

"Road mapping, Research Coordination and Policy activities supporting Future Internet-based Enterprise Innovation"



Inputs to Horizon 2020 Work Programme 2016-2018: Digital Business Innovation Orientations

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Table of Contents

1	What is the reality we expect in 10 years from now for Internet-based enterprises and entrepreneurs in Europe?	4
2	Which are the current needs / problems of Internet-based enterprises and web entrepreneurs in Europe?	5
3	Which actions need to be taken to boost Digital Business Innovation?	7
4	What is the expected impact of the proposed actions?	9
5	On the title of the proposed actions	10
	Annex I: References	11

1 What is the reality we expect in 10 years from now for Internet-based enterprises and entrepreneurs in Europe?

Attempting a prognosis of the business and entrepreneurial reality by 2025 in Europe, recent societal, technological, economic and other relevant developments and outlooks from their international experiences have been taken into account. While a more detailed view of the various mega-trends, uncertainties and future socio-technical scenarios is contained within the project deliverables (FutureEnterprise D1.1 “Trends and Visionary Scenarios for Acceleration of New Forms of the Enterprise”), a comprehensive list of the main, mostly non-technological, developments to be envisaged yields the following reality aspects.

Smaller size of enterprises: Self-employment and micro-enterprises will prevail

The number of self-employed people, entrepreneurs and micro-enterprises is expected to grow significantly during the next 10 years. It is expected some of these micro enterprises to re-group in complex collaboration ecosystems in order to share synergies between them, complementing and not competing, but also in order to reach a minimum critical mass to be sustainable and grow in a global market. We would also see a pervasive diffusion of entrepreneurship but without the emergence of big market players. The paradox is that those target groups (self-employed, micro-enterprises, SMEs) benefit the least from the EU initiatives in research and innovation. If no specific measures are taken, the gap between EU-funded programs and the growing community of very small enterprises will significantly reduce the impact of Horizon 2020. Initiatives like the FI-PPP and targeted actions for web entrepreneurs will certainly help to address this but more is needed.

Technology Spring: IoT, Big Data, Cloud Computing, Machine Intelligence, Mobile Devices, 5G Networks, Collective Intelligence

Not diving into the detailed research orientations discussed in other sections of this document, it is expected that the technological developments around data, services and intelligence, as well as Future Internet assets and platforms, will provide completely new means to cover enterprise needs in an international market context. As an example, in 10 years from now, an enterprise should be able to use advanced, real-time big data analytics to detect business opportunities and make informed decisions about where and how to best establish their web enterprise in the right ecosystem, offering more and more advanced digital services over 5G networks.

Emergence of innovative business models and new economic paradigms

New kinds of economies promoting a new culture of sharing, prosumption and supply circles and allowing monetization of dormant assets will disrupt the modus operandi of enterprises. A much larger number of successful (and unsuccessful) tech start-ups will emerge also, because of the increasing focus on entrepreneurship and business innovation by European entities including governments, universities and corporations, as well as incubators and accelerators to support start-ups. Access to funding will be higher because of increased awareness of the start-up potential for investors with a risk for fragmentation in the absence of “glocal” strategies shared at EU level. However, start-ups will succeed only if getting beyond the European markets, while utilizing innovative, disruptive, business models (e.g. Multisided business models and cooperative management habits / Shortest-ever time to market for products and services, through early customer engagement / Circular value chains and agile human resources / Translation of results and capabilities transfer, among academia, public and private subjects).

Regional and Digital Divide

The absence of structural changes to the support of entrepreneurship in Europe will translate in 10 years as concentration of European entrepreneurship in poles around London, Paris, Malmö, Madrid, Barcelona or Berlin, which may be helpful to local economies, but fails to create a broad enough labour

pool and innovation ecosystem to impact the European Economy as a whole. Furthermore, the divide will encompass the difference between people aware of the necessity of continuous education to extend and make dynamic capabilities; and, on the other hand, people relying mainly on capabilities resulting from linear as well as time-delimited educational paths, still believing in a “job for life.” A consequent jeopardized market labour as well as migration rules will increase the pressure on areas with better opportunities for funding, quality of life, and welfare state supporting a continuous variations in business as well individuals’ life innovation models.

2 Which are the current needs / problems of Internet-based enterprises and web entrepreneurs in Europe?

Entrepreneurship, especially through the utilisation of digital means and “web” technologies, is currently changing the business landscape, internationally. This fact is emphasised both by relevant reports and market analyses, but is also a common experience in business societies all over the world. Europe is certainly holding an important role in the global entrepreneurship movement, especially in areas like youth-entrepreneurship, high-tech entrepreneurship or culture-related entrepreneurship. However, **a number of core inhibiting factors / needs** for change have been identified by the FutureEnterprise international experts committee, as presented below.

The “Innovation Mismatch”: The need for successive innovation and evolution

Internet-based enterprises and entrepreneurs continuously look for better ways to innovate that are suited to tough problems’ resolution. Such innovations encompass new ways of doing business, new offerings or new systems of products and services and even new interactions and forms of engagement between an enterprise and its customers. We need to provide appropriate infrastructures, guidance and support to forge and propel innovation, capitalizing on Future Internet assets and technological advancements.

The “Business Mismatch”: The need for market-oriented pull and not only research-oriented push

The business relevance of technologies and research outcomes is not easy to identify, especially when working with a research-oriented push: defining the product / service not coming from a real market need. Universities and research organisations do not have a deep knowledge of markets and business trends while small / micro enterprises do not have the time, skills and resources to identify the business opportunities that could be enabled by the new scientific knowledge. We need to bridge the technology driven nature of research with market needs, following novel methods, such as knowledge co-creation in multidisciplinary teams or very fast cycles of market-oriented approaches, as part of future EU co-funded research projects.

The “Timing Mismatch”: The Need for Speed

There is mismatch in time between the availability of technology and research results and the moment that small/micro enterprises decide to build applications based on this knowledge to pursue new business opportunities. Additionally, market uncertainty proliferates, as technology is changing very fast, leading to a very short and reverse product life cycle with enterprises and entrepreneurs expected to shorten the time to market. We need to bridge this time gap with “just-in-time” knowledge delivery and technology experimentation models that go beyond the typical multi-year “cycles” of research planning, implementation and delivery to market, as prescribed and run by programmes like

FP7 (previously) or Horizon 2020 (currently). In addition, there is need of timely and decisive Business Model swifts for sustainable and adaptable, new forms of enterprises.

The “Place Mismatch”: The Need for ubiquitous, swift and targeted information sharing

Tech knowledge and experiences are often created and presented in one particular location at conferences and project events and, despite the knowledge accessibility due to the global web reach, it does not always reach the potential beneficiaries in other regions or countries. We need to reach our target audience at global level in ways that are not dependent on locations and local events and identify merging, potential collaborations.

The “Access Mismatch”: The need for openness in infrastructures, knowledge and innovation

The actual dissemination of research results uses channels that are difficult for innovation-driven enterprises to access. Experimentation infrastructures, scientific publications and conference proceedings are often behind payment walls and are written in a language for researchers to understand and build upon. Part of this problem is solved by the open access policy of the EU, but we still need to do a lot of work to describe research results in a way that is comprehensible and reusable for business actors and allows them to identify future applications in their own space.

The “Funding Mismatch”: The need for risk-tolerant capital sources and financing instruments

Access to capital is one of the top needs of entrepreneurs and SMEs in Europe. Acceptance of risk (risk tolerance) is a major issue for the capital sources and funding mechanisms that need to be brought into the game, like in USA or South Asia regions. This fact stresses the need for innovative financing instruments under the Horizon 2020 programme, going far beyond the structures of targeted research projects, or support & coordination actions.

The “Legal Mismatch”: The need for a flexible legal framework for entrepreneurs and SMEs

In many European countries, entrepreneurs are held personally responsible for the financial failures of their start-ups, especially in the case of bankruptcy, thus facing huge personal liabilities, which prevents them from taking the risks they want. Lessons should be taken from US, where the company financial risk can be separated from personal risk, so entrepreneurs are able to take risks without facing consequences like losing credit, losing personal collateral, etc., if their companies fail. Also, more and more entrepreneurs stress the need for innovative enterprise forms, that should be quickly populated and supported by all the EU member states, not to forget the need for versatile personnel hiring across EU member states, or the need for administrative burden reduction in establishing and running start-ups.

The “Education Mismatch”: The need for entrepreneurial education and early involvement

The current non-entrepreneurial culture at High School and University is jeopardizing the development of web entrepreneurs, specifically in southern European countries. As university students should be encouraged to start a business even before they graduate, there is a need for (digital) entrepreneurship curricula, university start-up incubators and even targeted education activities at very early stages of education, including high schools and primary education, in order to obtain a “commercialization” and “entrepreneurial” mentality.

These different dimensions of mismatches result on key challenges that need to be effectively addressed:

- Capitalize and transform the new emerging forms of collaborative (circular, sharing) economies enabled by the Internet into European enterprises' competitive advantages, employments and growth.
- Turn Europe into the global leader of platforms and intelligence services for web entrepreneurship and digital business innovation.
- Facilitate the educational and socio-techno-political framework to easily connect and intelligently "activate" the highly distributed entrepreneurial, investment and digital business innovation assets spread all over European regions to create flexible, ultra-dynamic and global business ecosystems.
- Facilitate ultra-fast, trusted and privacy-respecting digital ecosystems leveraging "digital alliances for growth" to high-quality enterprises from start-ups to mid-cap enterprises.

3 Which actions need to be taken to boost Digital Business Innovation?

In order to proactively address a number of identified and imminent challenges, a set of concrete directions and actions that view enterprises and web entrepreneurs as prosumers under the prism of "Collaborative Business Innovation Platforms" have been detected to foster business creativity and innovation.

The "WHAT"

The Research & Innovation Dimension: Federated, Multi-sided Enterprise-focused Platforms that create an uninterrupted cycle of innovation and allow Internet-based enterprises and entrepreneurs to collaborate, evolve and scale in a hyper-connected world. Such platforms need to combine business innovation and technology trends, addressing concrete business needs, generating value beyond short-term and opportunistic monetisation and ensuring adoption, while covering the following aspects:

- Collaborative, real-time, proactive business analytics-as-a-service tapping both the tangible and intangible knowledge assets of new forms of enterprises within and beyond their porous boundaries to inculcate quadruple-bottom-line innovation into any business endeavour. Novel, interactive techniques for locating, sharing, mining, understanding, simulating, predicting and acting upon the dynamics of real-time big data, collected by dispersed enterprises' clouds (enterprise systems and distributed sensors, as well as self-quantification tools of the workforce) and augmented by the wisdom of crowds, are expected to give insights on how the flow of ideas and information translates into agile business realities, stipulate faster evidence-based decision-making, facilitate coping with unexpected market and business risks and discover latent opportunities and emerging trends.
- Innovative, web-based business models and architectures for new kinds of economies that, in a systemic and lean manner, fundamentally rethink how a business is run, challenge traditional operating models along the Sharing Economy and the Circular Economy principles, and explore novel technologies and Future Internet assets in business environments in order to capture emerging opportunities and the networking effect, foster collaborative prosumption schemes and shorten time to value for web entrepreneurs and established businesses. Substantiating innovations at internal configuration, product / service offering or the customer experience levels, the conceptualization and application of such business models includes user-oriented design, rapid prototyping and instant market validation in "societies of makers" and may be (a) domain-specific and region-oriented in Europe, yet needs to demonstrate how they

can scale at pan-European level; or (b) apply reverse innovation, whereby products and services are created first for enterprises in emerging markets (outside Europe) and are then rolled out to Europe.

- Federated, Innovation-driven Enterprise Collaboration Platforms (Enterprise Application Stores, Enterprise API Marketplaces, etc.) that promote new ways of trustful collaboration among Internet-based enterprises and entrepreneurs (from engagement to disengagement, respecting the right to be forgotten), boost productivity and affect the complete business innovation lifecycle (from invention to production, and from supply chain management to customers' engagement), addressing multi-platform access and real-time, sustainable platforms interoperability challenges. Adopting both push and pull mentalities and targeting acknowledged and on-demand needs, such platforms empower Internet-based enterprises and entrepreneurs to provide utility applications and services to other enterprises and web entrepreneurs with the help of flexible financing schemas (e.g. crowdfunding, freemium, pay for success, subscription). They are also expected to cater for dynamic discovery of enterprise apps and APIs, leverage new technologies (e.g. enterprise social computing, gamification, virtual currency, NFC, wearable computing, micro-working techniques) in novel ways, and provide personalized recommendations at enterprise, business unit and individual worker level, thus promoting the concept of Business Innovation 2.0.
- Dynamic discovery and negotiation of the shared business value flow in open innovation disruption schemes that experiment with creative ways to reuse and mix knowledge, tangible and intangible assets from business platforms and the Web. Automated techniques for discovering and modelling the shared business value, reasoning and recommending the terms of their derivatives' configurations, incorporating third-party innovations by negotiating parts of their business model with external innovators, and even closing the licensing deals in a sustainable way, will allow Internet-based enterprises and entrepreneurs to efficiently track the (internal and external) knowledge they reuse and co-create ideas, software, services and data (at research and commercial levels) in order to derive actual business offerings and value.

The Support Dimension. An extended, educated entrepreneurship ecosystem needs to be cultivated, through appropriate, coordinated infrastructures and services with a regional and pan-European orientation, to better understand where and how innovation is working in Europe, and provide more personalized collaboration, networking and training support to aspiring European entrepreneurs and enterprises.

- Global entrepreneurial community hubs that constitute encounter venues for mentoring, collaboration and market validation among web entrepreneurs, Internet-based enterprises, researchers and investors internationally (EU, USA, BRICs, China) and strengthen the links between universities, start-ups, established enterprises, mentors, business angels and venture capitalists. By supporting crowdsharing, providing 2nd generation breeding and bridging the inherently different dynamics of markets and research communities, commercializing and scaling new technologies, as well as crossing the "Valley of Death", is facilitated and accelerated.
- Augmented Education Entrepreneurship infrastructure allowing for (re)training to business, science and technology competencies of web entrepreneurs, potential self-employed workers (needing to be reinserted in the market labour) and the enterprise workforce, according to their personalized needs. With the help of overarching entrepreneurial information repositories that accumulate "consumable" research knowledge, provide transparent access to regulations and distributed resources across the EU, and provide guidance on markets' understanding and best practices on business model, product, service, network and channel

innovations, wanna-be and current entrepreneurs and intra-preneurs will be educated on how to run a start-up or spur innovation in their existing enterprises.

- Intensive boot-camp training programmes offering unique experiential learning opportunities to web entrepreneurs and enterprises, and a broader understanding of what “starting my own business” means. Such programmes need to be accompanied by continuous mentoring support to successfully instil and mature a culture of business innovation.
- Customizing and cultivating best-of-breed entrepreneurial ecosystems into appropriate regional innovation clusters in North and South Europe, specialized by technology domains or business areas, to allow Internet-based enterprises and entrepreneurs to core their new ventures or localize ideas. Through such innovation clusters, web entrepreneurs and intra-preneurs will investigate how to tip across markets and support smooth scaling in order to move from the local to the European context.
- Evidence-based digital business innovation impact assessment through development of elaborate horizontal and vertical innovation Key Performance Indicators at local, pan-European and global level and quantification of innovation serendipity, especially in anecdotally-known local areas of competency.

The “HOW”

With regard to the instruments that can drive the implementation of the actions, a set of alternatives are proposed to be adopted:

- Research & Innovation Actions requesting Small and Large EC contribution, with the MVP (Minimum Value Product) being complemented by enterprises' / entrepreneurs' funding in their 1st year of implementation.
- Incubator Actions requesting Large contribution in order to fund, through small-scale open calls, enterprises and web entrepreneurs (50k-150k) to implement ideas on specific enterprise problems and challenges (with schemes similar to the one followed by the FI-PPP Phase III or the Open Data Research Incubator – ODRI objective within the Horizon programme).
- Public Procurement of Innovation scheme dedicated and adapted for SMEs and Web Entrepreneurs (or even a scheme along the lines of the SME Instrument).
- Coordination and Support Actions.

4 What is the expected impact of the proposed actions?

The proposed interventions are expected to have profound implications for Digital Business Innovation in the years ahead, leading to:

- Invigorated “platform” thinking and connected, intelligent business infrastructures for the digital economy, supporting enterprises and entrepreneurs to breed innovation and spur the development of disruptive products and services bound with novel business models.
- Setting Europe and European entrepreneurs and SMEs as global leaders, providing the reference ICT tools and platforms to enable sustainable digital business innovation.
- An educated entrepreneurial ecosystem that promotes new forms of enterprises, brings closer all stakeholders from the enterprise, entrepreneurship and intra-preneurship ecosystem in Europe and internationally for fluent transfer of knowledge, and provides the conduit for innovative incubation building (at university, regional or sectoral level).

- Nurturing new business opportunities for web entrepreneurs based on new forms of peer-to-peer and sharing-based economic models.
- A culture of open research that leads to collaborative ventures, which are inspired from actual needs and are rapidly commercialized, providing sustainable and scalable growth for innovative enterprises and start-ups. Such a web-entrepreneurship "gene" will be embedded in the European DNA of engineers and computer scientists.
- Growth and job creation as a result of enterprises being able to effectively harmonise traditional business practices and business models with new disruptive economic paradigms.
- More effective and intelligent utilisation of the scarce financial resources for investment and crowd-funding of high quality start-ups and mid-cap enterprises with good potential for growth and job creation in Europe.

A number of Key Performance Indicators are proposed in order to contribute to measuring the success of the proposed actions by indicating and quantifying to which extent the goals have been achieved, in accordance with other successful international initiatives (targeted values to be defined):

- Number of enterprises, SMEs, web entrepreneurs engaged.
- Number of web start-ups created.
- Percentage of revenue gained / cost savings for enterprises.
- Market share reached at global and local level.
- Volume of transnational commercial operations conducted by beneficiaries (enterprises and web entrepreneurs).
- Number of enterprises engaged in providing external capital.
- Volume of external capital raised for exploitation of results.
- Number of patents created.
- Number of successful (surviving for more than 3-5 years) spin-offs created from universities.
- Number of new markets and business models created.
- Revenues from markets outside the EU that are driven to the European economy (through European enterprises and web entrepreneurs).
- Percentage of enterprises participating that never received EU funding before.
- Number of jobs created.

5 On the title of the proposed actions

After deliberation with the experts and the Future Enterprise consortium, three possible titles for the whole area / objective are proposed:

- a. Collaborative Business Innovation Platforms
- b. Business Innovation Flow Platforms
- c. Net Innovation Intelligence Platforms

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