Small or medium-scale focused research project (STREP)

Full proposal

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Emergence by Design
MD

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Proposal Abstract:

MD research aspires to satisfy two kinds of objective. The first is to develop the foundations of a theory of innovation dynamics that concatenates design and emergence. The second is to design a set of processes, enabled in part by new ICT, that can help to mobilize civil society to construct a socially sustainable future. These processes will assist the managers of online communities of networks of innovators to enhance the generative potential of relationships among members of these communities; monitor innovation cascades to detect signals pointing to the onset of endogenously generated social crises, as part of a system innovation policy that goes beyond the current strategy of priming the pump of invention; and implement a new kind of dynamic evaluation for socially-oriented innovation projects, which can provide stakeholders with a multivalent representation of the social consequences induced by the projects to help them steer the resulting cascades of change in socially positive directions. The process designs will be informed by the theory, and the theory will be informed by the experience of consortium partners immersed in the world of relevant practice.

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Section 1: Scientific and/or technical quality, relevant to the topics addressed by the call

1.1 Targeted breakthrough and long-term vision

The MD consortium is extremely heterogeneous. In particular, it consists of three very different kinds of entities:

- The UNIVE, INRIA and CTH units include scientists from a variety of disciplines (archaeology, economics, physics, computer science), who have made major contributions to complex systems research. They share a commitment to understanding innovation processes and social change from a complexity perspective.
- HubNL, EN and KL units are practitioners from the emerging world of social innovation. They facilitate the formation and functioning of networks of "social innovators," people and organizations who initiate and carry out projects designed to instantiate, and enhance, social values.
- 24amp, Factlink and Tech4i2 are SMEs specializing in the development and use of knowledge management and social communication technologies.

The project's long-term vision arises from a fusion of our members' aspirations and competences. This vision can be summarized as follows: **to mobilize civil society to construct a socially sustainable future**. **To move towards this vision, we need to design new processes, powered by new ICT solutions, informed by new theory.** This summary requires a lot of un-packing. It also requires a codicil, which is the slogan of one of our practioner consortium members: "Big ambitions, small steps."

We proceed as follows. First, we introduce a series of concepts that together render intelligible the project vision stated above. Second, we use these concepts to state the breakthroughs towards the achieving of this vision that we hope MD research can provide. Third, we state the concrete objectives these targeted breakthroughs imply, and we sketch how these objectives will be addressed by the proposed research, described in detail in section 1.3 below.

Vision

Innovation cascades and their endogenous social crises MD's vision is premised on the idea that our current society is facing a grave meta-crisis, which will be extremely difficult to resolve via the economic and political processes we have come to rely on to deal with the challenges with which this meta-crisis confronts us. We propose to frame an alternative set of processes, in which the pre-eminent role is played neither by economic nor political actors, but by civil society (and we will explain what we mean by this term). We begin by introducing some ideas on innovation dynamics, which will allow us to formulate the nature of the meta-crisis and the reason for which we need to develop new processes to deal with it.[1]

By *innovation*, we refer to the processes through which new artifacts[2] are conceived, designed, produced and integrated into patterns of use. These processes necessarily involve the construction of new patterns of interaction among agents,[3] and hence transformations in the organization of what we may call agent space. Thus there is an inextricable linkage between the dynamics of change in the space of artifacts and in the space of agents. These dynamics are mediated by the way in which the relevant agents represent the contexts in which they act: in

[1] These ideas were developed by members of the MD consortium and their collaborators in the FET-sponsored FP5 ISCOM (Information Society as a Complex System) project. See Lane D, D Pumain, S van der Leeuw, G West (eds.), *Complexity Perspectives on Innovation and Social Change* (Spinger Verlag, 2009) for an account of the relevant ISCOM research results.

[2] By "artifacts", we mean anything produced by human beings for the use of (generally other) human beings. Artifacts may be physical, informational or performative. So "artifact innovation" includes process innovation, marketing innovation, artistic innovation.

[3] By agents, we mean human beings and organizations whose interactions with one another (and with artifacts) constitute social, political and economic phenomena. Lane et al. (2009), Ch. 1, provides the basis of a theory of agent organization, which in particular permits the attribution of representations and needs to them (not just to individual human beings), as we do in the sentences that follow this footnote.

particular, their attributions about the identity of the other agents with whom they interact and the functionality of the artifacts around which their interactions are organized; moreover, the incorporation of artifacts instantiating these new attributions of functionality into patterns of use by agents can lead to new *values* and, eventually, new *needs* on the part of these agents.

The key idea about innovation dynamics that MD takes from ISCOM research is that innovations occur in *cascades* – which link the generation of new artifact types, organizational transformations and new attributions of functionality. Moreover, these cascades are frequently driven by a positive feedback dynamic, *exaptive bootstrapping*,[4] which works like this:

1. New artifact types are designed to achieve some particular attribution of functionality.
2. Organizational transformations are constructed to proliferate the use of tokens of the new type.
3. Novel patterns of human interaction emerge around these artifacts in use.
4. New attributions of functionality are generated to describe what the participants in these interactions are obtaining or might obtain from them.[5]
5. New artifacts are designed to instantiate the new attributed functionality.

The cascades that result from this positive feedback dynamic, characterized as they are by the generation of new attributions and the emergence of new patterns of agent interaction, are anything but linear and predictable.[6] We illustrate this point by an example drawn from the early days of print. The story begins with a new attribution of functionality, by the great Venetian printer-publisher Aldo Manuzio, for the act of reading. Prior to 1500, reading had changed little from the days of the manuscript, preceding Gutenberg's invention of movable type. It was a formal, almost sacral event, as illustrated by Antonello's famous portrait of St. Jerome in the National Gallery in London,[7] in which St. Jerome is pictured in his study, wearing his best robes, in front of an imposing massive folio volume, whose margins were very likely crammed with comments by previous learned readers, interposing themselves between him and the text he is intent on studying.

Manuzio developed an alternative conception of reading as edifying recreation, to be carried out anywhere and any time.[8] He produced a series of editions of classic texts, printed in octavo, the first "pocket books," with introductions but no comments (enabling direct interaction between writer and reader), using his new italics font and new forms of punctuation (commas, apostrophes to indicate omitted letters, etc.), designed to enhance rapid (and silent) readability. Manuzio's young friend Pietro Bembo convinced him to publish texts in the series not only by Aldo's beloved ancient authors, but also in "volgare" – the first edition of which a Petrarch volume, published in 1501.[9] The series and in particular the Petrarch volume enjoyed a great success. Small, readable editions in volgare rapidly took over the market -- by 1540, they comprised over half of all books published in Venice, the printing capital of Europe. This was no process of passive diffusion or simple imitation: the new format enabled the recruitment of a new reading public, who could read volgare, but not Latin or Greek, and who could afford the increasingly cheap editions aimed at them (see footnote 8); new kinds of content were developed, designed to appeal to these new readers, including books of popular science ("secrets of nature"), letter collections giving insight into the lives of the great and powerful as well as guides to good writing style; almanacs and more; and new

[4] Lane et al. (2009), Ch. 1.

[5] This is where exaptation enters the story.

[6] Thus, the innovation literatures that concentrate on such phenomena as technological trajectories, supposed artifact-space dynamic regularities like Moore's Law, passive adoption processes in the course of which neither artifacts, organizations or attributions change ("innovation diffusion"), or "trickle-down" pathways that lead from breakthroughs in science to surprise-free developments in applied science to engineering advances to new products – all these have little of interest to say about the innovation cascades in agent-artifact space that, as we shall shortly argue, lie at the heart of 21st century innovation dynamics.

[7] See www.nationalgallery.org.uk/paintings/antonello-da-messina-saint-jerome-in-his-study

[8] Lowry, M, *The World of Aldus Manutius: Business and Scholarship in Renaissance Venice*. (Blackwell, 1979) offers some interesting speculation about why and how Manuzio came to this idea. Lowry effectively and definitively challenges the claim frequently encountered in the literature that the changes in size and font associated with this new attribution were really designed just to lower production costs and purchase price: this exaptation of Manuzio's innovation was due to printers in Lyons, who quickly produced low-cost copies of Manuzio's editions, taking advantage of the savings in paper associated with the elimination of comments and italics (which allow more characters per line than standard fonts). This exaptation was important in fueling the cascade sketched in the text above.

[9] In his introduction to this volume, Bembo developed an evolutionary theory of the volgare as a literary language, according to which the culmination was reached in the early 14th century Tuscan dialect of Petrarch and Boccaccio. This theory spurred a debate, involving such other notables as Castiglione and Machiavelli, with alternative proposals, which culminated with Bembo's triumphant "invention" of Italian in his 1525 *Prosa della volgar lingua*. So another emergent outcome of the innovation cascade described above is the birth of a (or rather the resurrection of a dead) language!

social roles emerged, including especially the first professional authors, who scraped out a living supplying this new content (the so-called "polygraphs").[10] These developments, compressed into a relatively short three decades, would have been impossible for anyone to foresee (however inevitable they may appear to us *a posteriori*), and they had very far-reaching social, cultural, political and eocnomic implications.

In the centuries since the introduction of printing, positive feedback innovation dynamics have become ever more important in the organization and collective imagination of Western[11] society. New organizational forms have emerged, whose principal functionality is to implement each step in the exaptive bootstrapping dynamic. For example, over the past 140 years, a plethora of engineering professions have arisen that support the training of, provide collective memory for, and establish communication networks among, people whose work consists of designing artifacts to deliver a specified functionality – exaptive bootstrapping's first step. Many of these engineers are employed in industrial and state-sponsored R&D laboratories, a 20th century organizational innovation; over the past half-century, and in particular the last two decades, their work is increasingly enabled by research that derives from new forms of formal and informal industrial-university partnership. Passing to exaptive bootstrapping's second step, the advertising industry over the last century has played a key role in translating new attributions of functionality into new needs, which over the last several decades are increasingly centered not on physical or biological requirements for sustenance, shelter or comfort, but on artifact-mediated attributions of individual and social identity. And the marketing profession over the last 50 years or so has developed increasingly sensitive instruments for uncovering new uses for existing artifacts (step 3), converting them into new attributions of functionality, and discovering agents who might conceivably come to engage in patterns of interaction with artifacts and other agents in which these new functionalities will provide them with the satisfaction of new needs (step 4). By providing an organizational scaffolding for the component processes of the exaptive bootstrapping dynamic, these innovations force the rate at which its cycles are enacted, generating innovation cascades that move with an ever-increasing velocity. Moreover, the successive waves of innovation in transportation and communication technologies that have taken place over the last two centuries, and the transformations in economic and political organization to which they have in large measure contributed have generated a corresponding expansion in the spatial scale over which innovation cascades operate. With these drastic increases in the temporal rate and spatial scale of innovation cascades, our social dynamics have become innovation dependent.

This dependence has created, and in turn is sustained by, an increasingly widespread way of thinking about innovation and its social, economic and political relevance, which we will term the Innovation Society ideology. This ideology, we claim, underlies almost all current discourse about business strategy and governmental policy. The following four propositions form its central core:

1. The principal aim of policy is *sustained economic growth*, interpreted as a steady increase in GDP.
2. The engine of this growth is *innovation*, interpreted as the creation of new kinds of artifacts.
3. Which new kinds of artifacts have value is decided by the *market*.
4. The price to pay for not innovating, or for subordinating innovation to other values, like cultural enrichment or social justice is prohibitively high: competition, at the level of firms and of national economies, dooms dawdlers to failure, which translates into economic decline and social chaos.

Any particular way of thinking about a complex phenomenon will illuminate some of its aspects, while it will enshroud others in shadows. The Innovation Society ideology focuses on only three outcomes for innovation processes: new artifacts, jobs and economic growth. In contrast, our account of innovation cascades highlights the emergent transformations in social organization and attributions, which we see as inextricably linked to the processes through which new artifacts enter into patterns of social interaction. From our point of view, some of the most difficult and unsettling societal challenges we currently face stand revealed as emergent outcomes of the very innovation processes that the Innovation Society interprets as the key to constructing our collective future: from the financial crisis and its devastating aftermath, to overburdened and increasingly costly health care systems, through the specters of climate change, environmental pollution and natural resource depletion. These crises – and many more – are, we claim, *endogenous* to the way our society organizes it innovation processes.

How can the Innovation Society responds to these crises? Its ideology offers space for two kinds of response, one primarily economic and the other political, in which the latter plays a subordinate role to the former. The economic response is via market-driven innovation: the market responds to opportunities to remediate the adverse consequences that innovation cascades may generate; how often have we heard offered the incantation "Innovate, innovate, innovate!" as the solution to all the problems that confront us? But it is becoming increasingly obvious

[10] See Lane, D, Complexity and innovation dynamics, in C. Antonelli (ed.), *Handbook on the Economic Complexity of Technological Change* (Edward Elgar, 2011) for a more detailed account of this innovation cascade and further references.
[11] And more recently, a large segment of Eastern as well.

that, despite its undeniable creativity in generating novelty, the market is not quick in detecting the negative consequences of innovation cascades, nor is it efficient in responding to them when it does detect them, whether they manifest themselves at the individual or the societal level. If the lesson of the climate change crisis is not sufficient to drive this point home, think instead about the current obesity epidemic, particularly in the U.S., which many in the public health community identify as the principal public health challenge of the 21st century. This epidemic arose from cascading innovations in agriculture (producing a huge surplus in cheap available calories), processed foods and new distribution channels for them, especially fast food restaurants (providing higher returns to producers and distributers from the cheap calory surplus), and changing patterns of consumption that emerged in response to these innovations. The "market" indeed responded to this innovation with another cascade of innovations, in the diet (including even more new kinds of processed foods and distribution channels) and pharmaceutical industries, among others; all of which have produced huge market successes, with no discernible effect in decreasing the epidemic (indeed, there are some indications that some of the attributional shifts and social transformations associated with these innovation cascades have actually augmented negative consequences for health and well-being).

The Innovation Society ideology guarantees that innovation policy is a high priority for governments at all levels, from the local to the European. For the most part, such policies are designed to prime the pump of invention: that is, create a favorable environment for firms to bring new artifact types to market, leaving to the market itself the task of sorting out which of these have value and which not. The political response to crises, once detected, is to try to support the processes that will bias the pump-priming towards the invention of new artifacts whose functionality will ameliorate in some way the crisis' negative consequences. There are in general many possible pathways by which such a strategy could be implemented (think of climate change: policies designed to encourage innovation in alternative energy technologies range from emission regulations, to carbon taxes, to public funding for or incentives for private investment in targeted R&D). Political discourse under the Innovation Society ideology is about which of these strategies to pursue. It does not address the question of how to organize processes that will provide early detection of potentially negative consequences of innovation cascades. Nor does it address (nor *could* it, without challenging the very premises of the Innovation Society ideology) the even more fundamental question: how to organize processes that would pro-actively steer innovation cascades in socially positive directions.

We believe that these two questions should be placed on the table. The current set of detected endogenous social crises generated by the way in which our society organizes innovation processes – not to mention existing crises we haven't yet managed to detect or crises yet to emerge – challenges the very sustainability of our Innovation Society. We next sketch a possible approach to addressing our two questions.

Civil society, pms and DIPOs Our analysis up to this point suggests it is unlikely that initiatives designed to reorganize innovation processes in order to construct a socially sustainable future will emerge from discourses or practices currently going on in either the economic or the political domain. Obviously, both must become engaged in the transformation process if such a reorganization can be achieved, but we believe that the leadership in designing and initiating such a process will be provided instead by *civil society*. For us, civil society is composed of organizations, the directedness of whose activities are provided primarily by attributions[12] of the social good that will accrue from them. Civil society organizations are often defined in contradistinction to state and market organizations: unlike state organizations, civil society organizations do not have recourse to force to induce individuals and organizations to participate in the processes they initiate; unlike market organizations, the primary directedness of a civil society organization cannot be the pursuit of profit.[13] Civil society organizations take many forms (e.g. professional associations, charities and foundations, think-tanks), engage in many different kinds of activities (e.g. assistance to the disadvantaged and underprivileged, sponsoring cultural events, enhancing the environment, lobbying governments), and entertain a great variety of (often contradictory) attributions of what constitutes the common good. Morever, individuals may belong to (or participate in the activities of) a great many different civil society organizations – exiting and entering at will. As a result, the *organization* of civil society is exceedingly complex – much more so than the zones of agent-space pertaining primarily to state or market; thus,

[12] These action-directing attributions of value are the organization's: see footnote 3.

[13] In fact, the tripartite partition (state, market, civil society) is only at best a useful first approximation: the boundaries between these three kinds of organization can be quite fuzzy (think for example of the growing "social entrepreurship" movement); and many activities initiated by civil society organizations require for their successful completion recurring patterns of interaction with organizations of one or both of the other two types. Indeed, a satisfying, precise definition of civil society would require the development of a theory of social organization, to provide the concepts and categories in terms of which such a definition could be formulated. Developing such a theory is closely related to what we propose to do in WP 2, Task 2 below.

the idea of *mobilizing* civil society for anything – much less to change the way society organizes innovation, in which both state and market are so heavily invested – may seem at first sight fanciful in the extreme. It turns out, though, that the contrary is the case: the very complexity of civil society's organization – its heterogeneity and its heterarchy[14] – lies at the core of the two ideas we now present for how civil society can help reorganize innovation processes to induce socially sustainable innovation dynamics. In particular, they both involve reconceptualizations of innovation policy, different from governmental action to prime the pump of invention.

The first reconceptualization retains the conventional idea that the locus of policy making is government (be it local, regional, national or European). Its novelty follows from the contention that innovation policy should be based on a systemic understanding of innovation cascades, and in particular on the intertwining of *design* and *emergence* in those dynamics. That is, innovation policy should be directed not just towards encouraging the design of new technologies and artifact types, but also towards uncovering and generating rapid responses, when appropriate, to emergent consequences as tokens of these new types get incorporated into new patterns of interaction among agents and artifacts. The idea for how to go about this daunting task is based on an analogy with an innovation in pharmaceutical innovation policy, which emerged in the wake of the Thalidomide tragedy. Thalidomide was a frequently prescribed sedative in Europe and Australia, in the late 1950's. In that same period, an epidemic – more than 10,000 cases, 2500 in W. Germany alone – of a previously rare birth defect, phocomelia, broke out. In a brilliant piece of scientific detective work, the epidemic was traced to fetal exposure to Thalidomide, assumed by the mother to help her sleep. The subsequent public outcry produced a change in drug regulatory policy, which up to that time had required rigorous testing for efficacy and safety of new pharmaceuticals before they were licensed for use, but no provisions for following what happened with the drug once it was marketed. With the post-Thalidomide mandating of postmarketing surveillance (pms) processes, initially designed just to uncover possible linkages of adverse events with pharmaceuticals, a systemic perspective on pharmaceutical innovation began to emerge within regulatory agencies, pharmaceutical companies and academia. This perspective led to much more intensive monitoring of the postmarketing environment – not only of adverse events, but also of emergent patterns in prescribing and usage behaviors. Many previously unsuspected features of pharmaceutical innovation dynamics uncovered through these new kinds of investigations led to significant changes in drug policy processes – not only with respect to postmarketing phenomena, but to the organization of the search for new potentially useful molecules and the premarketing approval process as well.

The pms systems that were put in place by national governments after Thalidomide relied on signals initiated by a network of experts positioned to see what happened as the new artifacts were incorporated into patterns of use, to identify unexpected adverse events and to (learn how to) interpret which of these might potentially be causally linked to interactions involving the new artifacts: prescribing physicians. This network nearly "covered" the network of agents interacting with the new artifact, a key ingredient to the systems' rapid detection capabilities. Is it possible to envisage the construction of a network of experts with similar properties to monitor innovation cascades in general?[15] Obviously, the relevant expertise potentially spans a much greater range of phenomena than those associated with adverse events to drugs, and the zones of agent-artifact space perturbed by many new artifact types are much more difficult to identify, never mind have access to, than the populations of patients who obtain prescriptions for pharmaceuticals. But collectively, precisely because of the heterogeneity and heterarchy of civil society, civil society organizations can provide the links to practice, the capacity to identify social transformations in practically any zone of agent-artifact space, and competences that could potentially be combined to become expertise in interpreting causal linkages between artifact innovation, social transformation and attributional shifts. The problem is how to recruit networks of these organizations that can initiate activities directed towards detecting untoward social consequences of innovation cascades.[16] There are at least two reasons to believe that in the long-

[14] With respect to values, unlike the market (where at least conceptually, value is just utility or profit); and with respect to control, unlike the state (where power – at least in the sense of permissions to issue orders and enforce adherence to them – concentrates the higher one ascends in the governmental hierarchy; while the information on the basis of which the orders are issued flows in the opposite direction).

[15] There is an increasing interest in harvesting the incredible amount of data about social processes currently being generated (not to mention generating even more) and subjecting these data to automated data (and text) mining procedures to extract signals of social transformations and attributional shifts. This is very exciting work, and it will need to be integrated into any systemic innovation cascade monitoring. What we do not believe is that automated analysis alone will be able to interpret these signals to construct causally convincing narratives of innovation cascades, which can provide the basis for generating actions to steer these cascades in socially positive directions. For this, we think competences and connections distributed through civil society will be essential, and hence so will be processes for mobilizing them.

[16] The research proposed in WP 5 Task 2 has as its aim to figure out how to construct such networks, what they would do, and how their activities would fit into a systemic innovation policy.

term this problem may be solvable. The first is that social values are paramount for these organizations; if the metanarrative about the unsustainability of the Innovation Society resonates with them, they will have a strong incentive for aligning their activities with other civil society organizations in a network such as we just described.[17] The second is that there already exists considerable experience and competence in facilitating the formation and functioning of networks of civil society organizations, to launch and carry out socially innovative initiatives. Indeed, there are an increasing number of civil service organizations that regard this as their principal activity. We call these organizations Distributed Innovation Policy Organizations (DIPOs); the reason we do so will be clear as we introduce our second reconceptualization of innovation policy in the next paragraphs.

Innovation policy, like all government policy, reflects the control hierarchy from which it arises. Policy is set at the highest level of that hierarchy. The policy is usually justified in the discourse that leads to its approval by some kind of narrative, which describes what its effects will be. The policy does not specify all the details of its implementation, which happen later and are planned, and then carried out, at successively lower levels of the governmental hierarchy. The policy's effects of course depend on these details, as well as many other factors, which may or may not have figured in the justifying narrative. By the time the effects are evaluated (if they ever are), the policy-makers' attention is elsewhere, and the narrative that justified the policy is generally long forgotten. None of this implies that policy doesn't matter – of course it does; just that if we want to understand how processes play out, we need to follow those processes, not concentrate our attention on the story that the people who initiated the process tell about it.

As we have seen, innovation processes are anything but linear and predictable, full of false starts and redirections on the part of their participants. What makes them "work" is the capacity of these participants, through their interactions to one another, to keep generating new ideas of how to interpret what is going on and what to do next. A distributed, rather than a top-down, approach to innovation policy would promote innovation by enhancing the *generative potential* of relationships among participants in innovation processes. This is what DIPOs do.[18] Of course, to do this successfully, DIPOs must constantly monitor interactions among all the agents in their purview, in order to evaluate changes in generative potential, to determine actions to enhance it where appropriate and possible, and to discover emergent outcomes that may require new interpretations about which kinds of transformations the DIPOs would really like to encourage, in which zones in agent-artifact space. The ways in which this monitoring and constant re-interpretation are carried out becomes then a fundamental part of what constitutes the DIPOs' contribution to innovation policy. A lot of different kind of agents can be DIPOs – governmental agencies, firms and industry associations, civil society organizations. In MD, we focus our attention on civil society DIPOs that aim to facilitate processes of social innovation – that is, innovation directed towards constructing new artifacts or social transformations that the DIPO regards as socially valuable. DIPOs are mesolevel organizations that enact policies at the microlevel; by promoting the proliferation of social innovation DIPOs, civil society seems to be enacting a distributed macrolevel policy to organize innovation processes that are guided by social values. MD envisions its research as a contribution to this policy.

Both the pms-inspired macrolevel systemic innovation policy model and the microlevel DIPO model involve recruiting, monitoring and coordinating the activities of networks of social innovators and civil society organizations. In both cases, ICT will have an important role to play in enabling these functionalities. Indeed, inspired by successful models like open-source software production and Wikipedia, some DIPOs have been already begun integrating web-based ICT into their practice,[19] making it possible to create ever-larger networks of innovators, many of whose interactions are virtual rather than face-to-face. The ICT systems they employ could in principle capture valuable information about patterns of interaction and even emerging attributions, the analysis of which could suggest changes in the interaction modalities that the organizations could implement to enhance generative potential in the network. That is, they could serve to support network interactions, to monitor them, and to guide the hosting DIPO toward implementing more effective innovation-enhancing policies – even helping to nudge the resulting innovation cascades in directions favored by the host DIPO. Through the activities of WP 3, MD intends to develop just such a system, while those of WP 4 will lead to the development of ICT that can play a crucial role in helping social innovators dynamically evaluate the innovation processes in which they are engaged.

Targeted breakthrough

[17] Developing and communicating a convincing such metanarrative is related to the research proposed in WP 5 Task 3.
[18] Developing an operationalizable theory about *how* they can do it is the principal activity of WP 2 Task 3, while eliciting some of the ways some of them currently do it is part of the work in WP 3 Task 1.
[19] Through the activities of WP 5 Task 1, MD will develop methodologies that make it easier for DIPOs and other civil society organizations to effectively use existing ICT and to tailor it to their particular needs.

The key breakthrough MD seeks to achieve is to *develop a theory of emergence by design* that can inform the design of ICT-enabled processes that DIPOs can use to facilitate the formation and functioning of networks of social innovators; to dynamically evaluate for themselves, their funders, and the general public the emergent socially transformative effects of the initiatives they generate and enable; and, at the macrolevel, to mobilize civil society to lead the construction of a systemic approach to innovation policy that monitors innovation cascades and steers them in socially positive directions.

What do we mean by emergence by design, and what kind of theory about it do we aim to develop? Design and emergence both generate novelties, but they do so in very different ways. Design expresses the agency of the designer, who seeks to construct an artifact that provides a predetermined functionality to a preconceived class of users. In contrast, although the entities in emergence processes may express their agency through the interactions in which they engage, what emerges from these interactions cannot be regarded as a mere consequence of their intentions, either individual or collective. Indeed, emergent phenomena cannot be described in terms of, or predicted directly from, the totality of the interacting entities' individual properties, let alone just those that express agency! Moreover, what functionality, if any, emergent phenomena provide, for whom, are questions that only make sense to frame *ex post*.

Given these fundamental differences, design and emergence seem to require completely different conceptual frameworks and modes of analysis. The "divide and conquer" reductionist strategy that characterizes mainstream science mandates separate theoretical domains for each of these two classes of processes, with distinct ontologies (for entity properties, interaction modalities and interaction dynamics), modeling styles and tools, and empirical methodologies. Until now, this has been largely the case. But the discussion of innovation dynamics in our vision discussion makes it clear that in innovation cascades, design and emergence are inextricably intermingled. In particular, the work of DIPOs essentially consists of designing processes that will foster the emergence of socially positive innovations: thus, what they aim to do, in their everyday practice, is precisely to achieve emergence by design – in which the design includes steering the resulting emergence in what the DIPO regards as socially positive directions![20]

Various ideas relevant to the construction of such a theory already exist, in particular the already cited ISCOM research (Lane et al., 2009). Of course, emergence is a central, if not the central, theme in complexity research. But there is a key element that is missing in that literature: an adequate understanding of emergence in (human) social organizations. Our current understanding of emergence is based for the most part on models and theories that emphasize bottom-up processes of interaction among entities with very limited agency: these entities are usually construed as rule-following; and if they are endowed with the possibility of constructing new rules, the processes through which they do so are generally modeled as random. In contrast, the innovation processes we seek to understand are characterized by what we call "directed emergence". Directed emergence means that some of the interacting agents intend through their actions to transform their worlds in particular directions, they employ models to guide them in selecting actions that are likely to move in desired directions, they monitor what happens as a result of the interaction processes in which they participate, and they modify their models, the directions in which they seek to move, and hence their future action choices on the basis of their interpretations of information obtained from this monitoring. To achieve this, agents constantly communicate among themselves to coordinate with respect to all three of these. Clearly, no model can capture the dynamics of change exactly or forever: novelty emerges. The development of theories, supported by models, for the dynamics of directed emergence, is the principal targeted theoretical breakthrough for MD. These theories will provide the backbone for a systemic theory of the dynamics of innovation cascades concatenating design and emergence (WP 2 Tasks 1, 2 and 4).

A second component of the theoretical breakthrough to which MD aspires is the extension and, in particular, the operationalization of the theory of generative relationships and generative potential (Lane et al, 2009, Ch. 9). Obviously, there is no point of view from which anyone can predict new attributions before they emerge. Nonetheless, according to the theory, it is possible to identify the kind of contexts and relationships in which they are likely to arise. That is, it is possible to assess the generative potential of agent *relationships*, even if just which novelties they are likely to generate is not predictable; this potential depends on such factors as attributional or competence heterogeneity among the agents in the relationship, the overlapping of the zones in agent-artifact space they seek to transform, their attributions about one another, the "permissions" that determine what they can communicate about, with whom, in which illocutionary modalities, and action opportunities. In MD research, we intend to extend this theory to two ways: first, to operationalize it by developing methods to assess quantitatively the various components of generative potential (WP 2 Task 3), in order to facilitate the modeling of generativity to

[20] What this means with respect to two concrete cases of DIPO-enabled projects, Education Pioneers and Green Communities, will be explained in the objectives section below.

understand the theory better, as well as to produce management tools; second, to refine the theory by applying recent developments in the theory of social networks to explore how the structure of networks of agent relationships impact generative potential.

We anticipate that MD's theoretical research on emergence by design, together with insights gleaned from our case studies and the experience of our practitioner partners, will also yield breakthroughs in practice, through the research and technological development in WPs 3, 4 and 5, in which we design and test processes through which DIPOs (and of course other kinds of organizations as well) can facilitate and evaluate their work in enabling innovation processes and steering innovation cascades.

Finally, we want to describe another aspect of MD research, which is not central to MD's vision, but which we think is important and which could, if successful, lead to an important conceptual (and eventually practical as well) breakthrough. It concerns the role of models in policy-making. As we already noted more than once, innovation processes generate inherently unpredictable novelty, especially with respect to the social and environmental consequences of innovation cascades. Yet systemic innovation policy requires taking action now, on the basis of sometimes very weak signals that something important may happen later. How do agents come to recognize the need to act and to generate coordinated action plans in such circumstances? One strategy, enacted even in prehistory by shamans reading bones or entrails, is to endow certain practices for deciphering the future with sufficient social legitimacy to act on the basis of their predictions. All too often today, scientists have tried to claim this legitimacy, although, as the current policy debate around climate change indicates, they don't necessarily attain it. We believe models have a fundamental role to play in innovation policy, but developing models that claim to generate reliable predictions for variables that depend on long-term innovation cascades is not necessarily the best way to go. Instead, we think that the aligned attributions and resulting coordinated action that are necessary prerequisites for systemic innovation policy result from causally convincing narratives that participants jointly construct, and the key to successful scientific intervention in the policy process is to help in this construction – as well as to provide sufficient monitoring and reinterpretation processes to determine when the narratives must be changed, with respect to which "characters" and "plot elements". Human beings have a very long experience, filled with excellent models, in crafting action-guiding narratives. But our narratives suffer from one critical drawback, related to cognitive constraints on short-term working memory: narratives proceed according a logic of agency (character determines action and outcome), and we can only operate that logic on a very limited number of agents (the famous 7 ± 2). We have learned how to endow multi-individual organizations, like firms or states or even abstract entities like "markets", with agency, but we cannot tell each other causally convincing stories whose plot depends on the dynamics of the interaction of many agents. There is a role here for models in helping to narrativize mass dynamics. MD research will tackle this problem from both theoretical (in WP Task 1b) and practical (in WP2 Task 1 and WP5 Task 3) perspectives.

Objectives

MD targets five research objectives. The first concerns theory, while the next three are about the design of the processes and supporting technologies through which the first "small steps" towards our long-term vision will be accomplished. The final objective straddles the boundary between research and diffusion, but it is very important in terms of what we seek to achieve with this project: it will help civil society organizations to interact with each other, with civil society in general, and with their interlocutors in the economic and political world, by increasing creative applications of ICT, including those that MD itself will develop.

Objective 1: Develop a theory of *emergence by design*, whose components include

- **models to illustrate and explore strategies and limitations of directed emergence;**
- **an ontology for innovation cascades (that is, a minimal set of concepts and categories for constructing causally convincing narratives about historical and ongoing cascades);**
- **an operational theory of generative relationships, which incorporates information about network structure in its assessment of generative potential; and**
- **agent-based models based upon the cascade ontology, which generate dynamics observed in MD-generated case studies of DIPO-enabled innovation initiatives.**

Discussion: We have already explained what we mean by directed emergence and generative relationships, and why developing a theoretical understanding of these two key concepts is fundamental to MD. The basic building block of the theory we intend to develop is the ontology for innovation cascades. This ontology provides the vocabulary for describing the kinds of entities (agents, artifacts and attributions) that figure in cascades, the modalities through which these entities interact, the processes to which these interactions give rise, and the transformations that these processes effect. Our ontology will build on the ISCOM theory of social organization

(Lane et al., 2009, Ch. 1), with elaboratorions and refinement developed in dialogue with models and case studies. The models will serve to refine and make more precise the theory under development, while the case studies provide the material the theory needs to express and explain – and tests its adequacy to do both, through the narratives we are able to frame in terms of the theory's concepts and categories, which order and provide meaning to the case study material.

We propose to construct two classes of models: the first will be simple and abstract, which we will use for refining and making precise the ontology for innovation cascades, as well as carrying out experiments to understand, in the artificial world of the model, how, in what conditions, and to what extent emergent phenomena might be steered; while the second will be more complicated agent-based models based upon the representations we generate for the relevant entities in the Education Pioneers and Green Community case studies (see the discussion of objective 4 below), to test the adequacy of the theory as formalized in the model, by observing whether the model can generate stylized versions of the key emergent phenomena observed in those studies.

Modeling directed emergence poses considerable difficulties, the most important of which we will try to avoid confronting directly. This difficulty has to do with the cognitive and communicative capacities that the agents who try to steer innovation cascades seem to require. The simplest way we know to think about directed emergence is as follows. We have an agent A who is observing a world B of interacting entities. B must be rich enough to support the emergence of a variety of metastable patterns. A is not only an observer; he can enter into interaction with the entities in B, and he has a variety of interaction modalities that he can employ to do so. He also has criteria C for the kind of configuration he likes in B. His task is to choose the interaction modalities he wants to employ. He observes the current state of the world, in which patterns may be emerging that conform more or less closely to C; on the basis of what he observes, he can change or not the interaction modalities he is employing. Stated in this way, the problem is a rather complicated (by the difficulty of predicting what configurations might emerge and thus how compatible they might be with C) standard control problem.[21]

While it will take considerable experimentation to determine a fruitful specification for the class of "simple" models of directed emergence we will develop and study, here is a brief description of the kind of framework about which we are currently thinking. Each entity in B is represented by a NK-model, and the interactions are modelled by the fact that the fitness of node i in agent j is affected by the value of some nodes in another agent. Let us also suppose for definiteness that the overall goal C which A wants the system to achieve is, for example, the average energy of the agents (we could also experiment with more complex goals, related e.g. to the number of interactions, to the robustness with respect to the elimination of an agent, or others). To achieve this goal the A can modify some system parameters (e.g. allowing a larger number of interactions, etc.) or perhaps he can also directly affect the behaviour of a few agents. He therefore has a "mental map" of the way in which the parameters affect the overall behaviour of the system. He can also have subgoals, like e.g. a desired pattern of interactions which he "thinks" would lead towards the goal. He also uses the history of results to modify his subgoals. Therefore the superagent is endowed with more sophisticated cognitive capabilites than the entities in B. There is evolutionary dynamics going on at the local level: agents modify themselves and their interactions independently of A, who specifies only the parameters. However agents also act in the world: one possibility to represent that is that of having some nodes in the agent's NK depend upon the value of variables which describe the external world. And these variables might themselves change in time (perhaps in a way which depends upon the agents' behaviour, therefore leading to a very dynamical setting). So the overall behaviour will depend upon some variables which the superagent knows (those which refer to the agents' interactions) and upon some others which he does not. With a model of this kind in place, we can address questions related to which kind of dynamics is generated by the interplay design-emergence, to what extent can the model be controlled by the superagent, and how this relates to the frequency of changes in the external world, and so on.

[21] If we want to understand the real difficulty of trying to steer innovation cascades, we have take into account a further issue: A can see new patterns emerge that have properties he had not previously envisioned. The new properties might induce A to change his criteria to C* (a new need, in terms of our innovation dynamics discussion above). Worse, they might also induce him to "arrogate" a permission to engage in a new interaction modality – which, if challenged by other agents in B, must be negotiated (see Lane et al., 2009, Ch. 1, which argues that new attributions of functionality, and hence needs, and arrogated permissions are fundamental ingredients of processes of innovation and social change). We do not know how to endow artificial agents with the cognitive or communicative capabilities to make these moves. Initially, we will restrict ourselves to what we can learn about the "static" version of directed emergence from the models as described above. If the material from our case studies suggests that this is too remote from the world of DIPO experience to be any use in theory-building, we have a back-up plan based on experiments that "represent" A by a human being, which we describe briefly in the section on risks. Obviously such a strategy also has its limitations.

Obviously, the agent-based models we develop to simulate the dynamics observed in WP 4's case studies will be much more "realistic" than the class of models described above. But their lack of realism does not imply that they are not useful. First, translating the qualitative ontological theory into the simple but rigorously-defined world that such toy models represent can help locate ambiguities, omissions and unnecessarily complicated formulations of concepts and categories in the theory – perhaps more effectively than can be achieved with the necessarily more complicated "realistic" simulation models. Second, we are much more likely to discover "universal" phenomena associated with directed emergence in the simplest models that instantiate it (as in the work of Eigen and Schuster on hypercycles or Kauffman's on the NK model), and it is through such phenomena that we can develop the simple stories that can help to "narrativize mass dynamics," as described in the breakthrough discussion. Indeed, this is our main motivation for investing two years in constructing and experimenting such models, and WP1b is dedicated to carrying out this activity.

Objective 2: Develop and test a prototype scalable software tool to assist DIPOs managing online communities of social innovators.

Discussion: Running an online community of innovators entails managing a paradox. Structuring interaction among participants as a network of relationships, of which participants themselves are the nodes, can result in extremely effective and rewarding participation, because – under certain circumstances – each participant is exposed to information that is relevant to them, while not having to browse all the information the community knows. This results in a very high signal to noise ratio from the point of view of the participants; they often report experiences of greatly enhanced serendipity, as they seem to stumble into useful information that they did not know they were looking for and was sent their way by other participants.

This extraordinary efficiency cannot be planned a priori by community managers, who – after all – do not and cannot know what individual participants know and what they want to know. The desirable properties of networks as information sharing tools arise from the link structure emerging from the community's endogenous social dynamics. The paradox stems from the fact that endogenous social dynamics can and often do steer online communities away from its goals and onto idle chitchat or "hanging out", which seems to be the default attractor for large online networks.[22] As a result, managers of communities of innovators need to let endogenous dynamics create a link structure to transport information efficiently across the network while ensuring that the community does not lose its focus on helping members to do what they participate in it to do.

The tool MD proposes to develop is conceived as a management augmentation tool. It models an online community as a network of relationships and uses network analysis as its main technique for drawing inferences about what goes on in the community. Generally speaking, community managers build knowledge of their communities by spending a lot of time participating rather than using formal analysis; they act on the basis of that knowledge by resorting to a repertoire of steering techniques learned by trial and error. The error component in trial-and-error is usually fairly large, because by construction there is no top-down control in online communities; the community manager can only attempt to direct emergent social dynamics towards desired directions. Control over the software does give top-down control in the trivial case of prohibition: by disabling access, or comments, the manager can always dampen activity directly. What cannot be done without directing emergence is enhancing activity – which is what online communities of innovators are for.

The tool aims at augmenting this approach in two ways. Firstly, it allows the community manager to enrich "local" knowledge gained through direct interactions with the community. Such knowledge is extremely rich and fairly accurate for small communities, but it does not scale well as the network grows. Network analysis, on the other hand, scales well: computing network metrics on large networks is conceptually not harder than doing it on small ones, though it can get computationally more intensive. In an ideal situation, a community manager might start to use the tool when the network is still small and the manager has a good informal understanding of what goes on therein simply by participating in it; at this point, the manager could build a repertoire of *recipes*. We define recipes as formalisms that map from changes in the mathematical characteristics of the network to social phenomena in the community represented by that network. Recipes of this kind enhance the community manager's diagnostic abilities, and take the form: *Network metric A is a signature of social phenomenon B.*

As the manager tries out different management techniques to yield desired results more recipes can be added, this time mapping from management techniques and their outcomes – the latter being also be measured in terms of changes in the metrics of the network representing the community. Recipes of this kind enhance the community manager's policy making, and take the form: *To get to social outcome C, try doing D. Success or failure would*

[22] Indeed, the largest of them have no goals other than connecting members: this might be a function of the fact that, being free to let their endogenous dynamics run unconstrained, they scale best.

show up in network metric E. The manager then might be able to lean on repertoires of recipes of both kinds to run the network as it gets larger, because the software does not lose its ability to monitor those changes.

In the context of MD, these repertoires of correspondences are going to be built by integrating inputs from two different sources. The first one is the theoretical component of MD, the systemic theory of emergence in the social world that is to be the project's chief goal; the second one is the firsthand experience of community managers in the three participating DIPOs. Once built, the two repertoires would make up the tool's knowledge base, its computational intelligence core.

The tool is conceived for use by real-world online community managers, who are typically good at negotiation, conflict resolution and diplomacy but do not necessarily know a lot about network analysis. The tool performs the network analysis for them and translates it into a form that community managers can make sense of, possibly using visualizations, infographics, and links to natural language explanations of the key concepts. By doing so, it augments community management by augmenting the manager's vision of what is going on in the relationship structure underpinning the community – and consequently the ability to steer the community's social dynamics towards the desired outcome.

Without the tool, a typical community management decision goes in a cycle:

- the community manager detects a situation that perhaps can be improved;
- the manager decides on a policy and sets some (generally not quantitatively defined) goal;
- the policy is rolled out;
- after some time, the manager looks at the result and figures out what to do next.

This cycle can be augmented by the tool in two ways. First, the tool "knows" a theory of emergence; therefore, it can bring to the table experiences and thinking made by researchers in the MD project. Second, the tool knows how to compute the metrics of the network that represents this particular community. This knowledge could be embedded into the community management decision making cycle as follows:

- the community manager detects a situation that possibly can be improved;
- the tool runs a network analysis, which detects changes in the community's structure, and it then proposes interpretations of what those changes might mean in the context of that community ("a k-core has formed since one month ago. The people in the k-core are A, B, …, N. This might mean one of the following: …");
- the community manager validates the interpretation;
- on that basis, the tool suggests a policy that might increase the network's performance ("try to increase the number of people in the k-core");
- the community manager signs off to the policy;
- the tool asks the community manager to set a target that can be translated into network metrics.
- the community manager signs off to a target and then rolls out the policy.
- after some time, the tool performs another network analysis; if the target has been met, that is an indication that the whole chain of interpretation from network metrics to social dynamics is probably broadly correct, reinforcing the tool's knowledge base.

Objective 3: Design a process of *dynamic evaluation* for social innovation projects, which includes the development of tools and techniques that

- **provide a visualization of the project state (current set of stakeholders, their directedness, and permission structures) and the history of transformations in agent-artifact space generated by project activities; and**
- **evaluate the generative potential of relationships among project participants.**

Provide proof-of-concept of the process by using it to evaluate two DIPO-mediated projects, Education Pioneers (EP) and Green Communities (GC).

Discussion: One of the biggest problems of social innovation is intimately tied to one of its greatest strengths. Both are linked to the slogan we cited at the beginning of this proposal: Big ambitions, small steps. The ambitions are big, because social innovators want their activities to conduce to the collective good – to make the world more cooperative, generous, welcoming and, of course, sustainable. The steps are small, because most social innovation projects at least in the beginning are local, with low levels of financial backing. The strength lies in the number of such projects, their diversity, the commitment of the people who carry them out – the initiators as well as those who become engaged in the course of the projects. Thus, in a distributed and parallel way, social innovators are exploring a huge set of possible transformations in the structure of agent-artifact space, and discovering in that exploration much of social value that could potentially be reproduced, with variations, in other contexts, by other agents. (We will illustrate all these points below, when we describe EP and GC.) But how can each individual

social innovation project be evaluated? For market-oriented innovation projects, in the end the market determines whether the project succeeds: does it produce an artifact that makes money, or doesn't it?[23] The value of social innovation projects depends on how the transformations in agent-artifact space it generates are valued socially – and of course that depends on who is doing the valuing, and which transformations they attend to. In any innovation process, social or otherwise, the "who" is constantly changing – it is impossible to predict in advance everyone that will be affected by an innovation cascade, never mind how they will be affected. Different stakeholders (let's use this word henceforth to describe the collectivity of those so affected) perceive different transformations, they value their effects differently – indeed, the process of transforming can also lead them to change the values they use to make these judgements.

This problem is not only confusing, it also has real implications for social innovators, especially for those who receive financing from the state (and frequently also private foundations as well). Those who provide the financing want accountability, and in the Innovation Society that accountability usually has the form of justifying project expenditures in terms of the project's impact on – growth and jobs. This places the social innovators who received the financing in an impossible situation; not only are these the wrong terms in which to carry out the evaluation as far as they are concerned, but it is often nearly impossible to calculate any such impact – which leads to a strange dance of faked figures and strained arguments, with a strong undertow of power and control.

It would be a great contribution to the distributed model of social innovation if an alternative discourse about evaluation could be introduced, which reflected what social innovation is really about, and which could be backed up by a process that could render this alternative plausible, attractive or even compelling. This objective is intended to be a step in this direction.

The key idea behind MD's concept of dynamic evaluation is that evaluation in terms of pre-defined "outcome variables", carried out at the project's conclusion, does not provide a valid measure of the social value of the project. That value is instead immanent in the process whereby the project unfolds in time. Providing a *representation* of that process in itself *constitutes* the project's evaluation. This is because social innovation is about transforming agent-artifact space in a socially positive direction, and what we mean by the *representing the process* is making visible the set of stakeholders as it changes over time, the transformations in relationships and attributions these stakeholders have experienced through their interactions with the project (that is, with other stakeholders in project-directed interactions), and the values (note the plural) the stakeholders assign to these transformations. A representation which makes these things visible has value for the DIPOs and innovators who enable and lead the project, because it shows who is affected, how, and what it means for them; for all the stakeholders, because it helps them see that the same process looks different, and is valued differently, by different participants, and thus can help them to act, if they can and want to do so, in ways that not only they but other participants as well will judge socially valuable (and it may even induce them to change what they regard as socially desirable); and funders, who can obtain a much richer, more nuanced and socially relevant picture of what the return on their money is, than the reductive and falsified accounting in terms of growth and jobs.

The design for the dynamic evaluation process must include processes for identifying stakeholders, eliciting their accounts of transformations as well as their valuations of the effects of these transformations, representing stakeholder interaction histories and inferring permission structures from these representations, and visualizing all of these so that they are comprehensible to stakeholders (including of course DIPOs, innovators and funders!). In addition, some of these stakeholders (including those in the preceding parenthetical phrase) may want to steer the process in particular directions: hence, the tool that takes information from the representation and calculates the generative potential of various subsets of stakeholders.

The design of the process, and the specification of the visualization and generative potential assessment tools, will involve close collaborations between the practitioners in the case studies (Chris Sigaloff of KL and Paolo Gurisatti of UNIVE), knowledge management technology experts from Factlink (led by Gordon Rios), and theoreticians from UNIVE (led by David Lane, the head of the WP 2 Task 2 and 3 working groups, which will provide the theoretical basis for the visualization and generative potential assessment tools respectively). The development of the tool prototypes will be carried out by Factlink. Data-gathering for the dynamic evaluation of the two proof-of-concept projects will be under the supervision of the project leaders, Sigaloff and Gurisatti, carried out by researchers hired by KL and UNIVE respectively.

[23] Famous cases of inventers who failed in the market but later received wide public acclaim – like the remarkable development of personal computing technologies at Xerox Parc – are judged to have succeeded only after some other entrepreneur finally capitalizes on their inventions. And of course by the time the artifact wins market acceptance, it is usually a very different thing, often with quite different functionalities, than its inventers ever intended!

We now provide short descriptions of the two projects. EP is a program directed by KL (in a DIPO role) and funded by a private bank, the Dutch Ministry of Education and the teachers' trade union. The purpose of the program is to improve the quality of education by encouraging "bottom-up" innovation, initiated by groups of teachers. EP starts with a campaign organized by KL to create attention and awareness, aimed secondary school teachers through the Netherlands. After the campaign, teachers can submit change initiatives. From prior experience in previous similar initiatives, KL knows that this is difficult for teachers, so they will organize brainstorm meetings at schools to stimulate teachers to come up with ideas. Ten of the submitted initiatives will be selected for funding. Criteria for selection are: innovativeness; demonstration of support within the school; relevance for improving the quality of education and for empowering teachers; need for funds. Teachers who submitted the selected initiatives will encouraged to form implementation teams. KL will provide coaching to support the team to implement the desired change. In addition, a learning community will be created that will meet regularly to share and build knowledge on how to realize transformative initiatives. If necessary, they will also negotiate sufficient "space for experimentation" with school leaders. At the end of the academic year, a national conference will be held in which the teachers will present their results. EP's stakeholders include teachers, students, school leaders, the Ministry of Education – and potentially parents, various citizens and civic organizations (there is a lively debate in the Netherlands now about education: some consider the system too innovative, some not innovative enough – it is conceivable that some of the EP initiatives could become entangled in this debate, with unpredictable cascading effects!). After the national conference, some of the ideas presented may be taken up elsewhere, perhaps with interesting variations. Our dynamic evaluation will track transformations linked to the initiatives launched under EP, at least for the following academic year (Milestone 4.3 is a choice point, in which the WP4 research team will decide whether the innovation cascades we are tracking are sufficiently rich to justify another year of tracking will be determined).

GC is a project financed by the Italian Ministry of the Environment and sponsored by the Union of Mountain Communities (UMC). The project aims to develop processes through which small communities can become energetically self-sufficient and achieve sustainable development trajectories based on low energy-use production systems, with the help of teams of experts who will carry out studies on the territory, develop plans together with local administrators, and introduce appropriate standards and technologies. During the first nine months of MD, the project will carry out pilot projects in four different mountain communities. The results of these pilot projects will be widely diffused, and then the Ministry will accept proposals from other communities for European funding to carry out similar projects (there are more than 4000 communities that could become involved in GC-related activities). Paolo Gurisatti, associated with the UNIVE MD team, is the scientific coordinator of the project, and he and his team will play a DIPO role in promoting and enabling initiatives that follow on GC activities. For this project, the planning processes and transformations introduced in their wake will involve a wide variety of stakeholder roles and interaction modalities. Coalitions and joint action among communities are very likely to develop, and in fact it is one of the aims of the UMC that they should be encouraged. The projects by their nature will generate a large number of "objective" outcome measures, which will support considerable heterogeneity in social valuation among different stakeholders. Obviously, there are scaling issues in conducting a dynamic evaluation of this project; we will almost surely be unable to follow all stakeholders, and we will need to develop role analyses, on the basis of which we can generate our representations. As with EP, Milestone 4.4 is a choice point, at which the team will decide whether, and if so how, to continue evaluation during MD's third year.

Objective 4: Design a process for mobilizing civil society to monitor innovation cascades, as a component of a systemic innovation policy whose aim is to steer innovation cascades in socially positive directions.

Discussion: See the vision section for a discussion of what this objective entails.

Objective 5: Develop an ICT active learning course for civil society organizations.

Discussion: MD partners from the social innovation world believe that ICT is seriously under-utilized by civil service organizations; our vision to create processes through which civil society can organize itself to lead the construction of a sustainable future makes it imperative that this be changed. This objective is a step in bringing about that change. MD will mobilize its internal expertise in ICT (Factlink), e-participation and e-democracy (Tech4i2), and civil society (EN) to develop a course in which representatives from civil society organizations will learn what is available and how they can adopt it and adapt it to their needs. We will ask each participant to our courses to present a problem that they have encountered in their work for which they believe that an ICT solution might be possible. On the last day of the course, our team will work with them to design solutions to the problems they present. In the process, we will also learn a lot about how civil society organizations currently use ICT and what kinds of future ICT might be developed for them. As we develop our own ICT artifacts, in WP 3 and 4, we

will incorporate them into the course curriculum. We know of no such courses currently in Europe, and we anticipate that the demand for such a course will be great. Through the networks of our social innovation partners, we will seek a social entrepreneur who would like to take over the course from us and make a socially useful business out of it.

1.2 Novelty and foundational character

The principal novelty of MD lies in its foundational character: we intend to develop a theory that concatenates design and emergence, providing a coherent account of innovation dynamics; and then to use that theory as a foundation from which to address a problem that we have argued is of fundamental importance: to mobilize civil society to take the lead in reorganizing how we innovate, in order to construct a socially sustainable future. We outlined novel approaches to three key steps towards a solution to this problem: the development of a scalable ICT tool to assist managers of online communities of innovators; the design of a dynamic evaluation process appropriate to innovative projects intended to generate socially beneficial transformations, which can help stakeholders to organize responses to unexpected turns in the cascade of changes induced by the project, taking into account multivalent perspectives on the social desirability of the direction of these changes; and the design of a systemic approach to innovation policy, which aims not just to prime the pump of invention but takes on the responsibility of discovering where innovation cascades are carrying us. We think that our work on each of these steps will open the door for many possibilities to develop socially useful ICT and uses of ICT in the future.

There is a lot of state-of-the-art relative to innovation theory and to emergence. We prepared a description of it, but space limits precluded us from putting it in the proposal. In our opinion, though there is much of great value in these literatures, and much that is related to what we intend to do, there is little that could modify the statements about novelty we make in the previous paragraph. In contrast, there is little relevant state-of-the art with respect to our proposals for dynamic management and systemic innovation policy. However, some comments are in order that position our proposed research with respect to current practice in online community management. Online community managers, in the vast majority of cases, do not use any software augmentation beyond standard web analytics, which translate into logs for offline communities. Most platforms for online communities, like Ning or BuddyPress, integrate analytics in the software's back end and redress them in the form of "top 10 hot topics", and the like. While valuable, these tools convey only a fraction of the information potentially available to someone endowed with a full knowledge of the topology connecting users to each other.

Standalone software packages that compute network metrics given the appropriate file format are available – Pajek being the most widespread one; Gephi a more recent addition; Tulip a tool with an emphasis on visualization. Of course their results only make sense to users with at least some network math skills, and are disconnected from any theory of emergence in the social world that could interpret those metrics.

Finally, digital marketers use online services – like Technorati, Wikio, WeFollow or Klout – to identify influencers in online social networks. They use popularity as a proxy for influence and they employ massive web crawling and ranking algorithms, usually based on the cross linking between blogs. These tools are usually based on a mix of link tracking and semantic analysis. Our prototype will be very different from all of the above, in that it is based on science (in particular, on a theory of emergence on the social world being developed in MD); it is meant for use by a broad range of users, irrespective of their mathematical background (visual analytics techniques will be used to improve the software's usability); it aims at suggesting action to herd social dynamics, rather than at mere analysis; and it is capable of learning which mathematical characteristics of the network are a signature of which social phenomenon, and which (designed) policies lead to which (emergent) social dynamics.

We plan to found our contribution on social network science. Since the seminal work of Watts and Strogatz (1998) social network analysis has come a long way. Different network topologies have been explored; their characteristics have been shown to be influenced by the social interaction they are the infrastructure of, and to influence the outcomes of that interaction in turn. The literature covers interaction types as diverse as epidemics (Pastor-Satorras and Vespignani, 2003), banking (Allen et. al, 2010), and revolutions (Chwe, 2000). Social network analysis conceptualizes real-world network as realizations of random networks, for which a concise description is provided in terms network metrics. Metrics lend themselves well to be encoded into software by means of formalisms.

References

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1.3 S/T methodology

MD research is divided into 6 workpackages. WP 1 is about the scientific and administrative coordination of the project and the organization of project events, including annual meetings and final conference. WP 6 is about the project's communication and engagement activities. The other four WPs are dedicated to project research and related activities. There is one WP dedicated to each of the four project objectives described in section 1.1 above. WP 2 is the theoretical core of the project. The theory of emergence by design will be developed in dialogue with modeling and the case studies. The principal anticipated modeling activities are to be carried out in Tasks 2.1 and 2.4. One of these, modeling directed emergence, is sufficiently difficult that we flagged it with Milestone 2.1, which essentially says that if we haven't achieved signs of life by month 12, we will switch to another "interlocutor" with the development of our theory, based on a human-model interaction. We choose not to launch both activities, but to use the less desirable one as a backup in case the more ambitious one fails. The case studies that will enter into dialogue with our theory as it is emerging will include some historical cases of innovation cascades, as described in Task 2.2, some of which are based on material we have already collected, as well as case studies generated by MD research in Tasks 4.2 and 4.3. Material from these latter case studies will be the objects of simulation modeling in Task 2.4. While Task 2.2 focuses on an "ontology for innovation cascades", given our ideas about what constitutes a theory for complex phenomena, this is really the heart of our theoretical endeavor. Task 2.3 focuses instead on a theory of particular importance for DIPO practice, the theory of generative relationships. All MD theoretical research will interact closely with the practice-oriented projects in other WPs, but this is particularly true for the research in Task 2.3.

WP 3 is the most focused of our research lines. It aims to build an ICT tool, based on some of our theoretical ideas merged with recent results from research in complex networks and social network analysis, to assist a particular kind of DIPO: managers of online communities of innovators. Though a lot of theoretical work enters into this WP as input, especially in the "recipe book" of Task 3.2, it is essentially a development project, for what we believe is a new kind of network ICT with a new and important functionality.

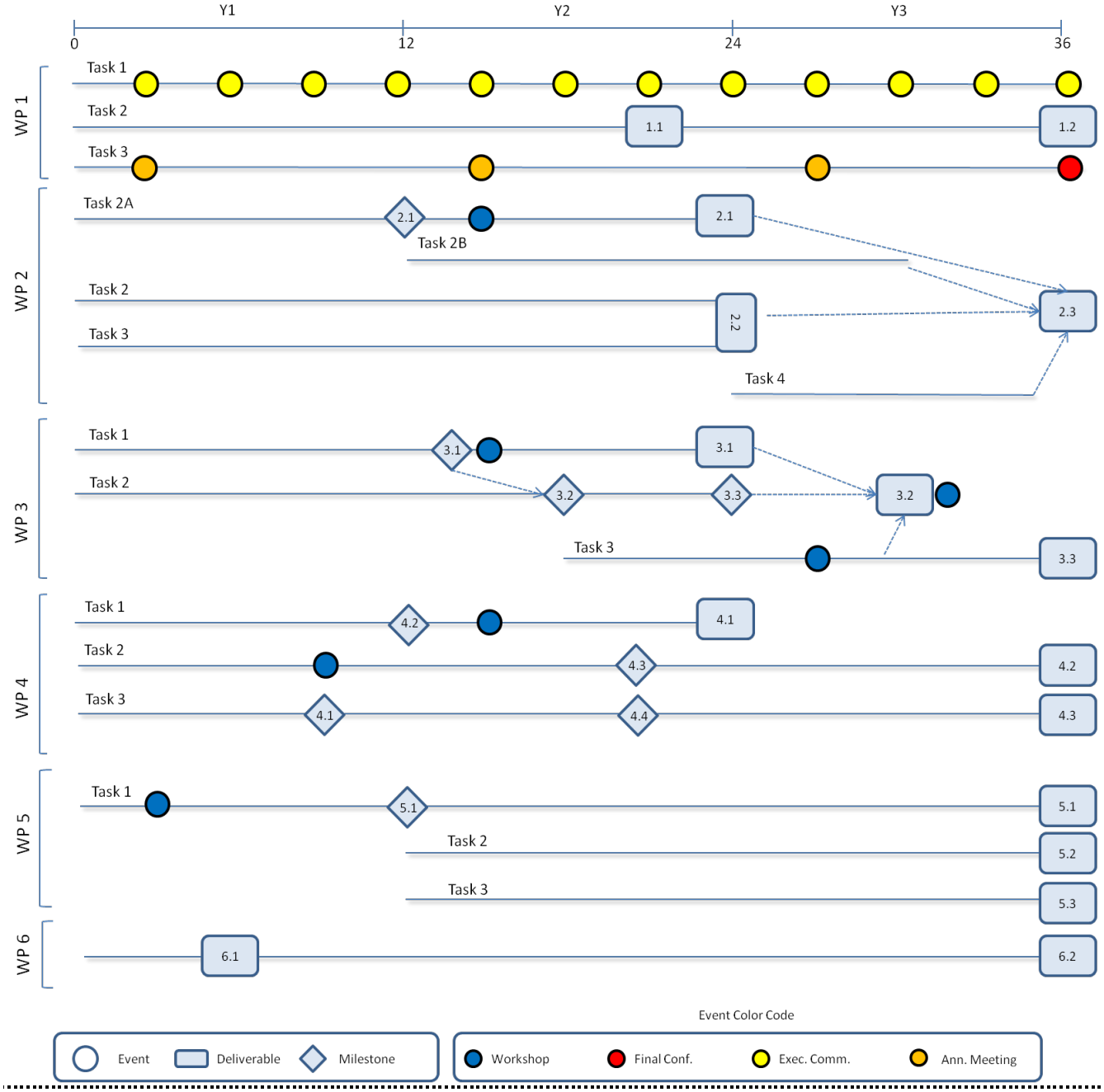
WP 4 is about the development and testing of a new concept: the dynamic evaluation of social innovation projects. As stated above, Tasks 4.2 and 4.3 run interesting social innovation project case studies to help specify what dynamic evaluation needs to do and to test whether the process we define in Task 4.1 does it. Obviously, there will be constant iteration between designing the processes and testing it, which will last either one year or two, depending on how much we have still to learn after the first year of dynamically evaluating the two projects. In Task 4.1, theoreticians, practitioners and technologists will work closely to learn from each other about what dynamic evaluation could be all about and what kinds of artifacts might be useful to carrying it out. We anticipate, though we cannot be certain at this point (Milestone 4.2 checks if this hunch turns out to be true) that we can design and develop two tools that will be useful, and if so, we plan to do it.

Finally, WP 5 puts together three different activities, related by their possibility importance and usefulness to move towards the long-term vision of MD: that is, to help mobilize civil society. The first is perhaps more a diffusion task than research, but in our vision the distinction gets blurred. It involves designing and running seminars to help civil service organizations use ICT in communicating with one another and their networks in civil society and in carrying out the socially-directed actions to which they are dedicated. Both the second and third Tasks will be mini-mobilizations of civil society, in the first case to figure out how to design a systemic innovation policy that takes responsibility for where innovation cascades lead, as opposed to the present conception of innovation policy that focuses on initiating these cascades and letting them go wherever they may lead. The third task tries to find ways of building a "civil society identity", which according to our theory can have a huge role to play in creating the capacity to mobilize it to take the lead in constructing a sustainable future.

Two final remarks: we flag with our milestones what we regard as the riskiest part of our proposed research, and we note how we plan to respond to their possible outcomes. But we know that innovation cascades proceed fraught with ontological uncertainty, and we prefer to leave to ongoing processes of dynamic evaluation and negotiation with each other and with the MD project officer how to respond when things don't go as we expected.

Finally: the project PERT chart shows just how much MD integrates the three "souls" of this project: theory, practice and technology.

Gannt Chart


Y1
Y2
Y3
0
12
24
36
WP 1
Task 1
Task 2
Task 3
1.1
1.2
WP 2
Task 2A
2.1
2.1
Task 2B
Task 2
Task 3
2.2
2.3
Task 4
WP 3
Task 1
3.1
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Task 2
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WP 4
Task 1
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WP 5
Task 1
5.1
5.1
Task 2
5.2
Task 3
5.3
WP 6
6.1
6.2
Event Color Code
Event
Deliverable
Milestone
Workshop
Final Conf.
Exec. Comm.
Ann. Meeting

Table 1.3a: Work package list

Work package No	Work package title	Type of activity	Lead partic no.	Lead partic. short name	Person-months	Start month	End month
1	Coordination	MGT	1	UNIVE	16	1	36
2	Theoretical core	RTD	1	UNIVE	67	1	36
3	Managing on-line communities of innovators	RTD	9	24amp	85	1	36
4	Dynamic evaluation of DIPO projects	RTD	5	KL	62	1	36
5	Mobilizing civil society	RTD	8	EN	40	1	36
6	Communication	RTD	2	CTH	9	1	36
		TOTAL			279		

Table 1.3b: Deliverables List

Del. no.	Deliverable name	WP no.	Nature	Dissemination level	Delivery date (proj. month)
D1.1	Midterm report	1	report	public	20
D1.2	Final report	1	report	public	36
D2.1	Modeling directed emergence	2	models, report	public	24
D2.2	Theory of innovation cascades	2	report	public	24
D2.3	Emergence by Design	2	book	public	36
D3.1	Recipes	3	report	public	24
D3.2	DT 1.0	3	software	public	30
D3.3	Using DT	3	report	public	36
D4.1	Dynamic evaluation	4	Report, tool prototypes	public	24
D4.2	Education pioneers case study	4	report	public	36
D4.3	Green communities case study	4	report	public	36
D5.1	ICT active learning seminars for civil society organizations	5	report, course materials	public	36
D5.2	PMS for innovation cascades	5	report		36
D5.3	DIPO narratives	5	report		36
D6.1	Website and blogspace	6	website		6
D6.2	Communications and engagement	6	report		36

Table 1.3c: List of milestones

Milestone number	Milestone name	Work package(s) involved	Expected date	Means of verification
2.1	Implementation of directed emergence model	2	12	Model runs
3.1	First edition of recipe book	3	15	Recipes coded
3.2	DT alpha	3	18	Code runs
3.3	DT beta	3	24	Code runs
4.1	Completion of pilots	4	9	Pilot reports filed with ministry
4.2	Dynamic evaluation process design V1.0	4	12	Design of representation tool completed
4.3	Decision: to continue with evaluation for Education Pioneers?	4	20	Innovation cascade still ongoing?
4.4	Decision: to continue with evaluation for Green communities?	4	20	Innovation cascade still ongoing?
5.1	Decision: choose initiating innovation	5	12	Decision taken by advisory committee

Table 1.3d: Work package description

Work package number	1	**Start date or starting event (month)**			1	
Work package title	Coordination					
Activity Type	MGT					
	WP Leader	**Other participants with major involvement**				
Participant number	1	2	5	8	9	
Participant short name	UNIVE	CTH	KL	EN	24amp	
Person-months per participant	12	1	1	1	1	

Objectives

1. Perform and coordinate administrative tasks necessary to achieve project goals.
2. Ensure integration of theory and methods, as well as consistency and coherence, among different WPs.
3. Ensure research quality through peer review and continuous reflection.
4. Maintain contact with FET project officer and coordinate administrative and financial reporting.

Description of work

Task 1.1 Scientific and technological coordination The WP will convene quarterly meetings of the executive committee, whose agenda will include discussions and activities dedicated to: maintaining quality and consistency in activities of different WPs; making sure they carry out assigned activities according to project timetable; creating and maintaining an archive of working papers, publications and media coverage of MD research activities.

Task 1.2 Administrative coordination The WP director and UNIVE staff will compile required reports for FET and keep project officers informed on MD activities and problems.

Task 1.3 Organizing project workshops, annual meetings and final conference Working with appropriate WP leaders, UNIVE staff will schedule, plan and make arrangements for all events (including two meetings of the advisory board in months 12 and 30), annual meetings and the final conference. All will be held in at ECLT in Venice.

Participants UNIVE will be responsible for overall management and coordination. In addition, it has management responsibility for WP 2. 24amp will manage WP 3, KL WP 4, EN WP 5 and CTH WP 6.

Deliverables and month of delivery

D1.1 Midterm report M 20

D1.2 Final report M 36

Work package number	2	Start date or starting event (month)		1
Work package title	Theoretical core			
Activity Type	RTD			
	WP Leader	Other participants with major involvement		
Participant number	1	2	6	
Participant short name	UNIVE	CTH	INRIA	
Person-months per participant	42	20	5	

Objective

Develop a theory of *emergence by design*, whose components include

- models to illustrate and explore strategies and limitations of directed emergence;
- an ontology for innovation cascades (that is, a minimal set of concepts and categories for constructing causally convincing narratives about historical and ongoing cascades);
- an operational theory of generative relationships, which incorporates information about network structure in its assessment of generative potential; and
- agent-based models based upon the cascade ontology, which generate dynamics observed in MD-generated case studies of DIPO-enabled innovation initiatives.

Description of work

Task 2.1a Modeling directed emergence The difficulties confronting this task and our initial strategy to deal with them are described in the objectives section. At Milestone 2.1 (month 12), we will control whether sufficient progress has been made to continue working on this task; the test will be whether or not we have succeeded in implementing at least one model that satisfies the behavior we are seeking. If not, we will change to an experimental strategy, based on a model for Darwinian Evolutionary Art developed at CTH, similar to Dawkin's biomorphs. In this strategy, the role of "superagent" A is played by a human being, while the emergent entities B represented as images on a computer screen, generated by the model. A can recognize bio-like patterns, and can direct the evolutionary process by choosing parameter values for the model. In this setting, we lose control over the behavior of A, and thus must interview the superagent as he proceeds to learn why he acts as he does, in response to what he sees on the screen. The advantage though is that we can trace changes in C (at least as he is able to articulate C for us), induced by new emergent patterns, and we obtain from him a narrative about the way he experiences his activity directing emergence, which could a useful substitute for Task 2.1b, should our research in Task 2.1a follow this fork. If it does, responsibility for the Task would shift to CTH, under the direction of Claes Andersson. (Of course, Serra and his UNIVE team could continue their efforts at modeling, but without further funding from MD.) If after Milestone 2.1, we continue with the initial strategy, second year research would consist of refining the "successful" class of models and carrying out experiments to characterize the model-based version of directed emergence phenomena, with a view to developing a narrative from the model's superagent A's "point of view" about how to interact with emergent phenomena to move the course of events in what one regards as favorable directions.

Task 2.1b Narrativizing mass dynamics This task involves using whichever of the two possible second year strategies is selected in Milestone 2.1 to develop a model for an agent acting in a world in which the effects of interest to him emerge from what we are calling mass dynamics. By studying the behavior of the relevant agent A (in the models or the experiments) in response to what is happening in B, the researchers will try to characterize coherent patterns of behavior that can be the basis for narratives of A-B interactions. The challenge will be to understand if such narrative structures can be translated to the worlds of the two case studies of WP 4 to give stakeholders any purchase in making sense of their own experiences with emerging transformations induced by the relevant innovation cascades.

Task 2.2 A theory of organization for innovation cascades Through a series of historical case studies, in part based on materials already collected by UNIVE researchers with respect to innovation cascades from the early history of printing, digital control technologies, and psychotropic drugs, and in part on further case studies we plan to initiate with partners from INSITE, we will develop a theory of social organization in the form of a minimal ontology for framing causally convincing narratives of innovation cascades. We begin with the theory

developed in ISCOM research, but there are many open issues to resolve, in particular with respect to "cognitive" representations attributed to organizations. The particular focus will be on the representation of structures and functionality adequate to frame accounts for how design and emergence concatenate.

Task 2.3 Operationalizing generative potential This task aims to extend the theory of generative relationships referred to in the objectives description by operationalizing it for contexts derived from the Task 4 case studies. Operationalization means identifying assessment procedures and observable proxy measures that can provide ordered categories or even quantitative scales for each of components of generative potential identified in the theory. Some of these proxies might be derived from representations of relations among relevant agents, inducing networks and hence network metrics. In addition, the research will explore possible additional factors affecting generative potential, on the basis of observations of dynamics in the historical case studies of Task 2.2 or observations from the case studies of WP 4.

Task 2.4 Modeling case study innovation cascades This task will use the ontology developed in Task 2.2 to model what we observe in the case studies of WP 4, with the aim of constructing agent-based models that can reproduce stylized descriptions of the observed transformations in agent and agent-artifact relationships. Since such models will necessarily be constructed with agents endowed with limited cognitive capacity, the models can provide insight into the extent to which, and how, design processes affect the characteristics of the emergence "phases" of the innovation cascades.

Participants UNIVE, led by Roberto Serra, has the responsibility of coordinating the research in this WP. Serra is also the leader for Task 2.1a. David Lane is leader for Tasks 2.2, in which INRIA will also participate, and Task 2.3. CTH, led by Claes Andersson, has responsibility for Task 2.4 and Task 2.1b; the former in collaboration with the teams for Tasks 4.2 and 4.3, the latter with the teams for Task 5.3.

Deliverables and month of delivery

D2.1 Modeling directed emergence (describing the results obtained from Task 2.1 and implementations of models developed) M24

D2.2 Theory of innovation cascades (a compedim of results of theory development and case studies from Tasks 2.2 and 2.3) M24

D2.3 Emergence by Design (a book aimed at the general public about innovation cascades and how, to what extent, and in what conditions they can be steered, based on concepts and models developed in this WP and results from case studies in WP 4 Tasks 2 and 3 and tests in WP 3 Task 3) M36

Work package number	3	**Start date or starting event (month)**		1	
Work package title	Managing on-line communities of innovators				
Activity Type	RTD				
	WP Leader	**Other participants with major involvement**			
Participant number	9	4	6	10	
Participant short name	24amp	HubNL	INRIA	MOZILLA	
Person-months per participant	63	6	10	6	

Objective: Develop and test a prototype scalable software tool to assist DIPOs managing online communities of social innovators.

Description of work

General considerations on software development: We want to stay open to ongoing and new technological trends, such as Javascript emerging as a universal technology on both the client and server side. We expect to use different technologies for different parts of the system to achieve both cost-saving and speed of implementation. Different services will communicate via APIs, so that individual parts can be re-engineered or substituted without affecting the system as a whole.

Researchers within and without MD might want to work with their own tools and it might be easier and cheaper to provide them with APIs to integrate their work than rewriting their algorithms. It is reasonable to expect some degree of integration with C/C++ code, python algorithms or matlab-produced libraries. Ever increasingly fast data generation typically requires new data storage platforms (NoSQL etc) to be applied where the choice of storage platform (MongoDB, Cassandra, Membase, Redis, etc) depends on the specific use of the data within the community platform. Including a data-abstraction layer that let's developers use different data storage platforms as a back end keeps the softeware open to more developers as developers can use platforms they're familiar with. Also, the speed of developments within the NoSQL community is so high that the leading platforms in three years are comp[letely unknown at this point. In case of use of commercial packages, the partners should also account for providing us with server-side licences to run their libraries.

Team skills: Web development - probably Ruby, PHP and Wordpress or Drupal; web design and interaction design; simulation engines; cloud computing - knowledge of Heroku or similar cloud computing platforms; system integration - C/C++, Unix; algorithm implementation and optimization; research and numerical modelling skills; project management; open source community engagement

Technology stack: JSON - as the baseline interchange data-format; Heroku - for cloud computing; MySql or Postgress database - for run-of-the-mill website support; NoSql document-based database (possibly MongoDB) - as snapshots repository; Ruby/Sinatra - for web services; Python - for web services interfacing to scientific libraries; Wordpress or Drupal - for the website; Python - to implement algorithms; Python and C/C++ - to interface to specific scientific libraries; MapReduce platforms to be able to scale data analysis with the size of the data set and and required processing time.

Task 3.1 Develop recipe book See discussion of project objective 2.

Task 3.2 Develop tools and modules Schedule: Data-crunching: data importing/exporting services, data repository, augmentation engine (months 1-6); Alpha version: recipe repository, suggestion engine (months 7-18); Beta version: vocaliser, dashboard, suggestion feedback module (months 19-24); Version 1.0: refine, beautify (months 24-30).

Architectural modules: Exporting services (built as online services that can read social network data dumps produced by individual netowrks and normalise them to common format); Importing and management service (load and manage individual social network data dumps; provision made for "snapshots"); Data repository (online repository for data-sets, organized by author, social networks and experiments); Augmentation engine (reads data-sets, enriching them with derived second-order information); Recipe repository (contains recipes; when interpreting network metrics or making suggestions, tool pulls in recipes that match metrics at hand; this module could support a web interface to allow researchers to upload new recipes and tweak old ones; recipes could also be ranked according to effectiveness by community managers); Suggestion engine (reads snapshots,

the bundles and thir derived data and searches for recipes matching the indicators; associates a weight to each recipe indicating probability that A really menas X or that doing Z will actually get to Y, which will be picked up by B; in evaluation stage, weights re-assessed – if targets are met, increased, if not decreased, similar to Holland's bucket brigade); Vocaliser (translates best practices and suggestions into actionable strategies understandable by a community manager); Dashboard (web-based interfact providing community manager with indicators and to propose and validate strategies); Suggestion feedback module (gathers feedback of community managers in terms of validtion and feedback on suggestions proposed by tool; uses this feedback to further enhance snapshot data or by scoring recipe effectiveness).

Task 3.3 Testing the tool Schedule: alpha test (initiates with Milestone 3.1, month 18), beta test (initiates with Milestone 3.2, month 24) version 1.0 test (months 24-36). Test networks: Drumbeat (a network of innovators around open technologies run by Mozilla Foundation, with more than 3000 registered members, many offline events, annual Drumbeat Festival in Barcelona – www.drumbeat.org); Kublai (a community of creatives to help each other design business ideas, launched and run by Italian Ministry of Economic Development; over 2500 registered users working on 400 projects); Hub network (organized as a network of co-working spaces for social innovators; 27 Hubs in 25 cities world-wide, with memberships in the hundreds).

Participants 24amp will lead the WP, with Alberto Cottica having primary responsibility for Task 3.1 and Ivan Vaghi for Task 3.2. INRIA will provide social network analysis competence to recipe development work of Task 3.1 and network visualization competence in Task 3.2. The tool will be tested (in Task 3.3) by the Kublai network (administered by Cottica), by the inter-Hub online community (led by HubNL), and by Mozilla Drumbeat (led by MOZILLA). 24amp will lead the Task 3.3 working group.

Deliverables and month of delivery

D3.1 Recipes M24
D3.2 DT 1.0 M30
D3.3 Using DT M36

Work package number	4	**Start date or starting event (month)**		1
Work package title	Dynamic evaluation of DIPO projects			
Activity Type	RTD			
	WP Leader	**Other participants with major involvement**		
Participant number	5	1	7	
Participant short name	KL	UNIVE	Factlink	
Person-months per participant	28.5	24	9.5	

Objectives

. Design a process of *dynamic evaluation* for social innovation projects, which includes the development of tools and techniques that

- provide a visualization of the project state (current set of stakeholders, their directedness, and permission structures) and the history of transformations in agent-artifact space generated by project activities; and
- evaluate the generative potential of relationships among project participants.

Provide proof-of-concept of the process by using it to evaluate two DIPO-mediated projects, Education Pioneers (EP) and Green Communities (GC).

Description of work

Task 4.1 Dynamic evaluation In the first year, this task will work out the design of a process for dynamic evaluation of social innovation projects, concentrating on the two case studies for concreteness. The first three months will be devoted to a mutual education process between Factlink, the technological partner, the two practitioners who are leading the case study, and UNIVE researchers Lane, van der Leeuw and Read, who developed the ISCOM ontology and will be working in Task 2.3 to develop it. The kind of representations required by this ontology, involving precise definitions of stakeholder relationships, directedness and permission structures, has never been performed by practitioners and of course not by Factlink engineers. On the other hand, these UNIVE researchers know little about the DIPO practice, in which Gurisatti and Sigaloff are expert. Through these learning sessions, the work group will begin to specify the components that a dynamic evaluation process, based on our ontology informed by our experience in practice, and Factlink will have the responsibility for identifying possible ICT tools that could facilitate the elicitation of data and construction of representations, and their use in the processes of negotiation among stakeholders and "directing emergence" that our DIPOs will be carrying out in their work on the two projects. Specifications and preliminary designs for the evaluation process and the tools should be ready by month 9 (Milestone 4.1), when the first phase of both projects should be close to completed. Process design and prototype tools should be completed by month 12, at Milestone 4.2, approximately the beginning of the beginning of projects' phase two, when dynamic evalutation activities should begin. If Milestone 4.2 is reached, then the second year of the project will be carrying out the evaluations as designed, and evaluating and modifying the designs. Assuming they have begun on schedule, at Milestone 4.3 and 4.4, the status of the two projects will be assessed to see whether further evaluation is justified.

Task 4.2 Education Pioneers case study Described in objectives section

Task 4.3 Green communities case study Described in objectives section

Participants KL has overall responsibility for leading this WP and for carrying out the case study in Task 4.2. UNIVE will carry out the Task 4.3 case study, and Factlink will coordinating Task 4.1 and providing the technological competence to specify, design and develop the visualization and generative potential assessment tools in conjunction with KL and UNIVE.

Deliverables and month of delivery

D4.1 Dynamic evaluation (a description of the process design and prototypes for the tools develop to support it) M24

D4.2 Education pioneers case study report M36

D4.3 Green communities case study report M36

Work package number	5	**Start date or starting event (month)**		1			
Work package title	Mobilizing civil society						
Activity Type	RTD						
	WP Leader	**Other participants with major involvement**					
Participant number	8	1	3	4	5	7	
Participant short name	EN	UNIVE	TECH4I2	HubNL	KL	Factlink	
Person-months per participant	12	8	8	3	3	6	

Objectives

Design a process for mobilizing civil society to monitor innovation cascades, as a component of a systemic innovation policy whose aim is to steer innovation cascades in socially positive directions.

Description of work

Task 5.1 Active Learning Seminars Described in objectives section. Month 2 is target date for first seminar. Curriculum prepared by Tech4i2, Factlink and EN, with Tech4i2 in lead role. EN, KL, and HubNL help to recruit participants and provide advice to participants about preparation of their cases. Milestone 5.1 is completion of version 1.0 of course, available for exploitation by social entrepreneurs. Curriculum updated with inclusion of tools developed in MD, presented as D5.1 at end of project.

Task 5.2 PMS system design During the first year of the project, the only activity will be to canvass people and organizations in the networks of our practitioner partners to find interest in participating in the design exercise. A "steering committee" from such recruits will be constituted in month12, and this committee, coordinated by EN, will carry out the design work. Its first task will be to choose a target innovation type to construct the prototype system design around, which will depend on the interests of the members of the steering committee. Discussions around the design of the system will be carried out virtually, with active participants invited to the second annual MD meeting. The system design will be drafted by month 30 and circulated to all MD researchers to collect different points of view, as well as steering committee members. Comments will be incorporated into the report D5.2, which EN will circulate widely through its network and its (and their) contacts in the policy world, particularly at the EC level.

Task 5.3 Unifying narratives This task will be carried out in a similar fashion to Task 5.2. The idea is to initiate a discourse in civil society, and especially in the social innovation world, about how to go from a dispersed local projects and concerns to a view of civil society, suitably mobilized, as an agent for change. Factlink will contribute a technological point of view to these discourse: ICT must play a critical role in constructing and communicating the narratives and attributions, the sharing of which will provide the basis for mobilization – and it will play a critical role in the mobilizing activities as well. EN will coordinate these discussions and the preparation of the manifesto that constitutes D5.3, and will be responsible for its circulation to the relevant communities.

Participants EN, Tech4i2, and Factlink will carry out Task 5.1, with Tech4i2 in the lead role. HubNL and KL will participate in the activities of all three tasks, as specified above in Task 5.1 and as co-organizers of the processes of Tasks 5.2 and 5.3 and co-editors of the documents that come out of them. UNIVE will help with the theoretical formulations as the need arises.

Deliverables and month of delivery

D5.1 ICT active learning seminars for civil society organizations M36
D5.2 PMS for innovation cascades M36
D5.3 DIPO narratives M36

Work package number	6	**Start date or starting event (month)**			1
Work package title	Communication				
Activity Type	RTD				
	WP Leader	**Other participants with major involvement**			
Participant number	2	5	8	9	
Participant short name	CTH	KL	EN	24amp	
Person-months per participant	6	1	1	1	

Objectives

1. Develop a strategy (mainly web-based) for engaging with the social innovators, policy-makers, researchers and the general public in an open, collaborative approach, to validate and gain insight beyond the project partners.

2. Based on this strategy, design and maintain project website and social media communication channels.

Description of work

Task 6.1 Development of a proactive dissemination and engagement strategy The guiding assumption is that wide interest in the project findings will not happen spontaneously. The goal is to gain wide validation and feedback on the projects main findings, in order to make the project conclusions more relevant, more insightful and more useful to a variety of stakeholders. This strategy will open up to the widest range of actors, by mapping the existing stakeholders, the existing discussion forums and conferences, and networks. It will then elaborate the most appropriate content to be made available, the online and offline channels to be used, with specific emphasis for web engagement. All evidence points out that engagement is not platform-centric, but happens across websites: simply publishing a website with the project content will not produce any meaningful engagement. Therefore the strategy will be organized in the following directions: simple publication of project material and deliverables; creation of content such as blog , videos and twitter feeds; collection of third party content relevant to the project; engagement in external mailing lists, forums, and events; monitoring of dissemination effects, defining appropriate indicators (visitors/followers/downloads etc.).

Task 6.2 Implementation of website and social media dissemination This task will start by construct a project website, which will serve as a depository and clearing house for project-related news, reports, working papers, and published journal articles, as well as hosting structured discussions among project participants. In addition, a wide range of tools will be adopted to reach out:

T 6.2.1 Set up and maintain a blog within the project's website, augmented by distribution of its content through the main social networks like Facebook, Twitter, etc. The blog will accompany the project along the different stages, opening up its processes and collecting feedback and any useful information that the social innovation community will want to contribute since the early stage.

T 6.2.2 Monitor and participate in online discussions relevant to themes of MD research taking place in blogs and other websites and communities of practice.

T 6.2.3 Monitor and participate in offline discussions relevant to themes of MD research taking place at conferences, congresses and workshops.

T 6.2.4 Reach out and engage civil service organizations and social innovators in Member States through Euclid Network and the Hub Network by disseminating project's news, reports summaries, invitations to discussions, etc.

T 6.2.5 Make project reports accessible through popular online repositories of documents like Slideshare and Scribd (for documents), to make is as easy as possible for users of the knowledge we will generate to find us and increase project impact.

T 6.2.6 Create and monitor project identity guidelines – logo, presentation template, brochure, posters, etc. to support communication efforts and ensure a consistent project identity.

T 6.2.7 Create dedicated channels on third party platforms. The project will curate relevant third party content and aggregate it in dedicated streams or channels. Concretely, it will set up a podcast collection on Spokenwords.com, where all relevant podcasts will be published, and a bookmarks collection on

delicious.com.

Participants CTH will have overall leadership of the activities of this WP and will have responsibility for setting up and maintaining the website and its associated wikis. EN will direct and manage the communication strategy and activities aimed at engaging civil service organizations and social innovators (Task 6.2.4). 24amp will coordinate blogging (Task 6.2.1) and social media activities. KL will participate in the assist CTH of Task 6.1 and EN in Task 6.2.4.

Deliverables and month of delivery

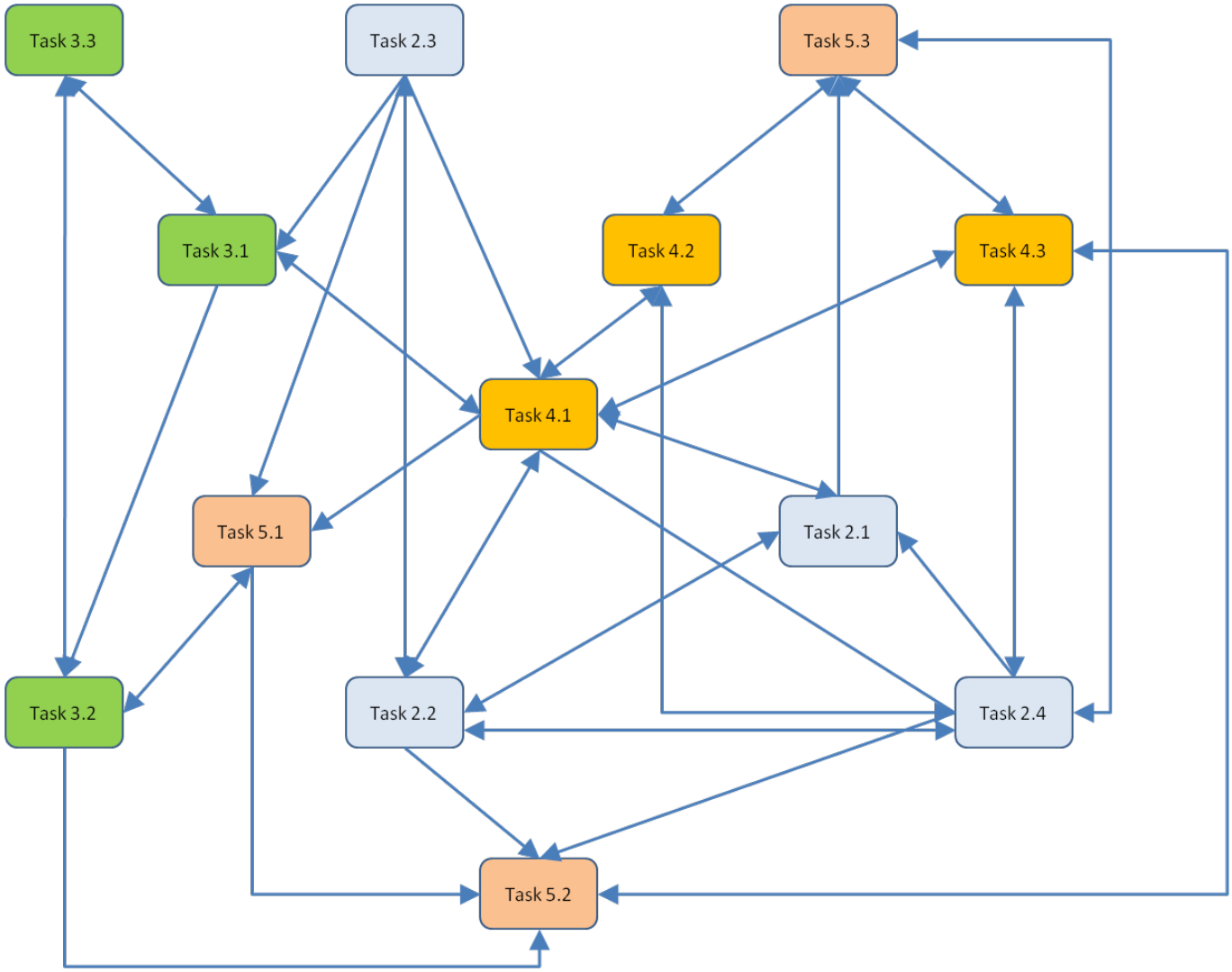
D6.1 Website and blogspace M6

D6.2 Communications and engagement M36

Table 1.3e: Summary of staff effort

Partic. no.	Partic. short name	WP1	WP2	WP3	WP4	WP5	WP6	Total person months
1	UNIVE	**12**	**42**		24	8		86
2	CTH	1	20				**6**	27
3	TECH4I2					8		8
4	HubNL			6		3		9
5	KL	1			**28.5**	3	1	33.5
6	INRIA		5	10				15
7	Factlink				9.5	6		15.5
8	EN	1				1**2**	1	14
9	24amp	1		**63**			1	65
10	MOZILLA			6				6
Total		16	67	85	62	40	9	279

Pert Diagram



Section 2: Implementation

2.1 Management structure and procedure

The MD management will have three levels: the coordinating partner, the executive committee, and the WP leaders.

The coordinating partner (UNIVE) will have responsibility for overall administration of the project, with David Lane as director. UNIVE will be responsible for maintaining the schedule of all project activities; for organizing and hosting kickoff meeting, the two project annual meetings and the project final conference; for convening and chairing meetings of the executive committee; for collating material for and preparing reports to the EC; for handling negotiations between MD and its project officer; and for maintaining a dynamic database of individuals and organizations that participate in MD activities, including new recruits not associated with any consortium member.

The executive committee will have responsibility for the project's scientific management. It will be chaired by the project director and will consist of the leaders of workpackages 2-6: Roberto Serra, UNIVE (WP 2); Alberto Cottica, 24amp (WP 3); Chris Sigaloff, KL (WP 4); Filippo Addarii, EN (WP 5); and Claes Andersson, CTH (WP 6); and Guy Melancon, who will assume the leading role in research relating to networks, especially in WP2 and WP3. The role of the scientific committee is primarily to monitor the project research activities and enhance generative potential among and between the research teams engaged in MD activities, as well as to encourage interactions among these teams, especially across WP boundaries, when appropriate. The committee will meet via teleconference every three months to report and review progress of each WP and MD as a whole. It will also meet at the kickoff meeting and the two project annual meetings; in addition, any member of the committee may request additional face-to-fact meetings of the whole committee or some subset of it, which, if the project director agrees, will be convened and organized by UNIVE. At its initial meeting, the committee will establish internal review processes for MD reports, papers and deliverables, and it will set up a subcommittee to oversee these processes. The committee will have the responsibility of determining if and when the current work plan needs to be modified, and if it deems appropriate, may propose alternatives to be negotiated with the EC project officer. In addition, the committee will mediate disputes that may arise among WP researchers, and it may also decide to replace a WP leader. While we will seek to make all decisions by consensus, either during the meetings or in discussions mediated by the project director in the succeeding days, when this is impossible the committee will vote by secret ballot, with a 2/3 majority required. If such a majority cannot be attained, the project leader will inform the EC project officer of the issue, and the two will negotiate a settlement that will be binding for the project.

WP leaders will allocate tasks among their research teams, monitor and when appropriate supervise WP activities, and report on progress and problems at executive committee meetings. They will be responsible with keeping UNIVE informed about who is participating on which WP activities and to approve the addition of new recruits from outside the consortium who would like to join activities of their WP. They will have the primary responsibility for making sure that WP research is proceeding on time, within budget and with acceptable levels of quality, and they will report any problems that arise in any of these respects to the executive committee when they are unable to resolve them themselves.

In addition to these three structures, a critical coordination role in MD activities will be borne by the communication strategies and tools developed and maintained by WP 6. Through these, including wikis and discussion groups hosted on the project website and social media channels, project members will communicate with one another and will enter into what we hope will prove to be generative relationships also with people and organizations outside the MD consortium, from academia, civil society organizations and the general public. We expect that some of these will seek to join some MD activities; in case a strong collaboration develops and an individual seeks and merits a home inside the consortium, the network structure of UNIVE program groups can allow this to happen, on the recommendation of the relevant WP leader and the approval of the UNIVE team.

2.2 Individual participants

2.2.1 UNIVE: European Center for Living Technology (ECLT), Univ. Ca' Foscari Venezia

Organization Description ECLT is dedicated to the study and development of living technology, from nano-scale artificial cells to the internet and world wide web to cities. Understanding living technology inevitably requires strong interdisciplinary collaboration, which is one of the hallmarks of ECLT's intellectual culture. ECLT currently has research programs in artificial cells, intelligent data and personal manufacturing, supported by grants from the European CommMDon, private foundations and industry. In 2009, ECLT instituted a program in Innovation and Sustainability, directed by Sander van der Leeuw. This program recently launched an FET-funded coordination action, INSITE (Innovation, Sustainability and ITC) and has several research proposals currently under evaluation.

ECLT is organized as an inter-university consortium, currently with 17 institutional affiliates. It is governed by its bylaws, a scientific advisory board, and a general assembly. Day-to-day management is entrusted to three directors, appointed by and responsible to the general assembly. ECLT is hosted by UNIVE, which assumes administrative responibility and legal liability.

Key Team Members *David Lane* is Prof. of Economics at University of Modena and Reggio Emilia, ECLT Fellow, and member of the Science Board of the Santa Fe Institute. Previously, he was Prof. of Statistics at the University of Minnesota. He has coordinated many research projects in the US and Italy, served as principal investigator of the FET FP 5 project ISCOM and is currently scientific director of INSITE. He has published in stochastic processes, foundations of statistics, clinical epidemiology, pharmacology, economics, innovation studies and anthropology.

Sander van der Leeuw is Dean of the School of Sustainability and Co-director of the Complex Adaptive Systems Initiative at Arizona State University; ECLT Fellow and Director of ECLT's Program in Innovation and Sustainability; External Professor, Santa Fe Institute; corresponding member, Royal Dutch Academy of Sciences; and member, Institut Universitaire of France. Van der Leeuw previously held faculty positions at the Universities of Leiden and Amsterdam, Cambridge, and Sorbonne, where he was Professor of Archaeology. Between 1992 and 2000, he coordinated research projects on socio-natural interactions and environmental problems. He was one of the four ISCOM project leaders. He has published extensively on archaeology, anthropology, ancient technologies, socio-environmental and sustainability issues, and invention and innovation.

Dwight Read is Prof. of Anthropology at UCLA. His research interests are in mathematical anthropology, the theory of social organization and cultural evolution. He collaborated with Lane and van der Leeuw in the ISCOM.

Paolo Gurisatti is Industrial Economist, Entrepreneur and Local Development Agent. He is President of STEP (Research Centre on Society, Territory, Economics and Politics in Vicenza – Italy) ane coordinates its MDA (Masters in District Administration) division. He was the first president of HABITECH (Technology District of Energy and Environment in Trento), promoter of GBC Italia and today he is scientific coordinator of the project "Green Communities" (UNCEM and the Italian Ministry of Environment). He has taught in different Italian universities (Venice, Padua, Udine and Trento) and participated to research projects, events and masters in different regions of the world.

Roberto Serra is full professor of Complex Systems at the University of Modena and Reggio Emilia and chairman of the Science Board of ECLT. He is member of the Steering Committee of the Complex Systems Society and has been president of AI*IA (the Italian Association for Artificial Intelligence) He has participated to several European and Italian research projects, coordinatìing some of them, and has extensive experience in industrial projects.

Main Tasks in MD UNIVE will be coordinating partner of MD. It will lead the WP2 research team, with primary responsibility for Tasks 2.1 (led by Roberto Serra), 2.2 and 2.3 (both led by David Lane). David Lane will also participate in the research team of Task 4.1, and Paolo Gurisatti will lead the work of Task 4.3. Finally, all the principal UNIVE researchers will participate in the work of Task 5.3.

2.2.2 CTH: Complex Systems Group (CSG), Dept. of Energy and Environment (DEE), Chalmers Univ. of Technology

Organization description CSG has been widely active in both instruction and research since the 1980's. It currently offers a M.Sc. program in complex adaptive systems, and six students enrolled in DEE's doctoral program have earned PhD's in complex systems, carrying out research under the direction of CSG staff. CSG researchers have led WPs in several EU projects, including PACE, EMBIO, MORPHEX, GSD and INSITE, as well as having leading roles in several national projects. Research areas include social systems, molecular and mesoscopic dynamics, and statistical mechanics and dynamical hierarchies.

Key team members *Claes Andersson* is currently a research fellow in CSG and assistant prof. in DEE. His research interests include long-term social dynamics, particularly the evolution of knowledge, but also the evolution of urban systems. He completed his PhD in 2005 under the direction of Kristian Lindgren. From 2000-2002, he worked with Prof. Steen Rasmussen at Los Alamos Laboratories. In 2005-6, he had a postdoctoral appointment with Prof. David Lane at the University of Modena and Reggio Emilia and ECLT.

Kristian Lindgren is currently Prof. of Complex Systems at DEE, Chalmers, Director of CSG, and Co-Director of ECLT. Trained as a physicist, he has published in evolutionary game theory, the evolution of cooperation and modeling of social dilemmas, cellular automata, and information theory applied to self-organizing systems as well as to models of microscopic dynamics. During the past decade, he has worked extensively on development of energy-economic models for the study of regional and global energy system development under different climate targets and policies.

Lars Jadelius is an associate professor in architecture and lecturer in cultural science and pedagogy with focus on design theory, modernity, knowledge progress and learning processes for creative, intercultural cities. He is active as a consultant and vice chairman of the Society of World Village.

Petter Törnberg has many years of professional experience as asoftware developer, both as a consultant and in-house, primarily focusing on web applications, usability, systems with large data quantities and GIS. He has worked with all phases of the development process, from analysis and designing user interfaces to programming and UNIX server configuration and administration. Parallel to working as a developer consultant and two research-centered projects at Physical Resource Theory, he took an Information Technology bachelor degree and is now finishing with a masters in Complex Adaptive Systems.

Anton Törnberg has experience with ordering, specification and documentation of user interfaces in computer systems. He was together with Petter involved in the above mentioned projects at Physical Resource Theory, though focusing more on management, verification and validation, and human-interaction issues than software development. He is now finishing a masters in sociology focused on ICT and complex social interaction. Anton is also currently co-responsible for a continual international research seminar in Social Movement Theory.

Main Tasks in MD: CTH will lead WP6 and have primary responsibility for building and managing the project website and its online collaborative tools. It will also participate in the WP2 modeling and theory building activities, with primary responsibility for the work carried out under Task 2.4.

2.2.3 TECH4I2: Tech4i^2 Limited

Organization description Tech4i^2 is an SME that provides research-based evidence and practical support for public and private sector organizations in the successful utilization of technology for policymaking, service delivery, performance monitoring and benchmarking. It has an extensive experience in the area of ICT-supported innovative and inclusive policies and strategies. Its areas of expertise include fostering public sector transparency and citizens engagement in the public sphere (social computing, web 2.0 for *eParticipation*); modernisation of the delivery of government services (*eGovernment*); and broadening the participation to the knowledge and information society and technology usage to address social exclusion and development (*eInclusion*). Tech4i^2 makes the most of its very strong links with government policymakers in the UK and throughout Europe and its network of highly experienced and established experts to develop activities throughout Europe and the rest of the world. Recent projects include *Crossroad*, a research roadmap on ICT for governance and policy modeling; *PADGETS*, policy gadgets mashing underlying group knowledge in Web 2.0 Media; and *Enterprise 2.0*, a study on the significance of enterprise 2.0 in Europe.

Key Team Members *David Osimo* is partner and director of Tech4i^2. He has 15 years experience working on ICT innovation policies and projects and is one of the leading European experts on web2.0 in government. From 2005 to 2008 he worked in the Joint Research Centre of the European CommMDon (Institute for Prospective Technological Studies), where he was coordinating research activities on eGovernment. Previously, he worked as advisor and project manager on public policies for innovation and information society in local and regional government in Milan, Brussels and Bologna. His current interests cover the development of new policy frameworks for open and user-driven innovation, the role of design and creativity in innovation policy, and in particular the impact of web 2.0 on public services. He has a blog on government 2.0 at http://egov20.wordpress.com.

Paul Foley is a Director of Tech4i2 Limited and previously was Professor of eGovernment at De Montfort University in England. He has been a consultant and adviser to national governments and international organisations in the successful adoption and utilisation of technology. Paul is currently leading Tech4i2 input to the EC Padgets project examining the use of social media in government, the project is also developing applications on social media and mobile platforms that will enable collaborative eGovernment. He has more than 25 years experience in technology adoption, government administration and social inclusion.

Katarzyna Szkuta is a Policy and Communication Specialist at Tech4i^2. Her expertise, gained in several pan-European projects, spans innovation policies, new technologies, website communication strategy evaluation, social media usage in communication as well as qualitative and quantitative research methods. Prior to joining Tech4i2, Katarzyna worked as a teaching fellow at the University of Warsaw, in a Brussels-based communication agency and in a management consultancy in Warsaw. She holds a PhD in Applied Social Sciences from Warsaw University.

Main Tasks in MD Tech4i2 will participate in the work of Tasks 5.1 and 5.2. David Osimo will share leadership with Gordon Rios of Factlink in developing the curriculum and materials for the active learning seminars, and Tech4i2 will have responsibility for organizing and leading the seminars.

2.2.4 HubNL: Stichting The Hub NL

Organization description The Hub NL Foundation (Stichting The Hub NL) is a global network of spaces and individuals dedicated to building a better world through innovative social projects and enterprises. In Europe alone, it brings together over 2000 social innovators and entrepreneurs spread across 16 Hubs in 12 different EU and neighbourhood countries. Its mission is to create locally-based habitats that offer the right mix of inspiration, connectivity, resources and talent to allow people with groundbreaking ideas for a better world turn them into reality. HubNL has, in just over 5 years, become the largest and fastest growing network of changemakers in the world. HubNL will play an active role in directing research within this proposal with a focus on its spaces for collaboration and innovation, and also acting as an intermediary organisation for the rest of the network.

Key Team Members *Tatiana Glad*, co-founder and director of The Hub Amsterdam, is a social entrepreneur, sustainability practitioner and change strategist. She works across sectors and cultures to develop life-affirming and resilient leadership for whole systems innovation. She is passionate about systemic change, sustainability, enabling start-up initiatives, creating synergies, good questions and meaningful conversations. Tatiana worked as a sustainability practitioner with companies to meaningfully develop indicators to reflect company strategy and values, developed and ran workshops and practices to embed sustainability. Based in the Netherlands, she holds degrees from the University of Bath, UK and McGill University, Canada. Tatiana is a steward of the Art of Hosting and a trainer in the Art of Participatory Leadership, and has experience in action-inquiry research approaches.

Main Tasks in MD HubNL will collaborate in the Task 3.1 research team, drawing on its experience as a DIPO to concoct management recipes. It will also serve as one of the three test sites for the alpha and beta versions of the tool WP 3 will develop (Task 3.3). Finally, it will participate in building the "mobilization narratives" in Task 5.3.

2.2.5 KL: Stichting Nederland Kennisland (Knowledgeland)

Organization description Knowledgeland (KL) is an independent Dutch think-tank based in Amsterdam. Founded in 1999, its mMDon is to help establish the Netherlands as one of the key regions in the international knowledge economy, in a way that creates both economic and social value. KL (staff of 15 people) brings together a network of government, private sector, knowledge institutions and civil society. We continuously search for ways to spark the social innovations needed to improve the knowledge society. Knowledgeland develops and carries out projects, programmes and platforms that contribute to this objective. Knowledgeland is active in six fields: education, government, cultural heritage, copyright, creative economy and social media. We strive to create innovation in these fields, often in collaboration with partners and networks.

Knowledgeland has extensive experience in EU funded projects. KL is one of the founding members of the COMMUNIA network (http://www.communia-project.eu - funded under the eContent+ programme), has contributed to the P2P-FUSION fusion project (funded through the IST programme under FP6) and is one of the consortium members of the EuropeanaConnect project (http://www.europeanaconnect.eu - funded under the eContent+ programme)

Key team members *Chris Sigaloff* leads Knowledgeland projects across education and the public sector. She is involved in facilitating collaboration between leading edge practitioners (the Innovators Network); stimulating teacher-led innovation in education systems (Education Pioneers); and empowering communities by organizing kitchen table forums and breakthrough courses. Chris‘ expertise is in the design and facilitation of courses through which people jointly create new knowledge - knowledge about the ability to create more public value, to collaborate more effectively, and to focus daily action as a professional. Unsurprisingly, therefore Chris is an active member of the Kafka brigade (www.kafkabrigade.nl).

Paul Keller is responsible for Knowledgeland’s activities in the fields of open content and social innovation. He is Public Project lead for Creative Commons Netherlands and leads the community integration works-package of the p2p fusion project. he also advises on the images of the future project on open content licensing and general rights management issues. Paul Keller is a member of the board of ICommons (www.icommons.org).

Iselien Nabben is a senior advisor at Kennisland. She focuses on organisations with a public and social role, such as those in education, healthcare and government. Recurrent themes include leadership and talent development, organizational issues and change management. ‘Social innovation’ and ‘changes from within’ are key concepts that underlie Iselien’s approach. Her aim is to strengthen the innovative capacity of people and organizations by means of learning platforms and interventions that enable a different, sometimes daring approach to be applied to organizations and working processes, ensuring lessons can be learned. Interventions are like ‘snowballs’, oil stains, kitchen tables, intermediate spaces and places to hang out.

Main Tasks in MD KL’s Kris Sigaloff is leader of the WP 4 research team. The KL team will direct the work of Task 4.2 and contribute its experience as a DIPO as a part of the teams of Task 4.1 and 5.2. It will also participate in the narrative construction activities of Task 5.3. Finally, KL will participate in the communications and engagements work directed towards civil society in WP 6.

2.2.6 INRIA: Institut National de Recherche en Informatique et en Automatique

Organization description INRIA, the French national institute for research in computer science and control, operating under the joint authority of the Ministries of Research and of Industry, is dedicated to fundamental and applied research in information and communication science and technology (ICST).

Throughout its eight research centres located, INRIA has a workforce of 3800 (2,800 of whom are scientists from INRIA or from INRIA's partner organisations such as CNRS (the French National Centre for Scientific Research), universities and leading engineering schools). They work in 168 project-teams. Many INRIA researchers are also professors who supervise around 1000 doctoral students, their theses work contributing to INRIA research projects. INRIA has an annual budget of 186 million Euros, 25% of which comes from its own research contracts and development products. In its 2008-2012 Strategic Plan, INRIA has defined seven scientific priorities: Modelling, simulation and optimisation of complex dynamic systems, Programming: security and reliability of computing systems, Communication, information, and ubiquitous computing, Interaction with real and virtual worlds, Computational engineering, Computational sciences, and Computational medicine.

As its strategy closely combines scientific excellence with technology transfer INRIA develops many partnerships with industry and fosters technology transfer and entrepreneurship in the field of ICST - some ninety companies have been founded since 1984. INRIA asserts its presence in the international research particularly in contributing to the development of the European Research Area through its implication in ERCIM (consortium of 19 European research institutions) and its participation in the 6th Framework Program (INRIA is partner in more than 120 FP6 projects (90 in the IST priority)). Concerning the FP7, the institute is involved in 128 selected proposals. In the ICT theme of the Cooperation programme, INRIA is partner in 71 selected proposals.

Key team members *Guy Melançon* is head of the GRAVITE[24] INRIA team. GRAVITE is world reknown for their contribution in advancing the state-of-the-art in Visual Analytics, with a special focus on network science, graphical statistics and interactive exploration. GM established himself in the field while he was junior scientist at CWI[25] in Amsterdam, after which he held University Professor positions in Montpellier and Bordeaux where he founded the GRAVITE team in 2006. He co-authored a survey on Graph Visualization which ranks as part of the top 10 most-cited papers published in the IEEE Transactions on Visualization and Comp uter Graphics in the past decade. GRAVITE is extremely active transferring science and technology to the industry as well as teaming up with social scientists in social sciences: geography, sociology, economy, business intelligence.

David Auber is associate professor and senior scientist member of the GRAVITE team. DA is part of the few worldwide researchers to fully master both the theoretical foundations and technological skills in Graph (Network) Drawing and Human-Computer Interaction, involved in Visual Analytics. DA publishes challenging visualization techniques exploiting the latest computer graphics, multi-core and web technologies in the highest quality journals and conferences. He is the main software architect and development leader of the OpenSource Tulip graph visualization framework used worldwide by the VA research community.

Bruno Pinaud is associate professor and junior scientist member of the GRAVITE team. BP masters all Visual Analytics concepts and best practices while developing a user-centered perspectives in the development of Visual Analytics techniques and systems. He has unique expertise in designing and conducting user studies he developed with top collaborators in Europe.

Main Tasks in MD INRIA will provide the network analysis and visualization expertise for all MD research. In particular, it will be an active partner in the design of the online management tool, in particular in Tasks 4.1 (social network analysis) and 4.2 (visualization framework design and development).

[24] GRAVITE stands for GRAph Visualization and InTeractive Exploration.
[25] CWI is a NWO founded research institute in computer science and mathematics.

2.2.7 Factlink BV, Groningen, the Netherlands

Organization description The staff of Factlink is producing a next generation information services technology and product developed on a social model for credibility. The product is designed through the principals' expertise with web scale data processing, search, and NoSQL technologies. In addition, the team at Factlink has developed a range of research engineering capability to develop and deploy working prototypes for information and knowledge management applications based on highly user centric designs. Factlink staff has in-depth experience with NoSQL as users of MongoDB (it's one of our core components) and one of us co-founded Hypertable one of the early entrants in NoSQL (column oriented data stores). In addition, we have an affiliate who is one of the two developers of Redis (distributed key value store).

Key team members *Merijn Terheggen* is the founder and CEO of Factlink and an Internet entrepreneur that founded several startups in the field of search engine, text mining, and data analysis. He has extensive expertise in initiating innovative projects and bringing stakeholders and experts together to collaboratively solve challenging technology problems and create pragmatic and analytical solutions. Merijn bridges the gap between strategy and technology by maintaining a very user oriented focus and work on pragmatic product marketing.

Gordon Rios is a co-founder of Factlink and a proven leader in search and search-related technologies. Over the past 15 years he has focused his efforts on devising machine learning systems for web search, document classification, and text mining. At Inktomi he developed the scoring engine for a user click-based ranking application that was deployed at HotBot and Snap, was a major contributor to the Directory Engine product which classified millions of web documents into over 14,000 categories, and was a founding member of Inktomi's Web Search Relevance Group. Gordon joined Yahoo! in the International Search team, where he worked on all aspects of search engine relevance developing production code running in all major international markets. He has a part-time appointment as a Research Fellow at the Cork Constraint Computation Centre in Ireland.

Main tasks in MD Factlink will provide support engineering and design that require use of document database, NoSQL storage and analytics, map/reduce processing using Hadoop and dataflow pipeline development using Cascading. At the other end, we can provide design assistance for information services applications being developed to support organizations such as KL. In particular, it will have primarily responsibility for technology needed to create the representation and generative potential assessment tools in WP 4 (Task 4.1). It will also provide techological input to the development of the ICT active learning seminars (Task 5.1).

2.2.8 EN: Euclid Network

Organization description Euclid Network (EN) is the pan-European network for civil society professionals. Established in 2007 as a joint venture between ACEVO (UK), CJDES (France) and Ideell Arena (Sweden), Euclid Network currently has more than 300 members in 31 countries (including several neighborhood countries) and more than 3000 contacts.

EN's mission is to empower civil society leaders across borders and boundaries to develop a more innovative, sustainable and effective civil society sector. To reach the objective, EN has mobilized European civil society, successfully campaigning for more effective and less bureaucratic financial rules (European Financial Regulation Review). We also focus on social innovation, for which we are currently organising a European competition in Naples, after the first successful edition.

EN receives a core grant from the European CommMDon, DG Education and Culture. We are also funded to run specific projects by the European CommMDon, the United Nations and the Foreign Commonwealth Office (FCO), including a number of activities and projects in the Western Balkans, where we have been very active to strengthening the dialogue between the IPA countries and the EU. We are members of several European networks and partners like ECAS, Bond (the UK network of development organisations, where we are on the steering committee of the European Neighbourhood Working group), Six (Social innovation exchanges). EN is also on DG Enlargement's Programming Committee for the Civil Society Facility, advising on how to increase effectiveness.

Key Team Members F*ilippo Addarii* is currently EN's Executive Director and Director of International Development at ACEVO, one of the UK's most influential third sector groups. Since 2008 he has advised the European CommMDon on civil society development and social innovation in the EU and Western Balkans. He has Masters degrees in third sector organization management from the University of Urbino and in strategic management for NGO leaders from Harvard.

Luisa De Amicis is EN's Policy and Project officer. She has a Master degree in Economic and Management from Bocconi University and has gained work experience both in international institutions and in the private sector (management consulting). As project manager for EN, she coordinates and manages civil society projects, while also leading on the European policy campaigns on the European funding.

Kate Duffy is EN's Network Coordinator. Kate graduated from LJMU University in 2005 in Environmental Education. Following this Kate went on to be involved in developmental training, followed by a period working in credit management and Agri-investment in Australia. Having recently completed a MSc Environmental Regulation and policy at London School of Economics (LSE) Kate joined Euclid Network, working to connect civil society professionals across and beyond Europe, with a focus on membership development and communications.

Main Tasks in MD: EN will lead the WP 5 work team. It will have primary responsibility for Tasks 5.2 and 5.3 (led by Filippo Addarii) and will also contribute knowledge about civil society organizations as part of the curriculum development team for the active learning seminars (Task 5.1).

2.2.9 24amp: Pianob S.L.

Organization description 24amp is a startup focused on social media strategies and execution. 24amp conceives and runs campaigns, also taking care of the development of custom web applications and creating a social CRM by discovering, monitoring and engaging relevant influencers and communities.

The main activity is centred on "listening": gathering data related to communities and clients from the web by using both custom-built automated tools and manual analysis. This is followed by seeding and engagement activities, constantly measured and fine tuned to obtain the strategic objectives.

Key Team Members *Alberto Cottica:* Lead Scientist. Alberto is a policy expert with extensive experience in designing and deploying Internet based massive collaboration tools geared towards public policy. He has worked with administrations of different levels, from the local and regional to the national (Italian Ministry of Economic Development) and the European (Council of Europe, workgroup on Social Innovation). From a creative industries background (he used to be a reasonably successful rock musician), Alberto moved to the public sector as the founder and first director of Kublai, a collaborative environment to develop business ideas for the creative industries in a peer-to-peer modality; promoted by the Italian Ministry of Economic Development, Kublai uses ICT in a socially advanced way (different technologies, from the web to virtual worlds) tend to be used for different interaction modalities, and has incubated many successful businesses. It is recognized as the first 2.0 project of the Italian central administration, and a world-class example of decentralized, "wiki" public service. An economist by training, Alberto is the author of many journal publications, a book on the Wiki government and a blog covering collaboration in governance and social business. He is currently completing a Ph.D. in quantitative economics at the University of Alicante.

Ivan Vaghi: Project Manager. Ivan grew up in Italy, moving to the UK in 1994 to pursue a degree in computer science leading to a PhD at the Mixed Reality Lab of the University of Nottingham, where he worked on online collaborative systems. After working for 5 years as a financial engineer for top italian investment banks, Ivan started MIKAMAI, a Milan-based web agency specialising on social networking, mobile development and innovative technologies. He led MIKAMAI as its CEO, bringing the company to one million revenues within 3 years and also opening a London branch and more recently EarlyMorning, a digital strategy consultancy company. Through MIKAMAI Ivan promoted the constitution and organisation of several communities around the themes of technological innovation, opensource, design and startups. He regularly organized events such as the Ruby Social Club, Dorkbot Milano, Hack-up and Startup-nights. Ivan has been working on a number of online pr and communication campaigns for institutions such as UniCredit (generating more than 12000 subscriptions). PR campaigns for other services, such as Sveltopedia, received international awareness with articles published on Repubblica, LeMonde and RAI3 Television coverage. Other projects include online communities such as Wikisap.it, a SAP sponsored community on innovation and TravelTradeItalia.com, an online business community with 14500 members from the tourism industry.

In 2010 he incorporated 24Amp, a Valencia-based social media and digital PR company with a technological heart.

Main Tasks in MD 24amp will be in charge of designing and delivering the architecture of the online community management tool in WP 3 and serve as a project manager for the development of the project. 24amp will also implement the architecture and encode the scientific algorithms within the system. Alberto Cottica will participate in the creation of the MD's blog presence and social media communication strategy in WP 6.

2.2.10 MOZILLA: Mozilla Foundation

Organization description Mozilla is a non-profit, 501(c)3 organization dedicated to promoting openness, innovation, and opportunity online. Mozilla is best known as the makers of Firefox and one of the largest social enterprises in the world. The organization advances its mission through software projects, competitive grants and prizes, and engagement efforts such as Open Innovation Challenges – a community innovation framework that tackles big problems in important fields (education, journalism, privacy) through the application of open principles, community engagement, and a hacker spirit.

Key Team Members *Mark Surman* is in the business of connecting things: people, ideas, everything. A community technology activist for almost 20 years, Mark is currently the executive director of the Mozilla Foundation, with a focus on inventing new ways to promote openness and opportunity on the Internet. On the side, Mark convenes conversations about 'open everything' in his home town of Toronto and around the world.

Before joining Mozilla, Mark was an open philanthropy fellow at the Shuttleworth Foundation in South Africa, he invented new ways to apply open source thinking to social innovation. Earlier, he was the founding director of telecentre.org, a $26 million effort to network community technology activists in countries around the world. Mark has also served as president of the Commons Group, Director of Content and Community at Web Networks and senior advisor to the Volunteer @ction Online grants program team. Mark's first real job was training social activists to make their own documentaries in the early 1990s.

Mark's biggest fetishes are community, conversation and collaboration. He has facilitated over three dozen participatory workshops and unconferences, including Open Everything, Hollyhock's Web of Change, CopyCamp, PenguinDay.ca and countless telecentre.org events. "Passionate conversation," says Mark, "is an essential fuel for building successful networks and communities."

In his years as an activist, consultant and funder, Mark has worked closely with some amazing people and organizations. His favourites include: Sarvodaya, Aspiration, the Association for Progressive Communications, the International Development Research Centre, Communicopia, Mary Helen Spence, rabble.ca, the Shuttleworth Foundation, Zhaba, and the Centre for Social Innovation. "I wouldn't be me had I not worked with these folks," says Mark.

When he finds time, Mark likes to write about community, technology and changing the world. He's proud to have written things like From the Ground Up (a nice picture book about why telecentres matter), Commonspace (FT.com book about web 2.0, written before there was web 2.0) and Appropriating Technology for Social Change (SSRC research paper about activism on the Internet). When he was still an idealistic student, he wrote From VTR to Cyberspace, an illustrated essay about Gramsci, community television and the Internet. Now his idealistic ramblings appear on his blog.

Matt Thompson is a storyteller working at the intersection of media, education and technology. He is the Chief Storyteller and Education Team Lead for Mozilla Drumbeat, a Mozilla Foundation project that brings open web tools and thinking to areas like education, media, science and the arts.

Before joining Mozilla, Matt worked as a campaign strategist on media reform and open internet campaigns, winning a 2007 Webby Award for his work with SavetheInternet.com. Based in Toronto, Matt is a former CBC radio producer and has been a guest speaker at McGill University, the Library of Congress and the London School of Economics. He is a board member for the Toronto Awesome Foundation.

Ben Moskowitz leads the Mozilla Foundation's media portfolio, overseeing the development of Popcorn.js and the Knight Mozilla News Technology Challenge, among other projects. He also serves as an adjunct professor at NYU's Interactive Telecommunications Program. As coordinator of the Open Video Alliance, Ben directed the Open Video Conference and led the 2009-2010 iCommons video policy project.

Main tasks in MD: testing the online network management tool in Drumbeat, in Task 3.3.

2.3 Consortium as a whole

As we stated at the beginning of the proposal, the consortium consists of three very different kinds of organizations. Three are academic research teams: UNIVE is a geographically-distributed group of complexity researchers associated with the Center for Living Technology, with disciplinary backgrounds ranging from archaeology to physics; CTH is based in a university complex systems department and research center, with disciplinary backgrounds in sociology, computer science and physics; and INRIA is a group of network researchers, primarily from computer science. Three are DIPOs, with quite different forms of practice: EN administers an international network of civil service organizations and is very active in developing initiatives to extend the range of social innovation activities and obtaining political backing for them, especially at the European Commission level; HubNL is one of a network of space-providers for social entrepreneurs and other professionals who work in social innovation projects – each Hub serves as a DIPO for the people and organizations it hosts, and The Hub is a DIPO for the network of Hubs; Knowledgeland is a Dutch think-tank (although they prefer to refer to themselves as a do-tank), an SME that promotes, enables and organizes a variety of cultural, educational and social initiatives designed to make Dutch society "smarter", more innovative and more cohesive. The other three partners are SMEs with expertise in the development and use of ICT for knowledge management, communication, and mediating the relations between citizens and governments.

MD research merges theory development, the design of processes to enhance DIPO practice, and the design and development of ICT to enable these processes. Thus, it not only requires all the competences embodied in the members of the nine organizations of its three organizational types, but the objectives of almost all its WP Tasks mandate that people from at least two and in many cases all three of these organizational types collaborate closely and continuously if the objectives are to be achieved. The main question we need to address is why we are confident that our people are committed to and capable of overcoming the substantial cultural, linguistic and conceptual barriers between people with such diverse backgrounds, experiences and professional aspirations.

We can use the language of the theory of generative relationships to provide an answer to this question. Let's examine each of the elements that contribute to generative potential in turn. First, aligned directedness: we share the project's vision. All of us are deeply concerned about whether the Innovation Society is sustainable, and we feel that the way towards a socially sustainable future passes through the mobilization of civil society. We arrived at this perspective through different routes, but we have spent enough time discussing these questions to share a language that lets us express what we've experienced in the common vocabulary that we use in this proposal. The "permissions" and opportunities to engage in these discussions were afforded through our participation in the activities of INSITE, an FP7 FET coordination action dedicated to the theme of Innovation, Sustainability and ICT. An agenda to explore new avenues of research and practice, of which MD is one of the first manifestions, is emerging from INSITE-sponsored interactions, and the aligned directedness this agenda provides is injecting elements of a common culture, language and aspirations that lowers the barriers (or at least provides us the patience and the intermediating means to climb over them). Second, heterogeneity: reread the first paragraph. If there is only heterogeneity, and a lot of it, relationships never get off the ground; if there is no heterogeneity, they stay in one place. Heterogeneity, with the other factors in place, is essential, and we have a lot of it – with respect to attributions, competence, and placement in social networks. Third, mutual directedness: obviously, there is a large measure of self-selection in people who enter in unfamiliar territory. For example, many (in our experience most) academics are most comfortable interacting with academics from their own disciplines, working on problems that those disciplines have anointed as "important", providing solutions in a disciplinarily canonical form (however novel their contents might be). Academics who ventured in complex systems research (at least a decade or so ago; it is fast becoming a discipline itself now) do not share these attributes; they are more attracted by people with quite different knowledges and interests, and they prefer to think about ill-posed problems and invent solution forms on the fly. It turns out that this is true for many serial entrepreneurs as well, not to mention people who work in DIPOs, where emergence by design is their daily bread. So in a certain sense, that the people in MD entered in the swirl of INSITE activities already predisposed them to be attracted by the other people they encountered there! Fourth: permissions. Here, not only INSITE, but FET provided requisite scaffolding, by insisting that we work together with heterogeneous others, and encouraging interests in complexity perspectives, policy, new uses for ICT, and social relevance, if we want to receive funding from them for the activities we find professionally stimulating. Fifth: action opportunities: writing this proposal together was one such; doing MD would be a much more important one.

2.4 Resources to be committed

The most significant resource to be committed to the project by UNIVE and CTH is the time of junior and senior researchers who participate in MD activities, a substantial part of which will be donated by the individuals and institutions involved, without cost to the EC. For the other partners, there will also be a contribution of time from staff and management, but given the nature of these organizations, this will be to a lesser extent than for these academic partners. The three DIPO partners will contribute significant social capital to the project, through their extensive ties with the civil society and the social innovation world whose practices we want MD research to impact. In addition, UNIVE, through ECLT, will provide facilities for all project-related meetings, except the final conference, without cost to the project.

Project costs that MD is asking the EC to bear are the following:

Personnel costs: Each WP is assigned one person month to assist in report preparation. The management costs for the coordinating partner will pay for time of a staff person for scheduling and preparing meetings of the executive committee; scheduling and handling all local arrangements for the workshops, annual meetings and final conference, all to be hosted by UNIVE at ECLT in Venice; preparing project reports; and assisting the project director in all other WP 1 tasks, as required. The personnel budgets assigned to UNIVE, CTH and INRIA will pay salary support for research assistants, either advanced PhD students or postdoctoral fellows, and partial salary support for senior investigators, as per university policy. The personnel budgets allotted to 24amp for WP3 will cover costs associated with developing the on-line community management tool. Personnel budgets for other organizations will be used either to compensate for time that organization salaried employees dedicated to MD research, or to pay temporary employees hired just to carry out tasks assigned to the organization in the MD work plan.

Meeting and travel costs: As noted, UNIVE will organize and host all MD meetings. We have budgeted the UNIVE-hosted meetings on the following basis: for the three annual meetings, we expect 30 participants each for 3 days; and for the final conference, 30 from consortium teams and 10 others. For all the participants to all these meetings, UNIVE will pay for hotel rooms, meeting costs (including coffee breaks and lunches), and conference dinners. Other consortium members will pay for travel for their team members and additional meals, if necessary. UNIVE will cover expenses for participants in workshops, annual meetings and the final conference who do not belong to any consortium member team.

The expenses for the launch of the tool developed in WP3, which will consist in a one-day public event will be covered by 24amp including travel expenses for some external guests.

Section 3: Impact

3.1 Transformational impact on science, technology and/or society

MD researchers are highly motivated to produce work that will have an important impact on science and an even greater one on society. Obviously, we believe that the theory we propose to develop intercalating design and emergence will open the way to a much deeper understanding than we currently possess of processes of innovation and social change, viewed from a complex systems perspective. These processes are fundamental in determining who we are, how we got here, and where we might be headed. From this point of view, we think our research will have many implications, ramifying through all the social sciences and historical disciplines. That of course is no guarantee of *impact*; these implications could well remain unexplored. Indeed, the very transdisciplinary and general character of MD research make it difficult to penetrate the closely-guarded gated communities (disciplines) of mainstream science. We think that the potential scientific impact of our research depends on its implications for social practice – that is, on its potential for social impact. If the latter potential is realized, its theoretical underpinnings will sooner or later have scientific impact. So we now turn to a discussion of what we think the societal impact of our research could be and why it may actually be achieved.

MD research is premised on a very tight linkage between theoretical development and DIPO practice. The theory exposes the potential unsustainability of the way in which the Innovation Society organizes innovation processes and highlights the potential for DIPO practice to contribute to constructing a socially sustainable future. Moreover, the research includes the design of processes and tools to increase that potential, in particular by assisting managers of online communities of innovators, by initiating a debate on how socially-directed innovation processes should be evaluated to reveal their full social impact and value, and by focusing attention on the need for and possibility of systemic innovation policy that monitors for and responds quickly to negative social consequences of innovation cascades. The theory itself can provide the basis of shared narratives within civil society that can play a very large role in assisting the process through civil society organizes itself to assume a leadership role in reorganizing our society's way of innovating in a socially positive direction. Moreover, the theory can help civil society, as it becomes self-aware and self-reflective through this process of organizing itself, understand how to design processes that can direct its emerging patterns of interaction. Thus the linkage of MD theory and DIPO practice that is essential to research within the consortium can reproduce and multiply through the ways in which the theory and practice reinforce one another.

In the early stages of this process of reproduction and multiplication, an important role can be played by two FET funded coordination action, INSITE and GSDP. The theme of INSITE is Innovation, Sustainability and ICT, and its primary objective is to encourage the formation of a community of research and practice around this theme. Indeed, the central ideas of MD and the connections among our partners from the three different worlds of academic research, DIPO practice and technology entrepreneurs arose in the context of INSITE activities. As a coordination action, INSITE can serve as a scaffolding structure to forge relationships between MD research and DIPO practice as well as to inject MD ideas into policy-related discourse. GSDP can provide further structuring to the links with the policy world. The theme of GSDP is Global System Dynamics and Policy, and it is commited to promoting the exploration of new kinds of and uses for scientific modeling in the policy process, in particular with respect to issues that involve global systems dynamics, as many of the endogenous crises generated by innovation cascades on which MD research is focused. UNIVE and CTH are both partners in the GSDP consortium, and obviously MD scientists from these units will work to place MD themes high on the GSDP agenda and use the communication channels that GSDP has been constructing to the policy world to push the policy implications of MD research. MD is thus well positioned, within a constellation of projects supported by FET, to take the first steps on a path along which its ambitious vision can impact our society in a fundamental and positive way, helping it redirect its innovative capacities towards a socially sustainable future.

3.2 Contribution at the European level towards the expected impacts listed in the work programme

We explained in section 1.1 why we believe that MD research is visionary and in section 3.1 why presented an argument that suggested how and why it might generate significant impacts on society and science. In these regards, MD is coherent with the requirements of the work programme. MD research premises an intimate and ongoing relationship between theoretical development and concrete practical immersion in socially-oriented innovation processes. It is impossible to describe this relationship in terms of the usual (directed) dichotomy theory->applications. For us, "practice" is not an "application" of pre-existing theory: practice informs theory, and theory informs practice, through an ongoing action/discursive process. MD is premised on the idea that we live in very perilous times, and intellectuals and practitioners must work together to construct a future worth living. If we are right about the implications of the current organization of innovation processes for social sustainability, researchers cannot afford the luxury of fiddling while Rome burns, no matter how sweet the music. We think the EC, and FET in particular, should take this message to heart, and the kind of collaboration MD is putting together, with the kind of research we propose, inspired by the vision we put forward, is what the listed expected impacts are really all about.

3.3 Dissemination and/or use of project results

MD researchers are strongly motivated to engage many people and organizations from the social innovation world and civil society more generally. We think that these agents will take a great interest in vision that guides our work and the urgency that it highlights. We plan to do our utmost, through the activities of WP 6, to communicate our ideas and results to them and to recruit them into joining us in our discussions and investigations. Through our active learning seminars, launch event for the online community management tool and final conference, we will provide oppportunities for these agents to see how the tools and processes MD will design and develop can work for them. If we are successful in finding a social entrepreneur who wants to continue and expand on the active learning seminars, the more exposure we will gain for the practical results of MD research.

The more self-aware and self-analytic civil society and its organizations become, the more possibilities they can generate and explore for finding ways to help steer the Innovation Society on a socially sustainable course. Besides the project website, with its wikis and discussion groups, WP 6 will also develop social media channels, which, together with the personal and organizational networks of our DIPO partners, the more we will be positioned to reach and engage agents from civil society and the social innovation world. Many of our project deliverables are targeted primarily for agents from those worlds and will be made available to them through the project website and various public on-line repositories.

MD's communication strategy will also extend to several other constituencies. First, we think that the general public needs to be better informed about the issues we are raising about the social sustainability of the Innovation Society and the possible roles that civil society can play in steering the Innovation Society away from its endogenous social crises. Project blogs and online discussions will play a role in this communication strategy, but so might some of our deliverables, especially if we package D 4.2, D4.3 and material from D 5.3 as a book aimed at the general public.

In addition, online community management tool and the research that produces it warrant particular communication efforts. We will maintain an interface to engage two communities that could add a lot of value to the development of this tool as well as speed up its adoption trajectory. These are the network science community (itself very interdisciplinary) and the open source software community. To do this, we will make the internal discussion visible online, and explicitly invite anyone interested in participating. This will happen by means of a blog, also a one-stop shop for positioning papers, slides from presentations and any other working material that developing the tool generates. Similarly, we will open the workshops we are scheduling around the tool development, in conjunction with the two MD annual meeting, to the general public, designing them so as to allow non-MD group members to submit materials, demos and insights in general. We will also release source code with an open licence, and store it in the repositories already in use by the open source community (GitHub). This will enable external developers to improve what we do, and the (compiled) code will also be released for free download, so that online community managers and researchers not in the MD group can use it to crunch their own data – and hopefully give back to the MD team in terms of feedback and insight. Full instructions will be released for researchers outside the MD group to enrich and improve the set of recipes underpinning the tool, allowing it to co-evolve with the state of the art of emergence science after the end of the project. Finally, we will hold MD sessions whenever possible relevant community events in this space; for example, Mozilla's Drumbeat Festival is an obvious choice of venue to hold such a session. This should bring value to the open source community's table as

well as increasing that community's engagement in our project. Done right, this should enable the formation of an ecosystem of developers, researchers and practitioners around the theme of online community management augmented by networks and complexity science

We anticipate that most of the other results of MD research – theoretical development, modeling, case studies, process designs – will be published in appropriate research journals and thus will be available to the various segments of the academic world that concerns itself with such matters. We also expect that project researchers will present their results at academic conferences and workshops.

Section 4: Ethical Issues

ETHICAL ISSUES TABLE

	YES	PAGE
Informed Consent		
• Does the proposal involve children?		
• Does the proposal involve patients or persons not able to give consent?		
• Does the proposal involve adult healthy volunteers?		
• Does the proposal involve Human Genetic Material?		
• Does the proposal involve Human biological samples?		
• Does the proposal involve Human data collection?		
Research on Human embryo/foetus		
• Does the proposal involve Human Embryos?		
• Does the proposal involve Human Foetal Tissue / Cells?		
• Does the proposal involve Human Embryonic Stem Cells?		
Privacy		
• Does the proposal involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)		
• Does the proposal involve tracking the location or observation of people?		
Research on Animals		
• Does the proposal involve research on animals?		
• Are those animals transgenic small laboratory animals?		
• Are those animals transgenic farm animals?		
• Are those animals cloned farm animals?		
• Are those animals non-human primates?		
Research Involving Developing Countries		
• Use of local resources (genetic, animal, plant etc)		
• Impact on local community		
Dual Use		
• Research having direct military application		
• Research having the potential for terrorist abuse		
ICT Implants		
• Does the proposal involve clinical trials of ICT implants?		
I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	**X**	

Table 4.1 Ethical Issues Table