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Interfaces between open and traditional organizations

the Sensorica experience

NOTE: This is a work in progress. As the story unfolds, with inputs from different Sensorica affiliates, please come back from time to time to get the latest. You are invited to comment on this document and to ask questions. We may decide to address your questions in the text. We are doing this work openly, collaboratively, the Sensorica way. If you find mistakes, unpolished phrases, a rough style here and there, don't be sad :) It will get better with time and with everyone's input.
One thing is certain, this document will be of great historical importance, because it is among the first to describe in detail and from real life experience economic interfaces between the emergent open world and the traditional world.

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Table of contents

Introduction
The Barda case
The Queen's University case
The IoT for heavy industry case
The Blockchain Access case
The SpiderRig case
Greens for Good
Breathing Games
To be developed further...
Discussions
Important links
Other issues
    IP, Patents, and Privacy vs. Openness

Introduction

Sensorica was officially launched in February 2011, as a *for-benefit*[1] open and collaborative network, focused on open source development of sensors and smart systems. Initial efforts went into the development of the Mosquito sensor, the ambition being to demonstrate that *peer production* can be applied to material things. Until 2015, the Sensorica *open value network (OVN)* was deploying most of its energy into developing its own products and services, while building infrastructure to sustain its operations. The vision was to find ways to engage in the traditional transactional (market-based) economy, not as a traditional organization, but as an OVN. As time went by, after the creation of Ethereum, the first DAO and the first series of ICOs Sensoricans realized that peer production can escape the traditional economy and become a dominant economic logic. In this document you'll see the progression towards self-sustaining models that bypass the market and the traditional financial system. You can find the synthesis of this thinking on the OVN wiki, Economic model and Peer production pages.

In the early days, Sensoricans chose the market of scientific instruments to experiment with peer production, because it is characterized by low volume and high profit margins, with a high degree of customization. To advance its open source scientific instrument projects, Sensoricans created strategic partnerships with academic labs. Three *ENGAGE* grants were obtained, with Montreal Heart Institute, McGill and Ecole Polytechnique de Montreal. Other grants were obtained for commercialization efforts, through an *Exchange firm* created for this purpose, Tactus Scientific.

In February 2015, Sensoricans took on the first service contract with a local architecture firm, to design a high tech observation tower, the *Barda periscope project*. In May 2015, Sensorica affiliates arranged a deal with Queen's University to design an open source scientific instrument for characterizing photovoltaic materials, the PV characterization project. The end of the year 2015 brought an even larger challenge, the development of an open source sensor network, an IoT application for the heavy industry, the Sensor Network project, with a well-established industry leader. At the beginning of 2016, Sensorica partnered with eVision Inc. on the *Blockchain Access* project.

Within one year, Sensoricans firmly established that *open networks* can service traditional organizations, in a way that provides great economic benefits on both sides of the deal, as well as for society at large. In other words, Sensorica demonstrated that peer *production networks* have a place in the current economy. That place was not in fabrication, but rather in innovation, by offering R&D services to traditional organizations.

[1] See this paper.

Let's make sure that we don't go over this too lightly. Sensorica is not a corporation, it is not a coop, it is not a non-profit, it is not an LLP. It is an *open value network* (OVN). From a legal perspective, it is a non-registered association. It is an open network of freelancers that coordinate and steward their work using specific IT tools (the NRP-CAS) and governance. If you still don't understand what Sensorica is and how it operates please don't panic. It is something new that requires a bit of time to digest. It is new, but at the same time it is very similar to other new things that have emerged recently, like the Bitcoin network for example. We can say that Sensorica is for material production what the Bitcoin network is for digital exchange services. So the million dollar question is how do we interface these new network-type creatures with traditional organizations? How do we sign a contract with a loose network of individuals? Who is going to show up to do the work? How can we guarantee that a swarm of people converging on tasks from all four corners of the planet via the Internet will deliver on time, within the budget, and with the required specifications? Who is responsible? Can the network be accountable? Sensoricans have worked hard to bring these questions to the attention of government officials in Canada, see more on the 4th Sector.

In our opinion, Sensorica is the most advanced *peer production* network applied to hardware production, using infrastructure and methodologies that have been specifically tailored for open networks and shaped by real projects and relations with traditional organizations. We claim that the OVN model is able to sustain deterministic economic processes and accountability, while preserving the open and fluid nature of networks, while maximizing individual autonomy. This new ability of open innovation and peer production networks to generate predictable outputs, demonstrated by Sensorica, was the main topic of the meeting with Jenn Gustetic from the White House, in June of 2015.

The role of Sensorica in the service cases enumerated above shaped the network as the ***interface between the crowd and traditional institutions***. In other words, input from the crowd can be structured and channeled towards solving someone's problem, through Sensorica's infrastructure, methodologies and governance. But let's not get confused, we are not talking about a crowdsourcing platform. So what is the difference? A crowdsourcing platform like Upwork is an intermediary between companies and the crowd: the company posts a problem with a prize for someone who can provide the solution; the platform takes a cut. Taskrabbit is the Uber of cheap labor, connecting people who need chores done with people who can do them, while taking a cut from their transactions. In both cases, the intermediary platform is owned by a company and those who supply the work aren't organized, they respond individually to demands, they compete with each other for the prize. In the Sensorica model, no one in particular really owns the platform. The same holds for Bitcoin, no one in particular owns the blockchain network. Affiliates of Sensorica organize, form collaborative groups to tackle complex problems that might even require long periods of time to solve. In the cases discussed here, the size of a project is comparable to a startup, reaching up to 10 individuals. The longest duration of a sustained project is over one and a half years, showing the capacity of Sensorica's model to sustain long-term crowd engagement. These are the first pilot projects, but the potential is for thousands of individuals per project, which amounts to a large size enterprise, for

long-term projects that can take several years. Sensorica is really showing the signs of a new system of innovation and production that can operate at large scale. But as an R&D service provider, it can already be seen by traditional institutions as ***R&D on demand***, as an adjacent, very cohesive ***R&D operation open to the crowd***, funneling in low cost and rapidly evolving open innovation. Practically the entire revenue generated is split among participants, with only 5% going to maintain and to develop the infrastructure, which is under the total control of participants.

At the third iteration of ***crowdsourced R&D service offerings***, the service beneficiary got a fast paced innovation at a quarter of the normal cost. Even more interestingly, the cost cuts aren't transferred to those who provide the service. They are actual cost savings that result from a heavy use and rapid remix of open source, from the mutualization of resources within the network, from the collaborative nature of activities, from the elimination of bureaucracy and inefficiencies that come from lack of motivation. On the contrary, everyone is paid with the same measure, according to the Canadian labor market, no matter where the contributor lives. More precisely, within Sensorica those who live in Pakistan aren't paid less. And if that wasn't enough, on top of providing rapid innovation to traditional institutions at a fraction of the cost, so that they can maintain jobs, at the same time Sensoricans increase the value of the global commons, because everything they do is open source. All the data about the economic activity within Sensorica is open to the public, we can't make this stuff up!

This mutually beneficial economic relationship between traditional organizations and Sensorica, as an open innovation and peer production network, can be seen as ***a bridge between the traditional capitalist economy and the p2p economy***, as a channel for transfer of resources from the old economy to the new. Under these hybrid models peer production is largely dependent on the traditional economy, it cannot reproduce itself outside if it. But by 2021, ten years in operation, the Greens for Good venture (see below) stimulated new realizations. Inspired by new decentralized blockchain projects, Sensoricans started to design and implement new economic models that exhibited capturing mechanisms within a larger ecosystem, beyond bilateral transactions, outside of the market. This was also the time when building networks-of-networks and interfaces with multiple types of traditional actors became a conscious choice, leaving aside the ideas of Sensorica as an isolated network. The same movement was developing in the blockchain space with inter-chain transactions, federating what was seen before as insular p2p digital infrastructures. The Breathing Game venture (see below) stimulated an even more decisive departure from earlier hybrid models, putting the open value network at the front of economic relations with traditional organizations, opening the door to self-sustaining peer production.

The Barda case

The Barda periscope project was the first implementation of a new open project development methodology designed by Tiberius and Lynn, in the context of a service provided to a client. This methodology was formalized in Sensorica's network resource planning (NRP) software through a concept named *Workflow recipes*, which are time-dependent and deliverables-dependent bundles of Processes associated with a Project (a context of work). This methodology consists of the following steps: *Project initiation*, *Design considerations*, *Design*, *Prototyping*, and *Product*. All the contributions to the Project were logged within this structure.

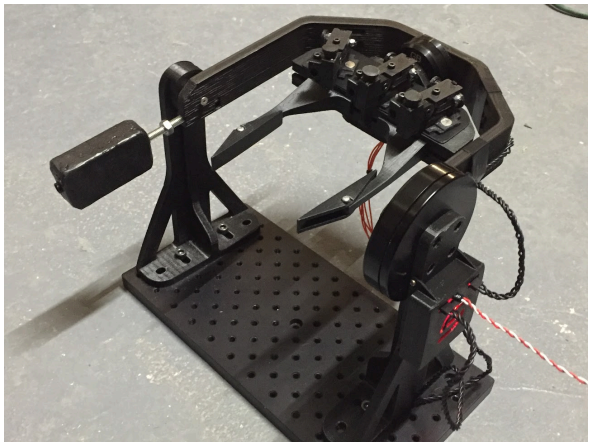
In order to reduce the perceived risk for the client, the Project was divided into milestones. A cost estimation was produced for the client for every milestone. The agreement was to get paid at the end of every milestone. Every milestone was to be delivered with complete documentation, open source style. The client could stop the process at the end of any milestone and decide to switch to another organization to complete the Project. The documentation provided a guarantee for rapid continuation. The burden was on Sensorica to provide a good service, at the level of satisfaction of the client, in order to complete all the milestones.

Moreover, the activity logs in the NRP and the associated documentation provided the client with full and real time access to the process. Coordination on different issues and tasks took place in context, directly in the working documents, and the client was invited to provide feedback on the fly.

A problem emerged during this project: very rapidly, the work documents became long and the client's ability to follow the process was hindered. We spent time formatting the documents to make their content more transparent, but these measures didn't diminish the time spent by the client to effectively follow the process. The situation was more complex, because this was a three party relation, between the Sensorica team, Barda and Parcs Canada, Barda's client. Information produced by sensoricans had to be reformatted to match Barda's project management structure and the language used between Barda and Parc Canada. In the end, Barda provided sensoricans with a template for 3-way communication, based on their own open issues and tasks.

The Barda periscope project was a small project, involving only a few contributors. Coordination was fairly easy at this small scale.

The Queen's University case



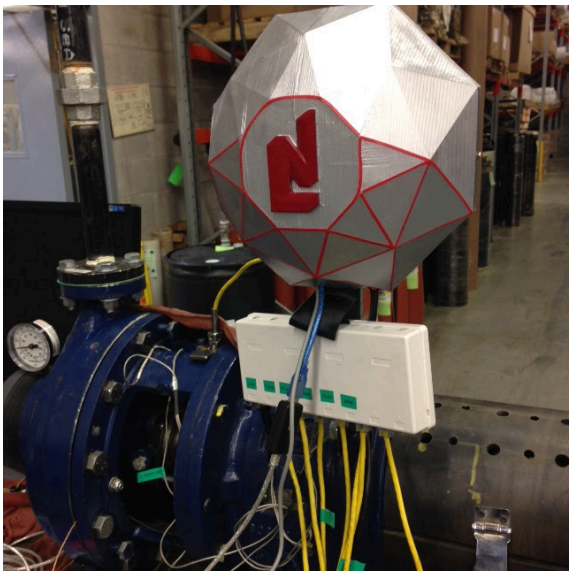
Joshua Pearce is a professor at Queen's University and Michigan Tech University. He is dedicated to open science and sustainable technologies, and has been following Sensorica since 2013. He is the author of the Quantifying the Value of Open Source Hardware Development paper. For years, Joshua's team has designed multiple scientific instruments by building on various open source projects. These instruments have been released under open licenses. In 2015, he decided to take a risk and transfer to the Sensorica network the task of designing an instrument used in the characterization of photovoltaic materials. This was an important shift in Joshua team's approach, from in-house development with inspiration from open source projects to crowdsourcing development through the Sensorica distributed network. The main goal was to create an instrument with a community around it, which would increase the speed of innovation, ensure continuity of the product, and increase its diffusion rate to universities around the world. At the same time, the PV characterization project was also seen as a pilot project to build an interface between the crowd and a traditional institution, Queen's University, through Sensorica's p2p infrastructure, open project methodologies, and governance.

The open science movement is building momentum. It started with open publications, increasing access to scientific knowledge. This initiative became more nuanced, proposing early stage sharing of data and information (prior to the publication), sharing of unpublished past results and even sharing of lessons learned from failed experiments. In parallel with the development on the distribution side, the movement also built infrastructure for data sharing in resource-intensive domains of inquiry, like genomics for example, as well as social networking platforms designed for scientists and scientific projects (like Research Gate). Recently, we have seen initiatives for redesigning scientific instruments that are in tune with the open science philosophy. New instruments are acquiring new characteristics: they become shareable, they facilitate socialization of scientific activities, they become modular and interoperable, as well as easily serviceable and upgradable. Efforts also go into redesigning scientific labs, making them more collaborative, interconnected, accessible through teleproxmity, etc. Sensorica leads the way to open science, as one can see here. The PV characterization project incorporates many of these new aspects.

This project was started by incorporating all the lessons learned in the Barda periscope project. There was a difference in scale: more individuals contributed to the design and the prototyping of the PV characterization device (11 affiliates and over 200 logged contributions). The requirements for accountability and responsibility were also higher, since we were now dealing with a University. All this puts more pressure on our support processes. We created a *Project responsible* role, to be the interface between the University and the Sensorica OVN. Financial incentives were attached to it. Moreover, the roles of outreach (find skills), orientation (help new affiliates get accustomed), coordination (make sure that all affiliates are on the same page) and facilitation (make sure that all affiliates get the help they need) became very important. We experimented with new tools for orientation that proved to be more effective. A specific forum was created for the project, in order to focus discussions. The PV project was also more complex, its documentation proliferated faster, which led to the need of content maps in order to ease the navigation.

During the course of the project we noticed that the outreach function was very important and not so easy to finetune. The answers to our signals propagated on social media were slow to come and the conversion to an active contributor was low. We attributed part of that to a poor general understanding of Sensorica's OVN model, including its system of incentives. At the beginning of the project, we grossly underestimated the efforts required for outreach, for generating the content to be broadcasted, for establishing a constant social media presence, for mapping the open source ecosystem, targeting specific pools of talent, and establishing trust relations. The project was run below the critical mass of open projects and therefore required a more centralized form of governance.

The IoT for heavy industry case



NOTE: We cannot publicly disclose the name of our sponsor in the IoT for heavy industry applications case.

In December 2015, sensoricans were contacted by a Montreal-based company to help develop an IoT solution for applications in heavy industry. They wanted to make their product “smart” and able to predict its life expectancy. The requirements consisted of a mesh network of sensors that send data to a cloud for analysis, in order to trigger maintenance tasks and to predict failure. The race to be first to market set the pace for fast innovation and low cost. The company crafted a business model based on services, not on selling the hardware, which is fully compatible with the open source development that Sensorica can offer. The agreement was that everything that Sensorica develops can be released under an open source license, with no restrictions for Sensoricans to remix this technology in other projects, including commercial ones.

Thus, the company became the sponsor of an open source IoT applications development project. CAKE, the Custodian of the Sensorica OVN takes in financial contributions from the company and distributes them to network affiliates, as a reward for their involvement in the project, as fiscal sponsorship. The company is not a client of CAKE, since this a three party relationship, between the company, CAKE and the world, the later benefiting from the open source IoT applications design, and not simply a one-to-one service exchange between two organizations, even if the company can draw a direct benefit from this relationship.

The Sensor Network project started almost in free form. The first tacit agreement was that the sponsor informs development based on their knowledge about these applications. Decisions on development were to be made during scrum meetings between sensoricans and employees of the sponsor, sensoricans would work on tasks, log their time contributions and get some financial compensation every two weeks, relative to their efforts. As the project unfolded, we felt the need for better planning and cost estimation. The first improvement was to manually create a map of content about R&D activities. This brought the idea of being able to generate dynamic content maps, either from the NRP-CAS (every development process requires R&D documents as deliverables) or from a CRM (content management system), which is not yet implemented. In order to allow the sponsor of the project to follow metrics about the project in real time, we created an experimental dashboard. In the end, we realized that we needed to synchronize the

sponsor’s ERP with Sensorica’s NRP. We crafted a shared language and project development structure, and the agreement was to keep track of work in both places. This brings the need to create interfaces between the two management systems, which hasn't yet been implemented. Moreover, we also decided to produce cost estimates for future tasks, to allow the sponsor to better plan its budget. All these measures had a positive impact on our relationship by making our activities much more predictable and auditable, and by increasing the level of reliability of the network.

As development progressed, the sponsor realized that his first-to-market advantage could be jeopardized if our results were made public, associated directly with the sponsor's business and interest. This sparked an interesting debate on openness (access to participation) and transparency (access to information). We drew from a past experience with a project that was also sensitive to transparency, and implemented an open and semi-transparent project model. In more concrete terms, anyone could join the project, which preserves the openness aspect, most of the technical information generated is public from the start, but the relation with the sponsor and applications in the sponsor's field of operations would be obscured. Two categories of documents were created, a non-public one, which contained raw information and making links between the sponsor's application and the developed technology, and another one that was completely public, in which that sensitive information has been extracted. Project affiliates needed to sign a non-publication agreement for documents clustered in the non-public folder, but there was no restriction related to the use of the technical information in any other project. Moreover, all these non-public documents were given a date for automatically becoming public, which is related to the sponsor’s market deployment strategy and pace. We believe that through this arrangement we preserved the nature of the Sensorica OVN, while mitigating the risks perceived by the sponsor, which led to a stronger synergy between the two entities.

Our estimation is that the sponsor saved at least 60% of R&D costs by adopting this *crowdsourced R&D on demand* service from Sensorica.

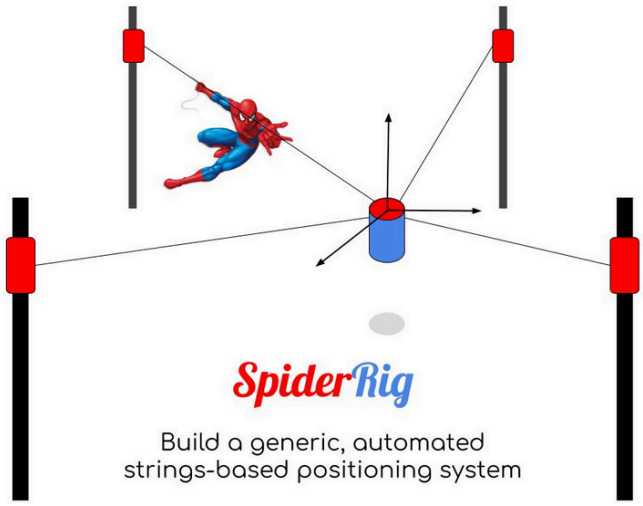
The Blockchain Access case

At the beginning of 2016 we were contacted by Living Labs Montreal and eVision to contribute to a digital access management project (smart locks). Our role was to explore the pertinence of blockchain technology in this field - see more on the project.

The main value perceived by Living Labs and eVision was the ability of Sensorica to gather rare talent, in this particular case people with blockchain skills. The interface between Sensorica and its partners was modeled as the Sensor Network IoT project. Most of the development work was performed during the summer of 2016.

During the Blockchain Access project sensoricans learned the hard way that culture is very important when interfaces between open and traditional organizations are established. eVision's corporate culture and Living Labs' non-transparent and competitive culture clashed with Sensorica's culture of open sharing and collaboration. Sensoricans ended up doing more work than they initially bargained for, had to catch up with delays introduced by these companies, suffered from lack of transparency and had to endure a corporate/naif project management style. The experience has been recorded in this document.

The SpiderRig case



In 2018 Sensorica was called by a small Montreal-based virtual reality firm to design a linear cable parallel robot to drive a video camera. This venture was the first one to involve more participants that were not situated in the vicinity of the Sensorica lab, testing our online collaboration methodologies and tools. A comprehensive outreach campaign was deployed to build the collaboration team. The planning was split into 4 milestones: Administration, Understanding, Design considerations and Prototyping. Templates for every milestone were created. The first graphical symbols for stigmergic collaboration were also implemented during this venture.Stigmergy was further developed in the subsequent ventures as a parallel mechanism of coordination to more traditional planning.
The legal interface used was CAKE, Sensorica's Custodian, to sign the agreement and hold and distribute the finding given by the sponsor firm.

[See project page](#).

Greens for Good

In 2021 Sensorica was called to design and prototype a green leaves protein extractor by a professor from the Michigan Tech University. This project was special for its broad collaboration with other universities and NGOs around the world. Sensoricans planned and executed the most comprehensive outreach campaign for building collaboration, building on top of the experience with the SpiderRig venture. The collaborative relations were cemented with support letters and commitments.

Another novel practice was the use of cryptocurrency to pay contributors located in countries that did not make it easy for their citizens to transact in foreign currencies. Some collaborators were located in Lebanon, others in various African countries.

This venture was also the most sophisticated one in terms of planning. The work methodology was also improved, splitting the tasks in various Work Packages such as: Capacity Building, Process Maintenance Deliverables, Deliverables, Packaging and Dissemination. Templates were created for future use.

During this project Sensorica developed further stigmergic processes, away from central planning. The work documents were pre-formatted to provide a structure to the collaborative environment and the list of graphical symbols (digital pheromones). A more comprehensive study about integrating stigmergy into Sensorica's methodologies was done, with some collaboration with the hREA project.

Greens for Good was also a context in which new economic models for material peer production were designed that bypass the market. This model is based on ecosystem services, more on the Dissemination doc. A very thorough investigation was sparked that continued with the IoPA investigation and the Breathing Games venture (see below), leading to advanced propositions of economic models that can exist outside of the current economic system. This development can very well mark the time in history when the p2p economy gave its first signs of self-sustainability, opening the way to becoming the dominant economic logic on planet Earth. In terms of interfacing with the traditional economy, this development may invert the situation, putting peer production in the leading position, as the main driving force.

The legal interface used was CAKE, Sensorica's Custodian, to sign the agreement and hold and distribute the finding given by the sponsor firm.

See project page.

Breathing Games

In 2023, Sensoricans were called to improve the Breathing Games PEP prototype that was previously developed at the Sensorica lab. This was another case of network-institution collaboration, involving two open networks, Breathing Games and Sensorica, and Dr. Tse Man from Montreal Sainte Justine Children Hospital. 15 new PEP devices were fabricated at the Sensorica lab based on the improved design, and delivered to the Sainte Justine Hospital for preliminary tests. This led to a 100,000$ grant awarded in April 2024 for a collaboration between Dr. Tse Man from Sainte Justine, Pr. Joshua Pearce from Western University, Breathing Games and Sensorica. We called this venture PEP Master.

PEP Master is special in multiple aspects. Firstly, it incorporates an increased complexity, as it involves two open networks and two institutions, departing from the simple binary network-institution relation. Secondly, PEP Master builds on a long standing relationship between Breathing Games and Sensorica, since 2015, demonstrating the resilience of open networks as well as the duration in their relations. Thirdly, this venture operates in the medical field, which imposes high level requirements for quality and security of deliverables. The devices made by Sensorica were provided to Dr. Tse Man as prototypes, to be used in research involving patients, under strict supervision. The goal is to bring these devices to the regulator for approval of use without direct supervision. This is groundbreaking because success means institutionalizing material peer production.

The legal interface used between the open networks and the institution was a new local non-profit organization, not CAKE, as in previous ventures. This was an interesting development, demonstrating that custodianship can be generalized, and can be seen as a service to the network provided by any non-profit organization, making OVNs very flexible, modular organizations.

During PEP Master, Sensoricans proposed a more advanced p2p economic model to sustain open source innovation and material peer production bypassing the mainstream financial system and the market. The scheme was called the Trust-based Economy, described here.

As in other past cases, negotiations with the institution, before formalizing the collaborative relationship and the funding distribution scheme, required some efforts, as institutions are still not well prepared to interface with open networks. These difficulties were surmounted like in previous cases, showing that these types of interfaces are possible, but still require some education.

Moreover, like in previous cases, we had to deal with the cultural differences between open networks (the open culture) and the medical/academic culture. We learned, yet again, that many subtle aspects of collaboration cannot be taken for granted, that the reality of each party needs to be well communicated. Going from academia and health institutions to an open network is a paradigm shift, not just a superficial institutional change. One example of cultural misalignment arose when we had to design a public event about the project. The expectations on the side of the network and the institutions were not the same, especially when it comes to transparency (public communication or dissemination on social media) and openness (who has access to the event and under what conditions). Some friction came from the need to reduce transparency to protect future publications in academic papers, opposed to the need to spread excitement about the project and draw in more collaborators. These differences were resolved after some discussions to build shared understanding and alignment on strategy and goals. These tensions are never insurmountable, as long as agents on all sides take the time to diffuse misconceptions and fears, and work out a win-win strategy.

To be developed further...

Lessons learned

- *Improved support roles for administration, accounting, customer relations, outreach, orientation, facilitation and coordination, when the project becomes more complex and larger in terms of participants*

Discussions

[Jim]

During the course of this project (IoT) I suffered from impaired self-determination, a psychological process that leads to the well known "crowding out" effect:

When individuals perceive an external intervention to reduce their self-determination, they substitute intrinsic motivation by extrinsic control. Following Rotter (1966), the locus of control shifts from the inside to the outside of the person affected. Individuals who are forced to behave in a specific way by outside intervention, feel overjustified if they maintain their intrinsic motivation.

This was due to the company's project management putting a choke on exploration to limit their costs. This didn't affect some individuals but affected me, a core contributor. The other main contributor was motivated to find a better interface to manage these effects, so his motivation to the project was moderately affected and the other was a new contributor, who wasn't part of the initial project terms.

This lead me to a few realizations:

- The value equation, a democratically agreed upon distribution of rewards, negates the extrinsic motivational effects money has on intrinsic motivation
- The problem occurs when an external force changes the governance to that equation
- Crowding out is not particularly tied to money, but the external processes attached to money .If a community itself decides how to split the pie and is part of the process, network dynamics are preserved and it has no effect on intrinsic motivation..

I hope this makes some sense :-)

I am playing with the notion of abstracting these external events in the future. Usually when two unbalanced forces are joined together there is a need of a buffer to provide a balance.

Important links

Sensorica service systems

Other issues

IP, Patents, and Privacy vs. Openness

Read [Open Value Networks: a framework for many-to-many innovation]

By Scott

Traditional intellectual property law evolved to protect the livelihood of inventors. This makes a lot of sense, because it is much easier to reproduce a technology than it is to invent one. Invention takes many months or years of thinking, striving, experimenting and struggling, before an invention sees fruition. The patent system protects inventors by giving them the exclusive rights to market their inventions, thereby giving them an incentive to invent things in the first place. Without a patent system, an inventor who spent years developing a technology would be powerless to stop a wealthier man from stealing his methods and leveraging his capital to beat the inventor out of the market. With a patent, the inventor keeps this right for up to 25 years to profit from his technology before the patent expires and anyone can market the technology freely.

However, owning a patent comes at a cost. The fees to get your patent globally recognised can accumulate in the tens of thousands of dollars per patent. Also since the nature of a patent is that you gain intellectual property at the cost of publicly revealing your ideas and methods, it becomes tempting for others to use your methods and violate your patents. Even though you have the right to a patent, defending a patent in court can cost hundreds of thousands or in some instances even millions of dollars in legal fees which is often enough to bankrupt a small company before the court date.

A traditional alternative to patents is to keep trade secrets. With trade secrets, you do not reveal your methods publicly, so this is often used in cases where it would be difficult to reverse engineer your methods. The drawback of this method is that you become limited to the intellect within your organization as no one outside your organization can develop your technology since they don't know it exists.

Today, we live in the world of lean startups, venture capital, and rapidly developing technologies. 25 years in an eternity in the high tech sector and a patent can completely block a market from developing. There is a case to be made for open innovation, as technology would develop more rapidly if everyone shared their technology with others.

However, from the perspective of a "traditional" institution, opening their technology up to the public represents a loss in competitiveness, since large investments into R&D can be easily taken and reproduced by competitors. In game theory terms, this is a tragedy. Since every traditional company would be better off if they held some trade secrets, and

absorbed the open source technologies of others, it leads to an in-ideal situation for the market where information is not shared openly.

One solution would be to enforce temporary non-disclosure agreements, or 6-month holds on the release of information, source code, or designs, to allow a company to get a head start in the market, while still allowing the open source community to develop and improve base technologies. Another option would be to invoke government support for open technologies, such as tax breaks for open innovation. A third option would be the legal development of shorter term patents, that better reflect the current high-tech market conditions. For example, a cheap 5-year term that a start-up could employ to protect their IP, which better reflects the pace at which the industry is moving.

At the end of the day, if an open source community wants to interface with a “traditional” company, they need to strike a balance between the open source’s need for transparency and the protection of research investment by the traditional company. There is a need to develop social, legal, and market frameworks that move the Nash equilibrium from the in-ideal closed market tactics of today, towards the open innovation of tomorrow. Humanity stands to benefit from it.