting involved in an open innovation approach, we can only remind you that it is not about interacting with some "happy few" in your own private space, it is about going out and working together in a common territory.

A few years have gone by and the faberNovel model, which was born from the vision of a lack in the practice innovation, has developed through its contacts with clients and the market. Our acting up to open innovation has allowed us to quickly take on many issues for our clients, and to collaborate with a wide number of companies, in the digital field, but also in the field of power, public transports or media. Through these encounters, our successes and our failures, our model has taken shape and has become readable… for us anyway! It is indeed only after two or three years time that we were able to define precisely our core activities and our competences: allow an innovation to arrive on the market in the best conditions possible, on our behalf, on the behalf of big companies or on the behalf of start-ups.

This model revolves around three key points:

- **The team:** It simply is the key resource in this kind of activity (and we believe it is the case for any open

innovation strategy). It is about finding brilliant people, with an entrepreneurial vein, but also capable of being "discrete heroes" and letting go to a client the innovation they carried. Our activity being somewhat specific, the management of these profiles has to adapt itself accordingly. Since the innovations we deal with are not profitable yet by nature, it is hard to propose interesting remunerations, however it is still possible to integrate some employees into the capital of subsidiary companies, to which they contributed. Internally, inspired by the Google system, we quickly established dedicated timeslots for personal projects, along with a management system for the employees' ideas. Finally, through the nature of our activity, we can make heavyweight projects succeed through a reduced team (many elements of a project are carried out outside the company and/or are pooled with other projects). The employees therefore take part in strategic realizations while still remaining in a small entity. All these operations have allowed us to retain the majority of our first employees and to reach an internship-work contract rate above average. It is of course pretty grueling to recruit the first gems but after that, a good team allows you to entice more and more easily new talents.

- **Business lines:** Our practice of open innovation is commercially materialized by two major activities. Firstly we manage delegated innovation services for major accounts, by accompanying them through each step of their innovation, from strategy defining to operational management, including prototyping. Thus, the RATP trusted us with the majority of its mobile strategy and its management (mobile website, iPhone application, design and development of guidance services for the visually impaired in subway stations etc…) [14]. The *excubation system*, as we name it internally, is another activity that we have developed through time. We regularly create companies *ad hoc*, as we did for digitick, to strengthen our know-how, which is an already existing practice. Therefore, after having worked with several communal web services, we decided, for the execution of the SFR Jeunes Talents service (a platform for amateur artists conceived and developed on the behalf of the mobile operator SFR), to create af83, a development company specialized in social media. FaberNovel can now count on a dozen participations. They each have their own goals and strategies, but, as many as they are, they are all favored actors that we can rally to our cause of delegated innovation. In order to make the job easier for all these entities, we have developed an activity for internal services and pooled resources. This business regularly lures in project carriers, desirous to launch
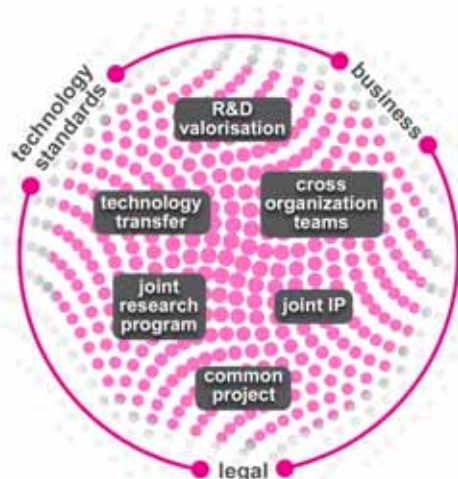
their own structure but wanting to focus exclusively on their core line of work.

■ **The ecosystem and the territory** in which we are developing ourselves and are playing our part: it would be extremely difficult for us to do our work without a quality ecosystem. In a similar approach to the one regarding sustainable development, we take great care in not damaging the economic and technological environment we are living in. We don't exploit it, we always try to give back what we have taken from it and we try to help everyone grow at the same speed as us. In fact, the success and development of our ecosystem is probably more important than ours. This is where the value of "local" comes in: whenever an entrepreneur arrives somewhere, his origins and his ecosystem always precedes him, before any exchange is even made. Try and guess who you would find more innovative between an entrepreneur from Paris and an entrepreneur from the Silicon Valley? Silicon Sentier has been able to carry through new projects in Paris (new events, new reflection groups, new fields of intervention), has seen its budget strongly increase and its number of employees go from none to a dozen. But in an even more blatant way, this association has managed to materialize this encountering principle, which is the basis of open innovation, through a unique place. La Cantine, open in Paris since 2008, defines itself as a network collaborative workspace ("co-working space") [15]. The goal of this place is to enable people working in fragmented places to meet each other in order to share means and skills between developers, entrepreneurs, users, artists, researchers and students. It is linked to other "co-working spaces" throughout the world and represents, for us, a key extension to the open innovation approach we have initiated. We were delighted to take part, among others, in the making of a place in which we can find the values we have been supporting since our creation, particularly when we had to put up with Silicon Sentier who could not yet afford to launch La Cantine. We keep supporting these values today all the way to San Francisco, where we opened a new "co-working space", PariSoMa [16].

The transition from faberNovel's young childhood to a precise definition of its activity did take quite some time. Too much time, could say some. And yet, without being capa-

ble of naming our profession or having a clear view of our model, faberNovel has never stopped growing since its birth and has never recorded a year with deficit. Even though we do not believe in fate, we refuse to acknowledge these results as an accident. On the other hand, we have faith in apprenticeship, we have more belief in acquired knowledge than in innate. And, methodically, we have pulled lessons out of every new experience faberNovel has come by. One of the simplest and most secure ways to do so resides in the following approach: hypothesis – experimentation – observation – conclusion. Internally, we refer to this process as a strategic experimentation. It allows the company to better understand the field into which it is venturing itself. The methodology inherent to this system was developed through our numerous encounters with academics, in particular with the Ecole Nationale Des Mines De Paris [17] (*Réseau d'Etude sur le Management de l'Innovation – REMI*). This is the proof that open innovation can also be applied to the management of a company. Strategic experimentation is not about carrying out a strategy whose solidity has already been proven, it is about testing an hypothesis expressed on a topic that is new for the company. It is therefore no surprise that, during the experimentation, the results were somewhat different from what we had expected. This disappointment is somehow promising. Because it means that the issue the company is tackling is genuinely complex and that the experience it is gathering will be hard to match or imitate for its rivals. In the worst case, losing a small bet is a profitable investment if you manage to get the adequate lessons out of it. So, without going into details about our methodology, in regards to open innovation practice, we have used this approach for most of our projects, whether it concerned our own activities ("in order to understand what we do") or whether it concerned our clients and partners ("in order to understand what others do"). Not only did this allow us to acquire, at a low expense (a too often underestimated benefit from open innovation), a ground knowledge on many sectors that contained major actors, it also allowed us internally to build up reacting and adapting behaviors and abilities, which will come in very handy if we wish to keep on winning the game of open innovation.

We are now in 2009. faberNovel is already, or only, 6 years old. Henry Chesbrough has published two new books dedicated to open innovation and has opened the *Center for*

Open Innovation in the Berkeley University, in California [18]. The practice of open innovation has massively spread within the big and the small businesses of almost every sector. faberNovel, along with a number of companies, has proven that a business model based on open innovation is sustainable. However the growth imperative, proper to every company, obliges us to grow on some levels, to gain maturity, but without ever losing our flexibility and our learning capacity. In other words, extending a model without bending it or tearing it. This is the strategic challenge we are facing today. Unfortunately, or fortunately, there is no secret recipe for succeeding in this transformation. Once again, all we can do is express some hypothesis, confront them to the facts and draw the required lessons quickly, very quickly. I call this the 300 DPI rule. One must determine straight away the most complete level of its marketing definition and its attributes. As it is the case for a 300 DPI image, one must aim straight away for the highest quality image possible so that, afterwards, he can easily and quickly stretch the image and make it grow without letting any pixels appear… Likewise, for an innovative project, its strategic attributes must be conceived according to this logic.

The number of faberNovel employees has increased and now stands around 25. According to the proportions of our participations in the different companies that make up our "federation", we are about 100. We are currently discovering the organizational and HR issues that are inherent to any company of this size. In order to answer to these issues we have explored many paths, have abandoned most of them and have persevered on others. We are even starting to see the results regarding some of them, and they could maybe become useful for other organizations.

Firstly, we are starting to meet some difficulties concerning the growth of our work in delegated innovation. At the heart of our activity is making contacts, connecting ideas with specific technologies within the context of a particular client. Each one of our employees has to be able to understand the issues the company is dealing with, the content of the projects we are carrying and, above all, has to constantly have those in mind. Every single member of faberNovel has to maintain a minimum level of knowledge regarding the technologies and the methods we, and our partners, have access to. It is the only way ideas and technologies can meet and we can be able to offer a relevant solution to our customers. Unfortunately, once we will have to deal with fifty projects and a couple hundred potential partners at the same time, this will quickly turn out to be impossible. We could, of course, automate these processes by going through a dedicated information system or external platforms and successive layers of middle-management. One possible scenario is that we lose the intimate knowledge of other actors that has allowed us to be seen by the other start-ups as partners and not as customers. The other scenario, which consists in the addition of another filter to the bottom-up innovation organization, might just definitely dry up this crucial source of ideas. In both scenarios, the task force aspect, which was one of the foundations of faberNovel and which allows our teams to focus on the success of an innovation, will disappear: we don't want a project to be considered by our partners only as "a" project. In that perspective, we are getting more and more used to the idea that faberNovel should not, regarding its number of employees, exceed a certain limit. We will keep on growing according to a model based on "small and fast is beautiful"

and by preferring the birth of children to a strengthening at any cost (growth of the network over the main node). These subsidiary companies will work with and for ecosystems that will be related to specific issues (digital, green tech, …) or specific locations (one branch has been launched in San Francisco, and another one recently in Ho Chi Minh City). In addition, this will allow us to let our finest talents evolve and will spare us from the "glass ceiling" syndrome so many small business' employees have been confronted with. We will not give in to the temptation of middle management and giant structures. We will stick to open innovation, forever uncompromised!

Limiting the size of our team doesn't necessarily mean limiting our revenue. As I have already said, our activity disposes of massive leverage in terms of production. For every faberNovel employee piloting a project for a customer, there is, through our different partners and subsidiaries, the equivalent of a whole small business working and developing solutions. Our expansion will also reside in the evolution of this ratio, by achieving more ambitious assignments and by letting our employees build up in strength. It will be about adding administrator qualities to the existing entrepreneurial skills of our employees.

In addition, we have noticed that one of the realizations of our open innovation policy remains undermined and not shared enough: knowledge. Indeed, with every project led, a large amount of knowledge is assembled (in order to benchmark the state of the art), questioned (in order to identify the possible innovation areas) and updated (return on experience). This technical and marketing knowledge can be made available to others, in industrial fashion, without taking us away of our main mission. On the contrary, it contributes to fuelling the ecosystem and helps us in the role of evangelist for big companies we hold on our favorite issues. digitalTrends (collection of ready-to-use online slides about digital issues) [19] is the first of our products that, in industrial fashion, makes our knowledge on digital business available. Thus, leverage will be made through technology, not through the size of the team.

Our *excubation system* consists in creating a specific subsidiary company following a project, internally or on the behalf of a client. It has been the natural and unexpected extension to our work in delegated innovation. Natural, since we quickly decided that turning projects into companies in order to keep carrying efficiently a specific innovation was a necessity. Unexpected, in regards to the growth this activity has known throughout the years. digitick was the first, and probably the most outstanding, illustration to this system. History has repeated itself many times since

and some of these spin-offs have developed way above our expectations. Being carried for a few months by faberNovel and then laying back on a reliable customer, as it was the case for af83 with SFR, gives these companies more hope of survival than other companies from the sector. By pooling services and by allowing start-ups to work with us and take part in projects financed by big companies, we have been able to form a track record that many venture capitalists could envy: among the 11 faberNovel participations, launched over 6 years, not one has filed for bankruptcy. However we have now come to a point where it is necessary for us to stay the course in direction of open innovation without drifting away towards conglomerate. The participations must keep on growing for their own sake, and not in order to support faberNovel. It is important that the various companies we have co-founded be also capable, independently, of blending into this open innovation logic without necessarily having faberNovel at their side. In addition, with our number of participations growing, our exposure will automatically increase. This will lead to numerous partnership opportunities between companies from the "faberNovel galaxy", but also with any company living in the same world as us. One will have to grasp these opportunities. For all the stated-above reasons, we must structure the *excubation system* in order to make this ecosystem we have created grow. Right now we can't be completely sure of the shape this action will take: investment structure, improved incubator, industrial holding… whatever, as long as we manage to help these companies make the transition from childhood to adolescence as fast and efficiently as possible.

But lastly, there is one very difficult challenge we have yet to face. We will have to find a way, a dynamic or a guardrail that will keep us from falling into the routine and into the trap of "risk-free exploitation" of technologies. Our job is to innovate and help others do as such. Of course, we can develop supplementary activities in order to fuel our work, which, by nature, doesn't pay 90 days end of month. However, never ever must we forget that at the origin of all the added value made by faberNovel resides an ability to build the new. Once again, we rely on our teams and the numerous talents it contains in order to do so. Our partners will also soon have the responsibility of revoking some of our practices, questioning our insight on businesses, launching new projects… It is up to us, the leaders, to listen to them and to hear the future of our ecosystem through them. This system of renewal from the bottom is the only way to keep on exploring the opportunities offered by new technologies, and we are convinced about this. Never stop being marveled at everything new. Never stop believing in utopias. In open innovation!

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[18] http://openinnovation.haas.berkeley.edu/

[19] http://digitaltrends.fabernovel.com/

faberNovel View on Future Innovation

As any other practice, the concept of open innovation will spread through the benchmarks that it will set and the mobility of its practitioners. The key will be to refine this practice, by always keeping in mind what issues are linked to open innovation and which ones are specific to the company. This means also dealing with the different forms of innovation and how they complete one another. Yet, the trend of open innovation is a profound and perennial one. Although, by definition, there aren't any historical figures regarding innovative models, some profound and proven trends allow us to believe that this open innovation model will soon become the reference model for every industry.

Information is now spreading in real-time, and the concept of "secret" innovation is no longer relevant. All the latest innovative successes have built themselves through strong and rapid exchanges between the product, its consumers and its suppliers, allowing everyone to profit from the network effects. We have entered the era of "Guerilla innovation" and consumer-actors: the innovation model now requires considering the whole ecosystem of a prod-uct. Technology has shortened the production cycle; every new product or service can be "virtually" tested very quickly. The cost of experimentations has also become much cheaper than it used to be. For instance, e-commerce has built a strong relationship with its customers, which enables them to test products at low cost and gather instantaneous feedback. Adding evolutions and corrections to a product now costs nothing more than a market study. The value of an innovation resides simply in its commercial success minus the amounts invested. And since the "idea to market" period is decreasing, it is only logic to observe an increase regarding the ROI of innovation.

The pure player generation will be in charge of middle management in ten years from now. And through the influence of this generation, brought up by Twitter, Youtube and Facebook, there is a big chance this trend will keep on growing.

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2.5 Innovative Cross-border eRegion Development, Focus on Slovenia

Outline

An emerging research question is how regional development policy can respond to the challenges of a global, informational and networked economy and how development processes are carried out in time. In an industrial society, borders between nations, institutions, organizations, regions, etc. largely determined the position of regions. In a global economy, however, borders are fuzzier than ever before. Now the positions of both organizations and regions are determined by their competencies and skills at learning and developing in a continuous process. Consequently, local initiatives and an enterprising disposition are becoming increasingly important in regional competitiveness. A regional competitiveness is defined as an ability to: connect the urban area and its actors to the best possible networks as tightly as possible; maintain and develop the quality of life of local residents (services, education, environment, etc.); attract new, competitive companies to the area; create such operational prerequisites that the existing companies of the area are able to maintain and develop their competitiveness.

In order to be competitive in the longer term as a whole, the regions should be able to redistribute the attracted flows within the region to enhance wealth, social equity and the quality of life of the region as a whole. It is therefore crucially important also to tie various activities, among other things, to the region. Such issues as networks and learning are thus often seen as effective ways of disseminating and creating knowledge and tying different issues and activities together for urban competitiveness. The question is not whether regional development is national or local, but rather what kind of new interrelationships are emerging between different actors and what the roles of different organizations in different contexts may be. The question is how the development processes can be global, national and local at the same time. Is is about the development capacity building by involving people at local level.

Adapting a more interactive and process-based but at the same time purpose-oriented way of generating regional development policies is not only a technical question. It is very much a matter of policy-making culture. Regional development policies are still based on a fairly well established belief in the capabilities of policy-makers to find the correct strategies for the future by rational planning.

Once development strategies have been formulated, action is assumed to follow. However, the regional development policies are often programmed descriptions of the current state, through which it is not always possible to generate innovative enough means to develop regions.

It is about creating an environment of supportive business-government-academia partnerships which are not easy and not commonly understood. Partnerships are sometimes controversial therefore an objective analysis could lead to a better understanding of the contributions and limitations of partnerships. They relate to the drivers of cooperation among industry, government, and universities. Special focus is needed with respect to the cross-border partnerships and opportunities for international cooperation and the changing roles of government, business, universities, and other research organizations. Properly constructed, operated, and evaluated partnerships can provide effective means for accelerating the progress of technology and knowledge sharing. Knowing of "best practices" may lead to a positive guidance for future public policy. In that sense, innovative use of e-technologies is critical to the region development, the region being considered an e-region.

We are proposing a coordinated research and development effort in an innovative cross-border eRegion development focused at selected problems as suggested by the representatives of the eRegion. From a methodology perspective, a living labs approach is suggested as proposed by the European Network of Living Labs – ENoLL [1]. Such an effort would be a contribution to accepting the challenges of the economic crisis (A European Economic Recovery Plan, Brussels, 26.11.2008, Measure No. 4. Reduce administrative burdens and promote entrepreneurship [2]).

In Slovenia, there are several initiatives related to the cross-border cooperation since the country is very much import-export oriented (close to 70% of GNP) and is logistically extremely well positioned in Central Europe. It is assumed that the cross-border cooperation may be accelerated by an intensified use of eTechnologies allowing for an eRegion of the neighboring countries to be created: Austria, Croatia, Hungary, Italy and Slovenia. It is expected that the inter-eRegions collaboration will be helpful to every region

involved. For example, Alpe-Adria, Central Europe, South East Europe, Danube, Mediterranean eRegion. The experimenting mentality and actions as provided in the Living Labs environment, are the components of a methodological approach. A contribution to the action suggested is the Slovenia initiative Innovation for Life Quality - Slovenia Living Lab (July 2007) [3].

An eRegion is expected to eCollaborate with other eRegions in the EU, in the non-EU countries and globally. An example of interest in the inter-eRegions collaboration has been suggested in the Nordic – Slovene Meeting on Innovative Cross-Border eRegion Development in Ljubljana on February 3, 2009 [4]. An example of a very successful cross-border cooperation is the case of the border towns Haparanda, Sweden & Tornio, Finland.

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III

Succesful Examples of Open Service Innovation

This chapter leads us to experiences of open service innovation and assessment of success factors for the new service innovation paradigm.

3.1 BT's Approach to Open Innovation: Leveraging our Research Investment

Introduction

BT has developed an Open Innovation Strategy to leverage BT's research investment. Open Innovation is key to ensuring that we gain maximum added value from a wide ecosystem of partners across the world by (i) scouting and surveying innovation opportunities across the word, (ii) assessing and adapting these opportunities for BT own use or BT customers, (iii) gaining benefit for BT by downstreaming these innovations through a number of different exploitation routes. Whilst much open innovation has focused on how companies develop and exploit the flow of ideas from external sources (described by Chesbrough and Garman [1], as 'outside-in' open innovation') BT has also placed high emphasis on gaining benefit from its open innovation programme through various forms of external engagement – letting some of its projects and intellectual assets be developed outside of the company. Chesbrough and Garman1 call this 'inside-out' open innovation and highlight BT's pioneering adoption of an 'inside-out' approach in their paper.

The Open Innovation model for external engagement can be seen as a pipeline. At the input are the innovation scouting and collaborative research programmes with start-ups,

universities and industrial partners. These are followed by the main assessment and research activities, which exploit our global capabilities (UK, Malaysia, China, India, USA and UAE) and link to major customers through the Engage programme. At the output the exploitation activities include venturing, licensing, standards, and spin-outs, as well as downstreaming into BT.

BT's excellence at operating Open Innovation has been recognised with a number of external awards, outlined in table 1

Outside-In Open Innovation

Innovation Scouting and Collaborative Research

Global Innovation Scouting: The Global Scouting team consists of a core team based in Palo Alto, California but with people and resources covering Japan, Korea, China, Taiwan, India and Israel. Each year, the team pro-actively identifies and qualifies more than 600 innovative new technologies, business models, market opportunities and customer experience processes. The Global Scouting team works hand in hand with the BT Procurement Glo-

External Recognition for BT's Open Innovation Strategy	
Commitment to providing customers with innovative and dynamic next-generation solutions backed by strong research focus (Frost and Sullivan)	Malaysian Research Centre won the APICTA Merit Award for Research and Development for the IMS-based Call System project
Arts and Business East Award for Technology for work with Cambridge University Digital Studios for the New Media for a New Millennium project	National Outsourcing Award for Innovation in Outsourcing for Field Optimisation Suite designed to manage field-force manpower and resources
Delivery model innovation category at the US-based Applied Innovation Awards for Business Excellence, for the mPowerproject	Three awards at the TeleManagement Forum
	RTEC (2007) best practice report on "Establishing Strategic Partnerships with Universities"

bal Innovation Team, a virtual team with resources in the US, India, China, Hungary and Latin America.

Collaborative Research: The innovation partners landscape has seen significant development over the past few years, resulting in an innovation ecosystem with R&V at Adastral Park as a hub (see figure 1). This innovation ecosystem comprises a wide range of activities, from shorter term work with BT's major suppliers for product and service development, through to longer term programmes with universities and European partners aimed at significant industry challenges.

- **Lab-to-lab collaboration** with key suppliers: the industry partnership programme undertakes specific joint research activities with targeted companies, the majority of which are key partners in BT's supply chain, including the 21C vendors. These relationships provide access to the latest research from world leading companies, and also provide the opportunity to influence industry direction to better meet BT's future needs.

- **University research:** We work with more than 30 universities around the world and have key partner relationships with the University of Cambridge, University of Oxford, University College London and MIT (Massachusetts Institute of Technology). BT's best practice in establishing strategic partnerships with universities is featured in the 2007 RTEC report Establishing Strategic Relationships with Universities.
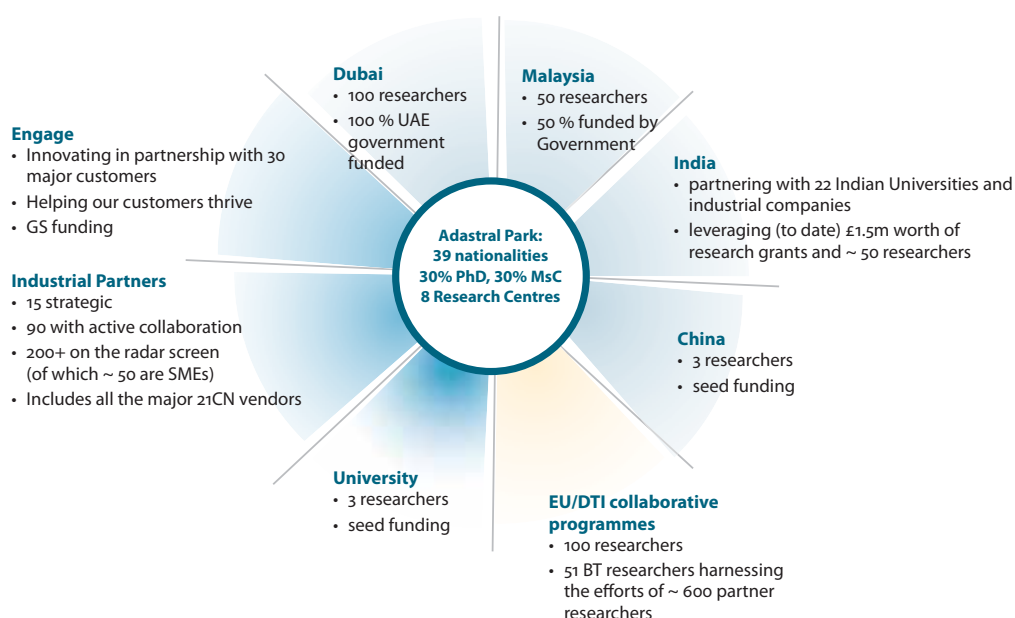
- **Collaborative research programmes**: BT's EU, Technology Strategy Board (ex-DTI) and other collaborative research programmes provide funding support and leverage know-how from the other consortium partners. Consequently, our 51 active participants benefit from the expertise of around 600 researchers from across the industry. For example, under MUSE II, together with Nokia-Siemens Networks, we have demonstrated long reach passive optical networks at 10Gbit/s over 100km, influencing the future design of access networks.

Main Assessment and Research Activities

Global Research: We have a world-class team of researchers, scientists and developers, including people at Adastral Park near Ipswich (England), a research team based in Malaysia and a new research centre in China. We have recently established a collaborative research and innovation centre in the United Arab Emirates with the Emirates Telecommunications Corporation (Etisalat) and Khalifa University – EBTIC (Etisalat BT Innovation Centre). We also play a leading role in the India-UK Advanced Technology Centre, a research consortium of industry and academic partners from India and the UK.

We have established two global development centres in the UK and India, and are currently establishing three more in Europe, the US and China. These bring our global devel-

Figure 1: BT's Open Innovation Ecosystem

Dubai
- 100 researchers
- 100 % UAE government funded

Malaysia
- 50 researchers
- 50 % funded by Government

Engage
- Innovating in partnership with 30 major customers
- Helping our customers thrive
- GS funding

India
- partnering with 22 Indian Universities and industrial companies
- leveraging (to date) £1.5m worth of research grants and ~ 50 researchers

Adastral Park:
39 nationalities
30% PhD, 30% MsC
8 Research Centres

Industrial Partners
- 15 strategic
- 90 with active collaboration
- 200+ on the radar screen (of which ~ 50 are SMEs)
- Includes all the major 21CN vendors

China
- 3 researchers
- seed funding

University
- 3 researchers
- seed funding

EU/DTI collaborative programmes
- 100 researchers
- 51 BT researchers harnessing the efforts of ~ 600 partner researchers

opment teams together, and use online collaboration and videoconferencing systems for virtual joint working.

The Engage programme BT has established a Customer Innovation Engagement programme for selected corporate customers to achieve mutually beneficial 'win-win' situations:

- Customers have access to BTs research and innovation programmes providing an opportunity to collaborate with BT
- BT seeks to augment its own innovation credentials, providing significant added value as a strategic technology partner, and gains further insight into our customer's business and sector challenges and opportunities

BT has an extensive track record of identifying, sourcing and successfully exploiting world-class innovation discovery and research in support of, and in partnership with, our partners, suppliers and customers. The Customer Innovation Engagement programme uses BT's wide range of global innovation capabilities around three core elements: Innovation Intelligence (with teams in the US, UK and Asia), Technology Strategy and Research and Venturing (with labs in the UK, Malaysia, China and UAE).

BT works closely with customers to build on our understanding of their business challenges in depth, to identify opportunity areas where our innovation programmes can deliver a significant impact. BT has established innovation engagement programmers with a number of global customers including those in the finance, FMCG, transport and pharmaceutical business sectors

Inside-out Open Innovation: Dowstreaming and Exploitation

Licensing of research: BT innovations that are protected by patents, copyright, design rights and know-how may be commercialised through licensing to external companies. We currently maintain a total worldwide portfolio of over 7,000 patents and applications.

Applied Technology Centre: The ATC produces rapid prototypes, both functional and illustrative, in order to help demonstrate new ideas to both internal employees and customers. As well as helping gain senior management 'buy in', the ATC demonstrations are often used in customer panels and for customer experience process re-engineering, providing a common point of understanding, based on an explicit multimedia demonstrator, for all members of cross functional teams when designing new solutions.

Innovation Central: Innovation Central is a UK based team of managers that can be seconded into a business in order to catalyze innovation. Armed with a set of proven processes they provide extra resource to help stimulate, co-ordinate and qualify new ideas. They help articulate the new ideas in a common format and help with market analysis, business case preparation and decision support.

Venturing: Although taking on many forms, the venturing activities include spinning out companies. Successful examples include Psytechnics (world leading voice and video quality measurement software) and iO (content management brokerage).

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3.2 Open Innovation at HP Laboratories

HP Labs carries out exploratory and advanced research for Hewlett-Packard (HP), tackling complex challenges facing our customers and society, while pushing the frontiers of fundamental science.

Open Innovation [1] is a core element of HP Labs' approach to research. Active collaboration with universities, commercial partners, and governments brings fresh insight and amplifies the work of our research teams around the world. HP Labs' Open Innovation investment is focused through its Strategy and Innovation Office (SIO) to ensure it delivers high-impact results that meet the scientific and business objectives of HP and its partners.

The Value of Open Innovation in HP Labs

As the world's largest technology company, HP has long recognised that innovation in products and services is critical to the company's vitality and success. A single research breakthrough can have significantly greater financial impact on a company than major acquisitions or cost-saving initiatives. Examples at HP include ink jet printers and RISC based computers.

HP is committed to active participation in the global innovation ecosystem as an essential path to bring new products and services to market. HP Labs is at the forefront of product and service development within the Company and focuses on Open Innovation as a critical strategy to amplify research investments. To this end, HP Labs works in partnership with industry, government and academia worldwide to engage the brightest minds, to share knowledge and ideas, and to advance a common technology vision.

While creating shareholder value through innovation, HP is also acutely aware of the need to reinvest in the innovation ecosystem so it can sustain and reinforce economic and societal benefits for the future. HP actively participates in government, academic and standards bodies, helping shape the landscape and agenda for research. HP also demonstrates an ongoing commitment to the training and development of future generations of scientists and engineers to sustain and develop the skills that are critical to future product and service innovation.

An Integrated Approach

HP Labs executes its Open Innovation investment from its Strategy and Innovation Office (SIO). SIO integrates HP Labs' research portfolio, its Open Innovation program and its channels to transfer research outcomes to HP business units. Making SIO a point of focus for Open Innovation enables HP Labs to:

- Create a consistent external presence, build relationships with universities, commercial organizations and governments, and to identify, stimulate and engage with Open Innovation opportunities.
- Evaluate alignment between Open Innovation projects and the core research portfolio.
- Assess the potential returns to the business from partnerships and to organize collaborations into a visible, coherent and complementary portfolio.
- Engage HP Labs research teams with Open Innovation opportunities and support them in pursuit of successful outcomes.
- Adopt broad-based, systematic and disciplined efforts like the Innovation Research Program (see below) to present a single HP face to the global research community.
- Lead in the creation of demonstrators and testbeds such as Open Cirrus™ (see below), bringing multiple corporate partners into alignment around a collaborative venture.
- Develop expertise and leverage in the underlying legal, procurement and financial processes, freeing critical research resources to focus on high-value research.
- Systematically secure and exploit intellectual property (IP).

This approach ensures alignment between strategic research priorities and actionable research programs, and leads to the transfer and utilization of knowledge and IP.

Open Innovation in Action at HP Labs

HP Labs' Open Innovation initiatives can be broadly categorised as University Collaborations, Commercial Partnerships and Government-led programs. In practice Open Innovation initiatives often span across all three of these areas as they include partners from universities, businesses and government agencies. The following examples illustrate some of HP Labs' key Open Innovation initiatives.

Innovation Research Program [2]

SIO leads in reaching out to the academic community to build a strategically aligned portfolio of collaborative research projects with universities worldwide. The primary vehicle for this work is the HP Labs Innovation Research Program (IRP). Launched in 2008, the IRP is centred on an annual call for research proposals in response to a published list of topics; it is open to universities worldwide. Successful projects can be funded for up to three years.

HP Labs' goals in creating the IRP are to:
- Provide the worldwide academic community with insight into HP Labs' top research themes;
- Build a visible and coherent program of research with leading universities based around complementary research interests;
- Create and extend relationships with leading researchers worldwide; and
- Actively share and leverage skills and resources to grow and enhance research.

A pivotal feature of the IRP is a standard Collaborative Research Agreement (CRA) which specifies key collaborative and IP terms, with an emphasis on ensuring mutual freedom of operation by both HP and its university partners. Wherever possible, the IRP aims to attract additional external funding to projects to amplify their scope, including through government or commercial partnerships. Such additional funding is used to enhance the impact of projects and extend their available resources.

In 2009, HP Labs' researchers reviewed nearly 300 IRP proposals and funded 61 projects at 47 universities in 12 countries. Included in this group are leading research universities such as Stanford University, the University of California, Berkeley, Technische Universitaet Muenchen, Konstanz University, University of Saint-Petersburg, Russian Academy of Sciences, Indian Institute of Technology Bombay, Peking University, and Imperial College London.

IRP projects are a route to seeding relationships; they allow the testing and development of ideas and act as a springboard to larger, higher impact programs. Based on early outcomes, one the projects initiated in 2008 attracted interest and successfully secured increased second year funding from the UK government. Others have opened the door to creation of joint submissions to the EU Framework 7 program.

While the IRP is the main point of focus for university collaborative research, HP Labs also invests in other projects that align with its broader mission. Recent examples include HP Labs India's HP Innovate 2008 and 2009 competitions, partnership with CERN's OpenLab, and the UNESCO-HP project to reduce "brain drain" in Africa through grid computing.

Open Cirrus [3]

HP Labs actively develops partnerships with other organizations to help create the building blocks for emerging market opportunities. Cloud computing has been identified as one of these opportunities and is a natural extension to HP Labs' research in utility data centres, grid computing and software as a service. HP Labs' approach to research in this area has been strongly rooted in testbed environments and in 2008 the Open Cirrus™ cloud computing research testbed was created.

The founding members of Open Cirrus are HP, Intel and Yahoo!, the University of Illinois at Urbana-Champaign, Karlsruhe Institute of Technology and Singapore's Infocomm Development Authority. Together, they set out to create an open testbed to support research in the design, provisioning, and management of cloud services at a global, multi-datacentre scale. The open nature of the testbed encourages research into all aspects of service and datacentre management. In addition, the partners are fostering a collaborative community around the testbed, sharing tools, best practices, and ways to benchmark and compare alternative approaches to service management at datacentre scale.

HP and its Open Cirrus partners each contribute significant computing and financial resources, and have succeeded in attracting additional funding from the US, German and Singapore governments. As of June 2009, five of six planned "centres of excellence", each hosting a segment of the cloud computing infrastructure consisting of 1,000 to 4,000 processor cores, was operational. Three new partners have joined in 2009, and other new partners are being recruited including universities in Canada, Japan, Korea, Malaysia, Russia and the US. HP Labs continues to play a

leading role in Open Cirrus' development by hosting the Central Management Office (CMO).

Government Collaborations

HP Labs engages with government sponsored research and innovation programs worldwide. In addition to participating in government funded collaborative research, members of HP Labs regularly serve on government committees, playing a role in developing policy and shaping programs.

In Europe, SIO leads HP Labs' engagement with the EU Framework 7 Programme. In 2009, HP Labs has a presence in the Future Internet Assembly (FIA), co-chairs the Trust / Security / Privacy program and contributes towards the overall FIA strategy. SIO also continues to represent HP on the boards of the European Technology Platforms in Software and Services (NESSI) and Networked Electronic Media (NEM), and engages with the Research Testbeds group in the European Commission to explore links between Open Cirrus and the EU's Future Internet research testbeds.

In the US, HP Labs is engaged with the White House Office of Science, Technology and Policy, the National Science Foundation (NSF), DARPA and IARPA (Defense and Intelligence Advanced Projects Research Agencies), and Department of Energy (DOE). HP Labs researchers are working with these agencies to vet new research program ideas of interest to both the agencies and HP. In addition, HP Labs is participating in programs such as 'Energy Efficient Information and Communications Technology' sponsored by the Office of Energy Efficiency and Renewable Energy.

Investment in Capacity Building

As part of its commitment to develop future generations of technologists, HP Labs works in partnership with a number of government-sponsored post-graduate programs. In the UK, in 2009, HP Labs sponsored 17 PhD candidates on Engineering and Physical Sciences Research Council (EPSRC) CASE studentships. In the US, HP Labs is engaged with NSF, the American Society for Engineering Education (ASEE) and other companies to create a post-doctoral fellowship program to place up to 500 candidates annually in US industrial research labs. Programmes of this type are highly valuable to HP, as they lay foundations for future partnerships with universities and newly qualified researchers, as well as being a vital investment in the future health of the innovation ecosystem.

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3.3   Open innovation is Good for Us All

"Advances in the various fields of human endeavour are due, to a large extent, to the cooperation of the best brains and best talents available everywhere." These words were documented more than four decades ago when IBM first opened its Zurich Research lab by none other than former IBM chairman, Thomas J. Watson Jr.

Collaboration

This insight and the availability of the great scientific talent and economic opportunity in Europe after the war lead to the foundation of the IBM Research lab in Zurich. The concept of close collaboration with leading university was a starting point of a path that leads us to the concepts of open innovation today that has changed the way new opportunities are identified or created, how work is conducted, and how value is brought to market.

CEOs, government officials, academic and community leaders around the world are all relying on "innovation" to be the fundamental driver of economic opportunity, job creation, business competitiveness and advances in education, health care and a vast range of other disciplines – now more than ever. Investing in innovation is the surest way to survive and thrive in today's complex, connected world.

What is Innovation?

The word innovation seems to be everywhere these days. Within the information technology industry, innovation has traditionally been defined historically by the process of invention and discovery, and driven by investments in research and development. And while this is accurate, innovation in the 21st century is broader and it needs to be. To quote IBM's innovative leader, Nick Donofrio, he defines innovation as, "Sometimes (innovation is) not an invention, a creation or a discovery. Sometimes it's just seeing things that other people missed. It's looking at these deep intersections or interstices and seeing something that nobody else saw before, and that becomes the innovation." Innovation is not only great technical breakthrough but any significant improvement in a good or a process that generates value or reduces waste.

Traditionally innovation has been viewed as starting with the famous corporate R&D labs of the resent past. Bell Labs, Xerox PARC and IBM Research, along with basic research programs at the world's leading universities, epitomized the innovation engines of the 20th century.

But with this traditional definition of innovation these organizations also operated in classic "ivory tower" mode – highly secretive and proprietary in their approaches, sharing little with others and, as a result, sometimes suffering from leisurely paths to market for their best ideas. And there is no better example of this in practice then the old IBM Research.

From the Ivory Towers to an Open Business Model

Through the 1970s much of IBM Research was corporate funded, it had its own research agenda and occasionally it did some technology transfer, but it was not done in a very coordinated manner. During this time IBM was the only company in information technology and with strong profit margins many IBM scientists could indulge in the kind of research and the kind of freedom they wanted.

In the 1980s, things started to shift and the company started looking at how to make research more effective and tried to influence the direction in which the developments had to go. IBM started joint programs between research and the product divisions with a shared agenda that both parties, research and development, had to agree upon. Collaborative teams were assembled to accelerate the transfer of research results, but again this was all being conducted within the walls of IBM.

This model was successful at its time but the dramatic changes in our industry in the last few decades required new models

Sign in front of IBM Research – Zurich in 1969 (Image courtesy of IBM Research – Zurich)

and an fundamental new approach on innovation. This shift first became evident in the 1990s, when IBM nearly collapsed. A truly dire time for IBM, where a lot of my colleagues started asking, "Are we going to survive as research or are we going to be blown apart and get sent off to the product divisions?" The only response to ensure survival and to shorten time to market was to become proactive and to work on real customer problems. IBM in the pre-years running up to this catastrophic date had somewhat ignored customer needs. The concept was to listen to the customer and get a direct insight into their problems. It was unheard of that a researcher would go and directly engage with the customer, but it created a very successful model bringing reward to the client and the Research organization.

Another driver for collaboration was and is the rising cost for technology development in the microelectronics industry. The infrastructure cost and investment became a limiting factor for most industry players. IBM reacted to this challenge by changing is R&D model for microelectronics to an alliance model where partner where invited to joint its efforts to take advantage of synergies in infrastructure, investment and talent. Most of the bigger European industry players joined the alliance that IBM established at the University of Albany in NY.

In information technology there have been a large number of start-ups and the competitive environment has changed a great deal. Opens standards are mandatory and together with open source became a strong driver that enabled the rapid deployment of new technologies and business ideas on a common often open source based platform. IBM is a strong supporter of this movement and is contributing to many projects Linux, Eclipse or Apache. These open platforms are an important nurturing ground for new technologies and businesses that bring innovation to the market place.

A key change in the last few years was how IT innovations have been brought to market. A business model or usage model of IT innovation evolved from a software licensing to software as a services and cloud computing services. Research followed this trend by announcing the IBM Research Labs Experimental Technology Site www.researchlabs.ibm.com/portal where the latest ideas can be tested and played with.

Another change that takes the traditional partnership model a step further is something IBM calls a collaboratory. Just like it sounds, a collaboratory is a laboratory where IBM Researchers co-locate with a university, government, or commercial partner to share skills, assets, and resources to achieve a common research goal. Our most recent one is with the Industrial Development Agency of Ireland, the University College Cork, IRCSET, Science Foundation Ireland, where we will develop advanced risk analytics technologies for the manufacturing, pharmaceutical, healthcare industries.

As you might expect we create a lot of technologies within Research, many of which we can transfer into the business and some that just don't fit. For these we need partners or suppliers to adopt and support them as their own. While it may fall outside of the traditional framework, it still can contribute to the intellectual property income of IBM that significantly contributes to its profit figures. In fact, IBM's intellectual property (IP) income is approximately $1 billion annually.

The Global Innovation Outlook

Once IBM was solid again, open innovation was a strategy that we were not only beginning to see inside, but we also began to hear about on the outside. In early in 2004, IBM launched a unique project called the Global Innovation Outlook (GIO) – a vastly different way of identifying and acting on emerging trends, policy matters and market opportunities, driven by input from hundreds of big thinkers in a diverse range of disciplines around the world.

When the results where compiled we learned a great deal. And it may seem obvious now, but perhaps the most valuable data point was the sweeping shift that became very apparent in the way innovation is created, managed and delivered. This shift was driven by several factors including the dynamics of a flattening world (i.e. Internet), the march of commoditization, the rapid and global adoption of new technologies, and particularly the open movement.

Because of these factors innovation happens much faster today, and it becomes much more rapidly a part of our everyday lives. It no longer is the domain of a solitary genius seeking to take the world by storm. Instead, innovation is increasingly:

Global: The widespread adoptions of networked technologies and open standards have removed barriers of geography and accessibility. Billions of people, even in the most remote regions of the world, have ready, affordable access to advanced wireless technologies and the Internet. Hitching high-speed rides on these platforms, ideas now circumnavigate the globe in a matter of minutes, if not seconds. As a result, almost anyone and everyone with a good idea can now participate in the innovation economy.

Multidisciplinary: Because the global challenges we face today are far more complex, innovation now requires a diverse mix of talent and expertise.

Consider the mapping of the human genome. After years of biological research in wet labs genome mapping is almost a commodity. The grand challenge is now to understand the vast amounts of data generated by all the biological instruments. Incredible advances in information technology make it practical to model and process genetic information in ways never before possible and possibly even understand it.

Collaborative and Open:

Just about every study on innovation identifies the power of collaboration and communities as one of the major forces driving innovation in today's environment.

Our first GIO exercise, for example, identified the "power of networks" as one of its top findings. Participants told us that, increasingly, their power comes largely from their ability to tap into – and sometimes transform – a larger network of people and ideas.

Innovation in the Eye of the CEO

Similarly, two years later after the GIO, IBM conducted the 2006 CEO study, which concluded that external collaboration is indispensable for innovation.

800 CEOs were interviewed representing a sample across all geographic areas, a range of annual revenues, and everything from small and medium businesses to large, global enterprises. When asked which sources their companies relied on for their innovative ideas, "business partners" were right near the top of the list, just behind the general employee population. "Customers" rounded out the top of the list, which solidified in the minds of many involved that the most significant sources of innovative ideas are predicated on open, collaborative approaches, including reaching outside the organization. In fact, CEOs said they are getting about twice as many innovation insights from customers as they are from their own sales and service organizations.

Perhaps most surprising and probably the only area where I disagree with the participants was that "Internal R&D" was second-to-last on the list. Now while I may be biased, as an engineer turned businessman, I would argue that those who do not see value returning from their R&D investments are not managing their portfolios to reflect the changes underway in the marketplace. In other words, they still are not collaborating externally and working directly with their customers and ecosystems.

The CEOs also told us that partnering – whether crossing internal or external boundaries – is easy in principle, but very difficult in practice. This is not at all surprising.

Working with different groups to achieve common objectives usually requires a change in the culture of most organizations, and cultural transformations may be the hardest of all. I am convinced that to truly embrace a culture of collaboration you must accept limitations in you competences and accept the skill and insights of others. We have had some success in this area with something we call Jams, where customers, partners, employees all participate in an giant, chat room and post ideas in an organized format. Our most recent Innovation Jam in 2008 generated 32,000 ideas and comments.

This is particularly important finding for those companies, like IBM, who are addressing problems of systems, like traffic monitoring, healthcare and energy grids – they are very sophisticated in nature and very complex.

We have learned that we cannot work on problems such as these unless we have established a very close relationship with clients, business partners, and even other vendors who might very well be competitors. This is the foundation of our smarter planet vision. We know we cannot instrument, interconnect and embed intelligence in objects as diverse as buoys in the middle of the ocean or livestock around the world without the help of our partners.

A Lab Grows in Rüschlikon

One example of open collaboration in practice can actually be seen in the suburb of Zurich called Rüschlikon. What you can see is a massive $90 million collaborative laboratory currently under construction. The lab is based on a partnership to explore nanoscience with the world-renown Swiss Federal Institute of Technology or ETH Zurich.

For the first time in Switzerland, industry and academia will create a research infrastructure for innovative cooperation in a joint effort.

Appropriately named, the Nanoscience Exploratory Technology Laboratory, raises the bar for collaborative research in nanoscience. Starting operations in 2011 the lab will provide nearly 1000 m² of cleanroom space, the most advanced tools, and special noise-free labs for highly sensitive experiments. IBM and ETH scientists will be staffed at the lab with room to grow, as IBM continues to look for additional qualified partners.

Nanoscale Exploratory Technology Laboratory in Rüschlikon.

(Image courtesy of IBM Research – Zurich).

Under the multi-year collaboration, IBM and ETH Zurich researchers and engineers will join forces to conduct research into new atomic and molecular-scale structures and devices for enhancing information technologies, as well as into discovering and understanding their scientific foundations. The economies of the combined investment and the shared motivation for scientific exploration will help to address the challenges that we will discover in this new venture.

Follow or Lead

Because of the shift to open innovation, the 20th-century business model as we know it could be history. Increasingly, the motivating force that brings people together for work is less about business organization and more about the collective enterprise – activities driven by a common set of interests, goals or values.

The trend is accelerating, and it will have profound implications on how companies think about everything from leadership to managing and motivating global talent. It will change the way companies approach innovation, itself.

As boundaries dissolve, as more fluid relationships form, as ecosystems expand and as networks get larger, the very nature of decision-making for individuals, businesses and the world takes on a new shape. Local actions now have global consequences, and the reverse is true as well.

To pursue open, collaborative innovation, enterprises simply must find ways to tap into the potential of the skill, talent and creativity of people from different teams in different organizations across the globe. A company can only be as innovative as the collective capacity of the people who make up its ecosystem. And to attract and retain talented people, a company must enable those people to feel respected, as individuals, as professionals and as members of a team. Collaborative innovation also depends on finding sustainable and agile business models in the ecosystem that allows the participants to establish survive and grow even in challenging times.

At IBM we are convinced that the art of collaboration will be the most distinguishing leadership characteristic of the 21st century. Universities need to teach it. Government policies and regulations need to facilitate it. The EU Framework programs are in many aspects a good example for this.

The grand challenges in the todays markets and the environment cannot be addressed by lone players. We are all networked and linked. Open innovation is just recognizing this fact and trying to take advantage of it. No individual enterprise, no matter how large and talented, can afford to go it alone in today's highly competitive, globally integrated marketplace.

If Thomas Watson Jr. could only see now, how right he was.

•••• **Contact**

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3.4   The New Club of Paris

The New Club of Paris is the agenda developer for the Knowledge Economy. The Club's main objective is to create awareness on what the knowledge society is and will be, and also support nations, regions, cities and communities in their transformation into the Knowledge Economy.

The New Club of Paris was founded in 2006. It was emerging as a consequence of two major events:

1. The finalization of a report called RICARDIS, (Reporting Intellectual Capital to Augment Research, Development and Innovation in SMEs) by a high level experts group, appointed by the European Commission. The report recommended a number of steps to the Commission for stimulating companies in Europe and to apply Intellectual Capital Reporting as a new method of knowledge leadership related to the so called Lisbon agenda. The RICARDIS group itself was initiated by among others Professor Guenter Koch in his role as a member of the European Association of leading Research and Technology Organizations (EARTO).

2. A major annually ongoing conference under the auspices of the World bank Institute in Paris, and initiated by Professor Ahmed Bounfour on the focus of "Intellectual Capital of Nations, Regions and Communities". This is also the title of a book initiated and compiled by Professor Ahmed Bounfour and Professor Leif Edvinsson.

The founding persons and initiators of the New Club of Paris became then Edvinsson, Bounfour and Koch. The first two are acting as Chairman and Vice Chairman with the latter acting as General Secretary. The Club as a set up is an international association under Austrian law with its seat in Vienna. The Board is now also supplemented with representatives from Japan (T. Sumita), South America (E. Rath-Fingerl) and Scandinavia (P. Stahle).

The "Credo" of the Club has been documented in its Manifesto, initially signed by some 30 prominent Founding Members. The Club's membership is focused on "Intellectual Entrepreneurs", knowledge scientists, opinion leaders in Knowledge Society / Economy and high level "knowledge politicians". The Club prominently participates in knowledge raising events around the world, runs an annual seminar in Paris, coordinates and contributes to worldwide research efforts on the knowledge economy, that it publish in papers and books, and on its emerging website www.new-club-of-paris.org.

The New Club of Paris runs successfully especially so called Round Table (RT) projects usually based on invitation by Governments or Cabinets. The purpose of RTs is to provide an analyzing dialogue and an agenda setting development process for a country, a region or a city to prepare the transformation towards a knowledge community. Thereby it initiates agenda developing projects clarifying and amplifying the global movement towards the Knowledge Society. Its work has an impact power of Knowledge Navigation leading to the refinement of national or regional Knowledge Policies.

The New Club of Paris cooperates with other important organizations and institutes such as the Club of Rome or the World Capital Institute. The Club has local emerging communities worldwide in different countries which are represented by so called "Ambassadors", who act due to local needs and preferences.

The New Club of Paris

The Knowledge
Agenda Developer…
www.new-club-of-paris.org

The Founders
of The New Club of Paris

Contact

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OISPG – Open Innovation Strategy and Policy Group

To foster the open service innovation European Commission has established an industrial group to advise on actions related to services sector and its development in Europe. The group has senior members from industry, in order to bring the industrial perspective to the discussions. The focus is clearly on the intangible economy, service economy and growth.

The OISPG group is not a technical group, even if many of its members are as well members of technology platforms and future PPP actions. The perspective is strongly complementary, as the fundamental paradigm shift in service innovation is enabled by technology, but requires fundamental structural and strategic rethinking in companies as well as in the society.

The group has set the following objectives for its work:

- **Recognition of the new innovation paradigm : „Open user-centric Innovation" and get it into European Policies**
- **Recognising the new research area of „Services Science" in research**
- **To get EAR (Experimentation and Application Research) methodology widely used in research**
  - User-centric application development
  - Creating environments for service innovation
- **Linking needed elements together to foster establishment and development of European-based service industry**
  - Open (functional) platforms
  - Reference architecture for services
  - Linking internationally actors around projects for service innovation
  - Support Lead Market Initiative in service sectors

Attached to this text is a copy of the leaflet of the OISPG group, which is welcoming new contributors to this extremely important forum for European service industry. Open innovation for service is the keywording of the work of the group.

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OISPG Open Innovation Strategy and Policy Group

Open Innovation Strategy and Policy Group

Increasing speed and success with open, participative innovation. Join new mainstream!

The Directorate General of Information Society and Media (ICT addressing societal challenges) has established an industrial group supporting innovation policy development for open innovation in services.

The group sees open innovation being crucial for the competitiveness of the European service sector, both for service providers and the related supporting industry.

OISPG Open Innovation Strategy and Policy Group

Increasing speed and success with open, participative innovation. Join new mainstream!

Open Innovation: driver for new innovation

- In the Knowledge economy, *multidisciplinary* is more important
- System products, *scalability*
- New value propositions, business models
- *Value creation* by collaboration
- Societal innovation with *technology innovation*
- Open Innovation Environments (Living Labs)
- Creative Commons to build added value on

The changes in pervasive connectivity and computing are creating a new dichotomy towards open philosophy and values. The movement from top-down and central functions to much more **participative and collaborative culture** is increasingly seen among leading innovators.

This, together with the multidisciplinarity required in true innovation suggest that this **connectivity and openness** need to be better captured in the innovation processes.

Open innovation is technologically very much based on new web technologies and open platforms for collaboration, enabling massive user involvement in the service innovation. This should also lead to the establishment of new collaborative culture among the innovation actors, in a strongly parallel way. The modern innovation process is strongly based on **creating the right framework for parallel multidisciplinary interactions.**

Users' roles are rapidly changing. When we take the potential of users as innovators we have not only better hit rate on service innovation, but we can create new competitive, personalized, and scalable services, directly deployable in real world settings. **Many of the companies participating in the OISPG group have concrete experience about the successful new approach to innovation.**

OISPG Objectives

• Recognition of the new innovation paradigm: open user-centric innovation as part of the European Policies
• Recognition of "Service Science" as research area
• Use of the EAR methodology (Experimentation and Application Research) in European research
    o User-centric application research
    o Creation of environments for service innovation
• Putting the right elements together to foster the establishment and development of a European-based Service Industry
    o Open (functional) platforms
    o Reference architecture for services
    o Linking international actors around projects for service innovation
    o Support lead market initiatives in service sectors

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Further information can be found on the OISPG wiki:
http://oispg.pbwiki.com/

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