

Case Report 'Excellent Practice'

How They Did It

Successful Innovations in Health Care
in Kagawe (Japan) and Alberta (Canada)

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This article is part of a series called 'Prima Praktijken' (Good Practices). The main research question is: what are the most important facilitators and barriers for innovators in innovation processes? The series are part of the project 'Health Care Innovation' and are written by the Lectorate Public Sector Innovation (HAN University of Applied Science).

Summary

This case report examines two cases of successful innovations in health care. In the province of Alberta (Canada) and in the prefecture of Kagawa (Japan), innovators have succeeded in implementing IT-applications to share information across organizational boundaries. Doctors and other health care providers can use these IT-applications in order to work more efficiently and effectively.

Japan

In the prefecture Kagawa on the island of Shikoku, several projects of digital information have been implemented. Professor Hara started to develop these IT-innovations in the nineties. His initial project was HelloBaby – a digital platform for sharing prenatal information about mother and child. After that, a broad platform with multiple information sharing software applications was rolled out among several medical facilities.

Canada

The Canadian province Alberta has rolled out an Electronic Health Record system in 2005. The system enables the sharing of patient charts and test results by professionals in hospitals, labs, pharmacies, doctors' offices, continuing care organizations and other facilities. The system is called Netcare and it delivers key medical information to healthcare professionals across the province, such as patients' lab test results, drug and allergy records, and demographic data.

Research Goals

The goals of this case report are 1) to describe the origins of the innovation and the innovation process 2) to assess how the innovators have dealt with intractable factors in their environment – in their case, with the institutional obstacles that they encountered along the way, and with reluctant colleagues who were unwilling to take risks with their patients lives, and who perceived innovations to be potentially risky.

Conclusions

Our tentative conclusions are:

- **Government Interventions** The innovators needed support and money from government, but had serious problems finding those. But most of them succeeded – not by doing exactly what the money was intended for, but by redefining what they found important in terms of the objectives of the providers. All key innovators had close relationships with decision makers. The innovators said that their close links to (local) politicians turned out to be very helpful during the process.
- **Incremental Approach** Reluctant medical professionals could be convinced to adopt the innovation, because the process was cautiously designed as a step by step achievement. The innovators did not take risks with their innovations; they defined the status quo as risky and their innovations as risk reducing solutions. The innovators were all cautious people, always avoiding risks.
- **Multiple Talents** The innovators were able to combine their different skills and talents to operate in two, or more, worlds. They contributed their successes to the fact that they had several specialties (e.g., gynecology and IT), as well as multiple social networks.

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Chapter 1 The Mystery of Successful Innovations

Why do innovations occur when they occur? Is it just because people put their minds to it and make it happen? Or can the innovators only succeed within carefully designed environments, with specific social, institutional and technological resources available to them? If we knew the answers to these questions, innovating would be routine business... We will not be able to solve the mystery of the occurrence of innovations in this case report. The required literature research on all possible explanations alone would take more than we could ever cover in the scope of a paper. What we will try to do, is shed some light on how some specific innovators were able to overcome some of the obstacles that they encountered along the way. It should enable us to modestly hypothesize answers to the question why innovations occur where they occur.

Case report

This case report is concerned with 1) describing the origins of two major innovations in health care and the innovation processes that have led to their occurrence; 2) assessing how the innovators have dealt with intractable factors in their environment. The last goal has to do with the context in which the innovation occurred. Since we did not want to look at innovation from one specific angle, but rather from an innovation's angle towards its context, we faced the risk of getting lost in the wide range of relevant variables – from the impact of the institutional framework to the organizational culture and from financial management to the available technology. Therefore, we have followed the main cues that the innovators gave us in personal interviews, as well as some lessons from research we have conducted in the past¹. That led us to two main factors: 1) the role of government and the overall institutional environment; 2) the reluctance among peers in the medical field to adopt the innovation.

Case selection

The criteria we used for the selection of cases derived from the Ash Institute for Democratic Governance and Innovation at Harvard's Kennedy School. These included 1) significance, 2) proven results, 3) novelty, and 4) replicability². On top of that, we wanted the innovations to comprise more than one heterogeneous organization within a policy field. This criterion (especially in combination with the former four) narrowed down the number of available options.

Recent developments in medical informatics proved to suit our criteria perfectly. They have provided some very interesting innovation challenges to organizations in the medical sector. Especially the development and implementation of Electronic Health Records or Electronic Patient Records has turned out to be a difficult process. Very few countries in the world have been successful at it. So the few places where some form of electronic medical records has been implemented – such as Canada and Japan – were interesting to look at in the first place. The fact that some of these places are institutionally and culturally very different was a plus. After all, we were focused at the context – and the more these contexts differed from each other, the more interesting the cases became.

Method

We have started with extensive literature study on the contextual factors of innovations and distinguished certain variables that could be at play. These insights formed the basis for a questionnaire for circa 40 semi-structured interviews with innovators and their accomplices in the two countries. They were conducted on location by two researchers in order to be able to cross-check and interpret more thoroughly. We have added open questions, such as: What do you think, as an innovator, were the factors that contributed to overcoming obstacles? The majority of our respondents were professionals who had gotten their hands dirty – who personally put the innovation into practice, such as doctors, pharmacists, hospital managers, officials and people from medical IT-organizations. A list of interviewees can be found at the end of this report.

Chapter 2 Digital sharing of medical information

Doctors and other parties in the health care sector share information about their patients every day. They often do so, however, in a 'traditional' way: on paper. This can lead to inefficiency and inaccuracy. This way of working is relatively slow and it can cause mistakes in information transfer. In extreme cases, the professionals do not use each other's data or judgment. Their working processes and administration are organized around their own expertise. Every kind of doctor has a particular view on the patient with subsequent taxonomies and data-categorizations. To put it boldly, the radiologist thinks in X-rays, the pharmacist thinks in recipes, the surgeon thinks in incisions and stitches, and the nurse in the amount of minutes she can spend on a patient. This can lead to a fragmented image of the patient, inefficient and ineffective data-transfers, time consuming procedures, and many mistakes varying from minor miscommunications to fatal errors.

Network innovation

There is an alternative. Doctors and other health care providers can use IT-applications in order to share information. A well-known example is the Electronic Health or Patient Record: a digital file with the data of a patient that can be read or actively adjusted by several partners in the health care network. This is not the only innovation in this field: health care professionals can benefit from many more IT-applications than just patients' records. Another example is a radiological information system that consists of a read only-database with pictures and information that general practitioners and clinical departments can use. A third innovation of the same family is a system that hospitals and general practitioners can use to exchange information about patient discharges and that enables them to send discharge letters electronically. You can also think of looking up X-ray images and descriptions via internet, to enable healthcare professionals to access patient information stored in the systems of another hospital in the country.

These kinds of innovations in medical informatics could improve service and save lives. But in order to implement them, the information on patients needs to be shared in a health network in which several partners participate, such as small pharmacies, huge hospitals, general practitioners and independent laboratories. Introducing an innovation like an Electronic Health Record can be a huge challenge in such a complex context.

Despite these difficult circumstances, in some countries innovators managed to do just so. In Canada and Japan, it is imperative that innovators have succeeded in their efforts to share information digitally, although this had to be done in a complex network of heterogeneous health care providers. How did they manage to do so? What happened?

Chapter 3: The Kagawa Case (Japan)

In the prefecture Kagawa, on the island of Shikoku, several projects of digital information have been developed in the nineties. Kagawa is a small territory, but the people are scattered and especially in the rural areas and on the islands in front of the coast, the inhabitants do not have easy access to health care. At the same time, Kagawa favors an equal distribution of health care facilities and sharing medical information

HelloBaby

In this prefecture, professor Hara started to develop IT-innovations in the nineties. Hara was a gynecologist from this region and he had also pioneered in the field of medical informatics before it was even seen as field in its own right. Hara brought together his gynaecological expertise and his ideas on medical informatics and started with a small project called HelloBaby – a web-based portal through which general practitioners, physicians and nurses could access data of mothers and their unborn children.

“We began very small and with a subject that I knew very well,” professor Hara said. “We focused on the fetus. We thought: what kind of information is relevant for all possible care around birth? It was very difficult to map all those data. We thought: if we do this right, then the rest will follow. So we started working on HelloBaby, the web based system that enables nurses and doctors to share all information about a mother and her child.”

According to interviewees who used the system, HelloBaby increased efficiency and effectiveness of communication between professionals across organizational boundaries. It also improved the health and safety of mother and child: if women experience complications during delivery, they often need to be transported to hospitals with specialized care. When their information is available in all hospitals and clinics, HelloBaby can save lives.

K-Mix

After HelloBaby, Hara and his team turned their attention to the development of a system to connect clinics and hospitals electronically. This was the initial phase of the STEP – an initiative for research on medical informatics. Hara convinced others to join. In 1999, the STEP had developed into an organization consisting of hospitals, academics and vendors and facilitated research on EMR network.

“I had a big picture in mind about sharing information for all medical purposes,” Hara told. “I knew I would fail if I started working on a grand design. So I moved step by step. The program is called STEP for a reason... With every step you take, you see the next step emerging. After we had one or two applications, we needed infrastructure and standards, then we needed money, after that we needed more users, after that we needed more applications, after that we needed legislation and so on and so forth.”

K-Mix

In simple words, K-Mix is the infrastructure on which many applications can run. It is an XML and HL7 based exchange protocol that defines standards for the exchange of medical information such as images, statistics, test results, etc

K-Mix started with only HelloBaby – one application on prenatal care. But the need for an infrastructure and standards grew. After HelloBaby, more applications were developed.

Governance

Money, legislation and other kinds of support from authorities were not easily available. Hara and his fellow innovators had to work within a complex institutional playing field. Telemedicine was a field of interest of several government departments. In fact, it was related to the Ministry of Health, Welfare and Labor; the Ministry of Economy Trade and Industry (METI); the Ministry of Agriculture; the cabinet of premier Koizumi in Tokyo and the prefectural government in Kagawa.

The Ministry of Health, Welfare and Labor was responsible for the national health care system. The Ministry was reluctant to speed up Hara's innovation process. Officials there knew how complicated the task was and were still studying on policy options. They did not want to invest randomly in specific innovations, but rather in a well coordinated effort to develop and implement comprehensive medical record systems. As a result, criteria for subsidies were developed at a system-level.

Several interviewees were critical of the limited part that this Ministry played in stimulating innovations in the health sector. Deaths in medical errors are unacceptable in the Japanese society, and innovations are generally seen as risky, they explained. "The Ministry of Health (...) cannot afford to make mistakes and are conservative for that reason", a civil servant from another Ministry said. "METI has a different approach and can support a pilot project."

METI is the abbreviation of the Ministry of Economy Trade and Industry. It also had connections with telemedicine. METI had the goal to improve the level of service in the health care sector. Therefore, METI promoted research and development in the medical sector and stimulate computerization. The biggest obstacle in this matter was the lack of a multi vendor system – a system that would work with the products and standards of a variety of hardware and software providers and that would sustain a high level of interoperability.

A custom made system for a single hospital was far too expensive and therefore they could not offer the service they wanted. All components of the master system were made by different producers and were often not compatible. METI started a special program to solve this problem by stimulating the development of a multi vendor system. According to several of our interviewees, METI did good work in terms of processing: the Ministry created a market for an integrated system and monitored further developments.

Besides the two ministries, a third department in Tokyo was relevant: the Ministry of Agriculture. This organization was preoccupied with the development of rural areas. Many Japanese in those areas did not have access to health care – a concern of this Ministry in Tokyo. In Kagawa, most people lived in Takamatsu, the big city, but many inhabitants lived in small islands in front of the coast. Specialized health care and expensive facilities are not available on these islands. Digital sharing of medical information could be an answer to the problem and therefore relevant for this particular Ministry.

Besides these departments, the cabinet of premier Koizumi played a part as well. The Prime Minister had launched an ambitious e-Government agenda called E-Japan; e-Health was made a key-issue in this prestigious reform agenda of the Koizumi Administration. This agenda was coordinated by the cabinet office and headed by Prime Minister Koizumi himself. Hundreds of millions of yen were allocated to develop medical informatics and stimulate innovations in the sector.

The prefectural government was also a player in the institutional field. The prefectures are relatively autonomous political and administrative bodies in Japan. They can levy taxes and spend the money they collect. They also get additional funding from the central government for specific purposes. The national government decides on virtually all legislation; the prefectures

mainly decide on allocation of funds, operations and regional development. Health care is administered at the prefectural level, but almost all health care legislation is national.

“They normally do not have the courage to do new things”, a hospital doctor said of the prefectural government of Kagawa, located in Takamatsu. “And every two or three years the civil servants change places. So they are never completely aware of the history and circumstances of their working field. They do not really understand what they’re doing and that makes them scared to take decisions and action.”

According to several interviewees, there was a lack of coordination between all departments. One of the respondents said: “Of course they are stimulating innovation, but each ministry and level of government does that with their own perspective and objectives. They do not coordinate their policies.” Another respondent added: “Health was focused on the existing health system and the risks of innovation. METI had the tendency to take everything as a matter of industry and economic innovation. They took the medical sector as 'service industry'.”

Maneuvering

How did Hara move forward with his innovative ambitions in this institutional setting? He understood that IT was a promising development, but he also realized that, despite its potential, IT-applications would require cooperation between several (governmental) organizations, parties in the health care network and groups of professionals – each with their own culture and convictions. In other words: IT-innovations had a lot of conflict potential as well. Hara therefore decided to start small, just with HelloBaby, so he could reduce potentially large conflicts.

Hara and his team used their network to convince key players on several levels and in different organizations. According to many interviewees, this network approach through informal channels was crucial. “We have good

relationships with the government of the prefecture, with the physicians association and with each other in this hospital,” Hara summed up. “We also have good contacts in Tokyo at the national government level and with the top of the national gynaecologist association. My former boss (...) helps with pushing our project and standards through. Plus I have friends in the top of the companies that develop the applications. So I have contacts in many different worlds: medicine, politics and business.”

Another strategy of professor Hara was “reframing”. His bottom up project did not quite match the criteria that were set out by the departments for IT or other projects. That did not stop Hara or redirect his course. He just redefined his project. “The government wants to reform the health care system. Because Japan has an aging population, health care expenses are staggering. We need to work more efficient. Telemedicine, like HelloBaby, causes a more differentiated and efficient use of resources. Uncomplicated deliveries are done in [private] clinics; the more complicated ones are done in hospitals. Because transferring a patient becomes more safe and effective with HelloBaby, the project fits in the government agenda.”

Result

As a result, Hara got the institutional support he needed. The Ministry of Agriculture had a budget for rural development. It subsidized the development of infrastructure for people living in remote areas. Hara's HelloBaby could be seen as an infrastructural project. After all, the distances between a small clinic in a village and the hospitals in the city are large. Emergency situations during child deliveries in the countryside are therefore more serious. People in rural areas need HelloBaby more than people in cities, reasoned Hara. He persuaded the officials from the Ministry of Agriculture and got funding for the development of his medical informatics innovation.

Hara also succeeded in his efforts to find support for STEP. STEP was supported by the Ministry of Economy Trade and Industry. The programs’

goals were to establish an electronic network for exchanging medical data: a single file per patient, medical information analysis, remote consulting, evidence based medicine (which required a database), specialization and differentiation of health care, process redesign and effective information systems in case of evacuation for example due to earthquakes.

Why did METI endorse STEP? A representative from METI explained: "As a civil servant for METI, I started research to promote medical information technology IT. Generally speaking, the idea was to promote the medical informatics industry. But I had other considerations as well: I wished to promote IT for homecare with regard to the growing number of elderly in my country. So I looked for IT in the traditional curative care (...) in terms of economic policy, which was relevant for METI. People tried to start this industry in Shikoku. They had started a general medical IT research program that was called STEP. We followed that very closely and supported it."

Besides these Ministries, Hara managed to get other organizations on board, in one way or the other. As a result, professor Hara's department was able to develop K-Mix with the Prefecture Government of Kagawa in association with Fujitsu, a software vendor. The e-Government agenda of Koizumi also turned out to be useful, because it enabled the innovators to find the necessary funds to finance the next stage. "Yes," Hara said, "money is important. But the idea that budgets for innovations serve their genuine purposes is a myth. Practice is always ahead of policy and budget definitions."

Caution

Hara's project could not move full speed ahead, although everybody seemed to be on board after a few years of maneuvering and networking. The fact that one ministry supported (a part of) the project did not make everyone happy. "METI framed [STEP] as an economic effort," an interviewee explained, "not necessarily an improvement in health care.

METI is now more aware of the sensitivities, but [the Ministry of] Health is still not very happy with the entrepreneurial spirit of the program. Now e-health is one of the main goals of the E-Japan strategy of the Prime Minister's office. That could be a good thing, but it is again another ministry, with a different angle."

Several officials that we spoke to expressed their reservations and their prudence. They did not give Hara a full go for his projects. We have the impression that government officials, reluctantly and cautiously, gave him the benefit of the doubt. Hara and other innovators had to stay cautious, moving forward with vigilance. A major experiment, for example, to scale one of the innovations up to a national standard met resistance. "METI did not agree, the national scale was too wide in their vision," according to a civil servant in Kagawa prefecture who was a supporter of the experiment. "We found we had a lack of knowledge and we missed out on legislation, support and understanding. People did not understand the concept. What's the point of all the hassle? Why bother? We had to compromise and start small."

Roll out

How did Hara convince other health care professionals to adopt the application? Interviewees came up with several reasons. Especially in Japan, medical errors were not acceptable. The sector is very risk averse, according to our interviewees. That was why Hara framed his innovation as one that reduced risks. HelloBaby does not only reduce costs, Hara argued, it also reduces the chances of medication or treatment errors. "I never take risks. I test every innovation over and over until I am sure it works. My credibility as an innovator depends on my risk reducing capabilities vis-à-vis my colleagues." Despite the emphasis on risk reduction, not all medical professionals smoothly cooperated with Hara. "They think it costs a lot of time, which they do not have. So you need visible advantages, quick results and, of course, some pressure. We used peer group pressure, but also government pressure."

The prefectural government was for instance helpful in rolling out K-Mix. "Kagawe is a small prefecture," a civil servant of Kagawe told. "There are only 105 clinics and hospitals. We have to inspect them on an annual basis, so we know all of the places and people. Professionally, we knew everybody. Therefore, we knew who to approach for participating in the project. The prefecture helped with contracts for the K-Mix systems and making rules for using it."

Besides that, the prefecture was helpful in convincing doctors. "An important aspect of K-Mix is remote consultation", the same servant told us. "Doctors in the bigger hospitals were afraid that they would get even busier than they already were, if they were going to get consulted by others. However, we did not want that to be a problem, so we figured out a way to ease their worries. We lowered their administrative burdens if they would join. Plus we invested in communication and marketing."

Hara also asked fellow physicians to promote his system; especially the members of his own informal network were important for selling the innovations to others. You could even qualify them as his "ambassadors". "I know how these things work," Hara said. "You have to make a critical group of befriended colleagues comply with a standard. Once it works in that group, they start convincing others to use the standard as well."

Hara's personal network proved to be important. "Everything I achieve is through my network. I do not have anything to be proud of, but I have many friends. What I have achieved is thanks to those friends and despite the government. I have three groups of contacts: people at the grass root level (nurses, doctors, technicians etc), CEO's, and fellow plastic surgeons. Through these contacts, their expertise and their respective networks I can achieve almost anything I need. It is important that I have a diverse network. When you merely talk to doctors, you do not get very far. Doctors

have their own professional tunnel vision on reality. They do not understand the world outside. I am not like that; I am curious by nature."

Another interviewee confirmed this: "The human network was excellent: Hara, Ogata and the prefecture civil servants worked as comrades. The people involved shared in the name of their profession but on the social level, there was a lot of good feeling. The main goal was clear and simple; the problems were well defined and organizable."

Conclusion

Almost a decade later after Hara's initial steps towards HelloBaby, his successes were obvious. In the Kagawe University Hospital in Takamatsu, many of his innovations were fully used. An electronic patient record system had been implemented. There was a wireless network that connected laptops both with an internal server and internet. On the internal server a software program called K-Mind enabled nurses and physicians to enter, edit and view data about a patients' past or present condition and about the drugs and treatments received. There were levels of authorization, but virtually all doctors could view each other's information. A number of applications were in use: HelloBaby, Remote Visual Consultation System (for follow up and second opinion) and a shared information system for internal medicine.

The introduction of these information sharing systems had led to improved health care, both in terms of effectiveness and efficiency, according to the hospital director and the medical informatics department in Takamatsu. Through remote consulting, specialization was enforced. Doctors could easily consult each other on difficult cases, so they did not need to be specialized in everything. Because work processes could be redesigned, nurses could do more of the intake and could leave the diagnosis and treatment to the doctors. And last but not least, waiting lists had shortened, because logistics had improved and administrative burdens had been diminished.

Chapter 4 The Alberta Case (Canada)

After several years of testing, the Canadian province Alberta has rolled out an Electronic Health Record system in 2005. The system enables the sharing of patient charts and test results by professionals in hospitals, labs, pharmacies, doctors' offices, continuing care organizations and other facilities. The system is called Netcare and it delivers key medical information to healthcare professionals across the province, such as patients' lab test results, drug and allergy records, and demographic data. Netcare was rolled out by Alberta Health and Wellness, a department of the provincial government, in cooperation with Alberta's health regions and many other parties. Their version of Netcare was in fact an upgrade of an already existing system. The original version was developed by several innovators, including Robert Hayward, a clinician and manager working at the Clinician University Hospital Alberta. They created the system in the nineties to connect physicians, laboratories and pharmacies.

Netcare: the early innovators

These early innovators had to deal with complex care: an increasing amount of older patients, using many providers, from hospitals, hospices and individual care at home. "The improvements are driven by need – and they are also very practical," explained Betty Loree, the Strategic Planning Coordinator of the Ministry of Health and Wellness of Alberta. "For example: a person is away from home, in Calgary, and has an injury. In that case it is very helpful if the information about this person is accessible to the doctors that treat the person. Now that there are computers we can achieve better information provision to doctors so they can do their job in a better way."

How did Robert Hayward and his fellow innovators work to create Netcare? "Our process was bottom up," told Hayward. "Together with specialists and the builders of the system, we went into a process of trial and error. First, a best guess of the technical people of how the system should be, then the test by the specialists, then adjustments by the technicians, and so on. We

got the one version after the other, and this process of try and improvement was one of the key success factors."

Hayward was not the only innovator – elsewhere in the province, other health care professionals started innovating too. "Physicians discovered in the nineties that they could establish a quick win by sharing information on drug use," Loree explained. "Very simple: just by registering data about patients, such as allergies and the drugs they use, and then share this information with other health care providers. [This] contributed to better and more efficient health [care]. For example: fewer prescriptions of conflicting drugs and less effort to gather information."

Government

In what institutional context did this innovative activity take place? Health care in Canada is publicly financed, but privately run.³ The system provides universal coverage and care is free at the point of use. The responsibility for health care is divided amongst different levels of government; the federal government, the provincial government, the health regions, and the municipalities. In reality, the provinces are the powerful players: the mandate for healthcare falls for the greater part under the jurisdiction of the provincial government. The provinces have large autonomy in fulfilling the healthcare task.⁴ Often the relation between national and local government is referred to as transfer payments from the federal government to the province.⁵

In the past, Canada faced pressure to control health expenditure. It had done so through explicit rationing: government simply reduced the expenses by limiting the service. In 1993, the Alberta province started a regionalization project in order to make the healthcare system more accountable and affordable. Many interviewees argued that it was a failure: it led to longer waiting lists and insufficient emergency help. One of them even said that "people died from regionalization."

Despite its authority, Alberta, the province in which Robert Hayward and other key innovators developed electronic information systems, was at first not a driving force behind their early innovation. It moved slowly in the beginning. Hayward: “We had a lot of energy to improve things, just because of the fact that Edmonton [Alberta’s capital] was last in line regarding the EHR developments. We were very frustrated about that.”

But further along the road, the province became a more important partner to further develop medical data sharing systems. The regionalization of the Health Care system, which has been mentioned above, turned out to be a driver for this change. The regionalization had led to a crisis in the health care sector – and that miserable situation put the improvement of the healthcare high on the political agenda of the province. One of the respondents said: “It was a complete disaster, but we needed the crisis to break the system. The regionalization was a disaster, but in the end it has supported the [IT] developments. Now all regions work with the same system.”

Besides this, the crisis led to the need for efficient and affordable distance health care (such as telemedicine) and for specialization (since not all care providers could provide for every kind of care anymore; that would be too costly). The province of Alberta and innovators found each other in a common goal: to improve and reform healthcare and, at the same time work cost and time efficient. “The EHR helps to fulfil the reform agenda [of the province of Alberta],” one of the interviewees explained. “It helps to build the reform. But on the other hand, the reform agenda legitimizes the creation of an EHR. So it is less or more a cyclic thing.”

PIN

The Ministry contributed by developing a senior drug profile (SDP), which ultimately led to benefits such as time savings for physicians and fewer calls. The first pilot took place in 1999 and already one year later, the SDP was rolled out.⁶ “However, we came to the conclusion that you can not

implement an EHR when physicians do not have computers in their offices,” told Loree, the Strategic Planning Coordinator of the Ministry of Health and Wellness of Alberta. This led to an initiative to computerize physicians in 2001: the Physician Office System Program (POSP).

PIN

The idea for renewal was created by a group of grass root innovators who brought their plan to the province of Alberta. The province then got involved in developing and implementing the innovation. It hired a consultancy organisation to support them.

The consultancy firm was held responsible for carrying out the actions they agreed on in order to develop PIN. Yet, the professionals could decide themselves to use PIN or not. In the early years, they did not see many advantages in using PIN. Using the system led to more administrative burden; entering codes and data.

But after a few changes, the benefits increased and disadvantages resolved. Simultaneously with the improvements of the systems, the number of users increased.

The province was also involved in another important initiative. “The Ministry [of Health] acknowledged the ideas [for sharing information] of the physicians,” added Loree. “It started a program to develop a system that supported the need on electronic pharmaceutical information sharing, called Pharmaceutical Information Network. This was a whole new way of working for the Ministry: not only to monitor, but also to take responsibility for the

actual initiation, development and implementation of an innovative health care project. We never did that before.”

PIN was developed bottom up, together with innovating pharmacists and other health care professionals. “These early adopters are natural innovators,” Loree said. “They knew how to find us. They saw advantages in the use of the EHR. The physicians started the innovation. Also the fact that we invested in the private sector has played a role. Vendors had to change the systems, so we involved them.” The first PIN pilot took place in 2002.⁷

In September 2002, the province had to move forward quickly. The Minister made a mandated deadline: Alberta had to establish a central system of sharing information in spring 2004 – within 18 months. “So we combined all the components we had, PIN, the lab results and the registries and made it available through the internet for physicians,” Loree explained. The net enabled program became the umbrella for a series of regional initiatives to build an integrated health information network in the province.⁸

Bank

Did the Canadian federal government play a role at all in the start up phase of EHR’s in Alberta? In its turn, it created Infoway, a federally-funded organization that tried to accelerate the development of electronic health records across Canada. It strategically sponsored successful projects and worked together with Canadian regions. “Infoway evolved from the first moment,” an interviewee from the provincial government explained. “At the beginning, they wanted to do the project management, to implement themselves nationwide systems. But that, of course, did not work. Then they changed strategy: Infoway now stimulates provinces to take over the plans of provinces that have leading initiatives.”

Infoway served to the early innovators as a national bank. Robert Hayward of Netcare said: “[It] has a role as investment banker. In the beginning budgets were only divided by them through the ministries of health of the

provinces. This was a big barrier. We could not get the funding directly. Happily things have changed and nowadays, in some cases, Infoway can fund us directly, without going first to the ministry of Health of Alberta.” Infoway is, however, not crucial. Money matters, but, a provincial official added: “Alberta is the province of oil, we have the money.” Some interviewees confirmed that the federal government did not dramatically change the way of working in the provinces; the provinces themselves were the key players.

To conclude, at the time Hayward and others started with their innovations, Canada was a highly decentralized constitutional state in which the provinces enjoyed large autonomy.⁹ One of the most powerful instruments the federal government of Canada used in order to influence local policies, was subsidy. By investing in certain local initiatives, such as the development of electronic health records, the central government tried to guide provincial policy and practice into a certain direction. However, the effect of these instruments in the ‘rich’ province of Alberta was limited, since Alberta generated large revenues through oil production.

Roll out

The innovators formed an informal advocacy group for IT-innovation in the healthcare sector. Hayward, the early innovator of Netcare, said: “We have an informal network of health information experts that is very important for the development of an electronic health record in Alberta.” But the innovations needed a lot of support from different parties. Their innovation was only valuable when others joined in.

First of all, physicians had to adopt the system. The Netcare-system provided for possibilities for feedback, so comments of newcomers were welcomed and processed. Users were involved in improving the system. Hayward stated: “One of the success factors of Netcare was the bottom up process. Together with the specialists and builders of the system we went into a process of trial and error. Together we found out how we could make

the information sharing work. First, a best guess of the technical people of how the system should be, then the test by the specialists, then adjustments by the technicians, and so on. We got the one version after the other and this process of try and improvement was one of the key success factors.”

Besides that, the innovators had to promote their product in order to find funding and other kinds of support. They convinced peers to join and because of their effort to persuade colleagues to get involved, the number of people that joined or supported the innovation grew. Most of the early innovators had an extensive and heterogeneous personal network.¹⁰ Their network reached further than the borders of their medical profession. They used contacts within and outside the healthcare sector – from nurses, to politicians and suppliers.

A professional involved in Infoway dedicated the success of the projects especially to the open culture and the community of improvement, involving all relevant partners. “The relationships in the project were informal. We consciously build on relationships. We did trips together. This worked very well, we got to know each other. We deliberately involved [medical professionals from New Zealand], organized barbeques to let them feel at home. We celebrated special events, milestones, but also events like Christmas. When someone did something good, we gave them mugs, for instance. We always remembered birthdays. There was a lot of humour, but there also were times when we were very serious.”

Managers, distributors and developers of the innovation consciously invested in expanding and maintaining their network of social relationships in order to have access to certain resources. Ausford, the general practitioner who was involved in PIN, said: “I deliberately invest in social relationships. When a new deputy minister is appointed I always invite him and build a relationship with him. I nurture and seek for interesting relationships; I do a lot of networking.” Loree, the Strategic Planning

Coordinator of the Ministry of Health and Wellness of Alberta, added: “Informal relationships are very important for us. We cannot do without them. We invest in relations by doing our job with the stakeholders. The network of informal relations helps in obtaining information.”

Arguments

But how exactly did they convince others in the health care network to join the system? Physicians could feel threatened by the system, because it led to more transparency. Because of the broad access to information of colleagues that the innovation provided for, physicians could start to scrutinize other professionals. “I think about 50 percent was opponent and 50 percent proponent,” the professional involved in Infoway said. “So half of the physicians were afraid of other professionals taking action based on their information. And they also feared the questioning of colleagues.

The reasons for convincing their colleagues to adopt shared information applications tended to be on the practical side. Hayward: “The fact that we chose for a system in which old system could still be used and the fact that actors could stay in control of their own data has reduced the conflict potential.” According to another interviewee, the innovators succeeded in achieving results, because they shared the same values. “We all wanted to improve the health care; we all wanted to solve the problems with the conflicting medicine (...) and we all want to work cost efficient. Based on these shared principles, decisions were made.”

Ausford, the general practitioner involved in PIN, added: “Study shows that more and more doctors are convinced by the advantages of the IT. We just have to perceive that there are benefits. A factor that withdraws doctors to participate is time. They work very hard, 14 hours per day. They just have to see that things improve and it does not take a lot of their time.”

Change in culture

The innovations changed relations in Alberta in several ways. The cooperation between governments and innovators transformed. "The Ministry used to want to develop solutions their own," Hayward of Netcare told us, "but that has changed. This change from top down management to collaboration is a major factor that influenced the process in a positive way. The culture of the governmental organisation has changed from top down to bottom up, from directive management to change agents. And the innovations really changed the culture in the health care sector from hierarchic to more horizontal. Besides the culture became more and more IT minded."

The relationship between regions and provinces has also altered. They used to compete over health care approaches and many other issues, if we take the juicy anecdotes of our interviewees for granted. Nowadays regions and provinces cooperate on health care issues – at least to a certain degree. Hayward: "We share knowledge now through a human, virtual and informal network of health information experts, and that is very important for the development of the EHR in Alberta. Bare foot innovators get the change to establish improvements." Others confirm the change in culture. The government official adds that "even the initiatives of Infoway are now bottom up. A culture has been developed of engagement."

It did take some effort in the beginning, though. "We had to deal with the hierarchical structure of government," Ausford told. "I and a few of my colleagues were very frustrated about the fact that we knew that with the help of IT we could improve healthcare. We, a bunch of clinicians, wanted change. We needed money and a program, so we bypassed the whole hierarchy and went directly to the Deputy Minister and said: "Cut the crap, we want better healthcare information.""

Conclusion

After several years of developing, many of the initiatives in Alberta became successful.¹¹ In 2005, the Electronic Medical Record, a system that supported the administrative processes of general practitioners, was widely used in Alberta. Besides that, practitioners had knowledge tools on their desktops to enable physicians to share information about treatments. A third system in use in that year was Netcare, the Electronic Health Record in which patients' data were collected and shared.

Another system was Wellnet, which covered PIN, registries and lab results. All systems had their own screens and software; the end user had them all on one computer. To conclude, Alberta did a good job in the early development of innovations in medical information sharing. "There was this preparatory conference, organized by the Health Board Canada," Ausford said. "And Alberta was far ahead compared to other provinces."

Chapter 5 Conclusions

Why did the innovators succeed? What negative role did contextual factors play along the way, and how did the innovators overcome obstacles? The case report provides for several answers to these questions. They show that there were many factors at play that have contributed to the success of the early innovators to start and roll out their practices. In this chapter, we have gathered and clustered our main observations. These conclusions are intended to serve as hypotheses for further research. By no means could we infer any universal propositions from just two cases. However, the explorative nature of the case reports, as well as the wide scope of the research per case may help direct future research towards interesting variables and relationships between variables.

Government intervention

In both cases, the government did not particularly help initiate the innovations, even though they intended to do so. In Japan, the ambitious E-government agenda of the Prime Minister was useful, for example, not because it directed efforts on the ground towards its stated goals, but because innovators were able to creatively claim funds and use them for whatever they thought was most useful. In Canada, the innovators realized that the scattered responsibilities for health care (federal government, provinces, health regions, municipalities) made concerted action very difficult. However, the fact that no single strategy was in place did not bother them. Instead, they took advantage of budgets and support on all different levels in order to develop a series of innovations. The lack of a comprehensive and coherent change innovation strategy turned out to open up space for the innovators.

All innovators needed support and money from the authorities. All innovators had initial problems finding those. But most of them succeeded in attracting support and budgets – not by doing exactly what the money was intended for, but by redefining what they found important in terms of

the objectives of the providers. We found this reframing strategy in both Japan and Canada. Especially professor Hara proved to be a master in reframing, dealing with many departments with overlapping and conflicting policy goals. The budgets that were coherent with these policies did not really match with HelloBaby in the first place. However, Hara was creative in the framing of his ambitions, so that budgets landed in his pockets. Twisting the “right” phrasing and creatively interpreting and translating budget proposals seems to be a crucial asset for innovators in the public sector.

Hypothesis: The less predefined and constrained government interventions to promote innovation are, the more likely innovators are to benefit from government intervention.

Multiple Talents

The innovators we interviewed, had much more in common with each other than with their direct professional environment. In other words: a Japanese innovator resembled his Canadian colleague in his ways of thinking and operating much more than his non innovative Japanese colleague next door. The people who started and disseminated the innovation were not mainstream professionals. They were more than their peers driven by possibilities to improve. They had certainly a passion for innovation.

If we would draw a profile of a successful innovator in the medical sector, it would be a person devoted to inventing new products, procedures, treatments, and technology. But he (or she) is more than an inventor in a laboratory; he is just as much focused on his environment as on his innovations. He uses his context as a resource for his actions. He does not change his project in order to obtain money from innovation budgets, but he obtains money from budgets that are not at all labelled as innovation funds. He does not take risks with his innovations, but he defines the status quo as risky, and his innovations as risk reducing solutions. He does not feel paralyzed or limited by his rigid, authorizing environment. He rather

activates it by subtle, but decidedly shifting the burden of proof to his superiors.

The early innovators in both countries shared certain characteristics, such as great social competences, a broad and heterogeneous social network, a professional drive and multiple expertises, such as political-administrative, management, technical and medical skills. On top of these characteristics, they were able to combine their different skills and talents to operate in two, or more, worlds. They contributed their successes to the fact that they had several specialties (e.g., gynecology and IT), as well as multiple social networks (e.g. in the medical and the political domain). The innovators knew to combine elements of their multi-layered knowledge, and to match their different acquaintances – a form of strategic orchestration.

Most of the interviewees, however, were much better at describing what they had done, than in describing how they had done it. They were proud to tell what they had achieved, but modest with regard to their particular skills and strategies. To some extent, they did not even realize how exactly they had accomplished their goals. By asking them our questions, and many follow up questions, they became more aware of how they had dealt with some of the intractable factors inhibiting innovations. This research, they said, helped them make explicit what they had done to overcome obstacles. Hopefully the research will help others identify obstacles and solutions as well. In any case, the research helps those studying innovation a bit more to answer the question where to look and how to look at processes of innovation in the public sector.

Endnotes

¹ Hollandse Helden, 2004.

² Source: http://innovationsaward.harvard.edu/Selection_Criteria.cfm

³ Health Care in Canada, Canadian Institute for Health Information, 2005.

⁴ The minimum standards are based on five principles:

- Comprehensiveness. To satisfy this criterion, a provincial health plan must provide all insured health services provided by physicians and hospitals. Those are the core services. The non core services like ambulance drugs, paramedical, supplemental hospital, dental, emergency travel, medical devices and vision care fall outside the frame work.
- Universality. To satisfy this criterion, 100% of the province residents have to be entitled to the services provided by the provincial health plan.
- Accessibility. For accessibility the criterion is, regardless of where an individual resides or one's income level, there must be reasonable access to insured services. User chargers and extra billing is forbidden.
- Portability. This means that Canadians travelling through the country, outside their home province, have to be protected should they need medical attention outside their home province.

Public administration. This last criterion means that provinces have to administer and operate the public health plan on a non-profit basis, by an appointed public authority.

⁵ When a province does not meet the objectives, the federal government can, based on the Canada Health Act, reduce or withhold federal contributions to the province.

⁶ Alberta's journey towards the HER can be found in powerpoint slides at the internet. Source: <http://www.slideshare.net/brighteyes/albertas-ehr-system-pin>

⁷ Alberta's journey towards the HER can be found in powerpoint slides at the internet. Source: <http://www.slideshare.net/brighteyes/albertas-ehr-system-pin>

⁸ This is called Wellnet.

⁹ It still is today.

¹⁰ For example, Ausford, one of the grass roots innovators of Wellnet (at first PIN) is general practitioner, and also professor at the Alberta University, member of the College of Family Physicians, Administrative Director of the Diabetes Education Center Misericordia Hospital, Expert Reviewer/Return to Practice Mentor of the Alberta College of Physicians and Surgeon. One of the key persons of Netcare is an internal clinician, chairman of the information management dependence of Health Informatics, professor of the faculty of Medicine of the Alberta University and director of the Centre for Health Evidence. A pharmacist, involved in PIN is also President of the Alberta College of Pharmacists, teacher at the Alberta University and President of Compression and Encryption Technology Inc.

¹¹ Current state of affairs: 'Federal Budget Boosts Canada's EMR Backbone', Reuters Online, January 27 2009. Source: <http://www.reuters.com/article/pressRelease/idUS243786+27-Jan-2009+MW20090127> 'The state of electronic health records across Canada', critical report, CBCNews Canada, June 30 2009. Source: <http://www.cbc.ca/health/story/2009/06/25/f-electronic-health-records-doctors-offices.html>

Appendices

I: List of Interviewees

Canada

Allan Ausford (General Practitioner Edmonton and clinical professor Alberta University)

Robert Hayward (Clinician University Hospital Alberta)

David Zussman (Professor of Public Sector Management, Expert on Governance Reform)

Mr. Makowichuk (Independent Pharmacist Edmonton, Alberta)

Roger Scott Douglas (Executive Director of the unit Strategic Policy of the Treasury Board Secretariat)

Betty Loree (Strategic Planning Coordinator, Provincial Government of Alberta, Department of Health)

Brian Hamilton (Privacy expert, Provincial Government of Alberta, Department of Health)

Brian Black (Assistant Deputy Minister, Business Development, Provincial Government of Alberta)

Cathryn Landreth (Assistant Deputy Minister, Service Delivery, Provincial Government of Alberta)

Brian Marson (Senior Advisor, Treasury Board of Canada, Secretariat)

Neal Campbell (Team Leader clinical systems and manager of the provincial viewer project, Capital region)

Japan

Professor Hara (Gynaecologist and Director of the Department of Medical Informatics,

Kagawa University Hospital, Shikoku)

Assistant professor Yokoi (Internal Medicine and Medical Informatics, Kagawa University Hospital, Shikoku)

Anonymous civil servant (Kagawa Prefecture Government)

Professor Akiyama (International Medical Centre, Tokyo)

Mr. Kanbayashi (Former Civil Servant in Kagawa Prefecture)

Dr. Myake (Plastical Surgeon and CEO of Myake Medical Center, Takamatsu)

Mr. Kameda (Director of Kameda Medical Center)

Mr. Yarime Masaru (Senior Research Fellow, National Institute of Science and Technology Policy

Ministry of Education, Culture, Sports and Technology)

Dr. Sigue (Director of the Sigue Maternity Clinic)

Anonymous civil servant (Sanuki City Hall, Department of Health and Wellness)

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