

Electronic Prescriptions

– *Developments in Finland*

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Abstract: The health care industry is going through a major transition period in many ways. The boundaries between the private and public sector are undergoing major changes. We witness a period of “Medicalization”, referring to the fact that almost all human issues also are connected to health issues. Accordingly, the amount of medical and health-oriented knowledge is growing exponentially. Last but not least, the field is fast adopting application of modern information systems and communications, not least because of the emerging solutions on the Internet. Prescriptions and the messing around them on a manual basis is one of the characteristics of the industry that the young computer generation has hard to understand. At a first sight, this area seems to of quite operational character, has a lot of volume, and should not be too complicated. Also an ideal target for automatisisation, not to speak even of process redesign. However, the current development projects of electronic prescriptions have turned out to be difficult ones. Maybe not so much because of technology, but because of regulation and market acceptance by the dominant players: national authorities, doctors, pharmacies, pharmaceutical industry, and distribution chain in all. Typical feature of the healthcare appears to be several different actors with, at least partly, divergent interests. Compounding the interests of private sector (profit maximisation, efficiency) and public sector (cost minimisation, regulation, standardisation,) is an immensely complex task, furthermore actors are struggling for more influence on the value chain, This article studies the state of the art of electronic prescriptions. Our research questions are: What are the promises of electronic prescriptions

- What are the inhibiting factors at the way towards electronic prescriptions
 - What could be done to speed up the adaptation of electronic prescriptions.
- Towards these ends, we review current literature on the issue, and take the Finnish initiatives towards a national electronic prescription system up as a case study. This enquiry was supported through expert interviews. This research uses multiple data gathering techniques. We use several, mainly

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qualitative methods in data gathering (Yin 1984, Patton 1988). The methods used are:

- Interviews of key persons
- Data sheets (for technical and financial data)
- Observations on case companies infrastructure and documents
- Interviews are used as main method of gathering data.

Traits of action research are too present, as the research is done in connection with a development project aiming at a security concept product for electronic data interchange in health care. Such research has the following characteristics (Hult & Lennung, 1980): *“Action research simultaneously assists in practical problem-solving and expands scientific knowledge as well as enhances the competence of the respective actors being performed collaboratively in an immediate situation using data feedback in a cyclical process aiming at an increased understanding of the totality of a given social situation primarily applicable for the understanding of change processes in social systems undertaken within a mutually acceptable ethical framework”*.

Our research results show, that the technology would be there, but because of unsettled interest and power ramifications, development is less than optimal. The field needs networking and concrete small steps in the form of prototypes. As a solution, we see no other possibility than a strong mandatory initiative by the market regulator, government.

Key words: Health Care Information Systems, Electronic Prescription,

1. INTRODUCTION

Electronic prescribing is the use of an automated data entry system to generate a prescription, rather than writing it on paper (Kilbridge – Gladysheva 2001). Prescribing can be divided into inpatient and outpatient prescribing (A primer on order entry 2000). We concentrate here on the more complicated outpatient prescribing.

At the moment, the processing of prescriptions is far from optimal, same data is de facto processed several times in different steps of a process. For the present, an outstanding majority of all prescriptions made are still written in paper form – in few very limited cases it is possible to make prescriptions via telephone. Already operational hassles count for a major burden: in the U.S. it is estimated that pharmacists make 150 million calls a year to physicians to clarify prescriptions (Versel 2001). It is expected that in the U.S within a ten-year period, medication errors alone will account for 7 000 deaths annually, a 2,57-fold increase (Protocare Sciences 2001).

Spil (1996) works out four motives to use information systems: to lower prices and costs through more efficient operations, to add to quality through increased functionality, to allow for flexibility and customer choice through integration, and to foster innovation and unique solutions through

knowledge. All these motives can be seen behind the introduction of electronic prescribing too.

In general, the following risks might materialize in medical prescribing, either in traditional or electronic (Soumerai – Avorn 1990):

- Use of drugs with low-benefit-to-risk in place of safer alternatives
- Use of ineffective or marginal therapies for treatable conditions
- Use of excessive numbers of medications in vulnerable populations
- Use of high-cost agents instead of less expensive, equally effective alternatives.

Kilbridge and Gladysheva (2001) describe the prescription management process to consist of the following parts:

- decision making
- prescription writing
- communication to pharmacy
- fulfilment
- administration
- prescription renewals.

The economic interests connected to electronic prescribing in particular and to e-health in general are huge. It is expected that by 2003 business-to-consumer e-health sales could be \$28 billion world-wide, business-to-business \$168 billion and healthcare information content and advertising sales \$400 million (Lohman 1999). Even if optimism into e-trading has diminished from the hype period, there are still definitely huge chances for new e-health related information systems. One of every seven dollars spent on final goods and services in the U.S. economy goes to the health sector (Folland & al 1997, 2).

According to US statistics, health care accounted for 17.4 percent of personal consumption expenditures in 1993. This 17.4 percent is further broken down as follows (Health Insurance Association of America 1994):

Drugs/sundries	1,6
Physicians	3,8
Dentists	0,9
Private hospitals	7,9
Health insurance	1,1
Other	2,2

The most potential benefits of e-prescribing according to Kilbridge and Gladysheva (2001) are:

- improved safety of the prescribing process
- reduced costs through improved efficiencies
- improved sales and marketing for pharmaceutical companies
- improved product design.

In the patient-physician interaction, the operational benefits are too very visible. Electronic prescribing can (Schiff – Rucker 1998):

- enhance drug selection by making information such as updated guidelines or formulary-compliant drug choices immediately available
- provide access to electronically available patient information
- prevent and monitor adverse drug effects by establishing links between pharmacy and clinical information databases
- reduce the risk of medication errors with improved legibility of prescriptions and decreased time spent by both pharmacists and physicians in clarifying illegible prescriptions.

Major obstacles for application of electronic prescriptions include (Freudenheim 2001):

- legislative restrictions
- missing capabilities by physician offices and pharmacies
- concerns about confidentiality and security.

Within information systems science, it is common knowledge that introducing technology necessitates organizational adjustments. For example Klein & Schad (2001) note that “companies that want to exploit the potential benefits of EDI need to focus on internal organizational adaptations as well as on adaptations along the supply chain”. Also, in the case of electronic prescriptions, both physicians as well as pharmacies have to change their internal activities, but as well adjustments to the whole supply value are needed. Kortelainen (1998) and Kivisaari et al (1999, 2001) have concentrated maybe most intensively on electronic prescription research in Finland. Kortelainen focuses in his study on the inter-organisational co-operation, social networks issues, and institutionalisation process in relation to the Finnish healthcare cluster. Kortelainen constitutes his theoretical framework on institutional field theories (see e.g. Phillips et al 2000). The study indicates that the emergence of “multi-actor co-operation” is required in order to create and implement new innovations in the environment studied. The concept “multi-actor co-operation” refers to actors originating from different institutional fields. According to Protocare Sciences (2001, 12), physician prescribing behaviour is affected by the following factors:

- physician training and experience
- colleagues and opinion leaders
- pharmaceutical companies
- health plans and other payers
- patients.

Kivisaari et al (1999) have studied the possibilities to launch an electronic prescription system in Finland. They concentrate in their study on the social embedding of innovations and on the challenges associated to it. The arrangement of key actors in their study is too used by us: *producers*, *users* and *societal actors* have a stake when electronic prescriptions are introduced.

Current academic and industry discussion around electronic descriptions we can summarize as in Table 1.

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- Out- and inpatient describing very different traditions
 - Current processes very inefficient and error-prone
 - Big promises in better quality, less errors, lower cost, increased system functionality
 - Risks of any prescribing well known and analysed
 - Huge importance of electronic describing even at the national economy level
 - Inhibitors of less security and privacy, missing legislation and missing capabilities of physicians
 - Co-operation of multiple actors needed
 - Organizational adjustments and social embedding of innovations too needed
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Table 1 :Traits of academic and industry discussion around electronic prescription

2. A CASE STUDY – ELECTRONIC PRESCRIPTIONS IN FINLAND

Background

Welfare cluster is a fascinating branch of industry for it contains several different actors with dissimilar backgrounds, valuations, beliefs, and motivations. Characteristic feature of health care branch is the strict governmental regulation. Traditionally the Finnish *health care cluster* (comprising several different activities, such as selling pharmaceuticals to consumers) has been very strictly regulated and stipulated with a numerous standards (Koivisto et. al 1998, 11). One of the biggest obstacles in the launching of electronic prescription system has been the data security issues, especially problems related to electronic signature, i.e. how to confirm the user identity (Kiiski 2001).

Also, the society is in a turning point, according to different studies (e.g. Rouvinen et al 1995) the biggest challenge for the health service is going to be the ageing of the population. It is as well a matter of resources, health services should be produced to increasing amount of people with ever scarcer resources.

Prescription: general features

In Finland, medicines may be sold to the public only by pharmacies and subsidiary pharmacies, except in sparsely populated areas, where non-prescription products may be sold by medicine dispensaries owned by pharmacies. An order by doctor, dentist, or veterinary surgeon is needed for the purchase of prescription medicines from a pharmacy. (Suomen Lääketilasto 2001, 53)

Prescription is a document written by a physician, pharmacy delivers the medicine to patient according to physician's instructions. Approximately 36 million prescriptions are ordered annually, which is roughly 7 prescriptions

per head. There are however some problems related to paper form prescriptions, biggest problems seem to be the difficulty of reading physician's handwriting, also the falsification of prescriptions is possible. Obscure prescriptions cause trouble to pharmacies, as interpretative prescriptions must be checked from the physician, which increases amount of work and delays the delivery of medicine. Furthermore, it seems that not all physicians have up to date information about the medicines in market, at the moment physicians order occasionally such packaging sizes or strengths of medicines that are actually replaced with new ones. (See also Kortelainen 2001, 61)

Users

A remarkable question is also the role and definition of the customer in health care. In the field of health care industry there are several different combinations of customers: Users can be the personnel of private or public health care, or the patients. Purchasing decision can be made by the patient itself or by the specialist of health care. Payer can be public reimbursement system, insurance company, employer, or even the patient. (See also Kortelainen 2001, 16)

Industry players

Pharmaceutical Industry in Finland has been going through major structural changes since 1980s. The number of manufacturers has been decreasing steadily due to mergers and acquisitions. (Kortelainen 2001, 63) Another feature has been the specialisation of manufacturers, at the moment there are few new manufacturers emerging in such niche fields as asthma medication. The aggregate turnover of the Finnish manufacturers and marketers of medicines was approximately 1,646 billion Euros in 2000 (Suomen Lääketilasto 2001, 1). At the present there are three major *Wholesalers* in the Finnish medicine markets. The wholesaling is arranged as a single channel distribution, meaning that products of a certain manufacturer can be ordered only via one wholesaler. The Pharmaceuticals Pricing Board approves reasonable wholesale prices for medicines, and wholesalers may not decide completely independently their prices. (Suomen Lääketilasto 2001, 77-80).

Pharmacies are privately owned. Permission to own and operate a pharmacy is granted by the National Agency for Medicines. The Agency announces vacancies and grants the privilege to the applicants of its choice. Proprietary pharmacists are required to have a M.Sc. in pharmacy. The University of Helsinki also has the statutory right to run one pharmacy in Helsinki and subsidiary pharmacies with the permission of the National Agency for Medicines. Also the University of Kuopio has the statutory right to run one pharmacy in Kuopio. An extra annual tax is levied on proprietary pharmacists under the Pharmacy Tax Act. The amount of the pharmacy tax depends on turnover. It is confirmed annually by the National Agency for

Medicines, according to a progressive pharmacy tax table. This means that big pharmacies are charged more than small ones. (Suomen Lääketilasto 2001, 53). Manual processing of the prescriptions is time-consuming and requires plenty of labour that could be used elsewhere as well.

Physicians

Approximately 80 percent of all medicament expenditure is due to prescription medicines (Suomen Lääketilasto 2001, 1). In other words, this means that physicians are maybe the most important single loop in the pharmaceutical supply chain to rationalise medical expenditure costs. General practitioner needs mostly information about the prices of medicines, refunds, and adverse drug reactions. However, it seems that the price of medicines is not very dominant factor when a prescription is made, more important factors tend to be the availability of particular medicine, other medication of the patient, and general practitioner's personal preferences. (Kortelainen 2001, 67) The physician order the prescription without exactly knowing what other medication the patient has received from other physicians and could the drugs have together adverse side effects.

Citizen

The role of citizens is to pay the bill, at least partly. There is a functioning refund system of medicine costs, however the patient pays indisputably more from her medication than she did ten years ago (Suomen Lääketilasto 2001, 38, 75, 82-85). Patients appreciate the reliability of the present system. The reliability has anyway its price. The excess of the patient is greater in Finland than in many other EU countries. Citizen receives at the moment paper copy from his prescription and especially finding out the total medication of the patient is difficult.

Efficiency of medical care can be severely hindered by user behaviour. They may for example not take the prescribed medicine because of cost. A study by HarrisInteractive (2001) shows for USA that 22% of the interviewed adults had not filled at least one prescription in the last year because of the cost, accordingly 14% said they had turned into smaller doses and 16% said they had taken a medication less frequently than prescribed because of cost.

Authorities and societal surroundings

At least the following authorities exist in the environment of medicine distribution: National Agency for Medicines, the Social Insurance Institution of Finland (KELA), the Ministry of Social Affairs and Health. These authorities monitor and if needed interfere to action of private operators, such as pharmacies or physician. There are also some actors that are not formally authorities, but have also a strong mandatory from their members, such unions are in example The Association of Finnish Pharmacies and The

Finnish Medical Association. Variable data is provided to above-mentioned authorities from the prescriptions, at the moment mainly in paper form with significant time lag.

Providers

So far we have been elaborating on the possible users of the electronic prescription. There are few software providers in Finland which develop electronic prescription applications. Our case company is MediWeb ltd. a Finnish SME, established in 1996 which managing director was interviewed as an expert from the provider side.

3. CURRENT ELECTRONIC PRESCRIPTION DEVELOPMENT INITIATIVES IN FINLAND

In the year 1998 64,8 per cent of Finns (over 3,2 million citizens) received reimbursement for medicament expenditure, aggregate sum being over 550 million Euros (Tabu 2001, 26). Approximately 36 million prescriptions are prescribed annually in Finland, this means roughly that one prescription is made every second (Kiiski 2001). All in all, the flows of money and information are very considerable in prescription process, this also places huge requirements for the processing system, no matter whether it is in paper form, or in electronic form.

Taking under consideration this huge paper flow the Social Insurance Institution of Finland has established a research group in order to map out the possibilities of utilising electronic prescription system. The preliminary investigation project should be finished by the end of November 2001. (Kiiski 2001) On the other hand, in the private sector there are several different actors possessing an interest in electronic prescriptions, in example pharmaceutical companies have their own interests, pharmacies their own, finally there are few innovative companies developing new means of managing prescriptions in electronic form.

The role of authorities must be seen in a wider context. Primary role of the related authorities is to protect the minimum standards of healthcare, secondly the authorities should advance the quality of healthcare and develop the well being of individuals. Consequently, in 1998 the Ministry of Social Affairs and Health initiated a three-year training programme, named ROHTO (a programme for rational prescribing). By utilising available data on the usefulness and overall financial implications of various drug treatments, the programme aims to improve the medication habits of doctors (Finnish Statistics on Medicines 2001, 30). Therefore, electronic prescription should be viewed from the viewpoint of authorities as a part of larger integrity, that is, continuous improvement of the national health care.

So far electronic prescription has been piloted few times in limited environments. MediWeb Ltd. has piloted electronic prescription system three times: First pilot, Prometheus, was launched in 1996 between one physician centre and one pharmacy. Second pilot, Koillismaa, was conducted as a part of larger integrity; co-operation was begun with a few other technology providers and local community authorities in the Northeast Finland. Third project, Makropilotti, again a co-operation project, was acceded by MediWeb in the summer 2000 (Makropilotti started in 1998, and new parties have joined and left the project since). The third project, Makropilotti, has been elaborated again by e.g. Kivisaari (1999) and Kortelainen (1999, 2001). The appearance of same names only proves that there is lack of both research environment and researchers in the field of electronic prescriptions.

4. EXPERT INTERVIEW RESEARCH RESULTS

The empirical part of this study was conducted through expert interviews. Experts were searched from varied organisations in order to cover many divergent opinions about the electronic prescription system. Experts represented a software provider, representative of the Finnish Independence Fund (Sitra) as a representative of resource allocators, the Social Insurance Institution of Finland authorities (KELA), a pharmacist and a physician.

The experts were given a questionnaire comprising fourteen questions, from which three were targeted especially to authorities, the questions were set up according to our three research questions:

I What are the promises of electronic prescriptions

1. What do you think that would be the most important benefits of the electronic prescription?
2. What do you expect from the electronic prescription system?
3. Who would benefit the most from the electronic prescription system, and how? (Patients, Physicians, Pharmacies, Health Care Organisations, National Pensions Institution, National Agency for Medicines, Pharmaceutical Industry, Pharmaceutical Wholesalers, etc.)
4. What kind of influences the electronic prescription could have to the society and to the well being of the citizens?
5. Has any calculations been made in order to find out how much savings could be obtained via electronic prescription in national level?
6. How would the benefits divide, how would benefit the most, who would lose, how the new system would alter the current power balance between the actors?
7. Who will be the payer of electronic prescription?

II What are the inhibiting factors at the way towards electronic prescriptions

8. What kind of risks are associated to electronic prescription in Your opinion?
9. What are the drawbacks of electronic prescription in Your opinion?
10. What are the central issues inhibiting development of electronic prescription?
11. Who would be the losers if an electronic prescription is implemented and what would they lose? (Patients, Physician, Pharmacies, Health Care Organisations, National Pensions Institution, National Agency for Medicines, Pharmaceutical Industry, Pharmaceutical Wholesalers, etc.)

III What could be done to speed up the adaptation of electronic prescriptions.

12. What is Your organisation's role regarding to the electronic prescription?
13. In Your opinion, what should be done in Finland in order to implement the electronic prescription?
14. What issues should be academically studied regarding to the electronic prescription?

5. FINDINGS OF THE STUDY

We have arranged the findings of the questionnaire according to our research questions. Noticeable perception is that the answers differ substantially depending on the background of the respondent. An interesting observation is the discrepancy of the answers with respect to our research questions, in the first group there was no such issues presented that would exclude the opinions of the other actors. The answers of the second research question evidence that there is wide gap between the opinions of the different actors, second part of the questionnaire indicates also that the knowledge of especially *users* about the critical features of an electronic prescription system is still somewhat low. Positive outcome of the third part was that the majority of the respondent group shared congruent prospects about the future of an electronic prescription.

I What are the promises of electronic prescriptions

Users (physicians and pharmacists) emphasise the importance of patient's benefit, though with slightly divergent arguments. Physicians stress the importance of comprehensive medication, in other words that the physicians can check the total medication of the patient, and if detrimental effect is noticed, can the physician alter patient's medication. Pharmacists emphasise the importance of customer relationship, meaning that patient can feel herself comfortable in pharmacy, and that pharmacies would be even more

tightly knitted in the health care cluster. Electronic prescription could advance this when the pharmacy personnel would have more time to their customers, when amount of routine processing is decreased.

Producer side considers the most important single factor the improvement of the medical data security, falsification of prescriptions becomes more difficult, on the other hand gaining information for physicians or authorities needs becomes easier - and in practise, information can be gathered online.

Societal actors e.g. the Finnish Independence Fund and the Social Insurance Institution of Finland authorities stress the national benefit. Representative of the Finnish Independence Fund perceives that the situation is clearly a win-win situation, if it is accomplished in an optimal manner, meaning that single actors as well as the whole national economy can benefit from the system. National Pensions Institution authorities emphasise the importance of rationalisation benefits, such as decrease of prescriptions ordered in vain. All in all the Social Insurance Institution of Finland authorities point out that the launch of electronic prescription must provide some concrete value added compared to the present system, present system has been seen quite stable and reliable, and authorities hesitate to adopt any new technology.

II What are the inhibiting factors at the way towards electronic prescriptions

Users were particularly concerned about the data security issues of an electronic prescription system, fear of hacking connected both physician and pharmacist, both agreed that data security issues can be solved, but marketing this idea to customers, who are often elderly people, can turn out to be problematic. Furthermore both emphasised that technology must not be seen as a substitute for traditional care, but as an aid.

Producer representative denies that data security issues would cause problems, according to the respondent, the data security would increase remarkably as falsifications coarsen. Biggest obstacle seems to be from this viewpoint the attitudes of the people and how to change them. Also seamless co-operation between many actors might take some time.

Societal actors did not see things quite similarly in their responses. The authorities of the Social Insurance Institution of Finland see that biggest obstacle is at the moment the lack of required legislation. Also selection of the software providers can turn out to be problematic, e.g. how to certificate the providers and how to make sure that the system operates in all circumstances.

The representative of the Finnish Independence Fund saw things quite differently, in his opinion biggest obstacle is at the moment lack of knowledge, especially in the authorities side of the field. Other important

issue hindering the development is the power struggle between different actors in the field: the Social Insurance Institution of Finland, The Association of Finnish Pharmacies, The Finnish Medical Association etc. have all slightly differing expectations from the system and they all emphasise a bit different features, this is not so much technological problem, but "political", when deciding which actor will overcome the others.

III What could be done to speed up the adaptation of electronic prescriptions.

After quite unlike opinions in two above treated questions, all actors interviewed concluded that the next step should be the establishment of properly co-ordinated co-operation network and finally piloting the present systems. One could constitute that even if the expectations differ still, the actors share same objective.

To sum out our interviews, we can conclude the following:

- All in all, it seems that all the actors interviewed possess sincere will to pilot the electronic prescription system
- Many obstacles must still be overcome before the system is in use
- Biggest obstacles seem to be peoples prejudices and lack of knowledge, an interesting finding was also that the Social Insurance Institution of Finland authorities yearn for determining role in the field, but according to the study, they seemed to be least informed and least interested in the whole matter
- Innovations in health care cluster are often resulted as combination of three branches of science: most important is the medical research, second factor are the progress and needs of the health care, and third factor is derived from the technological research and development process (Kortelainen 2001, 13).

It seems that electronic prescription has several different benefits: for the pharmacies electronic prescription decreases the time and labour needed to process prescription, also falsifications should become rare. Patient receives more seamless health care. Physician receives new tools, in example combination of different medicines, negative side effects, dosage etc. possibility to inspect patients medical record on other words it supports doctor's therapy decisions. Also the National Pensions Institution authorities would benefit in term of rationalising benefits and cutting costs caused by "vain" medication.

6. CONCLUSIONS

There seems to be a world-wide consensus on the need for electronic prescriptions. The advantages are huge and many times even life-

critical, literally. However, the status of disappointment because of slow advancements is too universal.

We can see a general feeling of getting tired with new information technology in the health care field: it is not long ago electronic patient systems were implemented, and their use is not yet on a standardized routine level. It might be too early for the health care professionals to aspire at sophisticated electronic prescription systems.

Opponents towards the introduction of IS into the health care have a too effective and easy-to-use weapon: appealing at security and privacy issues can ruin any information system project, or at least make the introduction of the systems too complicated and expensive to be worth the effort. Unsettled legislative ramifications and business processes add up to the confusions. While we wholly understand and underwrite the importance of privacy and security, we believe that in most cases turning the systems into computers away from paper-based media already as such will significantly improve both security and privacy. And at the very end, privacy in health care too is at the hands of ethical professional codes adopted by the professions active in the field.

One issue that emerged too is that of external extra finance and support. Health care organizations are too used to get external extra finance for IS development projects. This has resulted in a situation, that they no more understand and consider IS development as a normal activity in any organization. If external finance is stopped, too little happens.

One can see that we live a period of different projects and trials. No wonder the customers get confused. The only standard way of contacting doctors seems to be that of personal general practice consultation. The traditional paper prescriptions too belong to the "safe" heritage of the field. Take private banking as an example: though more easy in context, it has taken over 20 years for bank customers to learn to use new media, and the service structures still are in a constant flux. Many customers, especially the older generation, have decided to keep out of electronic media in total. This is too a problem in the health-care. Heavy-users of the services, the older people, are most unlikely to adopt to computer usage. The computer-literate younger generation again is not in a big demand for health care services.

The easy conclusion would be that everyone will benefit from electronic descriptions, and so we should implement the systems at once. However, we must take a look at the inhibiting factors too. One obvious conclusion is that the key players, clinicians, are not yet motivated enough by electronic prescriptions. They are not taking part in the development initiatives, as the benefits for them are marginal. The biggest benefits would be visible for other actors. Neither do pharmaceutical companies very much favour the electronic prescription initiatives, as they would mean more informed and rational markets, and so a cut on their margins and profits. The same might be true in the case of pharmacies.

The biggest beneficiary would be you and me, in the role of patients and tax-payers. Safety and cost-efficiency of electronic prescriptions is clearly recognized. Electronic prescription systems seem to be public goods, where the total overall benefit is very much bigger than the benefits for the individual players. They contain infrastructure capital. One could compare them with sewer systems or railways. In current conditions, neither would emerge under classical market conditions. However, they are needed and maintained by public support. So, regulative authorities should too take strong initiatives to introduce electronic prescription systems. Our study results however show, that in Finland they are stuck to internal power struggles and lack of vision and knowledge. There is reason to believe that the case is the same in many other countries too.

One thing we see as necessary is a continuous discussion – both scientific and popular – on the motivations and benefits of electronic descriptions. Through this an atmosphere needed for a social innovation (Arnbrak 1988) to wake-up even in the case of electronic prescriptions is created. Our article too is one small part in this process.

Our conclusions are summarized in Table 2.

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- Huge demand for electronic prescriptions, dissatisfaction because of slow advances
 - Overburden of new IS for health care professionals
 - Privacy and security issues too easy to use as stops in any health care IS project
 - Own aspiration to introduce modern IS of the industry weak – too much relying on external public finance
 - Confusion because of many change-over periods in services
 - Demand and supply of health-care IS do not meet
 - The key parties having to invest gain maybe the lowest benefits
 - Biggest beneficiaries tax-payers and patients – public support for the systems appropriate anyway
 - Processes of social innovation in the field still too
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Table 2 : Conclusions summarized

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Interviews (all conducted in November 2001)

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Pharmacist	Timo Lehtola	Kupittaa apteekki
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