Management of Research and Development

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A demonstration and discussion of how I have applied some of the course topics to planning the eGovMon project.

Abstract. This paper is part a deliverable and a prerequisite for passing the Ph.D. course Management of Research and Development at Aalborg University 2009.
This paper presents different areas of managing research and development. It further shows how these areas are related to the ongoing research project eGovMon as well as presenting findings on how eGovMon can benefit of these.

Keywords: Management, Research, Development, eGovernment.

1 Introduction

The eGovMon project [1] aims at measuring and benchmarking governmental services on the Internet. In the project, a tool for monitoring the quality of governmental web sites will be developed. This will give a better understanding of how to build good online services for both citizens and businesses.

The eGovMon project focuses on four main Areas:

Accessibility:	How well can people with special needs use the web site.
Transparency:	How transparent and open is the government agency.
Efficiency:	Does the introduction of a governmental service increase the efficiency for the government agency and its users/citizens.
Impact:	Is there any measurable positive effect for the users of the eGovernment service.

The eGovMon is a user driven research project where the users consists of a selected group of Norwegian municipalities. In practice this means that the research and research results can be used by the selected municipalities is a prerequisite for the funding. If they do not find the work useful, the funding will disappear. It is worth mentioning that the eGovMon project does sell any product, all software is released under an open licenses. However, the eGovMon project may sell services connected to the software which could for example be detailed analysis of the quality of individual governmental services.

2 Type of research

In [2] Trott introduces different types of research as a continues line. Each research type is more tangible than the previous starting from concept up to a finished product. The most elementary research and development is knowledge and concept, followed by basic research, applied research, development, technical service and physical product. The further along the line, the more tangible a product us.

As mentioned above, the eGovMon project is a user driven research project and the funding is directly connected to users finding the proviced service useful. The involved municipalities are interested in

products being as tangible as possible. Their main requirement is the actual evaluation results and the fact the results are trustworthy.

On the other hand, eGovMon is doing research. The methodology and process for measuring quality of online governmental services is not know and has to be invented.

The project has a special need to be met; *benchmarking of the quality of governmental web sites*. Even though how this is done, how the methodology is performed and which algorithms are applied, are of little interest to the users - the main purpose of the project is research. We need to invent and create the methodologies and algorithms to be used.

Taking this into account, according to [2] eGovMon is between applied research and development.

How it can be applied to the eGovMon project: When managing eGovMon we should be more aware of and have a cleared understanding of the differences between research done (applied research) and the service delivered (development). The two need to be clearly separated.

3 Types of innovation

3.1 Steady state and Radical innovation

In [3] Tidd presents two distinct types of innovation: "Steady State Innovation" and "Discontinuous Innovation". These are two completely different types of methods for carrying out research.
Steady State Innovation is characterized by:

- Based on clear set of rules.
- Dependand on the path strategy chosen.
- Clear environment.
- Resources selected to fit criteria.
- Routines refined and stable.
- Strong ties and knowledge flows along clear channels.

Discontinuous or Radical Innovation is characterized by:

- Rules emerge over time.
- Path emerges over time.
- Fuzzy selection environment.
- Risk taking, tolerance of failure.
- Operating patterns emerge and are fuzzy.
- Weak ties and peripheral vision.

The eGovMon project can be identified by both types of innovations.

First and foremost, what is to be created is known - even though how to make it is unknown. According to [3] this strongly suggest use of steady state innovation characterized by clear rules and strategy.

However, looking at project from a broader perspective, we are operating in a very new environment. In fact, as is often the case when performing research, no similar product or service exists. This is a clear risk. It could be that the quality of eGovernment services cannot be measured automatically, which means that the project cannot be carried out as intended. Naturally, to what extent the project can be carried is not known until it has actually been done, which again is a typical characteristic of a research project. This suggests, according to [3], that the project is mostly identified by radical innovation.

How it can be applied to the eGovMon project: Following [3] eGovMon has characteristics of both steady state and radical innovation. It should be made more clear that two different ways of innovating exists in the project. The project may benefit from more actively scan the environment for potential innovation ideas. This could fuel the radical innovation with tradeoff for the existing continuous development in the project.

The distinction is further elaborated in 4.

	Existing Marked	New Marked
New Technology	Disruptive Technologies	Breakthrough Innovation
Exiting Technology	Incremental Innovation	Disruptive Business Concepts

Table 1. Marked versus Technology

3.2 Marked and Technology

In table 1 a correlation matrix between market and technology is presented. The Matrix was originally published in [4] with the intention of showing innovation in different types of businesses and how businesses deal with both new and existing technologies as well as new and existing markets.

As elaborated in section 4 the eGovMon project use both new technology and operate in a relatively new marked. According to [4], this means that we are operating with risky breakthrough innovations. This is in contrast to the findings in 3.1 where, according to [3], the eGovMon project had characteristics of both steady state and radical innovation.

How it can be applied to the eGovMon project: Working with what is, according [4] breakthrough innovation is risky. It may be the developed technology is not good enough. Additionally, it may be that the marked is not ready for the product. Even though the funding for the research is covered, the project could benefit from being more aware of the high risks.

4 Triggering Innovation

Innovation is triggered by different types of scenarios and events. In [3] seven types scenarios are presented which trigger innovation:

- New Technology.
- New Market.
- Political Regime.
- Change in the market or attitude and behavior.
- Regulatory Regime Changes.
- New business model.
- Unthinkable events.

In the eGovMon project several of the above scenarios trigger innovation.

New Technology : Having governmental services available on the web is a new and emerging technology.

New Marked : In the light of the new eGovernment technologies, a need for measuring the quality and use of these technologies emerges. This includes finding good and best practices as well as technologies for comparing government agencies with each other. Clearly the world wide web and new online government services has created a marked which the project operates in.

Political Regime : Several of the areas we are measuring are popular political topics these days. **Accessibility** for all on the web will be set in practice by Norwegan law in the beginning of 2011 and is an important goal of the European i2010 strategy ([5]). **Transparent** and open government is key areas for organisations such as United Nations. Additionally, it has been a key area for the Barack Obama administration. **Efficient** government is not law binding. However, it is often prioritized as citizens are interested in having their government as efficient as possible. **Impact** of government services in practice means that the services are actually used. Clearly, there are no interests in using tax payers money to create services which are not used.

How it can be applied to the eGovMon project: The eGovMon project should aim at having a clearer understanding of where the innovation is triggered in the project. We should be more aware that the innovation in our project comes mostly from new technology, new marked and political regimes. Any changes to these areas will effect the project and may force us to innovate radically.

5 Where does ideas come from?

As mentioned in [6], ideas for innovation may come from many areas. It is not necessarily so that the best ideas comes from the people with longest running time in the company etc.

Ideas may come from customers, internally, suppliers, trade fairs etc. The important issue is to include ideas from any person independent of the position in the company. Furthermore, [6] claims that the most important ideas come from the customers.

In the eGovMon project there are three types of participants:

Active Research Partners:	Core participants of the project using close to 100% of the time in the project.
Other Research Partners:	Partners part of reference group. These partner in the needed meetings etc. but have their main activity in other areas.
Users / Municipalities:	The users of the results using approximately 20% of their time in the project or areas closesly related to the project.

For the **active research partners**, we have two days each week phone meetings as well as physical meetings three-four times a year. To more actively include any idea from all participants, the project could attempt at reducing the hierarchical structure of such meetings. This could help us fuel even better ideas.

We also hold phone meetings and physical meetings with the **municipalities** and **other research patters**. Also here we could try to reduce the hierarchical structure to fuel more ideas.

Additionally, we could hold meetings with all three types of participants without any separation of type of participant. A challenge here would be language barriers. Many of the users claim not to be too familiar with English - while most of the research partners have no knowledge of Norwegian

How it can be applied to the eGovMon project: We could include all types of partners in the physical meetings to better fuel more ideas. I.e. avoid having developers in one meeting and municipalities/users in others, making sure that the project benefit from both areas. Additionally, we should aim at removing any type hierarchical structure in the meetings allowing all ideas to be presented, even ideas which at first glance seem unrealistic.

6 Open Source and actively involving users

At first glance [7] appears to be a normal online newspaper. However, in addition to reading news, users may contribute their own articles. In fact, the entire newspaper relies upon contribution of news articles from users in a similar way as Wikipedia relies upon contributions of encyclopedia articles from its users.

In other words, not only is the software used open source - but the text itself has an open license and provided only by the users.

For the eGovMon project, using accessibility as an example, not providing alternative text to images is a barrier for people with visual impairments [8]. For these people, the image itself does not contain any information since they cannot see it. People with visual impairments often rely upon getting the text of web pages read out loud with speakers or with screen readers. Because of this, if there is no alternative text to the image, the information is often lost. Unfortunately, how to add alternative text to an image mostly depends on the content management system used. In practice this means that the eGovMon project can only show that an image is missing an alternative text, not explain how to fix it.

To improve this situation we can allow users, or developers of content management systems, to provide the information themselves, similar to how this is done in [7]. People who for instance know how to add alternative text to an image in a particular content management system could add this in a wiki-like environment, which would benefit all users of the service.

How it can be applied to the eGovMon project: We could add a wiki-like approach for adding information which is in general unknown. This allows users and content management developers to be more actively involved in the project in addition to over all improving the service provided.

7 Strategy for making decisions

Stevens and Burley presented in [9] decision making as a funnel. They claim that for every idea/discovery, only a subset will be be developed. Furthermore, for every development only a subset will be designed from which only a subset will be launched as a final project/product which can be commercialized.

The example provided in [9] claims that only $\frac{1}{3000}$ of the initial ideas launched become commercializable products. It is a common belief within the eGovMon project, that the number of ideas which become products is far greater than $\frac{1}{3000}$[1]. There could be several reasons for this:

1. This approach presented in [9] may be true for traditional tangible products. However, for software development, making a product from an idea is often considered easier that for traditional product.
2. Very few software development companies make money from selling licenses or patents for products alone. In fact, most make money from from selling services connected to the software [10]. Services may not be applicable for the findings in [9]. Obviously, this has changed from the first release of [9] in 1997.
3. eGovMon deals with research. [9] may not applicable for research companies/projects.
4. The findings in [9] may be more applicable for larger companies and projects. It may be easier to promote an idea in a relatively small project such as eGovMon compared to the larger commercial companies - because there are fewer other ideas to compete with.

How it can be applied to the eGovMon project: This seem to be not applicable for the eGovMon project. This is most likely because the approach is developed for more tangible products compared to research and software development.

8 Involving users

An essential part of the eGovMon project involves users. Citizens are the main users of Governmental services. Furthermore, it goes without saying that citizens are people from all levels of society - and people with any type of educational background.

The essence of [11] is that instead of experts, interfaces should be tested using a "Blondie group", making sure that the simplest interface is created. A "Blondie group" could be defined as a group of people with little or no knowledge in the area.

One of the areas to test in the eGovMon project is efficiency. This can be interpreted such that citizens should more efficiently use online government service compared to traditional offline government services. E.g. it should be more efficient to file tax reports online compared to handing in paper tax reports.

Clearly, what is defined as efficient should be efficient for all citizens, including everyone from experts to people with computer illiteracy. It should not be so that you have to be a tax expert to benefit from an online tax reports service.

Example of efficient tax return only for a tax expert: Choosing between tax report 1040 or 1040A. A tax expert would easily know which form to fill out. However, people without expert knowledge, would normally not know the difference between these forms. Howver, for an expert such a choice is fast and efficient.

[1] We have not collected the number of ideas which are developed further. It is however obvious to the participants of the project that this number is far greater than $\frac{1}{3000}$.

Example of efficient tax return for people without expert knowledge in the area (Blondie Group - [11]): Asking if you have an income of more or less than 100000 USD annually. People who have an annual income of less than 100000 USD should fill out form 1040A, while the remaining should fill out form 1040. This is not known to people without expert tax knowledge, and only asking for form 1040 or 1040A is not efficient for this group.[2]

In the eGovMon project, we will present data in an online user interface. Clearly, we should keep in mind not to create such an interface only for eGovernment experts, but rather for any citizen without expert knowledge in eGovernment. This could possibly mean that we include people without expert knowledge on eGovernment for testing the interface.

How it can be applied to the eGovMon project: We should keep in mind that there are different types of people with different background knowledge. What may be efficient for an expert may not be so for a person without expert knowledge. Furthermore, for user testing interfaces to data produced by eGovMon we should include both people with expert knowledge and without to ensure that the interface works well for all.

9 Conclusion

Several areas if management of research and development has been addressed in this paper - most of which are directly applicable to the ongoing eGovMon project.

The main focus of the eGovMon project is measuring quality of eGovernment services. In addition to being a research project, we also deliver services to our users. The project could benefit from being more aware that there is a difference between research performed and service delivered. Furthermore, innovation in eGovMon has characteristics both from steady state and radical as well as operating with new technology and in a new market. According to the state-of-the-art literature, this makes eGovMon a high risk. Innovations are triggered by the new market, new technologies available as well as political regimes and any changes in these areas will influence the project - it may even, in a worst case scenario, make the services provided by the eGovMon project useless. Because of this, the project may benefit from more actively searching the marked.

Furthermore, the project could involve users in a more constructive manner such as enabling the users to provide solutions in a wiki-like environment. Such content should be available for both eGovernment expert and for users with little or no experience with eGovernment.

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[2] An even better solution would be for a system to know your annual income without the need to ask for this.