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e-health solutions in Denmark, Poland, Spain

qualitative research report

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Aim of the research

One of the aims of the EPP project is to assess the potential for the development of Joint Statement of Unmet Needs in various European countries. In order to achieve it, a series of research steps have been planned, to comprehensively and thoroughly approach the issue. A comparative desk study (results of which were described in the EPP report 'e-health solutions in European countries'), was followed by qualitative interview-based study that included various stakeholders from Denmark, Poland and Spain. The study focused on understanding of e-health, barriers and opportunities for its further development and impact of (innovation) procurement on the notion.

Methodology

Research was conducted through structured interviews with three categories of stakeholders: suppliers, buyers and experts (in case of Spain two users were interviewed and their opinions were included in the report). Each interview lasted about 30 minutes and was conducted by the phone. Interviews were recorded and transcribed. Gathered data underwent thematic analysis[1]. A code book was prepared before the analysis and developed inductively to include emerging themes. First codes were based on previous part of the research – desk study, and included: barriers, opportunities, motivations, efficiency, costs and conducted projects. Using inductive approach additional codes were added during the analysis.

Analysis was conducted at a semantic level with latent level analysis being conducted in cases of reoccurring themes. As underlying social and economic mechanisms were more important for the research than particular interviewee experience, constructionist thematic analysis was included whenever possible to supplement the essentialist one.

Interviewees in the text remain anonymous. Particular quotations are described by the country of interview (D – Denmark, P – Poland, S – Spain), stakeholder group they represent (B – buyers, S – suppliers, E – experts, U – users) and ordinal number (e.g. SB2 is the second interviewee representing buyers from Spain).

[1] Braun, V., Clarke, V. (2006), Using thematic analysis in psychology. Qualitative Research in Psychology, 3 (2), pp. 77-101.

DENMARK

Research sample

The sample was gathered through convenience sampling and included 3 buyers, 3 suppliers and 4 experts. Interviews were conducted in Danish. Translation of quotations was conducted by interviewers.

E-health understanding

Qualitative research analysis suggests rather broad understanding of e-health presented by representatives of various stakeholders groups. This understanding includes administration, data management, communication, telemedicine, etc.

> *It is IT solutions that support the work of health. It is close to the clinic, it is close to the patients, it binds things together including the medical equipment. Messages that bind the cross-sectoral landscape together are also e-health. Messages include referrals, discharge summaries – e-health relations to all stakeholders – primary and secondary sectors – telemedicine and medical equipment (DB3).*

This broad understanding of e-health includes elements rarely mentioned in case of other countries, like patient empowerment or integration of solutions. That understanding influences interviewees' perception of contemporary situation and is later referred to in the report.

> *Better quality for less money coupled with a movement toward patient empowerment (DE2).*
>
> *I have a broad understanding of e-health solutions. The solution includes the software and all elements in the solution fits together – the solution is a long chain linked together including the clinicians dedicated systems. Each link in the chain is also an e-health solution (DE3).*

It is interesting however than even with this broad understanding, the most commonly purchased solutions identified by representative of suppliers remain those regarding administration.

> *First of all, administrative solutions that support the daily work in the clinic [are purchased]. Administration and back-office (DS2).*

Procurement

Interviewees agree that the way of conducting procurement influences the level of innovation of purchased product. That can work both ways though. It can not only develop innovation, but also hinder it.

The procurement kills innovation. As it is today one wants to make sure that you get the best at the cheapest price. This is in conflict with innovation. Today you get (procure) something you know but it is not innovative (DS3).

Because e-health is a constantly developing market with a lot of specialized knowledge, it is difficult for non-specialists to remain up-to-date with its potential. With that in mind, specified description of procured product can lead not only to a purchase of solutions that are not innovative but even an out of date.

If you have already planned how the solutions should be designed then you have already put the lid on innovation. Innovation is something bigger. Innovation is when you do not know the answer yet (DB2).

That is why outcome-based procurement, opened to a variety of technical solutions, can be the key to purchase of efficient solution.

You should specify what you have, what you need, interfaces and so forth (DB3).

Representatives of suppliers agree with this way of thinking and point out that outcome-based specification gives them more chances to propose some solutions that could fit well with expectations.

Procurement process with functional requirements is very important. This will mean more focus on the problems that are to be solved, and more suppliers can contribute/participate. At the end, this will mean better solutions (DS2).

Unfortunately, buyers rarely use this option and end up constraining suppliers with detailed technical specification of purchased solution.

The contracting authority often applies a known procedure, based on a very detailed specification of requirements. In that case you do not get in touch with the innovative market and we do not get hold of the knowledge held by the suppliers (DE4).

An interviewed expert identifies reasons for such situation in attitudes people have and their risk-aversion. It is the fear of doing something differently, even if it is in accordance to the law. The fear of failure motivates people to do things in a way they always did.

We are afraid of using the procurement procedures already existing according to the law. There are several dialogue-based procedures. (…). There is zero failure culture within public procurement. We need some go ahead and try something new [attitude] (DE4).

Attitudes and fear of failure are supplemented with lack of competences in conducting efficient procurements. Even a representative of buyers points out that it is not the case of procedures but rather the way they are – or often, are not – used.

You need to see procedures as a way to consider all the important questions connected with an e-health procurement. We must strengthen the skills to procure and contract management. It is primitive to say the process is a bureaucratic exercise – instead we should get something out of the process. I do not think that the procedure is a problem – the problem is that one can't enter into a dialogue with the market (DB3).

Appropriate usage of available procurement tools needs to start with effective communication of various stakeholders including buyers and suppliers, public and private sector and even those on international level.

Closer cooperation with suppliers – public – private cooperation is an option. We must open the dialogue before embarking on the procurement process. Start in time – we need to spread our ideas in the industry. You are afraid of unequal treatment of suppliers and incompetence.

There are many opportunities in the knowledge-sharing between countries. Countries are similar and have similar challenges – there is lots of learning. It is the same diseases we get regardless of frontiers (DE4).

Lack of consultations with the market is not the only factor leading to procuring suboptimal solutions. According to interviewees, people responsible for procurements tend not to take into account opinions of end-users of purchased solutions, hence have limited knowledge regarding their expectations.

Health IT solutions are being purchased by people who are too far away from the users. They need to include health care professionals in the process (DB1).

Way of conducting procurement can influence not only development of innovation but also the scale of its usage. According to one of the experts, using joint procurements can play an important role in facing a challenge of fragmentation of used solutions.

Purchasing processes and methods have an impact on the health IT solutions acquired. It has (…) influence whether purchasing processes are local anchored or you ensure that you buy a large coherent system which may even cover the entire country. There are too many pilot projects and trials not integrated with other systems. Joint procurement will promote coherent solutions (DE3).

Integration

One of the most important issues (pointed out by representatives of all stakeholder groups) that needs to be addressed in further development of e-health is the matter of integration and interoperability of various solutions.

It is about lack of integration of telemedicine solutions. There are many solutions and applications on the market (DE4).

The challenge is the fact that e-health solutions are being developed in an unorganized way that results in a considerable amount of standalone solutions that cannot cooperate with each other.

> *There are too many stand-alone solutions and processes are not coherent. An example: a hospital in our region where every ward / hospital has its own app – but not coherent with the rest of the system (DS3).*

This situation described by the interviewees can lead to waste of potential of many interesting solutions that could be used in a variety of ways if they were integrated with work of other devices.

> *Bed wetting sheets which communicates via Wi-Fi is innovative. However, as long as one has not determined how to handle the data – and therefore just ends in a separate file – the data is not registered on patient's record and therefore it is not possible to mobilise the rest of the organization. Consequently, it is necessary to integrate solutions – we do not need un-integrated solutions. It results in stow pipe solutions as it happens when you just address one problem at the time. Then you get a lot of stow pipes – one must build a common layer to get things to work in an integrated manner (DB3).*

A number of reasons for this situation was mentioned by interviewees and blame was laid on buyers as well as suppliers. According to an interviewed expert, one of the important elements buyers need to work on is the clarity of requirements and expectations from the purchased solutions.

> *Innovators should do so but the public must also be clearer in its requirements – including requirements for compliance with the personal data legislation (DE4).*

Suppliers were criticized by not acknowledging the specificity of public health care market.

> *Suppliers may have crossed from the consumer market directly to the public sector without the considering what the transition means (DE4).*

Finally something that both sides need to work on is communication with each other.

> *We must come to a higher level of understanding and develop solutions that can communicate together. It's about both suppliers and public sector getting better to agree on a solution. It's about that we are in close dialogue with each other before embarking on innovation (DE4).*

Interviewees from various stakeholder groups claim that the big number of small pilot projects conducted in Denmark gives the impression of considerable development in the field, but since those independent projects do not have the pressure on interoperability, they do not build up integration. Reason for the big number of such small projects is twofold. First it is the matter of financing criterion.

Many small grants have been given to small pilots, but they remain good ideas – not implemented, and have not been scaled up. There are many opportunities for scaling but large amounts of resources have been wasted on small pilot projects. There is a big need for large projects with an impact (DS3).

Secondly it's the fact that people prefer to take responsibilities for smaller, possibly easier projects, rather than big, complicated ones.

Not enough emphasis on scaling up. Nobody wants to be responsible for, e.g. large IT-project that may fail. Many small pilots are not adequate for scaling up (DS3).

The innovative nature of e-health solutions motivates people to develop their own solutions, rather than build on something that was developed before. Due to that, instead of a coherent progress Denmark faces a challenge of a number of solutions that cannot cooperate with each other.

Many kings and the "not invented here" syndrome. In spite of the fact that we are a small country, there are too many small solutions. We must be better at stealing and implementing already developed solutions (DS3).

Integration of e-health solutions is not only the responsibility of the market. An interviewed expert points out that local policy makers can show more initiative and take a lead in the matter of consolidating e-health solutions and securing their cooperation.

The regions and the local governments have more muscles than previously. Today, the local governments intend to create a procurement monopoly in IT. The regions needed to consolidate its IT after the reform. We see it in Capital Region where all IT is re-organised and nowadays is managed by one large IT department (DE2).

Another expert interviewee points that there are fields in which regions did considerable work (e.g. Electronic Patients Records) but those are still being considered insufficient by the public and national policymakers.

Despite the fact that the regions have done much to reduce the number of EPR solutions it is still the perception among the public and national parliamentarians: why do we not just have one IT solution for the entire country? (DE1)

Patient empowerment

An interesting aspect that was hardly mentioned by interviewees in other researched countries, but considered important by all stakeholders groups in Denmark is the way e-health influences patient empowerment. One of the interviewees pointed that empowerment through ICT is a key element in Denmark and an object of pride.

Digital empowerment of patients. Coordination across patients, materials, health care professionals. In Denmark, we believe that we are in the forefront and that we are world champions in this field (DS2).

One of the suppliers pointed out to differences between patients and the variety of customised approaches contemporary health care needs to apply in order to optimize health care provision, since not all patients are yet ready to take certain level of involvement. Some are more prone to empowerment, the others less, but both groups need to be taken in consideration.

> *There are two groups of citizens, A and B. Some cost an awful lot of money and the challenge is how we provide more (for less). The other group are good at self-management. They act responsible for their own health, they are seen as experts (DS3).*

There is a variety of ways through which e-health solutions can be used by patients. A basic example is access, ownership and usage of patients' data through appropriate online portals.

> *The motivation is empowerment and user involvement and the ownership of data. E-health unleashes data and it does no longer belong to an institution. Patients will own their data (DB2).*

E-health solutions can meet patients' growing expectations of reducing the time spent in the hospital to the minimum. That can be done by increasing the amount of things patients can do online.

> *We are accustomed to meeting physically in a hospital. But the new generation of patients expects that the meeting with the hospital starts more digital – then we meet up physically (DE4).*

Growing empowerment of patients connected with development of ICT can – according to some of the interviewees – put additional responsibilities on patient in the treatment process. An example of such responsibilities is monitoring.

> *Home measurement and self-measurement– here comes a lot of development. Apple will allow different devises to supply data into their health IT. There is much innovation in making things evolve and present new solutions to users. If you want to use home data measurements in clinical treatment this will require quality assurance of data. The new dimension is self-generating data followed by the professionals' data interpretation. It provides semi-automatic data with the view to suggest follow-up actions. There will be a market for self-monitoring combined with interpretation of the measurements (DE2).*

Potential of e-heath usage recognized by Danish interviewees however goes beyond simple monitoring. The bigger responsibility patients are given, the more can be taken care of outside hospital environment, ultimately changing the way of health care is provided.

> *There is awareness of IT as solutions for faster treatment and an awareness that we involve citizens in their own treatment and thereby move resources away from the hospital system. Empowerment will be a big step and IT will be an important step in*

that direction. The hospitals are only for the most sick and people are sent home quickly (DE3).

Data management

From technical point of view, the cornerstone of any kind of e-health solutions is data. It needs to be constantly gathered, analysed and transferred. That however builds up to an important responsibility of managing that very sensitive data.

The health sector has a high degree of digitization compared with the social sector or the education sector. The health sector is good at collecting data and share data between the players.

The hospitals need to improve the handling all the data they collect; that means the hospitals need be better to use these data in patient treatment (DE1).

This data, with appropriate infrastructure, organization and staff can prove to be the most useful tool for provision of effective, economically feasible and fast individualised health care for patients.

We will get more 'Personalised Data'. It provides more targeted treatment instructions for the individual patient. The clinicians can use more IT in the treatment. It requires, however, that you have a tool in the clinic which can retrieve the data, make calculations, make forecasts of how a given treatment will impact on the individual patient (DE1).

In order to fully benefit from the personalised data, it is not only the responsibility of organization to efficiently manage it, but also of health professionals to use it effectively.

Mass customization – if not all health care professionals can manage personalization things will become very expensive – what fits exactly to the patient? Our systems must support this objective. The result is higher quality, shorter processes, higher efficiency and lifetime extension for the patient (DB3).

Fast transfer of data can make it possible to decrease the amount of administrative tasks, save time and money, while at the same time increase patients' experience.

Before you had to go the doctor, he should identify the medical specialist, the referral was printed and became finally too old in your drawer. Now the referral is up in the cloud. Then you can think about things together with your family and you choose which specialist to visit (DE4).

Such wide and broad usage of personalised medical data faces a number of challenges though. One of those is the law that is not prepared for such technology. This challenge

however is not limited to ‘simple’ policymaking process. It requires a comprehensive debate regarding matter of ownership of data, forms of consent and trust.

> *The current legislation is a barrier – made in 1960 – both the Health Act and the Data Protection Act. There are limitations to how one can share knowledge. Sharing requires the signing of consent forms. Instead, you could use negative consent. It is important to create trust and confidence in the use of health data. Confidence means that we can share knowledge (DE4).*

Trust however cannot divert attention from a number of real threats that need to be addressed. There are few kinds of data more sensitive than medical records and their common usage by ICT requires certainty of their security. One of expert interviewees presents a lists of most obvious treats.

> *You can be blinded by the potential of e-health – but where does the data end up? Data can go to hackers, Google, sundheds.dk .... We are not aware of the extent of this problem. Who has access to your health data if you put them into an app of unknown origin – it's not like seeing your doctor as you know – here your data ends on an American server and where do data go from there? (DE3)*

Buyers also share the fear of the lack of appropriate security that needs to be sorted out, before full potential of e-health solutions can be seen.

> *However, as to data security we have no solutions, anybody can use data. [I do] not feel secure in spite of firewalls (DB2).*

It’s important to keep in mind that there will never be full security from all sorts of ICT related threats. Minimization of this risk is the best to be hoped for. Especially since every mean to make data more secure from external treats, will make it also harder to use for the users. Due to that, in order to be able to move forward in wide usage of e-health solutions, there will need to be a discussion regarding the agreed line between safety and comfort of usage.

> *The issues of data safety and protection will create a rather rigid framework – the public sector needs to be more in control of patients’ data. We possess enormous amounts of data – but we need to make patients comfortable with the use of data and at the same time not making it so difficult to use data that no one benefits from the collected data (DE2).*

Finally a law-related factor Denmark needs to take into consideration is the compliance with European law. That can be both a challenge and an opportunity, since it may be an excellent chance for mutual learning and building on common experiences. However, it requires the entire EU to keep up to date with e-health development.

> *The data protection legislation and the EU Regulation have a major impact. The same applies to the national Health Act, which regulates health care and who can see what*

data. There is sometimes overlap between the Health Act and the Personal Data Protection Act, which is a general law (DE4).

E-health efficiency

Using e-health solutions can rise effectiveness of health care on many levels. That includes lowering costs of health services and providing faster, more targeted care. The rationale of one of the buyers' representative is that health care should learn from other industries and include automatization of processes where possible.

We want to make the organization more efficient in order to get more for our money. Health care professionals are expensive resources.

It's like a Columbus egg. We optimise the use of our own resources and it provides shorter treatments for patients. It applies for example in cancer treatment packets. This is a diagnosis with great attention and we have developed a fast examination and treatment process – but the process should of course be extended to other diagnoses. When you can achieve high efficiency and quality in the automotive industry – why not in hospitals? (DB3)

E-health solutions have the potential of going beyond improvement of services people are used to today. Appropriate usage of such tools can make it possible to go further. An example given by one of the interviewed buyers is the possibility of using e-health data in order to identify and address risk groups in advance.

Population health management: 'Inequality in health'– the development of our abilities to track patients on basis of the right criteria – the search for risk groups much earlier than today, meaning we can come to the patient instead of the patient coming to us (DB3).

According to the buyer, with the development of technology, the limits to innovation and the possibility of harnessing it comes down to the amount of resources used on it and the competences of using it.

Our ability to fund and our skills – is our organization generally clever enough? It is about skills to implement large calibre projects (DB3)

Summary

Danish interviewees presented very broad understanding of e-health. Still, administrative solutions seem to remain those most often bought by hospitals.

One of the most important factor of e-health solutions – identified by interviewees – is their integration and interoperability. It is also one of the elements lacking in majority of solutions currently used. Buyers should clearly communicate to the market that integration of purchased solution with other devices is one of requirements. Interviewees also claim that there is too many small pilot projects regarding e-health and too small pressure on integration. They also

believe that regional policymakers should be more active in steering development of e-health solutions towards integration.

Danish interviewees believe that empowering patients is an important objective that e-health solutions should aim for and have the potential of reaching. Technologies like computers, cell-phones and tablets, commonly used by citizens, can be integrated with health care solutions and make patients more active in treatment process. That can happen by access to medical data, carrying out some administrative actions online and telemedicine.

Development of e-health solutions however requires Denmark to work on the matter of sensitive data safety. That includes policymaking activities, improvement of technical security and discussion regarding the line between safety and convenience.

Interviewee recognize the importance of procurement in purchasing efficient solutions. Rapid development of technology makes it difficult for people who are not directly associated with particular branch to keep up to date. Due to that, buyers may lack the knowledge to prepare detailed specifications. Using outcome-based specification in which buyer describes the needs and lets suppliers propose solutions seems to be more efficient. Still, few procurements are organized that way.

POLAND

Research sample

Sample was gathered through convenience sampling and included 6 buyers, 4 suppliers and 4 experts. Interviews were conducted in Polish. Translation of quotations was conducted by researchers.

E-health understanding

Interviewees seem to agree with the notion that in Poland e-health is regarded mostly in terms of administrative solutions, such as e-registration.

> *The entire notion of e-health in Poland is something new. Everyone starts with solutions such as e-registration. They don't think about technologies thanks to which e.g. patient wares a product and transmits data online (PB1).*

Interestingly enough interviewees themselves – regardless of the stakeholders' group they represent – believe that e-health is a broad and complex notion. There seems to be big confusion over the relation between e-health and telemedicine. Some interviewees treat those as one, others believe those notions are separate or even contradictory.

> *There is a strong discrepancy between telemedicine and e-health. Generally e-health is everything that is not telemedicine but is provided remotely (PB6).*

The complexity of understanding of e-health seems to be bigger in case of interviewees representing suppliers and experts than those representing buyers. Most often mentioned features of e-health are those including data management, transfer and storage, increase of health care efficiency, patient service, patient-health care professional contact and telediagnostics.

It was also pointed out that the term e-health is often abused in order to create an illusion of innovation and receive more money from external sources.

> *Innovation is often artificially exaggerated (…). During grant proposals assessment, when something is 'e-', it gets additional points (…). All those justifications of innovations come down to getting money from the European Union for any kind of informatization and all elements including 'e-' are exaggerated (PS3).*

Data management

An important element in e-health development is digitalization of health care data. Some suppliers put a lot of hope in the law that requires health care institutions to use digital medical documentation by 2017. Some of them consider it a chance for important step toward e-health usage in Poland. They however acknowledge the fact that introduction of this law was already

postponed in the past and point out that many health care institutions leave preparation to it to the last moment or even hope for the law to be postponed again. Such attitude is identified as a barrier due to which this potential step can be ruined due to lack of readiness of health care institutions.

> *Many institutions postpone it to the last moment (…).This is the worst option. We can sell you license, that is not a problem, but you need to learn how to use the software. It is not a notebook (…). There is some advanced logic in this software. You need to learn it in order to become a fluent user and take what is best from the software (…). Unfortunately, the market reacts in such a way "they postponed the law once, they will probably do it again". What is the point of spending money if we don't have to do it yet (PS3).*

Buyers seem to support the idea of digitalization of health care but complain that it is not actively promoted, but only imposed by the central authorities.

> *There are constant targets that we have to meet but often with no solution that could help us reach them. I believe that changes are necessary but (…) it is important to think through with what means we are supposed to implement them (…). [Health care] managers have will and determination but without resources it is difficult to do (PB5).*

Introduction of digitalization is not the only legal factor regarding data management. Interviewees (especially suppliers and experts) point out that the legal issues regarding safety of data are not sorted out yet and this legal void is a barrier for e-health development.

> *I believe further works regarding improvement of data exchange security system [are important]. I think that legislative work that would clearly define the responsibility of health care institutions regarding data management – that is what happens between data manager, which is the hospital, patient and external operator that will be responsible for storing medical data [is important]. Those are the fields that are not yet clear at the moment (PS2).*

The issue is familiar to buyers.

> *The problem is with sensitive data, and specifically the way they are used (…). It is an aspect often neglected during formulating of law (…) (PB1).*

Challenge of data security goes beyond legal framework however. It is also a matter of resources (money and equipment) and competences (highly skilled IT personnel) required to secure the data. Those are often lacking in hospitals.

> *Many institutions have weakly secured systems, due to which IT personnel is afraid to run new software (PB3).*

Potential benefits of medical data digitalization, and possibility of its fast transfer do not go unnoticed by interviewees. Using it could help health care professionals exchange important data, hence increasing health care efficiency and improving patient wellbeing.

> *Doctors who are responsible for health of certain population, often don't have key information. Such doctor sends a patient for examination or to a specialist. Theoretically the specialist is obliged to send information to the doctor, so that the doctor knows what is going on with the patient. But the specialist, having a lot of work, does not do it. However, had it been possible for a doctor – with patient consent – to check what the effect of the specialist visit was, he or she would be able to take better care of the patient (PS1).*

All stakeholders groups acknowledge the fact that digitalization of data is a direction health care should move in. Lack of resources, attitudes and the law are mentioned as barriers standing on the way. Interestingly enough, no interviewee mentioned technological challenges as a barrier.

> *Looking from a computer science perspective, there is nothing that cannot be done. Everything can be done, it is just a matter of money and money transfer to time (PS3).*

Just as with law requirements, a lot of hope of suppliers is being put in introduction of P1 Electronic Platform for Collection, Analysis and Sharing of Medical Records[2].

> *If it will actually work and it will be possible to convince health care providers to conduct properly integration with P1, than all data exchange will be electronic and information will be reachable by patient and other institutions (PS1).*

Only one buyer mentioned introduction of P1 platform, although it was also very positive.

> *Most anticipated change is the beginning of P1 platform functioning, which will make information exchange between units in whole Poland possible (PB4).*

Attitudes

Attitudes of users are very often mentioned as an important factor of introducing e-health in Poland. Many interviewees consider them, next to limited access to funds (PB4) a key barrier.

> *The weakest link in the process of e-health development is human. In case of system users, you will always find those resistant to change (PB4).*

[2] P1 is one of five country-wide projects that implement digitalisation of health care records and registers, and launching on-line services related to health care. The targets of P1 include: a system gathering medical records accessible to both patients and medical professionals, a system enabling data exchange with other Member States and handling of planned-for e-prescriptions. Responsibility for implantation of the P1 lies with the Centre of Health Information Systems (Centrum Systemów Informacyjnych Ochrony Zdrowia, CSIOZ).

This attitude issue is recognized by various stakeholders and it refers not only to patients, doctors and managers but also politicians, who tend to marginalize the topic of e-health (PS3). According to interviewee (PS4) working on public perception is an important factor that needs to be dealt with in order to develop e-health.

> *The element limiting development of telemedicine is low social awareness of benefits for patient and lack of trust – especially of elderly people – to that kind of services. They prefer direct contact with a doctor (PS4).*

With 9.5 million people (around 25% of population) in Poland subject to digital exclusion (according to Ministry of Administration and Digitalization[3]) there is a lot of work to be done. This is related with generational change as almost 6 million (around 16% of population) of those excluded are pensioners and builds up to additional challenge of the fact that people most likely to require health care are those most opposing to change. Such challenge is much smaller in case of younger people.

> *More and more people are familiar with computers, with internet. Mostly young people. Those things are natural for them (PS1).*

According to interviewees, attitude of hospitals' management is crucial.

> *If there is no support on their side [management], if they do not strive to implement solutions themselves, introducing changes is not possible (PB4).*

There is a difference in assessment of level of motivation and engagement on the side of hospital managers. Interviewee representing buyers claims that it is high (PB5), whereas supplier representative argues that managers are postponing implementation of e-health solutions as much as they can (PS3). Level of motivation of hospital management is additionally important as it tends to set priorities for the entire unit and spread to personnel. This lack of interest may even result in more ambitious IT specialists moving away from health care sector.

> *There is no motivation on the IT staff side to implement changes. Often management shows little interest in IT personnel, does not send them to additional trainings. That's why if an IT specialist shows some initiative, he develops on his own. But it shouldn't be only his own initiative. The best [IT specialists] leave to those, who pay more (PB4).*

There are also organizational factors that may limit e-health development even in case of manager's openness to changes.

[3] Data confirmed on Digital Integration Workshop Report, https://mac.gov.pl/files/wp-content/uploads/2012/06/integracja-cyfrowa.pdf.

IT staff often does not answer to hospital managers but rather other supervisors, e.g. regarding logistics, human resources, etc. Due to that managers may not even be aware of the necessity of implementing new solutions (PB4).

It was pointed out that even if managers decide to invest in e-health solutions, they approach it in a wrong way.

There is a prevailing view among hospitals' managers that [e-health] equipment once bought, it is an investment for years. It is not true. Investment in IT is ongoing. Once you started it, you need to keep on going (PB4).

Doctors are identified as a group that tends to oppose using e-health solutions. Two reasons for that were most often mentioned. First of all, they fear that e-health may be a threat to their position and job security. Secondly, they are afraid that indirect performance of health services (via e-health solutions) may result in the decrease in quality of performance.

The lobby most interested in not introducing some regulations are the doctors. From the beginning it approached the new solutions with limited trust. That originates in thinking in terms of their own work places and potential limitation of demand for doctors (…). On the other hand, according to doctors, patient needs to be examined thoroughly and seeing him (…) in a web-cam and performing consultations in that manner, they consider unreliable (PE2).

Interestingly, despite identifying barriers on the health care providers' side, buyers acknowledge positive attitude of general public to e-health solutions that follows overall inurement to advanced technology present in everyday lives.

Today's society in its majority is able to use tablets and smartphones. And the internet is widely available. This wide availability of the internet creates an opportunity for e-health development (PB4).

Patients in general accept e-health solutions. They do not even know what dangers it can lead to (PS1).

It is also in this positive attitude of younger patients, where a chance for important change lies.

It's about patient expectations, because it is them who will demand such solutions. They can already expect to be able to register to a doctor through (…) IT solutions (PE1).

Resources

Some buyers identify lack of finances as the sole barrier of development of e-health.

Financial aspect [is the key]. Regardless the determination and will to implement (…), it is not possible [without it] (PB6).

Not all buyers agree with the argument of the lack of funds being the main barrier that postponed e-health development in Poland in recent years. One of them points out that today's e-health market is a consequence of the fact that the majority of hospitals missed a chance of receiving financing from European Union projects.

Nowadays co-financing is smaller. Infrastructure financing was important a couple of years ago. Today priorities shifted and funds are being offered to other issues (PB8).

Purchasing equipment is one side of the problem. It is also important to remember about the costs of using it, as well as securing funds to cover those costs.

Right now most important thing is limiting the costs of exploitation of IT systems in health care sector. That is the most important driver (PS2).

There is a number of e-health-related pilot projects running in Poland. Often they are financed through external sources, either domestic or European. A big challenge appears once the projects are finalized and beneficiary units need to carry on paying for the work of particular solution.

A company comes to that kind of institution and says: listen, we will write you an (…) application. You will get such a device and we guarantee 90% of financing. Why not? (…) Often such company gets the money (…) and everyone is happy. Hospital receives something new and after (…) the project a problem begins of how to support it (PS3).

The problem with telemedicine solutions is that they are not recognized by the payer, which makes them financially not feasible.

As long as telemedicine service will not be [recognized], no-one will be able to purchase it. They will buy it only as an attraction, something of a pilot. Something that will let them prepare for the moment in which legislation will allow that kind of services. [Today] potential buyers have no motivation to purchase (PS4).

Until this is solved, e-health market in Poland will not be able to move into mainstream usage, or at least – public sector usage.

Companies who deal with it do not go beyond experiments. The only projects that worked – and it is important to point out that there were those that worked – are all projects co-financed by EU funds. Those are research projects and after financing if finished (…) they no longer develop (PS4).

Problem of the lack of resources is not limited only to finances. Representatives of buyers point to lack of infrastructure but also limited competences of staff (PB1).

Way of financing

Financial issues have been unanimously recognized as a barrier to e-health development, not in the context of the amount of money in the system, but rather the way they are distributed in the Polish health care system. The problem is described as twofold. Firstly it is a matter of domestic sources of financing aimed specifically at IT solutions, second is the way of financing health care services. The former is officially regulated but is not efficient.

> *Currently flat rate mechanism is in place. Some part of the contract can be spent on expenses related to IT solutions of the unit and that is all the responsibility the National Health Fund [public payer] takes for the process. When asked if they spend money on IT, they always say yes (…). Amounts however are so low that the average hospital cannot deal with it (PS2).*

Second challenge: way of financing health care services. Interviewees highlight the fundamental issue. From a provider point of view the process of treating the patient is far more profitable than actual curing the patient. That provokes suboptimal actions (from the system point of view).

> *In Polish health care a 'not quite healthy' financial system exists. In Poland it's treating a patient that is financed, not curing them. That leads to the situation in which a doctor could check data and help diabetes patient in the choice of appropriate medicine, but the doctor lacks financial motivation. For the doctor it is even better if a patient comes more often for visits, because then [the doctor] earns more money] (PS1).*

The system also does not motivate public health care providers to improve quality of customer service (including e-health solutions). Paying for procedures (not for results) motivates hospitals to provide a lot of services, without caring about health outcomes. This superficial demand causes the undersupply of health care services in Poland. Therefore public hospitals will always have enough patients, regardless of what they do.

> *Majority of public hospitals and clinics suffer for overflow of patients, not for their lack. Due to that opening new channel of communication through which patients can register is a problem for those units, not facilitation (…). That shows that e-solutions in case of public hospitals and clinics are unnecessary from the point of view of [their] management. Manager (…) knows that even if there is no e-registration, he will still have set of patients (PS1).*

Interviewees point out that the organization of health care insurance system, monopolized by National Health Fund (NHF) – the sole public payer, causes many challenges.

> *In Poland we are dependent on one payer. In very limited extend it is supplemented by private insurers but it is – presently – marginal. This is a huge barrier in a way to*

innovation. Especially telemedicine, since the payer is currently not interested in investing in such solutions. We can discuss on the reasons for that. Everyone has their own hypothesis. Most importantly – there is status quo and that is a serious problem (PS2).

The way of financing tele-health services, or rather the lack of such makes development of e-health economically not feasible and difficult to conduct from legal point of view.

Today there is no model of financing telemedical procedures. Should such standards be developed, their approval would be possible and hence – their inclusion to health care offer (PS4).

This model of financing public health care with NHF being the sole payer creates specific market dynamic. NHF can facilitate changes, which creates a big opportunity for development, if used effectively. The way decisions are being made and implemented (in fast and arbitrary way) however creates disturbances on the market.

It is incredible. NHF can introduce changes overnight. Sometimes even retroactively. This is very dangerous to health care providers (PS3).

Innovation (through) procurement

Interviewees agree that development of e-health requires pursuit of innovation and that can only happen if the market is opened to purchasing new solutions. In public health care that can be achieved through innovative approach to public procurement that is focused on outcomes, innovation and full life cycle costings. Unfortunately, practice of that kind of procurements in Poland is very limited as people are afraid of doing things in a different way.

For now it [interest in such procurement] is small. My observation shows that people who do that try more not to run the risk of breaking the law or getting in trouble with the Public Procurement Office, rather than use it to achieve the aim. Procurement should not be a barrier and should not cause people to conduct a purchase focusing only on the possibility of breaking the law, but rather to conduct a good purchase. That what we most care for. Whereas people responsible for that try to stay away from risk (…). E.g. using other than price criterion. If they use weight ratio [they use] e.g. 95:5 or even 99:1. That makes it fiction because the other parameter has practically no meaning in choosing the best offer (PE1).

It is also a matter of competences and priorities of people preparing specifications for tenders. Often those are not sufficient to prepare good procurement.

There is a [hospital] manager (…) who goes to his IT specialist and says: listen, we need new software. Normally that is the end of message. If we look at the average pay rate of IT staff is [Polish] hospitals, we should consider if such a person is able to produce really specific description of the product (…). Normally those are low payed people who do that kind of work once, twice in their lives (PS3).

Such people often try to analyse a number of various specification and choose elements they consider worth including. This results in developing requirements of products that do not make sense.

> *It is like taking 6 cars and saying: I want a driver from that one, gear from that one (…) and I want you to make a car from that. That doesn't work like that (…). Functionalities of particular systems are often not compatible (…). In this way an abnormality occurs. It is most often later adjusted through questions or no-one makes an offer (PS3).*

The point regarding difficulty in describing the subject of procurement is also mentioned by buyers' representative.

> *The most important matter in the process of procurement of e-health solutions is the description of the subject of procurement. It is hard due to the fact that it requires a thorough analysis of what the (…) solution is supposed to look like. It is also necessary to conduct a market analysis [to check] if the solution we want to purchase already exists, if the suppliers will be ready to take part in such procurement (…). That is why preparation of the description of the process and the technical specification is key element of the purchase of new technologies (PB4).*

The necessity of such actions is supported by other representatives of buyers (e.g. PB6). That suggests that the way of conducting procurement is a major factor in the development of e-health solutions. It is important to point out that some interviewees talk of the difficulty of preparing a comprehensive specification and refer to thinking in terms of outcomes. Interestingly, the interviewees asked directly about innovation procurement (which includes outcome based specification) either admit to the lack of knowledge regarding it or associate it with procurement of innovative solutions. That suggests that there seems to be a demand for that kind of procurement and that a lot more work needs to be put into disseminating that method.

Summary

Level of understanding of what e-health is varies depending on interviewees and clearly differs in relation to stakeholder group interviewees represent. Basing on the limited sample is seems that suppliers understand it broader than buyers. All groups (including experts) agree however than e-health today – if employed at all – is most often used for administrative tasks.

Biggest e-health initiative conducted in Poland today is the matter of gradual digitalization of medical records. It is the first step towards usage of majority of e-health solutions although Polish health care units – despite legal requirements – still struggle with it.

Key challenge identified by interviewees are stakeholders' attitudes that often do not favour wider e-health usage. Negative approach towards implementing e-health solutions characterises many doctors who are afraid of lowering quality of care but also decreasing number of patients they take care of. Interestingly patients are also identified as a group

presenting some restraints towards e-health development. The reason suggested for that is a limited level of digital literacy among certain part of population. That tends to shift with generational change but still is an important factor.

Interviewees focus a lot of attention on the matter of resources in the context of e-health. There is a considerable variety regarding costs of such solutions. Some interviewees perceive it as too expensive to think of, others see it as a way to save money. All of them agree however that an important barrier for e-health development is the service purchasing policy of National Health Fund. Until such solutions are not recognized by the payer, we cannot count on their common usage, as they remain economically unfeasible.

SPAIN

Research sample

Sample was gathered through convenience sampling and included 3 buyers, 4 suppliers, 4 experts and 2 end users. Interviews were conducted in Spanish. Translation of quotations was conducted by interviewers.

E-health understanding

Based on results of the interviews, it seems that Spanish stakeholders have a very broad and comprehensive understanding of e-health. Interestingly, this understanding seems not to be dependent on the interest group they represent. Simplest put, interviewees understand e-health as everything that involves information technology used in health care.

> *E-health refers to health services and information delivered or enhanced through the internet and related technologies (SU2).*

Interviewed stakeholders point out to the variety of possible usage of e-health solution and a variety of beneficiaries. Most often mentioned by interviewees aspects of e-health usage include:

a) health management
   The use of information and communication technologies for the better health management (SB2).

b) more efficient service for patients
   Application of Information and Communication Technologies in health care, including diagnosis [and] patient follow-up (SB3).

c) more efficient treatment with the use of ICT.
   It's the technology to facilitate the care of the patients. It can be IT for data, clinic reports, etc. And also to take care the patient at home for example: new-borns, chronicle, elderly patients, etc. (SB1).

An important element of e-health usage, that was hardly mentioned in other researched countries but pointed out by various stakeholders in Spain, is the matter of medical decision-making. That seems to be understood in three ways. First it is the provision of relevant information that make health professional's work more efficient.

> *A professional app providing doctors with information and tools at the point of care (SS1).*

Secondly, it is the decision making support system that helps health professionals make choices.

> *Help health care professionals take better decisions (SS1).*

Finally, it is the matter of partial automatization of decision making so that it can be conducted using particular algorithms.

(…) automatic decisions and alerts on the basis of real time health data collection and algorithms for critical patients (SS1)

This particular usage of e-health services presented by a supplier representative is also present by a buyer representative (SB1) who refers to decision-making support system and is reinforced by interviewed expert.

From my point of view, an innovative e-health solution goes beyond simply registering health care data or presentation of clinical data or parameters. An innovative solution should be used as an expert system to help to decision-making in complex environments and with information being sometimes unclear (SE4).

This broad understanding of e-health is followed up by vide category of traditional e-health solutions. Those include:

Diagnosis by image service. Different devices for patient monitoring. Widespread use of electronic health records (SB3)

Technology development

The biggest ally for expansion of usage of e-health solutions pointed out by one of interviewed experts is the rapid development of technology, followed by reduction of its costs.

Better access to technology; fast technology evolution; reduction of technology costs; etc. (SU1).

This point is reinforced by another expert interviewee who points out that e-health can be used in a way that makes not only health care more effective but also – due to growing commonness of technology in everyday life, its usage can be easy to grasp by patients.

Monitoring patients at home can be safe, and cost-effective. As more technology is implemented more technology would be developed. More and more people are now ready to embrace technology in health care (SE1).

This overall belief in positive force of the development of technology in the context of rising health care efficiency that is shared by the majority of interviewees is opposed by a point made by a different expert interviewee. He claims that putting technology on the pedestal can make us lose sight of the fact that it is but a tool for achieving our main goal – efficient health care. With such approach we can put too much work into thinking what technology to use, instead of how best to use it.

Sometimes technology itself is a barrier. Tech should be seamlessly integrated with our solutions in a way that users don't even realise they're working with it. I have the impression that in some cases, technology is the leading actor, instead of an assistant (SE3).

The mentioned challenge is recognized by a suppliers' representative, who again seems to claim that the proper solution is the one that performs set purpose while improving user experience. Building on that one can argue that the best solution to the issue is for buyers to focus on their needs and communicate them efficiently through outcome based specification and leave the choice of appropriate technology to the suppliers.

> *In this world with thousands of Apps, gadgets and many noise around technology and health, from our point of view innovative e-health solutions are those that (1) are well designed for a particular purpose and not with a general intention covering many areas, and (2) get the best user experience so that the solution is aimed to help the health care professional, meaning that they do not have to work for the solution but, on the contrary, the solution works for them (SS1).*

The trends in the development of technology, reduction of its price and growing prevalence of usage brings to the conclusion that the expansion of e-health solution usage is unavoidable. With that in mind it seems that the most important things stakeholders should focus on is the speed and quality of its implementation. That again leads us to the topic of procurements.

> *Digitalization of other daily activities/sectors makes the e-health development unstoppable, but…question is…how fast is it [e-health] going to develop? (SS3).*

Procurements

The above-mentioned development of technology can be a big ally for wider implementation of e-health solutions. It can however also create many difficulties, as hospitals' representatives cannot keep up-to-date with an area that needs a lot of highly specialised knowledge. This challenge is pointed out by one of the buyers and refers to big hospitals. It is easy to imagine that the issue grows even bigger in case of smaller units.

> *To get good and practical ideas, sometimes it's difficult in big hospital just to know what the technology allows us to do and also that people know the way to be implemented (SB1).*

Even with the clear agreement to the correctness of the outcome-based approach, application of innovation procurement seems to cause ambivalent emotions among some Spanish interviewees. An example of such approach is represented by one of the expert interviewees, who believes that focusing on using innovative tool of procurement can impeach the aim of procuring innovative solution.

> *Some "innovations" are subordinated to a tool. In that case, procuring it would obviously help. But, to me, that's not good innovation. Innovation is doing something new with the tools (or means) you already have, so procurement is not needed (SE3).*

Some suppliers seem to share that fear as well as conviction regarding limited influence of procurement on innovations.

> *Nowadays, there is a limited influence of the procurement processes on the innovation produced in the e-health solutions (SS3).*

Comparing various opinions however is seems that it is not the procurement as such that suppliers criticize but rather the notion of perfect procurement tool that would force innovation. The key aspect is its efficient application. They seem to be claiming that it is less the matter of what kind of procurement tool is used, but more regarding the way it is used.

> *More than procurement tool the procurement process can influence the level of innovation. Software applications development can rarely be completely specified before the engineering starts, and that makes it hard to take a well informed decision to select a provider (SS1).*

Based on interviewee's declarations it seems that suppliers are motivated to develop innovative solutions and are glad to have a chance to do so. Reason for that is twofold – the development of the industry and improvements for society arising from the e.g. more efficient health care system, more involved patients, etc.

> *On one side, technology companies are motivated because they foresee that a great investment will be done in the future on those kind of systems, meaning that they develop e-health solutions, because they see a market opportunity there (so…economic motivations are one of the main reasons).*
>
> *On the other hand, the members of technology companies are also persons, feeling that with their professional activities and business they can work aligned with the common interest of the society, to improve our society and health care (SS4).*

Financial restraints

Financial crisis hit Spain hard and strongly influenced its economy. Interviewees from all stakeholder groups refer to the new financial situation it created. Due to that costs saving is currently one of top priorities.

> *The need to save costs, in times of financial crisis [is crucial] (SU2).*

That new situation however has some upsides recognized by interviewees. Budgetary shortcuts puts a stop to 'business-as-usual' approach and enforce searching for new solutions. According to an interviewed buyer, it is even recognized as a big opportunity for further development of e-health.

> *[Motivation are] (…) budget cuts, which have favoured the development of new and cost effective solutions (SB2).*

Financial crisis did not only influence health care institutions' budgets, but also increased the amount of poverty in general population. E-health solutions are recognized as a way to providing relatively inexpensive care to poor regions. One of the experts identified such type of solution as a standard one.

> *[Using] remote diagnostic services of ultrasound scans performed in poor regions (SS2).*

Buyers' representative points out that European Union's funds help in development of e-health solutions in Spain.

> *EU programmes boosting e-health [are helpful] (SB3).*

Interestingly with all that said, e-health solutions can still not only be associated with high costs but – ironically enough – are expected to be expensive. Experts' representative points out the fact that most expensive and biggest solutions are the ones most often bought. Outcomes that follow the price seem to be less relevant.

> *[Most often bought are] those that are expensive. And if they include hardware, much better. Unfortunately, clinical results and evidence are not always the drivers for e-health purchasing (SE3).*

Difference between public and private sector approach was not mentioned often by interviewees. Only one supplier referred to it, but the difference was very clear. Based on his observation, while representatives of public sector are using e-health solutions with an aim to survive, private sector representatives also see it as an opportunity to get ahead of their competitors and develop even further.

> *[In] public sector (…) e-health solutions and e-health solutions that are business-critical (…) [are those] needed to keep the business 'running'. No incentives to 'engage' new clients or to retain them.*
>
> *[In] private sector (…) [e-health] solutions show an upward trend due to the existing need to differentiate from competitors and to search for efficiency (SS3).*

Social change

Social change acknowledged by interviewees is an important factor influencing health care priorities. As mentioned by a buyer representative, health care users are growing more aware in the aspects of self-care.

> *Individuals' awareness of self-care is increasing (SE2)*

The matter of awareness follows increasing level of ICT usage from generation to generation.

> *Technological barriers are disappearing from generation X and millennial (SE2).*

This corresponds with the demand for e-health market. As a supplier representative states, e-health solutions are perceived as efficient tools that can be used to improve patient experience.

> *In short, e-health is the application of technologies to improve patient care. This implies all kind of devices and software applications that are intended to any or all of the following (SS1).*

An interviewed expert supplements this by pointing out that e-health as such in Spain is understood as solutions oriented at patients.

> *Leverage of technology to deliver better – more effective, efficient, [better] quality and affordable –health care. Although there are not unique definitions, experts in the area usually refer to e-health for patient-oriented solutions. If we stick to this definition, an EHR would not be considered e-health unless that patient has access to his/her health records. In which case we usually call this module/platform PHR (SE2).*

Some of the interviewees also acknowledge social change regarding pursuit of a healthy lifestyle, and see mobile phones as an important tool in that process. A supplier notes that many people today take good care of their health and ICT solutions used on their phones can help them do that. Moreover, mobile phones applications can play an important role in providing basic health assistance in regions with limited access to physicians.

> *The access to mobile phones has largely contributed to the widespread use of health applications. On one side, people in industrialized countries have become more aware of the importance of caring about health and feel rewarded when realizing they're doing good! On the other side, phones have allowed e-health applications in poor countries where medical assistance can be remotely delivered (SS2).*

This growing prevalence of usage of ICT tools (such as mobile phones, tablets, etc.) along with their reducing costs can make them important factor influencing health care efficiency, costs and – even broader – the way health care is provided.

> *The reducing cost of the ICT tools. Also the age of the patients that can help them to have care in their homes if they are old people and also the new generation (patients, employees) that manage everything with the mobile phone, tablets, etc. (SB1)*

In recent years one could witness development of 'wearables'. Devices such as arm wrists, watches, glasses, etc. can monitor vital data, analyse them and transfer via ICT. According to the interviewed experts, these devices can become e-health tools and play an important part in the future of health care.

> *Wearable's: people are concerned about their health and this technology is available and affordable (SE1).*

Another expert goes even further, relating to the idea of the 'internet of things' where huge amounts of various devices could constantly communicate with one another, monitor owners' data, compare them to other, analyse results and produce informative output.

> *The internet of things and bio-signals monitoring are great opportunities to change how we use technology. A quantified person connected to other people is self-aware enough to take better care of him (SE3).*

Based on the interviewees' answers it seems that they perceive the mentioned social change as a bottom-up motion that takes place 'on its own', as a result of technology development and

generational change. Policy makers' actions do not take big credit for that. Although it is important to remember that policy makers cannot remain blind to that social change and need to adjust laws and policies in order to catch up with the progress.

> *Social changes, via the citizen empowerment, have fostered a change in the point of view of politicians, regarding procedures and laws, to bring the e-health solutions closer to the reality, and to streamline it, exploiting the high technologies available and to move forward on the use of e-health solutions (SS4).*

Law

The described process in which the law is trying to catch up with the technology can be however an important barrier for innovation as the truly innovative ideas may be considered illegal for a while.

> *Legal [challenge are the] difficulties (or impossibility) to implement e-health solutions that stay ahead of the law or the current acquisition methods. The evaluation of medical technology is not a uniform process, it costs time and it is difficult to apply (SB2).*

Policy makers also need to address a variety of legal issues that will set the direction in which e-health solution will go and hence, influence health care.

> *There has to be specific laws and regulations for e-health. Open software and hardware can have a huge impact in the number of people who buy and sell e-health (SE1).*

Interviewees varied in the perception of the already introduced changes in policies. For example one of the experts pointed out that the law already faced a number of important issues.

> *Legal: some security/confidentiality/privacy barriers have disappeared (SE2).*

On the other hand, an interviewed supplier argued that the changes in law were rather symbolic and had very limited impact on the market. In order to make the law 'innovation friendly', changes need to go much deeper.

> *Just little changes…Some laws, as 'La Ley de la Dependencia' ('Dependency Law', a law regulating the services that should be provided for the promotion of persons empowerment) or some changes (like the integration of the Department of Health care and Social Services) did not really have an impact.*
>
> *Those kind of changes did not really turned into innovations in the e-health sector (SS3).*

Interestingly, despite Spain being a country with significant differences between particular regions, that topic did not come up all that often during interviews. Interviewees were from three different regions, but only one interviewee representing users referred to it by pointing out that those differences may be problematic and are worth addressing.

Homogenize practices within different regions. This could improve competitiveness and save costs (SU2).

E-health beneficiaries

E-health solutions are recognized as having potential to increase health care efficiency thanks to proper data management. A variety of health care actors could benefit from that. First of all those are patients and doctors who could take advantage of fast medical data transfer.

A solution consisting on a device monitoring health data from patients [could be used], sending them to a server infrastructure that collect all data and distribute them to the doctors (each one would receive only those data from patients which they are in charge of) (SS1).

Secondly, everyday administrative tasks could me more effective with using e-health services.

[Health care could benefit from] digital transformation of clinical and / or administrative processes that support the provision and management of health services to customers (regardless of whether the end user is involved in the processes or not) (SS3).

Finally, such data could become important element in building strategy of health care unit development by its managers, as aggregative data could be used to build predictive models.

[E-health solutions can be useful tools] for the manager. Big Data analysis. [Building] predictive models) (SS3).

Summary

Spanish interviewees often mentioned that one of the factors influencing development of e-health is funds. Financial crisis forced health care institutions to cut costs. Interestingly, that was a moment described as many as key for development of innovations as it required buyers to think differently than before and look for other solutions. E-health is perceived as a tool that may help save money.

Interviewees acknowledge public procurement as a tool that can strongly influence development of innovation. It is important to observe however that it is less a particular procurement tool, rather than the way buyers use it, that interviewees found most important. Key elements include communication with the market and building specification in a way that describes desired outcomes, rather used technology.

According to Spanish interviewees, today we witness two important factors that strongly influence health care. One of them is social change and that fact that citizens become more health aware, empowered but at the same time have higher expectations. Those citizens are also more accustomed to using ICT. Another factor often mentioned by interviewees is the rapid development of technology and reduction of its costs. That makes it more useful and affordable. Those two factors make – according to the interviewees – wider usage of e-health solutions only a matter of time.

Countries comparison

Development of Joint Statement of Unmet Needs must start at the level of common understanding of the subject of procurement. In case of e-health, the qualitative study has shown that there is a considerable difference in its understanding among representatives of various countries and various stakeholder groups. This difference goes beyond the challenge of academic semantics and relates to a very practical issue. When trying to conduct a joint procurement on international level, there needs to be an agreement as to what e-health is and what is expected from it.

Qualitative study has proven that there is a considerable difference in understanding of e-health. Polish buyers seem to be the group identified by all stakeholders, as the one with most narrow interpretation of e-health. Often, they limit it to administrative tasks that include e-registration and digitalization of medical records. In comparison, representatives of Spanish stakeholders represented a wider understanding of e-health, very much corresponding with the EC definition and including data sharing, telemedicine services, portable patient-monitoring devices, etc. Danish interviewees also had such broad understanding that was additionally supplemented with key role of e-health in development of patient empowerment.

Representatives of researched countries recognize the importance of public procurement in development of innovation. However they differ in the approach to various tools of procurement, there are a couple of fundaments they all agree on. First of all it's the case of rapid development of technology. Hospitals' representatives have difficulties to keep up to date with this development. Interviewees pointed at many advantages of describing the outcome a hospital wishes to achieve, rather than particular technology that has to be used. Secondly, interviewees agree on the importance of efficient communication of buyers and suppliers. Unfortunately, interviewees in three countries also agree that despite the belief in importance of procurement, the majority of procurements is being conducted in traditional, suboptimal way.

The issue of attitudes toward e-health solutions is similar in three researched countries. Interviewees point out that policy makers, managers, health care providers often lack motivation to further incorporate e-health solutions. On the other hand, interviewees in Denmark and Spain acknowledge the fact that the development of e-health solutions is driven by the growing usage of ICT in citizens'/patients' everyday lives. The prevalence of usage of such tools as well as level of competences of using them is related to generational change. Polish interviewees however mention a considerable amount of Poles that – with limited access to computers or internet – are the subject to 'digital exclusion'.

Interviewees of Denmark and Poland agree on the fact that there seems to be a lack in a comprehensive development strategy that could secure efficient cooperation of used e-health solutions. Instead a number of small, independent pilot projects is being developed. The solutions created in those various projects often cannot cooperate with one another. Lack of interoperability makes them inefficient to use on a bigger scale.

A considerable difference could be noticed in the matter of finances. In case of Danish interviewees, it was hardly ever mentioned, suggesting that it is not a key element. It was however very important for interviewees in both Poland and Spain. In Spain it was regarded as a fundamental challenge, but was also – by many stakeholders – perceived as an opportunity for development, and motivation for pursuing new cost-effective solutions. Whereas in Poland it was described only as a problem. Lack of money was considered an argument against investing in e-health solutions and lack of e-health financing by public payer, as a barrier for development of the field.

APPENDIX I – Interview questions

Interview questions for buyers:

1. What is e-health? */subjective understanding/*
2. What is your understanding of 'typical' e-health solutions?
3. What is your understanding of 'innovative' e-health solutions?
4. Did you purchase any e-health solutions? */EC definition/* If so, when was that and what were there? */examples/*
5. What is the motivation for purchasing and/or using e-health solutions?
6. What areas of healthcare could most benefit from usage of ICT?
7. What are the most important qualities (name 2-3) that e-health solutions should have (please, try to use very general terms/description) and they don't have now?
8. What procurement tool do you use in purchasing e-health solutions?
9. Did you ever use innovation procurement process? */standardised definition/*
    a. What did you purchase?
    b. What is your impression of using innovation procurement?
10. What kind of legal/political/social changes in recent years influenced e-health market?
11. What kind of changes can influence e-health market in the future?
12. What are the most important barriers and opportunities for development of e-health market?

Interview questions for suppliers:

1. What is e-health? */subjective understanding/*
2. What is your understanding of 'typical' e-health solutions?
3. What is your understanding of 'innovative' e-health solutions?
4. What kind of e-health solutions are most often bought? */examples/* Do you know why?
5. What is the motivation for developing e-health solutions?
6. What areas of healthcare could most benefit from usage of ICT?
7. Can procurement tool influence the level of innovation of the solution you propose? If so – in what way?
8. Did you ever participate in innovation procurement process? */standardised definition/*
    a. What did you sell?
    b. What is your impression of participating in innovation procurement?
9. What kind of legal/political/social changes in recent years influenced e-health market?
10. What kind of changes can influence e-health market in the future?
11. What are the most important barriers and opportunities for development of e-health market?

Interview questions for experts:

1. What is e-health? */subjective understanding/*
2. What is your understanding of 'typical' e-health solutions?
3. What is your understanding of 'innovative' e-health solutions?
4. What kind of e-health solutions are most often bought? */examples/* Do you know why?
5. What is the motivation for purchasing and developing e-health solutions?
6. What areas of healthcare could most benefit from usage of ICT?
7. Can procurement tool influence the level of innovation of the solution you propose? If so – in what way?
8. What kind of legal/political/social changes in recent years influenced e-health market?
9. What kind of changes can influence e-health market in the future?
10. What are the most important barriers and opportunities for development of e-health market?

APPENDIX II – Definitions

e-health[4]:

- refers to tools and services using **information and communication technologies (ICTs)** that can improve prevention, diagnosis, treatment, monitoring and management.
- can benefit the entire community by **improving access to care and quality of care** and by making the health sector more efficient.
- includes information and data sharing between patients and health service providers, hospitals, health professionals and health information networks; electronic health records; telemedicine services; portable patient-monitoring devices, operating room scheduling software, robotized surgery and blue-sky research on the virtual physiological human.

When talking about innovation procurement during the interviews, its understanding agreed in the desk study research report is used:

Public procurement *occurs when a public institution purchases products or services from an outside institution. Innovation can be defined as an introduction of a new idea, device, service, product, process or system.*

Public procurement of innovation (PPI) *is defined as procurement of something that does not yet exist. However, what is a regular, off-shelf product or service in one society, can easily be considered an innovation somewhere else. In addition to demand-side PPI, there is a possibility of supply-side PPI, when potential suppliers approach a public institution with unsolicited innovative solutions.*

[4] http://ec.europa.eu/health/ehealth/policy/index_en.htm