The Morfeo Open Source Community: Building Technologies of the Future Web through Open Innovation[*]

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ABSTRACT

Nowadays enterprise collaboration is becoming essential for valuable innovation and competitive advantage. This collaboration has to be brought a step forward from technical collaboration till collective smart exploitation of global intelligence. Morfeo Open Source Community implements it as an open innovation schema of collaboration among SME's, universities, research centres, public administration and major corporations. Its disruptive contribution to the state of the art is to manage the collaboration licensing the shared technology as open, with an OSI accepted license. The main results of this innovation model are the development of SOA open software standards, the increase of OSS quality, the creation of an OSS services provider ecosystem, with an important impact in the local economical development and the dissemination of the R&D&i activities among a broader set of organizations. Now Morfeo, with established relationship in Spain and EU, is involved defining new cooperation schemas in Ibero-America. The aim is to define a network of Morfeo Office in several countries to coordinate the global community.

Categories and Subject Descriptors

K.6.1 [**Computing Milieux**]: People and Project Management;
K.4.3 [**Computing Milieux**]: Organizational Impacts;
H.1.2 [**Information Systems**]: User/Machine Systems;
H.3.3 [**Information Systems**]: Information Search and Retrieval;
D.2.11 [**Software Architectures**]: patterns

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General Terms

Management, Performance, Economics, Human Factors

Keywords

Open Innovation, Collaboration, Project Management, Web 2.0, User-Centric, Collective Intelligence

1. INTRODUCTION

As Gary Hamel, an eminent guru in the field of business concepts innovation, said,

> Would-be revolutionaries, intent on discovering uncontested competitive space, think about the future very differently from prognosticators and scenario planners. They know you can't see the future. Their goal is less to understand the future than to understand the revolutionary portent in what is already changing. More specifically, they are looking for things where the rate of change is changing –for inflection points that foreshadow significant discontinuities. Those who fail to notice these nascent discontinuities will be rudely awakened by those who were paying attention.

The Web technologies phenomenon, is definitely one of the most significant disruptions in the field of ICT. Emerging Internet technologies continue to enable businesses to expand their ecosystems and partnerships [1]. The Web is no longer seen as it was conceived, but as a platform for ubiquitous and pervasive access to a global mesh of interoperable resources, including services, composite applications and personalized delivery [8]. As global market opportunities and competitiveness increase, collaboration is becoming more and more essential for improving productivity and accelerating innovation in Web technologies development [9]. The required collaboration must be supported and fostered

at several coalition levels, ranging from individuals, through the team, corporation to the business.

Many enterprise collaboration platforms and models have already been developed and successfully deployed in large corporations, small- and medium-sized enterprises (SMEs) and development communities to carry out innovative projects and software implementation. Used in the context of a carefully engineered community collaboration strategy, these tools have proved to be effective in collaborative web developments [5].

This collaboration can be taken a step forward, evolving from project development to the successful emergence of innovation through the smart exploitation of collective intelligence. Empowering every individual and fostering people collaboration are key factors in the innovative process, just as the Long Tail is considered the innovative engine of the new Web 2.0 [2]. However, this introduces additional managerial problems and handicaps that have to be taken into consideration to avoid being left behind. Following this approach, the Morfeo Community is a Spanish led initiative to leverage open innovation by providing an open framework for collaboration among enterprises (major corporations and SMEs), universities, research centers and public administrations that believe in the potential of open-source software and open collaboration, with a view to achieving the above goals. The suggested framework is based on the emerging Enterprise 2.0 vision and will help to minimize the risks of inhibiting the innovation peace [4]. These risks are caused by several factors, like key information and knowledge being lost or simply not being available on time for the stakeholders; projects started and never finished; worse time-to-market; results not meeting expectations; failure of global, cross-organizational IT integration processes; or even incoherences between technology and company strategy or structure [10].

As new Web technologies tend to be global, the Morfeo Open Innovation framework is focused on reaching the whole Long Tail advanced by Chris Anderson [2], from large enterprises to non-technical end users, fostering productivity and collaboration and finally providing solutions to currently hard-to-solve problems in up to three different scenarios explained next.

1. Large enterprises may capitalize on faster Web technologies development, a more agile collaboration landscape and the empowerment of their employees to exploit their innovative ideas and apply them to fit their unique requirements, sharing this knowledge with other employees. This approach to setting up and managing enterprise IT systems will considerably reduce the backlogs that IT departments frequently have to cope with. It will also increase operational flexibility, which is crucial in a world with fierce global competition and quickly changing market demands. Again it creates an ecosystem for collaboration and co-creation of knowledge with other stakeholders, thus profiting from a well-known truism, now known as Joy's law: *Innovation happens elsewhere* [7].

2. The Morfeo community enables SMEs to find, customize, combine, catalogue, share and finally use valuable information about projects or applications that exactly meet their individual demands by leveraging the Software as a Service (SaaS) model. Supported by the open innovation framework, they can apply its expertise and innovative ideas collaborating with third parties rather than lose this feedback due to pre-determined, inflexible and potentially heavyweight management models. Finally they can influence the evolution of these projects.

3. Finally, individuals benefit from a much bigger opportunity to participate. The Morfeo community provides end-users with intuitive, unsophisticated IT ways to discover, remix and use knowledge about Web-based applications and technologies, that they consider interesting and useful. It also enables them to participate, exchange information with other users and resource providers and to actively contribute in a way that encourages extensive use of the resources offered via the community. This speeds up the open innovation pace. Focusing on the long tail rather than a limited number of sophisticated experts, Morfeo involves the bulk of private users or small businesses and allows for customer innovation anytime-anywhere.

The key idea behind this vision, and the lesson many businesses must learn, is that next-generation IT management frameworks must be conceived to acquire the knowledge they operate on directly from who really has it, i.e. their users, teams and partners and from the operation and communication processes among these stakeholders[6]. With the aid of collaboration frameworks like Morfeo much of this operational knowledge can be easily and effectively spread.

The remainder of this paper is organized as follows. First we present what Morfeo is and its relevance in Spain. This section includes Morfeo's main objectives and goals; Morfeo's framework model, which was built with a focus on the main ideas of the Web 2.0; Morfeo project management models; and Morfeo's success and impact, outlining its major innovative challenges and ambitions in Spain and Europe and several success stories. We then go on to illustrate the keys for producing a beneficial shift of the successful (European) model of Morfeo to Ibero-America. Finally, we explain the main conclusions that can be drawn from the ideas in this paper, and what we consider to be the work that needs to be undertaken in the future.

2. MORFEO IN SPAIN: OBJECTIVES, ACHIEVEMENTS AND IMPACT

Nowadays, the Web is immersed in a technological and social movement named Web 2.0. This movement could be considered a first experimental approach to the Intelligent Web. The Intelligent Web is a web handling not only contents and applications, but knowledge and processes.

Web 2.0 does not involve fundamental technological changes. However, user-knowledge exploitation through well-known technologies has brought about a new understanding of both the Web and systems generally. This leads to a highly user-centered approach, enabling the integration of user capabilities in every phase of the system life cycle rather than the input of mere requirements.

From this viewpoint, Morfeo, a community of open software communities specialized in platform software development projects, considers a gradual introduction of a new set of technologies, such as semantic technologies, automatic planning and reasoning, decision support, service and process choreography, context-awareness adaptation for all kind

of environments, people and devices. Additionally, the introduction of new business and market models will make the Web evolve in a place where developing social relationships, business, leisure time and all our daily activities, breaking the barriers which separate us from life on the Web. This way, Morfeo has managed to leverage new Web technologies innovation in Spain, and by extension its projects are becoming essential in the European Union.

Morfeo's framework and organization model, as a social open collaboration enabler, was set up with several primary objectives in mind:

- Speed up the development and adoption of software standards for Service Oriented Architectures (SOA), which are key for both systems integration and the evolution of the network as an ecosystem of proliferating services

- Create business opportunities in the field and integrate solutions targeting enterprises and the public administrations based on standard platforms and applications developed within the community

- Improve productivity and assure the quality of software developments through an open development process that eases the collaboration of all stakeholders, thus enhancing consensus in any software development process.

- Act as a catalyst for R&D&I initiatives in the software field that naturally integrate a range of scientific and technological agents, helping to boost R&D&I activities and the development of a strong industrial fabric in countries where the consortium members operate. The community offers a knowledge base founded on a model associated with open software, and will provide enterprises with counseling on open source development. In this sense, the community enables the development of:

  - an information base containing general open source issues, including a non-exclusive discourse against traditional legacy software.
  - guidelines advising enterprises to develop open source solutions and manage their implicit implications. These guidelines also report on the open source release process, and the opportunities for defining new business models focused on open source development.

- Be a mark of quality and benchmark for open innovative projects.

The community will provide a knowledge base founded on a model associated with open innovation project and will provide enterprises with counseling on new and emerging Web technologies, standards, methodologies and tools. To do this, the community will also:

- Provide guidance on and help with maturing innovative ideas, issues and solutions to effectively focus on the creation of a new innovative project to materialize them.

- Serve as a communication channel to find and maintain the appropriate partners to successfully carry out innovative projects.

- Harvest entrepreneurial expertise in all phases of project life cycle, including analysis, design, development, management, testing and validation.

Since it was set up, the Morfeo community has hit the headlines and has the unqualified backing of a number of public administrations in Spain, namely, the regional governments of Andalusia, Aragon, Castile-La Mancha, Extremadura, Catalonia and Valencia.

The community will feed off its members' contribution, but Telefónica I+D is the community's *engine*, releasing proprietary software components and injecting resources into the community.

2.1 Morfeo's Framework Model: Supporting Web 2.0 Patterns and Fostering Collective Innovation

Morfeo's framework and its whole community is founded on a model that has been conceived under the Web 2.0 paradigm. This model, rather than Morfeo itself, is responsible for the resounding success at leading Spanish and European innovation. Web 2.0, and its application to enterprises (Enterprise 2.0) has proved to be very useful for fostering innovation, harnessing collective intelligence and collaboration and exploiting the knowledge emergence.

There are several different definitions for Web 2.0 (a.k.a. social networking) that mostly only describe certain aspects of the overall concept. Tim O'Reilly, who originally coined the term [8], initially identified seven major characteristics inherent to the Web 2.0 concept. First, the Web is considered as a platform for building systems that do not necessarily have a specific owner and are "tied together by a set of protocols, open standards and agreements for cooperation". Harnessing Web users' collective intelligence is the second major paradigm. This promotes architecture by participation and democracy and encourages users to add value to the application as they use it. The ownership of mission-critical data is regarded a further cornerstone of numerous Web 2.0 applications. Fourth, O'Reilly propagates the end of the software release cycle as another central paradigm. The use of lightweight programming models that allow for loosely coupled systems and applications, the provision of software above the level of a single device and the realization of rich user experience are the last major paradigms inherent to the Web 2.0 concept. In conclusion, Web 2.0 could be defined as the philosophy of mutually maximizing collective intelligence and added value for each participant by formalized and dynamic information sharing and creation [8].

The Enterprise 2.0 concept is related to its big brother Web 2.0 because, to a certain extent, it can be viewed as many existing Web 2.0 consumer-oriented services maturing to include features that are important for enterprise users. Enterprise 2.0 is in itself a new paradigm in which employees, providers, consumers and end users are co-producers of innovation as new content, knowledge, applications and services. Enterprise 2.0 provides enterprises with new models and tools for emergent collaboration and co-creation. Enterprise collaboration is thus being enhanced by virtual communities that leverage social linking and tagging tools (like tools for social networking, social bookmarking and social search), user-contributed content management platforms (like enterprise wikis, blogs and forums), tools that leverage user opinions (like tools supporting comments and

voting), subscription-based information distribution tools (like Enterprise RSS feeds), user-centered services (like mash-up- and pipe-based services), etc.

Andrew McAfee [7] first introduced the acronym *SLATES* to indicate the six key patterns of Enterprise 2.0 ideology: *S*earch, *L*inks, *A*uthoring, *T*ags, *E*xtensions, and *S*ignals. As technologists build Enterprise 2.0 technologies that incorporate the *SLATES* components, they seem to be following two intelligent ground rules following McAfee's vision of *SLATES*. First, they are making sure their offerings are easy to use. Second, Enterprise 2.0 technologists are trying hard not to impose any preconceived notions on users about how work should proceed or how output should be categorized or structured. Instead, they are building tools that enable these aspects of knowledge work to emerge:

- The Search pattern means that all end users searching for any information in the community must be able to locate it easily in a short time.

- The Links pattern means that all content, knowledge and information in the community must be linked to other related knowledge across the whole community, including other projects and departments, to foster collaboration and innovation.

- The Authoring pattern means that all deliverables, milestones or information must have a well-known author to lead its creation, management and evolution. This way all information items grow adequately.

- The Tags pattern means that all knowledge could have associated tags, enabling the creation of folksonomies for managing tag clouds, searching issues and linking ideas.

- The Extensions pattern means that all technology, tools or knowledge should be scalable, enabling the growth of the community in innovative, unexpected ways.

- The Signals pattern means that community must provide for on-line feedback, chats, RSS feeds, comments, voting tools and so on to foster collective communication.

The Morfeo community has been built using just these technologies, tools and design patterns to improve resource visibility and mobility and be as successful as Web 2.0 sites were in the new Web revolution. In addition, Morfeo expects to be a source of innovation. Howard Bloom [3] identified the following five elements as causing a group to be intelligent (a "collective learning machine") and be able to innovate:

Conformity enforcers mechanisms that cause consensus and similarities among most members of the group

Variety generators mechanisms that cause some differences and discussion among members of the group

Inner judges mechanisms that cause individual members of a group to reward themselves for successes and to punish themselves for failures, and cause everyone to evaluate a concept or idea and validate it after their own experience-based verification.

Resource shifters mechanisms that shift resources (such as admiration, information, data, concepts, knowledge, money, or influence) to members of the group

Intergroup tournaments promote competitions between subgroups or departments (such as games, corporate competitions, rivalry discussions, etc.)

Other authors, like Surowiecki [11], state that there are three conditions for a group to be intelligent (for a "crowd to be wise"):

Diversity the group includes members with a wide diversity of knowledge or abilities (and the ability to recognize successful and unsuccessful outcomes)

Independence group members use their own knowledge and abilities without being overly influenced by others. (When group members have too much influence over each other, various kinds of bad outcomes can result.)

A particular kind of decentralization group members' actions are aggregated in a way that finds the right balance between: (a) making individual knowledge globally and collectively useful, and (b) still allowing it to remain resolutely specific and local.

This way, all these factors establish a group of key factors that enable innovation to emerge and foster the exploitation of collective intelligence. Therefore, innovation requires tools, technologies and processes that tackle these factors.

Putting all this together, Figure 1 shows the Morfeo framework to be a complex model built on McAfee's patterns. All of these patterns are supported and fostered by the effective exploitation of toolkits, technologies and infrastructure, like social communities, wikis, blogs or forums. And all this Morfeo infrastructure is in turn focused on satisfying or enabling one or more of the key innovation factors outlined above in pursuit of the ultimate aim of fostering open innovation.
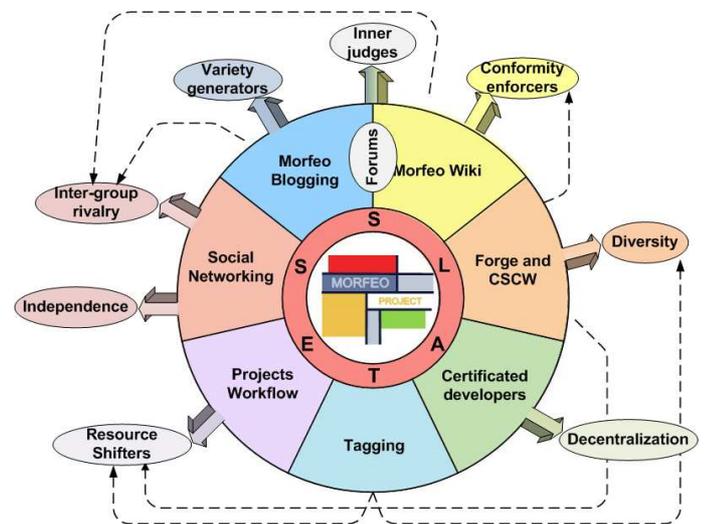

Figure 1: Morfeo framework

The Web 2.0, materialized by the McAfee's SLATES patterns, is the cornerstone of the Morfeo framework. Every Morfeo tool or applied technology generally supports every Enterprise 2.0 pattern. However, some technologies more specifically designed for a specific pattern:

- Morfeo blogs, forums and wikis enables all end users to search, access and give feedback about any information or project in the community. They are then closely related to the Search pattern.

- Technologies like the forge, computer-supported cooperative work (CSCW) tools or a simple wiki can be used to link knowledge, information and related contents across the community, following the Links pattern.

- The Authoring pattern is closely related to the exploitation of certificated and independent developers who could effectively lead relevant managerial processes, developments or tasks.

- The Tags pattern is supported in the Morfeo framework by simply exploiting tags to socially categorize contents and knowledge. These tags are then used to create a folksonomy and a community tag cloud, which facilitates searching and linking issues.

- Thanks to Morfeo's project workflows, all technology or knowledge that has been applied to a project could grow up in unexpected ways, as workflows and processes are scalable and do not restrict innovation. This philosophy clearly supports the Extensions pattern.

- Finally, Morfeo's social networking is very useful, among other things, for enabling on-line feedback inside the community, using chats, RSS feeds, comments or voting tools as the Signals pattern dictates.

Taking a step forward, all these Enterprise 2.0-oriented technologies that the Morfeo framework exploits pursue the ultimate goal of fostering open innovation by enabling and supporting the key innovative factors outlined above.

- Morfeo's Wiki is used to input common descriptions and definitions of key community concepts. Everyone can bring their own experience and knowledge to bear to find, evaluate and improve knowledge. This iterative process enforces common data and knowledge conformity across Morfeo since the Wiki only visualizes agreed upon versions. Each knowledge worker must review the wiki concepts and will use an inner judge of content to do their best to improve them. In addition, this phenomenon shows group and partner knowledge outputs, allowing the management of constructive intergroup rivalry in order to improve the descriptions of concepts or knowledge about business processes.

- Enterprise blogging is useful for keeping track of ideas, concept redefinitions or process information on a time line. This visibility stimulates each knowledge worker to discuss this information, generating a variety of ideas in an approximate definition cycle. Obviously, this technology, like the wiki approach, fosters the ideas of judgment and intergroup rivalry through the contribution of their own experiences. Therefore, wiki and blogging together can tackle the emerging knowledge, social capital and collective enterprise intelligence created by groups of knowledge workers.

- Forums could be considered a mixed approach for tracking ideas, halfway between wikis and blogs. Like them,

they foster three innovative factors: inner judge of contents because the ideas discussed on forums are commented, variety of ideas because participation is open, and publishers and enforcement of conformity as the final goal is to jointly reach a solution for everyone.

- Forge and CSCW technologies manage to bring developers, end users and partners within the community together, fostering the diversity of human resources dedicated to a project. These technologies also allow everyone to bring their own expertise to bear and enforce contribution sharing. Finally, forges can be considered as huge source repositories and task organizers, and can thus also be regarded as resource shifters.

- Certified developers offer a high level of decentralization and diversity in each Morfeo initiative. This is vital for ultimately fostering open innovation.

- Folksonomies are related to resource visibility, as well as to resource discovery and recommendation issues. The use of a relaxed taxonomy based on tagging and created by end users improves the diversity of knowledge related to such resources, and the collaborative intelligence present in the community can be better emerged. Tagging processes, folksomonies and tag clouds support two major key factors of innovation. First, they allow diversity in the semantic enrichment of resources. Each end user can use different concepts to mark and tag resources (this process enriches the resource's information with user-centric semantic data) allowing the collective intelligence to be exploited in unexpected ways. Second,tag clouds can be very useful as data shifters because each concept is linked to all the related projects, knowledge, resources or developments in the whole community.

- Morfeo's project workflow acts as a resource shifter itself, enabling anyone in the Morfeo community to exploit all the current and past knowledge and expertise deployed in Morfeo in order to enrich any project with the information and guidelines generated by Morfeo.

- The social networking idea promotes rivalry and communication between Morfeo's end users in a social network, using several communication channels to increase the dialogue in the whole community (chats, meetings, RSS feeds, and so on). Users usually follow a "do-it-yourself" philosophy in this social networking establishment. This philosophy encourages both the independence of end users from the service providers and legacy systems, and the independence of the collective intelligence from the traditional barriers to innovation.

From Morfeo's successful results and considering how Morfeo has been able to combine all the ideas presented by McAfee, Bloom and Surowiecki, we can conclude that Morfeo has developed a framework that exploits all of the advantages of Web 2.0 and is conceived to lay the foundations for open innovation by supporting, managing, emerging and exploiting the collective intelligence from an open user-centered revolutionary viewpoint.

2.2 Morfeo Models for Project Management

Morfeo is a project-driven open innovation community. The projects hosted by the community are open to the participation of any interested collaborating entity, and the community is receptive to new innovative projects, even if led by what were previously community non-members. The project management models that are currently been used in Morfeo to successfully foster innovation and collaboration within the community are:

Business Model In this model a sponsor (organization or consortium) decides to lead an open source software project, where the characteristics of the Management Committee will be:

- The sponsor will retain control over the project design and management decisions by nominating or joining the Project Management Committee.
- The sponsor leads the project from the very start and is the only member that can transfer this position if it opts to drop out of the project.
- The leader reserves the right to change this model if it sees fit and again subject to the condition that it is approved by the Community's Board of Directors.

Foundational Model The foundational model targets project leaders that intend to maximize the contributions gained from the collaborator development community.

The foundational model is based exclusively on meritocracy as a method of government. Whereas the documentation on open software communities has already described the enormous benefits of this model, it is very important to note the possible difficulties that a company that opts for this model could come up against. They are in principle wholly related to community government:

- The project is governed entirely by a meritocracy; project leadership is not permanent and can be changed democratically.
- Being entitled to a say in and membership of the project management committee, individual developers could constitute a big enough group to become project leaders on their account, provided they get together to elect a leader and the leader is approved by the Community's Board of Directors.

Consortium Model The consortium model is created for projects with representation from more than one company. The companies should reach an agreement to select the Project Manager, as well as the power sharing in the Project Management Committee. This agreement will normally be set out in a contract. The consortium should submit this contract or an organizational document summarizing the project characteristics for acceptance by Morfeo's Board of Directors. This will be a binding agreement that should be respected by both the consortium and Morfeo, although the consortium could change the terms of the contract provided that all the parties agree and it is approved by Morfeo's Board of Directors.

2.3 Success and Impact of Morfeo

Morfeo offers several competitive advantages that have been repeatedly corroborated both on the Spanish and European research and development horizon. The open innovation community provides a plural and dynamic forum for establishing synergies and fostering the in-house development of initiatives, encouraging the participation and collaboration between highly competitivenational and international partners. Regarding Morfeo's solutions and results, the framework has proved its soundness only too well:

- Each proposal has been adequately evolved and continued, and the finished projects have been positively evaluated
- Morfeo's initiatives have a great European-wide acceptance
- Morfeo highly visible in technological platforms from both Spain (INES) and Europe (NESSI)
- Morfeo is currently an active stakeholder in standardization bodies like W3C.

All these guarantees and references amount to a clear competitive advantage for energizing future proposals of R&D&I activities and fostering open innovation in Ibero-America.

In recent years, Morfeo has led several major projects and initiatives from a wide range of IT paradigms. Each project evolved adequately from the start, achieving a very good acceptance and success rate. To illustrate the evolution of Morfeo's R&D&I activity over the last few years, Figure 2 shows a simple budget progress chart. It is not hard to appreciate Morfeo's growth and its increasing economic impact as an innovation platform. In addition, all the projects have been successfully followed up and gained more and more economic and prestige support in time.
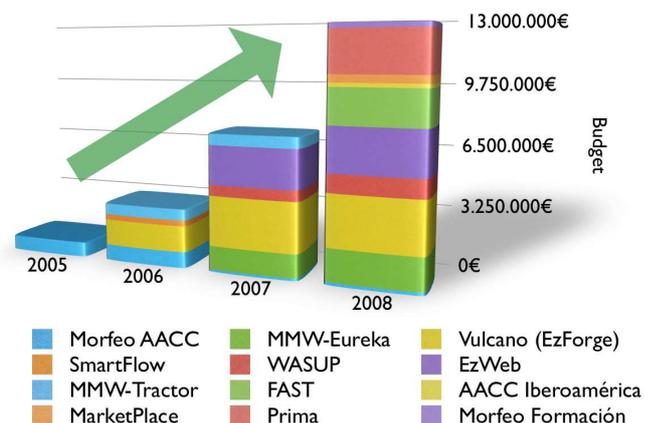

Figure 2: Morfeo's budget progress

In the following, we will summarize several of Morfeo's innovative proposals and their impact, elaborating on a number of Morfeo's project success stories.

2.3.1 Innovative Challenges and Ambitions Raised by Morfeo

One of the most important challenges raised by Morfeo is the formation of the Open Alliance for Service Front-Ends, an open innovation initiative to lead the European research and deployment in the field of service front-ends. Internet users are expecting the Web to provide support for daily activities, acting as the front-end through which they will gain access to and mix services (either application services, content/data delivery services) that they really find useful, matching their needs at any time in a context/knowledge-aware manner. Therefore, the objective of the Open Coalition on Service Front-Ends is to set up an Open Global Alliance aimed at effectively managing open innovation sourcing from Morfeo to deliver:

- A common vision of the technologies and architecture associated with service front-ends in the future Internet of Services

- Open specifications and, potentially, open source reference implementations of components in the envisioned architecture

The key idea behind all Morfeo's international and national success and the bulk of accepted projects and budgets supported by European Commission is that Europe does not want to miss the Internet train and has come to trust Morfeo to lead its R&D&I investments. No one really knows what the World Wide Web will look like in a few years' time, but there are research solutions like Morfeo that suggest part of the landscape of the future Internet.

The European Commission fosters the creation of interest groups to set the future net trends and standards. As a result of these efforts, a large number of projects sponsored through the EU Framework Programs signed the BLED declaration, pledging to "Build upon the obligations of our individual project contracts and the goals of the Strategic Agendas of the European Technology Platforms". Following this philosophy, Morfeo's ambitions include:

- Fostering Favorable Conditions through Coordinated Action

- Jointly Designing, Developing and Experimenting

- Increasing Awareness at Policy Level

The signatory parties also state that "To help meet these major challenges, it is important to call on the:

- European Member States to strengthen and coordinate their national R&D efforts and initiatives toward the Future Internet.

- European Commission to stress the vision and amplify the related R&D in order to drive Europe ahead of tomorrow's Internet transformations in the way we work, live, and interact.

- European Member States and the European Commission to support the creation and activities of the European Future Internet Assembly proposed in this declaration."

Shortly afterwards, the EC launched the creation of the working groups in different key areas. Morfeo accepted to lead the "service front end" working group, an exciting challenge that will bring together projects with common interests and will make the most of its synergies. FAST, together with the NESSI strategic project, EzWeb, will take active part in the definition of the standards and strategy in the future evolution of the external layer of networked applications.

2.3.2 Morfeo's Innovation and Management Success Stories

Morfeo's current proposals are mainly focused on the Future of the Web, and the research and development of revolutionary WWW technologies and ubiquitous web applications. These initiatives prove the viability of the Morfeo's organizational model when dealing with open innovation in complex scenarios such as the evolution of the Web and the Future of the Internet. All these initiatives are targeted at covering a significant part of a future open SOA architecture. This is major challenge in terms of coordination, as well as effective knowledge management and innovation flow. Noteworthy projects in this respect are:

- EzWeb[1] pursues the development of an enriched enterprise mash-up platform and the development of key technologies to be employed in building the front-end layer of a gadget-based new generation SOA architecture. A gadget is a component that encapsulates content and services that can be deployed on desktops, mobile phones and the web. These movable mini-applications enable users to craft their personal digital space to meet their unique needs and requirements. It is undeniable that gadgets have generated significant interest, reshaping the landscape of the WWW and having become a standard functional feature of the most predominant operating systems. However, the true potential of gadgets remains untapped as only those possessing the necessary competence are able to develop and mash-up gadgets. EzWeb creates an Enterprise 2.0 mash-up platform that is able to interconnect, remix, fix and customize several gadgets importing and exporting this mash-ups from a user-friendly catalogue. This way users can self-create workspaces that exactly meet their needs, because it is the users themselves (without programming skills) that really create and exploit these dashboards.

- FAST[2] aims to provide an innovative visual programming environment that will facilitate the development of next-generation composite user interfaces. It is a novel approach to application composition and business process definition from a top-down user-centric perspective. The main aim of the FAST project is to lower the technical expertise necessary for someone to build their own gadgets for social and work purposes. This will enable more users to create and develop gadgets, thereby addressing The Long Tail of technology adopters. This aim is achieved by developing a visual Integrated Development Environment (IDE) for gadgets, with strong emphasis on high usability and user friendliness. The FAST IDE uses intuitive storyboarding techniques as its foundational paradigm, adopting

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[1]EzWeb Project, http://ezweb.morfeo-project.org
[2]FAST Project, http://www.fast-project.eu

the use of visual flows supported by control constructs that the user can visually manipulate and combine together. However, the FAST IDE also accommodates the needs of more technically oriented users by providing scoped access to the FAST development language and allowing the integration of common web technologies (e.g. AJAX, Javascript, etc). The FAST IDE is designed to ease the construction of gadgets, enabling users to manage the life cycle of all their gadgets in an integrated manner rather than on an individual basis.

- MyMobileWeb[3] is the open source reference implementation of the next-generation content and application adaptation platform for the mobile web. MyMobileWeb enables the (time-to-market) creation of high quality mobile applications capable of adapting to multiple delivery contexts. Therefore, MyMobileWeb is a mobile Web software platform that facilitates the development of applications and mobile sites. MyMobileWeb is currently working on the definition of new standards that will enable the creation of shareable definitions of mobile Web applications and the introduction of semantic Web technologies to enhance the mobile Web user experience. In addition, MyMobileWeb is the only open-source mobile Web solution that has been recommended to create dotMobi sites, the high level domain for providing web pages and services for mobile devices.

In addition, Morfeo acts as innovation catalyst in several projects focused on other IT sectors, like quality platforms for open source development and management such as Qualipso, business support (with key projects, like PRIMA, WASUP or Smartflow, offering BPMs an Enterprise 2.0-oriented Web-based API) or SOI Middleware (with very important CORBA and SOA platforms).

These success stories and activities have successfully attracted the interest of other consortia. Other, Ibero-American consortia can learn from all these European efforts, supporting Morfeo and its major projects, and take an active part in the future WWW.

3. SHIFTING THE SUCCESSFUL MORFEO MODEL TO IBERO-AMERICA

Morfeo has proved to be a powerful tool for producing, fostering and exploiting the collective intelligence, listening to the requirements and finally meeting the needs of enterprises, groups and users creating new opportunities to produce innovative Web technologies. This way, Morfeo is leading current Spanish innovative IT developments and efforts, and it is having a growing influence on the IT and WWW scene all over the European Union. The most relevant evidence is in this respect is that Morfeo's key projects, like Qualipso and FAST, are supported by the European Commission under the first call of its Sixth and Seventh Framework Programs, respectively.

Morfeo's current strategy of international relationships is shaping up to attract high participation and visibility in both Europe and Ibero-America.

In Europe, Morfeo is working closely with the NESSI Technology Platform. One of the main objectives of this

[3]MyMobileWeb Project, http://mymobileweb.morfeo-project.org

relationship is to define a Service-Oriented Reference Architecture, based on open standards and open collaboration in open software reference implementations. This way, Morfeo is currently leading the most part of European innovation using the outlined framework focused on fostering open innovation:

- Morfeo is the NESSI open software group that kicked off at the beginning of 2008, starting with the objectives defined jointly during 2007.

- Morfeo is participating in the ambitious NEXOF-RA project, which is to define the whole NESSI reference architecture. In addition it will be responsible for leading the standardization process of all new technologies based on open source reference implementations.

- Over the past few years, several European partners like DERI-Galway, SAP, University of Kassel and Cyntelix joined the Morfeo community. These new members have enrolled due to the fact that Morfeo leads some strategic NESSI projects, like FAST and MyMobileWeb.

This European appreciation proves Morfeo's success and encourages other partners, enterprises and countries to take advantage of similar open innovation frameworks. Adding another facet to Morfeo's keys to success, there are intimate and human side aspects that perhaps justify its resounding effectiveness. Morfeo turned out to be very useful for creating new bonds and strengthening relationships between communities and partnerships thanks to its open and user-friendly approach, and its underlying Latin culture metaphor. For this reason, other Ibero-American countries could simply imitate this framework model that has been cultivated and matured in Spain, an integral part of the Ibero-American culture, with similar success and benefits.

In fact, the Morfeo model and framework has been reviewed by several Ibero-American organizations that are currently interested in its adoption. Morfeo has already established contacts in Ibero-America with several business and university organizations with a view to setting up a Morfeo Office to coordinate the community's activities in this region. More to the point, Morfeo has carried out several dissemination and publicity activities at major Ibero-American events, earning a lot of recognition and support from many partners interested in benefiting from the Morfeo community:

- Brazil has recently adopted the Morfeo framework, which was well received at the last Campus Party in Sao Paulo, 2008. Morfeo presented the innovative EzWeb and MyMobileWeb WWW technologies, as well as the actual community framework and ideology.

- EzWeb and MyMobileWeb and the frameworks were also presented at the 9th International Open Source Forum (FISL) in Porto Alegre, Brazil, held in April 2008, again attracting a big share of Ibero-American interest.

More proof that Morfeo is becoming established in Ibero-America are the twin projects named Morfeo Training and Morfeo Training in Ibero-America. These projects are going to be managed jointly with similar efforts, infrastructure

and investment by Morfeo in Spain and Ibero-America, respectively. This initiative could be considered as a proof of concept about the feasibility of satisfactorily migrating Morfeo to all of Ibero-America. The project proposes the development of an educational program, focused on satisfying the training needs for open and innovative technologies (e.g. WWW technologies) of an enterprise collective made up of three groups: IT professionals, IT providers, and IT users and consumers. A summary of the features and general goals of both projects follows:

- The project's main objective is to foster the innovation, research and development of open technologies. The evolution of the new Internet and new communication opportunities and channels foster a new way of carrying out daily activities, marked by a pronounced social and collaborative influence. Therefore, a new work philosophy is emerging in the software development field, based on social collaboration and the exploitation of collective intelligence, ultimately leading to open innovation. This new philosophy has been growing in industry and business at a rate of knots, and Morfeo expects to lead the formation of the IT crowd at all application levels in this new social and technological movement.

- Both projects aim to create a certification process for the students brought up on new open technologies. This milestone intends to bring together all students, from anywhere, homogeneously, breaking down Ibero-American cultural barriers.

- The formative process is managed as distance learning, but supported by the local presence of the Morfeo community. This demands setting up Morfeo branches in Ibero-America, which would mean the first rapprochement between the Morfeo framework and community and other Ibero-American countries.

- The learning guidelines are divided in two separate levels:

  - The formative process of IT center personnel and the development of virtualized courses

  - The training and education of end users about tools, frameworks and technologies.

Morfeo Training Ibero-America is a first step in the whole Ibero-American adoption of new open initiatives based on collaboration and collective intelligence in South America, establishing at the same time an enriching parallelism between a project matured in a well-known cultural medium like the Morfeo collective in Spain, and this same proposal in a new territory with a similar culture. This way it would be possible to identify future pros and cons when it comes to moving Morfeo across other frontiers.

In conclusion, the spread of Morfeo to Ibero-America, and the application of its success and winning models and frameworks to the Latin brotherhood, is closer to becoming a reality everyday. It's only a matter of time until more and more Ibero-American countries adopt Morfeo's principles and the open innovation initiative, reaching new heights at the head of IT and WWW technologies research and development.

4. CONCLUSIONS

Morfeo Open Source Community proposes a collaboration model specifically designed to foster enterprises, SME's, universities and research centres work jointly to others in the new century innovation endeavor. Using the web collaborative resources and, more important, producing the new Web solutions, this model allows merge very different competitive advantages: From dynamical small and smart companies, the only ones those are able to test a wider market opportunities, to huge and powerful companies those are able to develop, support and promote the creation of open standards. From universities, the only ones those are able to reduce the risk of the research activity to research centers those are able to effective dissemination of the results, involving lots of SME's in integration and commercialization task that complete the technological chain of value. The results are a big set of technologies incubated in the community and a increasing number of consortium where each stage of R&D&i process is accomplished by the meritocratic selection of the best candidate. In term of budget, the data are evident. During the first four years the budget of projects incubated in the community has doubled year by year. Morfeo is a reference in IT within Spain and Europe and we hope that very soon the same success story can be told about Morfeo in Ibero-America.

5. ACKNOWLEDGMENTS

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