Folia Oeconomica
Acta Universitatis Lodziensis
ISSN 0208-6018 e-ISSN 2353-7663
www.czasopisma.uni.lodz.pl/foe/
4(337) 2018

DOI: http://dx.doi.org/10.18778/0208-6018.337.14

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The Innovation Procurement Policies and the Development of e-health in the EU Member States: What Can Be Learnt?

Abstract: The article presents findings of research on e-health development in four European Union (EU) Member States in the context of public procurement of innovation (PPI). EU policies attempt to make public procurement leverage for innovation by introducing a number of new tender procedures. Policies and practices in PPI, including e-health, were investigated for Denmark, Great Britain, Spain and Poland. For various reasons, all four countries struggle with the introduction of the European PPI procedures, and with making a transition to outcome-based tenders. Though they all introduced policies implementing these procedures, Denmark and Great Britain seem to have achieved better results, having well-established public-private collaboration. This correlates with a more efficient adoption of e-health solutions in those countries. With some minor successes, Spain, and particularly Poland, display attachment to traditional procedures despite changes in the public procurement regulations.

Keywords: e-health, public procurement, innovation, European Union

JEL: I18, I19, H57, O38, N44

1. Introduction

Public health care sector faces a number of challenges, many of which are expected to intensify in the future. Ageing of the population, growing burden of chronic diseases and shrinking tax base are good examples of such challenges (Knutsson, Thomasson, 2014: 242–255). Health care systems are in particular need for innovation necessary to overcome these issues. Information and communications technologies (ICT) hold much promise in providing solutions capable of increasing efficiency in health care delivery and data management (European Commission, 2004).

There is, however, a considerable difference in implementation of these promising solutions across European countries. Despite a relatively recent introduction of ICT solutions in health care, studies suggest that some countries may already be considered frontrunners (e.g. Denmark, UK), leapfroggers (e.g. Spain) and laggards (e.g. Poland) (Currie, Seddon, 2014). That suggests important systemic differences in the approach to innovation between various countries. This article aims to assess the scope of such differences in relation to the role of innovations in procurement by analyzing barriers and opportunities for developing e-health and innovative procurement.

2. Public procurement of innovation

Many definitions of public procurement can be found. The basic ones refer to the process by which public authorities purchase work, goods or services (European Commission, n.d.). As far as innovation is concerned, in this paper, it will be understood as "the process of making changes to something established, by introducing something new that adds value to customers and contributes to the knowledge store of the organization" (O'Sullivan, Dooley, 2008: 5).

PPI[1] is sometimes defined as procurement of something that does not yet exist (Uyarra, Flanagan, 2010: 123–143). However, as some authors (Rolfstam, Phillips, Bakker, 2011: 452–468; Greenhalgh et al., 2004: 581–629) point out, what is a regular, off the shelf product or service in one society, can easily be considered an innovation somewhere else.

[1] Also referred to as Public Procurement of Innovative Solutions, Public Innovation Procurement and Innovative Public Procurement. Similar, although a narrower concept, is *public technology procurement* or *government technology procurement*. For more, see: Rolfstam (2008).

2.1. General barriers to and opportunities for public procurement of innovation

Amann and Essig (2015: 3) point out that "public procurement goals such as cost efficiency, legal conformity as well as the advancement of environmental protection, and the promotion of innovation often represent competing priorities". PPI is also time-consuming as a result of the requirement of coordination between many stakeholders, not to mention navigating through the unknown process without well-established routines. Risk aversion characterising public officials responsible for procurement is perhaps the barrier most often cited in the subject literature. Greenhalgh et al. (2004: 597) recall multiple studies suggesting that if an innovation is perceived as risky to an individual making a choice about its adoption, it is less likely to be adopted. According to Kalvet and Lember (2012: 241–262), risk management practices constitute another important barrier; naturally risk-averse, public contractors try to shift risks back to suppliers, or to third-party institutions when possible. According to the authors, mainstreaming PPI may require further innovations in the process of procurement itself, in order to make it easier to manage risks bigger than those involved in procurement of ready-made services and products. Nevertheless, Amann & Essig (2015: 1–11) suggest that risk aversion may not be the main factor contributing to the unpopularity of PPI; instead, aversion to complexity plays the biggest role, with time limitation being the second most significant barrier.

Despite the fact that new instruments (see below) were introduced in the EU with the purpose of making PPI easier, the accompanying legal regulations are perceived as complicated, which discourages potential suppliers from participation (especially SMEs). This perception holds back contracting institutions as well; fearing appeals from the tender results, they "play it safe" (Knutsson, Thomasson, 2014: 242–255).

Innovative products, services or processes require some prerequisites (Galanes, Adams, 2006; Caldwell, O'Reilly III, 2003: 497–517) to be developed. Those include support for risk-taking and tolerance for mistakes (Bain, Mann, Pirola-Merlo, 2001: 55–73). Various studies (Knutsson, Thomasson, 2014: 242–255; Dale-Clough, 2015: 1–23) suggest that the power of local authorities in triggering and deploying innovative solutions may prove greater than expected, provided they learn from each other's experiences and adapt their tender guidelines accordingly. Best results are achieved where institutionalised collaboration between authorities, R&D and businesses is established.

2.2. E-health: definition and relation to PPI

Definition of e-health used by the European Commission (EC) is very broad; it encompasses most of the health care tasks executed via ICT. According to the EC, e-health "means ICT tools and services for health. E-health covers the interaction

between patients and health service providers, institution-to-institution transmission of data, or peer-to-peer communication between patients and/or health professionals" (European Commission, 2011: 4).

E-health solutions have been playing an increasingly important role in health care systems across the world (Iakovidis, Wilson, Healy, 2004) and its development is recommended by the World Health Organization (World Health Organization, 2005). In the EU alone, e-health market was estimated at €21 billion in 2006 (Dobrev et al., 2010). In 2016, in the European OECD countries, public expenditure was 75.1% of total health care expenditure (OECD, 2017), which shows how important the role of the states is in creating the e-health sector. ICT solutions in health care have been intensely promoted by the European Commission (2013; 2014a) in a belief that ICT can help the EU in dealing with a growing burden of chronic diseases, and reduce care and treatment costs (Bell, Thornton, 2011: 51–56; Kumar, Bauer, 2011: 119–131). Because many e-health services are created from scratch and first of their kind, at least in their local contexts, they are innovative by nature.

3. Research methods

Desktop study research conducted between February and May 2015, included a secondary analysis of documents regarding innovation procurement and e-health. Its aim was to identify and compare the various approaches to PPI and e-health, understand definitions used in national documents, regulations regarding those issues and plans for future development. The analysis also included aims, strategies, key public bodies and time frames. During the preparatory phase of the desktop study, a questionnaire consisting of 15 elements corresponding with the above-mentioned issues was developed and later used in case of all analyzed countries to secure consistency and comparability of the results.

4. PPI in the policies of the European Union and selected Member States

Responsible for about 19.4% of GDP in the 27 EU Member States (data from 2009) (Amann, Essig, 2015: 1–11), public procurement is perceived by the EU as a powerful tool for reaching goals like employment, environmental protection, social equality and technological development. Prior to the formulation of the *Lisbon Strategy* in 2000, EU policies on public procurement were strongly influenced by neo-liberal school of economics. Factors like cost efficiency and freeing common European market from national protections had been prioritized (Rolfstam,

2009: 349–360). However, the millennium shift set a new vision of the EU as the most competitive and knowledge-based economy in the world. Reaching this vision required a strong stimulus. To facilitate public procurement of innovation, new procurement procedures were introduced, promoting practices that previously would have invalidated tender on legal grounds:

1. Competitive dialogue, derived from the Directive 2004/18/EC European Commission 2005, later replaced by the Directive 2014/24/EU. It involves several rounds of discussions between the contractor and potential suppliers, shifting focus from the input demanded from suppliers to the outcome desired by the contractor (Hoezen, Voordijk, Dewulf, 2012: 145–158), and making room for innovative solutions to be presented.
2. Technical dialogue is regulated by the EC directives 2014/24/EU and 2014/25/EU. It allows a procurer to request a consultation or relevant information (not necessarily technological in nature) before starting tendering process, in order to specify requirements of the solution (UZP, 2014). It is deemed innovation-friendly because it increases the odds that contracting authority becomes aware of previously unknown solutions.
3. Pre-commercial procurement (PCP) is described as procurement of research and development of solutions before they are commercially developed, with "different suppliers competing through different phases of development. The risks and benefits are shared between the procurers and the suppliers under market conditions" (European Commission, 2015; Edquist, Zabala-Iturriagagoitia, 2015: 147–160).
4. Innovation partnership procedure derives from the Directive 2014/24/EU that repealed Directive 2004/18/EC. It enables a procurer to enter with a supplier or suppliers into a structured partnership that would proceed in stages, with intermediate targets.

The EC is firmly committed to its PPI strategy, despite difficulties with the adoption of this systemic change. The literature on the topic points to organisational resistance to transition from specification-based tenders to outcome-based tenders (Uyarra et al., 2014: 631–645). Part of this resistance comes from the fact that the new procedures involve practices (meetings with potential suppliers, negotiable nature of the solution) that go against safeguards of fairness in the tender process. Once the price ceased to be the deciding factor, procurement process may have become morally and legally confusing for some procurers. The EU, by asking the Member States to widely adopt the PPI procedures, actually asks them to change organisational cultures in their public institutions, to further correspond with the legal frameworks for procurement. The PPI requires more coordination among stakeholders (Amann, Essig, 2015) than regular procedures, which are already complex. Individual Member States approach it very differently; some had made it part of their policy even before the EU did, while others restrict themselves to formal compliance with the EU requirements.

4.1. Legal barriers to PPI

The authors in their previous work (Kautsch, Lichoń, Matuszak, 2016) explored in detail the legal obstacles that various ICT technologies encountered when entering the health care systems in various EU states, and how e-health, in fact, prompted a re-think and updates of the law. Main areas of concern were: professional responsibility during remote medical consultations, protection of the personal data from unauthorised access and secondary (e.g. research) uses of personal health data with associated questions of patient's consent, as well as responsibility for ensuring systems interoperability.

Legal and technical complications related to the above problems halted development of e-health for a long time.

During PPI procedures, concerns regarding the lawfulness of the solutions procured are compounded by concerns related to the procurement process itself.

4.2. PPI in Denmark

There is no national initiative promoting PPI in the area of e-health solutions in Denmark, which can be explained – to a certain extent – by strong decentralisation of the Danish health care system. Nevertheless, the Association of Local Governments, Association of Danish Regions, and the Government published in 2012 a *National Action Plan for Dissemination of Telemedicine* (Digitaliseringsstyrelsen, 2014) and, in 2013, *Strategy for Digital Welfare 2013–2020* (Danish Government et al., 2013) on dissemination of telemedicine throughout the country. The government has committed itself to PPI through the *Strategy for Intelligent Public Procurement*, the establishment of the Market Development Fund and the *Bill for Public Tendering.*

What is more, representatives of the public sector and the industry form the Committee for Medical Equipment (Sundhedsstyrelsen, 2015) that advises the Minister for Health and Prevention in maintaining an overview over initiatives within the field of medical equipment, including e-health solutions. Table 1 gives an overview of barriers to PPI that exist in Denmark, along with opportunities created for it.

Table 1. Barriers to and opportunities for PPI in Denmark

Barriers	Opportunities
1. Competitive dialogue use stopped by national Appeal Board for Public Tenders' ruling. 2. Need for solutions that have proved to be reliable and are offered at reasonable prices. 3. Traditionally very detailed requirements' specifications that offer little incentive or opportunity for suppliers to offer something different. 4. Perception of innovative procurement procedures as costlier rather than typical ones.	1. Grants from Market Development Fund for contracting authorities using pre-competitive procurement, at least for the 2014–2016 period. 2. Increasing use of outcome-based specifications. 3. Institutional support for collaboration between science and SMEs. 4. Promotion of "industrial PhD", where a PhD candidate conducts research funded by a private company interested in commercialization of the results 5. "Innovation vouchers" for companies investing for the first time in innovative solutions. 6. Government's investment in the R&D. Private sector's investment in the R&D at the level of 70%. 7. Commitment to studying innovation procurement as an organisational process, which makes it possible to remove barriers to innovation that stem from human behaviour.

Source: Adamiec (2011: 133–156), Markedsmodningsfonden (2014); Seemann, Dinesen, Gustafsson (2013: 1–18)

4.3. PPI in Great Britain

There are strong ties between science and business in Great Britain. They are coupled with government's support for the cooperation with the scientific community (Adamiec, 2011: 133–156). No PPI strategy for e-health that would apply across whole Great Britain was defined, though national branches of National Health Service (NHS) expressed an intention to engage in innovation procurement. There are various institutions (centres, committees, groups etc.)[2] established specifically with the purpose of stimulating PPI, with PCP being the procedure of choice. NHSs define their own strategies, and then implement them through specific recommendations, for instance, English *National Innovation Procurement Plan* from 2009 (Department of Health, 2009) or Scottish *Route Map to the 2020 Vision for Health and Social Care* (Scottish Government, 2013) and *National Telehealth and Telecare Delivery Plan to 2015* (Scottish Government, 2012). The official strategy encourages authorities to take innovation criterion into account when tendering, but austerity measures slowed down transition towards new procurement procedures. According to Dale-Clough (2015: 1): "In the aftermath of the 2008 global financial crisis, and resultant changes to public sector funding, national procure-

[2] E.g. Government Chief Science Adviser, Technology Strategy Board, National Innovation Fund, NHS National Innovation Centre and nine regional ones, Support Commissioning Units, Technology Enabled Care Services Resource for Commissioners, etc.

ment policy in some settings shows signs of a retreat to efficiency savings and cost reduction as key performance indicators."

Researching outcomes of PPI may substantially help overcome barriers related to lack of proof of efficiency. Studying organisational dimension is necessary to deal with some "human factor" obstacles. Some of the significant barriers to implementation of PPI tools are presented below in Table 2, along with factors supporting it.

Table 2. Barriers to and opportunities for PPI in Great Britain

Barriers	Opportunities
1. Lack of engagement between procurers and suppliers. 2. Overly prescriptive and burdensome procurement processes. 3. Risk aversion and insufficient procurement capability. 4. Failure to identify unmet needs before they become too urgent for PPI process to be initiated. 5. Lack of know-how among supply-chain managers. 6. Prevalence of solution-led rather than outcome-led specifications.	1. The legal duty of strategic health agencies to promote innovation. 2. Strong representation of science community in the form of Government Chief Science Adviser who cooperates with the Prime Minister directly. 3. Strong cooperation between science and business (Technology Strategy Board). 4. Efficiency in gaining EU grants and financing for R&D. Tax breaks for SME's engaging in R&D. Promotion of health care and business cooperation for innovation, e.g. Scottish Health Innovation Assessment Portal (HIAP-Scotland) encouraging innovators and providing them with a feedback. 5. Presence of specialised bodies within the NHS's dedicated to promotion and improvement of PPI and/or e-health. 6. National £220 million Innovation Fund for health authorities. 7. A developed system of institutions implementing PPI strategy. In England alone, there is an NHS National Innovation Centre and nine regional ones. They cooperate with Support Commissioning Units. 8. Introduction of *Technology Enabled Care Services* (TECS) *Resource for Commissioners* – a set of tools facilitating commissioning of e-health solutions.

Source: Adamiec 2011, 133–156; Common Services Agency for the Scottish Health Service, 2013; Department for Business Innovation & Skills, 2011; Department of Health, 2009; House of Lord's Science and Technology Committee, 2011; NHS Commissioning Assembly, 2015; Office of Government Commerce, 2004

4.4. PPI in Poland

In 2010, the Public Procurement Office joined Polish Agency for Enterprise Development in an initiative called *New Approach to Public Procurement* (*Nowe podejście do zamówień publicznych*), which involved publication of guidelines informing

about new priorities in public procurement and new methods of conducting tenders (UZP, 2011). It was accompanied by conferences and training for public procurers (Wiktorowicz, 2011). The main goal was to improve the odds of micro-, small and medium enterprises in public tenders, through raising officials' awareness of the benefits and innovations that they can bring. So far (May 2017), the direction towards which PPI is heading remains uncertain. While social and environmental clauses slowly become popular (Joniewicz, Jawor-Joniewicz, 2015), PPI examples can be rarely found. With the implementation of the *Directive 2014/24/EU*, which was due in April 2016 and finally introduced in June 2016, there are still controversies over a shape of the bill that is supposed to introduce it (Borowska, 2015; Wikariak, 2015).

Table 3. Barriers to and opportunities for PPI in Poland

Barriers	Opportunities
1. Low general awareness. 2. Lack of experience in PPI among both procurers and suppliers. 3. Prevalence of short-term, small-scale procurement strategies. 4. Difficulties on the side of procurers in defining features, conditions and criteria of choice of a desired solution. 5. Risk aversion aggravated by stiff bureaucratic procedures. 6. Over-reliance on the criterion of price as a "safe" one. 7. Conservative and risk-averse culture of majority of public institutions (also the auditing ones). 8. Lack of active support from public or political institutions.	1. Amendments to Public Procurement Law: 2. June 2016: further adjustment of the Polish regulations to the EU ones. 3. August 2014: limiting phenomena of offering abnormally low prices, making price the only criterion, and keeping too much information classified as a business secret. 4. October 2012: introducing technical dialogue. 5. Growing public interest in social and environmental clauses in public procurement (signals a rising awareness of its role in the economy).

Source: Enterprise Europe Network, 2013; Wiktorowicz, 2011; Sejm Rzeczypospolitej Polskiej, 2012; 2014; 2016; Smart-Grids.pl, 2014

Strategies for innovative economy and e-health seem to be largely separate in practice; currently the Ministry of Health and CSIOZ (Centrum Systemów Informacyjnych Ochrony Zdrowia, Centre of Health Information Systems, a Ministry of Health agency), an institution responsible for digitalisation of Polish health care system, fail to meet deadlines and struggle with implementation of medical data exchange systems (some of which may be considered innovative on the Polish market) and computerisation of health care facilities.

Despite some positive changes in the country's policies that led to the wider inclusion of criteria other than purchase price in tenders (Wiktorowicz, 2011), in practice it is still the price that is the deciding factor, with an average weight

of 90% (UZP, 2015). Technical dialogue was used only in 0.19% of public tenders (UZP, 2013), competitive dialogues are practically non-existent.

However, it is too early to assess the influence of those amendments on the procurement practices in Poland. The direction of changes and involvement of legislative authorities create an opportunity for the development of PPI in the country (Kautsch, Lichoń, Whyles, 2015: 312–323). Table 3 presents barriers to and opportunities for PPI introduction in Poland.

4.5. PPI in Spain

The *National Innovation Strategy* (*Estrategia Estatal de Innovación*, *e2i*) (Ministerio de Economía y Competitividad, 2012) is incorporated in the *Law of Science, Technology and Innovation* (Jefatura del Estado, 2011) that introduces policy instruments such as PPI, territorial cooperation and internationalization as means to the end of transforming Spain into a knowledge-based economy. Research, development and innovation are treated as inseparable parts of the process.

There is no nation-wide PPI strategy concentrating on e-health. Nevertheless, the regional governments do procure innovation for health care, e.g. Galicia led two PPI projects: Hospital2050 and InnovaSaúde (European Commission, 2014b; Consellería de Sanidade e o Servizo Galego de Saúde, n.d.). InnovaSaúde focused on digitalisation and mobile health care services. Hospital2050 involved procurement of technologies helping to create an energy self-sufficient hospital and introduce innovative management technologies. Innovative procurement tools were used in both projects. In Table 4 below barriers to and opportunities for PPI development in Spain are presented.

Table 4. Barriers to and opportunities for PPI in Spain

Barriers	Opportunities
1. Unconcern of the R&D sector with commercialization. 2. Aversion to risk of both suppliers and procurers, coupled with a tendency to bureaucratic inertia. 3. Perception of PPI as more expensive and time-consuming. 4. Budget deficits aggravating aversion to investing in untested solutions with an uncertain price.	1. Central and regional governments' support for PPI. 2. Best Practice Guides providing "tender templates" distributed by the Ministry of Economy and Competitiveness. 3. Studies on the PPI taking into account "human factor".

Source: Castells et al., 2007; Luis, Alvarez De Sotomayor, Garrido, 2013; Roig, Saigí, 2011: 397–402; Ministerio de Economía y Competitividad, 2012

5. Conclusions

Variety of barriers and challenges that particular countries need to face regarding e-health and innovation emphasise their varying levels of development and different organisational cultures. In the case of the countries that are more advanced in using PPI (Denmark, Great Britain) also more opportunities in developing e-health were identified. Poland and Spain having less experience in these areas seem to perceive the mentioned development through the perspective of barriers mostly.

Not surprisingly, risk aversion, existing, complicated procedures and lack of belief in novelty or a belief that the innovation has to be more expensive than the existing solutions are barriers common to all states. In all of them, the central/local government's help (existing or expected) is seen as an obvious opportunity, which shows how important this factor is, though it can be described as a prerequisite. While Poland and Spain have great expectations in such governmental incentives, Denmark and Great Britain seem to be utilizing government support (issued legal acts) and both are far more pro-active in seeking other opportunities. Maybe Poland/Spain due to the reasons presented above do not have structures, but expectations?

Knutsson & Thomasson (2014: 242–255) point out to the importance of local authorities in the process of developing innovative solutions, driving changes in their local markets. Research suggests that coherence of goals among different levels of management is crucial for successful adoption of innovation (Greenhalgh et al., 2004: 581–629). For this reason, determination of an official procurement strategy that sets and aligns goals may prove an important step towards popularisation of PPI. Ideally, PPI policies should be coherent on different levels of authority: from central government to municipalities.

Great Britain and Denmark, both highly innovative economies, differ in terms of governmental involvement, financing and reception of the innovative procurement tools, as well as in the roles that local authorities play in the health care service. Their common feature is a well-functioning and institutionalised cooperation between science, business and public institutions, such as health care funds or regional governments. This kind of institutional cooperation seems to constitute a strong incentive for PPI to develop, especially in the field of e-health. British and Danish trials of e-health suggest that studying both technical efficiency of solutions and organisational dimension of PPI help improve the processes. While Denmark seems to have largely overcome legal obstacles to the new mode of conducting tenders, Poland struggles with the implementation of PPI legislation and is attached to almost solely price-based forms of procurement. Major problems in Spain seem to result rather from bureaucracy and severe budget cuts than from the law. Similarly to Poland, Spain cannot boast strong cooperation between science and busi-

ness. The low propensity for inter-institutional collaboration may be the main reason behind the relative lack of innovativeness.

In their comprehensive review of the literature on dissemination of innovation, Greenhalgh et al. (2004) enumerate attributes that a service organisation should have if it is to successfully reutilise innovation adoption. Large size, maturity, decentralised decision-making structure, good internal communication and positive managerial attitudes were mentioned, among others. A rather obvious conclusion might be that PPI will be most readily adopted in institutions that are already innovating. The results of the research conducted by the authors show, which is not surprising, that organisational culture within health care system may be a stronger predictor of PPI success than the formal implementation of EU directives or introduction of PPI procedures.

In order to fully exploit the potential of PPI, health care managers might have to address organizational patterns that stand in the way of embracing innovation. Governmental support, tangible evidence and widespread awareness are necessary to achieve it. Without these prerequisites, ambitious European plans will be at risk of remaining a set of cumbersome procedures with nebulous goals.

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Prawo dotyczące innowacyjnych zamówień publicznych i rozwój e-zdrowia w państwach członkowskich UE. Czego można się nauczyć?

Streszczenie: W artykule przedstawiono wyniki badań nad e-zdrowiem w czterech państwach Unii Europejskiej (UE) omówione przez pryzmat innowacyjnych zamówień publicznych (PPI). Polityka UE stara się uczynić zamówienia publiczne dźwignią innowacji, wprowadzając szereg nowych procedur przetargowych. Zbadano zasady i praktyki w zakresie PPI, w tym w e-zdrowiu, w Danii, Wielkiej Brytanii, Hiszpanii i Polsce. Z różnych powodów wszystkie cztery kraje zmagają się z wprowadzeniem nowych europejskich procedur PPI oraz przejściem na przetargi oparte o efekty, które przyniosą stosowane dobra czy usługi. Choć wszystkie kraje wprowadziły ustawodawstwo umożliwiające takie procedury, Dania i Wielka Brytania wydają się osiągać lepsze rezultaty, mając ugruntowane zaangażowanie na rzecz współpracy publiczno-prywatnej w celu włączania przedsiębiorstw w zamówienia publiczne nakierowane na innowacje. Wydaje się to korelować z bardziej wydajnym wdrożeniem rozwiązania e-zdrowia w tych krajach. Mimo pewnych sukcesów w omawianej dziedzinie oraz zmian w prawie zamówień publicznych Hiszpania i Polska wykazują przywiązanie do tradycyjnych procedur.

Słowa kluczowe: e-zdrowie, zamówienia publiczne, innowacje, Unia Europejska

JEL: I18, I19, H57, O38, N44

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Received: 2017-09-10; verified: 2018-04-05. Accepted: 2018-06-28