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ASSESSING THE SUCCESSFULNESS OF E-GOVERNMENT ON AN EXAMPLE OF THE CZECH REPUBLIC

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ABSTRACT

The development of e-Government in each country is conditioned on the technical and technological progress, financial resources, and last but not least, political attitudes. The influences of these factors determine the dynamics and direction of the IS/ICT development in the new information society. Nevertheless, the achievements and failures have to be inspected, assessed, and thus, measured. The objective of this paper is to point out the pitfalls of metrics used to measure the development of e-Government in the Czech Republic. It also classifies various potential assessment approaches, and pays attention to issues of assessing efficiency and impacts of introduction of modern information technologies in the public administration environment.

JEL CLASSIFICATION & KEYWORDS

O38 | IS/ICT | e-Government | Metrics | Indicator | Efficiency assessment | Broadband

INTRODUCTION

Development of e-Government in the Czech Republic

There are numerous definitions of e-Government. They agree in that *e-Government* is the sum of various activities that utilize information technologies as a tool for achieving better public administration (Lau et al., 2005). The progressive improvement in public administration performance may assume various forms; the most frequently quoted objectives include: faster, more reliable and cheaper provision of public administration services and ensuring better openness of public administration towards its users (Ministerstvo informatiky, 2003).

The embargo on importing IS/ICT to then Czechoslovakia from advanced countries of the world was lifted in the early 1990s. However, the professionals soon experienced a certain disillusionment, as it became evident that not all successful technological processes can be adopted without costly modification, chiefly due to the necessity of converting them to the existing national environment.[1]

The Czech Republic then established a Government Committee for the State Information System, which was meant to co-ordinate the works on setting up a unified state information system (a SIS) while making an efficient use of the funds. Its relatively centralistic approach was to handle both legislative issues and those of standardizing technical, technological and data resources, including the potential construction of arterial data networks. The insufficient powers and authorities of the Committee[2] led to termination of its activity in 1993 and a lapse in the area for several years afterwards.

A revival only came about after the State Information System Authority (the SISA) was established. Materials generated by the SISA were presented by the Government Council for State Information Policy, meaning that SISA proposals were still being presented through an intermediary. The State Information Policy – A Path Towards an Information Society, produced in 1999 (the SIP) was not based in its content on the eEurope concepts,[3] although some of the principles for the EU strategy under preparation had been known in the expert circles. Essentially, the SIP focused on three areas: setting up an information environment in public administration, electronic trading, and IT education. In the same year, Act no. 106/1999 Coll. on Free Access to Information was approved based on EU requirements; it set out procedures for enforcing the right to information about the work of public administration.

The SIP was progressively followed by a number of other specialized strategic sub-documents, mostly dealing with the three above priority areas. The general nature of the SIP was to be elaborated in detail by the SIP Action Plan, setting a detailed time schedule for the tasks required to fulfil the SIP. It was approved in 2000, but the state budget for that year had not set aside the funds (in the order of hundreds of millions of CZK). The planned activities thus stagnated, because adequate funding (expected to be up to CZK 6 billion) was not earmarked for the following year either. However, the said deficiencies had been known even before the document was approved (see also Peterka, 2000).

The SIP Action Plan 2003 was supposed to resolve the situation. Again, it contained several dozen tasks, including a proposal to monitor achieved progress. However, the development of the Czech Republic's e-Government was largely assessed only as yes/no (i.e., project implemented, not implemented, or implemented with a delay or only partially) in the first years of the new millennium. The quality of the project execution was not only determined by the funding; other factors effected changes in priorities or project design. The main ones included the evolving IS/ICT, the Czech Republic's approaching accession to the EU, and a growing criticism of the still relatively centralistic approach to IS/ICT development.

The latter factor manifested itself already in 2000, when the SISA was transformed into the Public Information System Authority (the PISA). As seen in the name change, the idea of a unified and largely comprehensive and homogeneous SIS was being abandoned in favour of the idea to primarily interconnect existing public administration and self-government systems,[4] which had been established largely as isolated.

Three new acts of law thus had the most significant impact on the development of e-Government in the Czech Republic at the turn of the millennium. The first was Act no. 101/2000

[1] An example may be the attempt to employ Norwegian public administration technologies (NIT) in Bratislava, the capital of Slovakia. It became evident that the problem was not only to make a national language environment, but to adapt the transformation functionalities of the Norwegian SW (e.g., in accounting).

[2] Chiefly the multiple-stage process of approving the Committee proposals.

[3] Chiefly eEurope 2002 Action Plan, produced one year later.

[4] The abbreviation PAIS (public administration information systems) is gradually introduced for these information systems.

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Coll. on Protection of Personal Data, which defined procedures for protecting personal and sensitive data and set up the Personal Data Protection Authority. Another was Act no. 227/2000 Coll. on Electronic Signature, instituting the so-called guaranteed electronic signature, which is the only one legitimately acceptable in communication with public authorities; the third was Act no. 365/2000 Coll. on Information Systems of Public Administration, which set out rights and obligations of entities dealing with information services in public administration.

The eEurope+ 2003 was published in 2001; its significance lay in the fact that it was updated for the new candidate countries, including the Czech Republic. Although the SIP Action Plan 2003 had already been based on this European document, it was obvious that the original SIP concept had become obsolete.

In 2002, the new government's agenda declaration contained a requirement to join the PISA with some powers of the Ministry of Transport and Telecommunications in the telecommunications sphere.[5] It was expected to establish a competitive environment in the area of Internet provision, thus bring down its prices. This logical requirement led to the establishment of a separate Ministry of Information (the MI) as of 1 January 2003. e-Government issues were thus handled at the governmental level and the former intermediaries were dropped.

The MI soon came up with a new strategic concept: the eČesko 2006 State Information and Communication Policy, combining the above mentioned powers of the new ministry in a comprehensive document. It was also a follow-up on eEurope 2005. The main objectives of eČesko included increased accessibility of the Internet, expansion of broadband connections, expansion of public on-line services, progressively improving information literacy, and supporting electronic trade. The document also contained evident decentralization tendencies, with the state to mostly assume an initiator's role rather than conducting its own investment projects.

While the MI existed, Act no. 480/2004 Coll. on Certain Information Society Services was approved[6]; it mostly defined rights and obligations of Internet provides concerning the content of services provided. The above acts of law underwent multiple amendments in the following years, and bills for several other acts were drawn, but were not passed while the MI existed. The criticism of the government's undue involvement in the PAIS was constantly growing, particularly among liberal politicians.

The pressure culminated in the dissolution of the MI in 2007. Its powers were largely transferred to the Ministry of the Interior. A Government Council for Information Society was set up as an advisory body of the Government. Among other things, the Council presents the Government with materials on information society and elaborates strategic papers in the area of e-Government. By taking this step, the discussion of the development of e-Government has virtually reverted to the situation prior to the turn of the millennium in organizational terms. There are also certain limitations to the Council's powers. The Council is "merely" appointed by the Government (see also Peterka, 2008), whereas the Ministry of the Interior has its co-ordination powers defined directly by law.[7]

[5] Including the long-postponed privatization of Czech Telecom.

[6] Promoted mostly as the Antispam Act in various media, which was somewhat misleading concerning its purpose.

[7] Various e-Government experts (members of eStat or Professor Smejkal) have deemed the Council redundant because of that, because the Government Council powers are severely limited.

The next e-Government policy, confessing to so-called Smart Administration, established the Strategy on Developing Services for Information Society (the Strategy), which was approved by the Government Council only (not the Government itself) in 2008.[8] It contains a laconic list of issues that require attention in 2008-2012, without the opportunity to exactly verify any achievements. The goal of the Strategy is to make the Czech Republic one of the EU's five most advanced countries in terms of e-Government. However, it is not clear when and how any potential success or failure should be assessed (as pointed out by, e.g., Jirkovský, 2008). The main message of the Strategy can thus be seen in that "information society… can only arise from the free initiative of citizens and businesses", and the Strategy itself therefore only concerns the "strategy for developing services for information society" (see Rada vlády pro informační společnost, 2008).

Two more important acts of law were passed at the end of the decade. The first was Act no. 300/2008 Coll. on Electronic Acts and Authorized Document Conversion, introducing a new method of electronic delivery using so-called data boxes[9] and instituting authorized conversion, which is the conversion of a document from its paper form to the electronic form (and vice versa), while the conversion output has the same legal significance as the converted document. The other important act was Act no. 111/2009 Coll. on Basic Registers, defining the content of the four most important databases in public administration and setting out procedures for data sharing among various public authorities.

In spite of the changes in e-Government management, we now have a number of crucial acts of law that should enable further development in the area and so rank the Czech Republic among advanced EU countries as concerns the use of IS/ICT. According to the above mentioned Strategy, the legislative process is essentially complete after the last acts of law have been passed; only certain specialized applications remain to be made (e.g., for healthcare and social welfare), and the digitization of the data base has to be completed.

Barriers to assessing the successfulness of e-Government in the Czech Republic

It follows from the above that besides political and other factors, the development of e-Government in the Czech Republic has been significantly affected by the method of assessing achievements. Numerous activities are still mostly evaluated verbally. As e.g. Jirkovský (2008) points out, in the Strategy chapter on assessing the success of the Czech Republic's e-Government, "the points listed here can only be assessed locally and most likely in the form of a public survey"[10]. Even the proposed "success check points" (such as the existence of data boxes and public administration

[8] Although the Opening Word is signed by the then Prime Minister. Nevertheless, the full wording of the Strategy is not included on the website of the ministry in charge of e-Government: Ministry of the Interior (January 2011).

[9] Let us note that the Czech Republic is not the only country in Central Europe with legalized delivery to data boxes. A similar system has existed in Austria since January 2009. Unlike the Czech system of data boxes set up exclusively by the State, Austria has a dual system of electronic delivery. Data boxes set up by the State and those operated by private providers exist in parallel (Ščerba, 2009). A similar delivery system is under intense preparation in Germany. There, data boxes should be set up by commercial providers meeting accreditation requirements. The new delivery system is expected to be launched in the course of 2011, if the Bundestag approves the government bill known as the De-Mail-Gesetz (Die Beauftragte der Bundesregierung für Informationstechnik, 2010).

[10] For example, this allows us to find out whether the population trusts more communicating with public administration on-line or via paper letters.

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contact points[11]) do not guarantee by themselves that the degree of successfulness can be quantified.

One of the points made when assessing the successfulness of the Strategy is whether the introduction of e-Government has resulted in a significant cost reduction. However, a method for assessing this potential saving is lacking, as is a time frame for such assessment; it is a fact that such studies have not been made in the country[12].

When assessing the implementation of the constituent e-Government projects, therefore, one has to measure the degree of achievement of their various component goals. Let us start from the below general theses known in management:

- If the management is capable of measuring the progress of fulfilling component goals, it can correct its future course of action based on such information.
- What cannot be measured cannot be managed (Deming, 2000).

So-called metrics can be used for measuring the partial progress. The term *metric* refers to an exactly defined indicator, or assessment criterion, used for evaluating the effectiveness in a specific area of management and its support with IS/ICT (Učeň, 2001). A near synonym to the term metric – indicator – is also used.

Literature agrees that when choosing metrics, one has to look for such indicators that can be measured exactly – so-called hard metrics – or at least determined with a qualified guess – so-called soft metrics (Molnár, 2000). Jung and Kim (2004) describe an alternative classification of metrics, speaking of internal and external metrics. An external metric refers to an indicator that measures a property outside the information system that can be influenced by the IS/ICT. As a rule, an external metric can be measured exactly (total transportation costs, profit from a certain deal). Conversely, internal metrics describe a property of the information system itself, such as its quality, reliability, and conformity to technical standards (Xenos, 2006). Some internal metrics are directly measurable and can be measured more or less exactly (wrong order ratio); some are only measurable by means of a detailed analysis (the IS either conforms to a technical standard or it does not).

It follows from the definition that metrics should be recruited among indicators the value of which has a significant impact on an important activity of the organization (Earl, 1993). Typical examples of metrics used in companies include the trends in profit, turnover, market share, and production factor productivity (Lockemann et al., 1983). Industrial operations measure additional indicators such as raw material consumption, stock level, reject ratio (Fenton, Pfleeger, 1997), or indicators expressing the quality of computerized logistics, such as truck load ratio, mileage travelled, and total transportation costs (Böhnlein et al., 2002).

The purpose of metrics is to compare the values of indicators before significant changes to an information system are made with values identified after the implementation of a new information system, or after deployment of new functionalities (Xenos, 2006). Metric values are periodically compared and the differences in the readings form the basis for partial conclusions about the performance of the implementation processes and benefits of new IS/ICT.

Indicator values may be affected by a great number of factors, some of which originate in the deployment of a new information system (influence of competition, oscillation in supply and demand, changing legislation). One therefore has to choose such indicators that are related to the IS/ICT project assessed and can be expected to show a causality between the deployment of IS/ICT and the gradual changes in the indicator values (Lockemann et al., 1983).

When defining metrics for assessing e-Government projects, one has to focus primarily on metrics required by top management, which are able to measure so-called critical success factors (Boynton, Zmud, 1984). The metrics chosen would incur nearly zero costs of measurements, because almost all the required data are available from databases operated by the central public administration bodies. The weakness, on the other hand, consists in the fact that measurable indicators are difficult to find for some important factors. What is more, it is difficult to find a reliable causality between the values of some metrics and their influence on the success of the related project (Mertens et al., 1987).

Indicators measured by expert estimate and some logical (yes/no) indicators may also be interpreted ambiguously. Another problem in public administration is that inputs (typically money) and outputs frequently cannot be expressed in identical units (Hendrych, 2003). Admittedly, some indicators concerning costs can be converted by attempting to appraise the financial benefits of more accurate information, but subjective estimates will generate inaccuracy (Dohnal, Pour, 1997). Another problem is that the costs may not belong to the same time period as the achieved results (Hendrych, 2003).

When assessing the successfulness of e-Government, the assessment method has to be both as exact as possible and relatively simple, therefore transparent. This is appropriate especially in cases where the final metric assessment is intended for the lay public with the aim to win its trust in introducing new IS/ICT.

To illustrate some of the difficulties arising from the metrics used, we select three e-Government activities that have occurred in the Czech Republic in the recent years:

- *Prevalence of broadband Internet* connection in public administration as well as the private sector and households. The measurement employed a simple criterion: the number of Internet connections conforming to the definition of broadband.
- *Electronic income reports as part of tax declaration and income reports to* pension scheme authorities: the extent of the service was measured primarily by the number of forms submitted electronically and the ratio of electronically submitted forms to the total number of completed forms of a certain type.
- With *deliveries via data boxes*, the situation was more complicated; we primarily established indicators allowing mutual comparison of efficiency of deliveries via letter mail and the newly introduced procedures for electronic deliveries to data boxes (see the conclusion of Chapter Three).

First, we list some of the problems when assessing the interpretation of the successfulness of e-Government inferred by analyzing the indicators of *prevalence of broad-*

[11] Public administration contact points (so-called Czech POINTs) are another e-Government project. Each contact point provides authenticated statements from various official registers, accepts submissions to public authorities, and does authorized document conversion. The contact point network is very dense: the number of Czech POINTs has exceeded the number of municipalities in the Czech Republic since late 2010. Statistics are available at: <http://www.czechpoint.cz/web/index.php?q=node/488>.

[12] It is generally believed that E-Government should besides direct cost reduction also produce positive externalities. However it is questionable if these externalities do not affect agents assymetrically (Čadil 2005).

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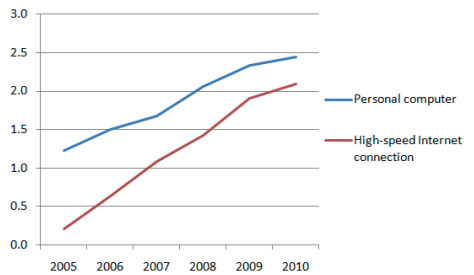
band connection in the Czech Republic's households in dependence on households being equipped with a PC; see Table 1 and Chart 1.

Table 1 – Possession of information technologies (thousands of households)

	2005	2006	2007	2008	2009	2010
Czech Republic's households with a computer	1,231.8	1,499.4	1,678.0	2,059.5	2,334.7	2,442.4
Czech Republic's households with high-speed Internet	208.1	636.3	1,082.4	1,429.4	1,911.6	2,098.3

Source: Czech Statistical Office (2011) and own treatment

Chart 1 – Possession of information technologies (thousands of households)



Source: Czech Statistical Office (2011) and own treatment

As Telecom had been sold to Spanish Telefónica already in 2004, the figures easily permit deducing a hypothesis that the importance of the privatization is overrated. Another possibility is that the privatization did have a significant impact on the competitive environment, thus Internet prices, but with a lag of some 2 years.

Combining the data for high-speed Internet connections in households with the data for their computer possession, it is obvious that the scissors between households with a computer without broadband connection and with it are progressively closing, attesting to a rather significant impact of the privatization on the process, particularly between 2006 and 2009.

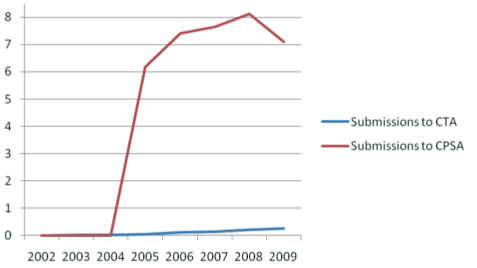
Between 2009 and 2010, however, there was a noticeable stagnation in the growth of household broadband connection. An explanation offers itself in the form of external factors: repercussions of the global crisis. However, such a statement would require support with additional data (such as reduced household incomes in 2009 and 2010, increasing household savings, etc.). Another possible factor may be the saturation of the household demand for broadband Internet (in 2010), which would be an internal factor indicating success of the Czech Republic's e-Government strategy.

Further combinations would therefore allow us to verify which factors of the expansion of broadband connection in households were a consequence of e-Government projects (e.g., expanding supply of e-Government services, effect of privatization of Telecom), and which were due to external factors (e.g., household demand for other Internet services, Internet connection price trend, IT becoming cheaper on global markets). Naturally, this renders the assessment substantially more complex, time consuming, and ultimately less transparent. The reason is that factors convenient for confirming the potential assessor's hypotheses can be combined at will.

Admittedly, assessment of the chosen metric (prevalence of broadband in households) is also complicated due to methodological problems. For instance, they include differing definitions of broadband[13], and differing methods of obtaining these indicators, which often lead to different entities arriving at different results (for more, see Peterka, 2007).

Another e-Government process that we assessed was *electronic submissions* to tax authorities and pension scheme authorities. The trend in the numbers of electronic submissions can be seen in Table 2.

Chart 2 – Numbers of electronic submissions to Czech Tax Authority – CTA and Czech Pension Scheme Authority – CPSA (in millions)



Source: Czech Tax Authority (2008, 2010), Czech Pension Scheme Authority (2003–2010).

It can be inferred from the table that the numbers of submissions to the CTA increase by approx. 30-50% each year compared to the previous year. The reasons may be both the increasing possession of IS/ICT in households (see Chart 1) and companies, and the progressively growing offer of electronic submissions to the CTA.

A much more interesting finding is that the CTA has so far received about 50× fewer electronically completed forms than the CPSA (see Chart 2), although the CTA has a three years' head start. In 2009, the last documented year, there were about 0.025 electronic submissions to the CTA and 0.677 to the CPSA per capita in the Czech Republic. Yet, the two services are comparable in terms of the numbers of entities for which forms are submitted. Moreover, the legislation allows users in both cases to choose whether to complete the form manually or electronically, so the user chooses the alternative that suits the user personally better.

[13] The Czech Statistical Office defines high-speed Internet as connection with at least 144 kbps, whereas the MI's eČesko 2006 defines broadband as connection with at least 256 kbps.

Table 2 – Numbers of electronic submissions to Czech Tax Authority – CTA and Czech Pension Scheme Authority – CPSA

	2002	2003	2004	2005	2006	2007	2008	2009	Total
Submissions to CTA	311	7.018	20.205	48.978	102.866	147.269	198.962	262.049	787.658
Submissions to CPSA	0	0	0	6.184.686	7.398.786	7.645.441	8.117.114	7.104.532	36.440.559

Source: Czech Tax Authority (2008, 2010), Czech Pension Scheme Authority (2003–2010).

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A more detailed analysis of the differences allows us to infer why CPSA services are much more successful in the indicator of numbers of electronically submitted forms. The advantage of the electronic submission to the CPSA consists in completing a simple, very concise form that requires no annexes, is modest both financially and technically, and the related agenda is not punctuated with too frequent changes in legal regulation, which would force the software producer to make fundamental changes in the applications for communication with the public authority several times a year (Rieger, 2010).

The comparison of two similar electronic submission services leads to a conclusion that the Czech Tax Authority should think about possible modifications to its electronic submissions (e.g., consider making the forms or the administrative procedures simpler). Failing that, investment in similar applications will only have a little effect on development of e-Government, and will probably incur costs instead of bringing time and money savings. It remains a question whether the success of electronically submitted forms to the CPSA is due to the developing e-Government (thus its success) or whether the conciseness of its forms is predetermined by the pension scheme agenda being simpler from the start.

Classification of metrics for assessing e-Government

For each metric, one has to consider whether the aim is to maximize or minimize the indicator value. In some metrics, there is a clear effort to minimize it (number of days required for handling an administrative act as an indicator of the promptness of public administration) or maximize it (information system availability in % of working hours). In some cases, it cannot be clearly determined whether the goal of public administration is to increase or decrease the indicator value (for instance, the indicator of numbers of trade licences issued), which is why a third category of metrics ought to be introduced in addition to maximization or minimization metrics: informative ones.

Summing up the metrics proposed in the various parts of our analysis, they can be divided into several groups. As in every artificial classification, some of them may belong to multiple groups at the same time:

- Volume metrics (e.g., number of authorized conversion, number of statements of a certain type issued, number of data messages sent): these are mostly metrics used to inform about the use rate of a service, and the goal will usually not be to maximize the value. Only where it is established that the unit costs decrease with the volume metric increasing (Lechner, 2007)[14], it would be a goal to maximize the indicator value. This may apply to the number of electronically signed messages sent via the electronic mail office (the costs being much lower than for any letter), or the number of users of a service (pension insurance registration sheets).
- Metrics for measuring error (information system availability, number of database queries not served): the purpose of these metrics is to evaluate error statuses. Values measured should serve above all persons responsible for systems integration and sometimes also top managers (especially where errors or information system breakdowns are too frequent, as they may put the entire public administration of data boxes or basic registers out of operation if the breakdown occurs during working hours).
- Quality metrics (e.g., IS conformity to technical standards): in many cases, the metric is not directly measurable and can only be measures by attestation or other detailed examination.
- Temporal metrics (e.g., number of working days required for registering a free trade in the trade register, number of days required for registration in the cadastre): as a rule, the goal of temporal metrics will be to minimize the value.
- Cost metrics (e.g., total costs of deliveries in the electronic and paper forms, unit costs of sending one data message, costs of providing e-Government services): here, the goal is to minimize the metric, but especially when determining the total costs of using IS/ICT, it may not be easy to pair the costs with a particular e-Government project (data boxes, public administration contact points, basic registers). The reason is that the procured hardware, software, costs of Internet connection, energies, office supplies, etc., are not used for a single e-Government project exclusively, but for all of them at once. Moreover, some of the costs mentioned (computer procurement, Internet connection) would exist regardless of the existence or non-existence of a specific e-Government service.

We can conclude that in many cases, the interpretation of the benefits of metrics to e-Government will not be quite clear. Even for such an easily interpreted metric as the average number of working days required for registering a free trade in the trade register, it is apparently clear that the goal of public administration is to minimize the indicator. However, if a comparison of the indicator in a time series identifies a noticeable decrease approximately starting from the moment of increased electronization of the process (e.g., electronic application for a criminal record statement), it is nearly impossible to determine what proportion of the change in the indicator is caused by the direct effect of the electronization, and how much of it is due to other factors (changing legal regulation, promptness of particular officials).

The interpretation comes up against the problem that the investment in e-Government in expressed in monetary units, whereas the improvement in the relevant administrative procedure is expressed in days. Therefore, the input and output are not in the same units, which is a typical problem when assessing the efficiency of public administration (Hendrych, 2003).

When assessing the successfulness of e-Government services, we therefore recommend combining the cost-effectiveness concept with the goal-result concept, as does Gerloch (Gerloch, 2005). Most of the proposed metrics are used for assessing a specific process within public administration (time required for handling an act, proportion of deliveries made fictitiously[15]); this is therefore a predominantly goal-result concept. If the metric value develops in the desired sense after the e-Government service is implemented (less time required for handling an

[14] Based on an examination of electronic mail rooms, Lechner concludes that the postage savings cannot cover the increased costs of purchasing and operating the IS/ICT if the volume of electronic communication is low. Only when electronic messages substitute for more letters in the paper form (at least 3-4 messages a day), do the postage savings become noticeable and it is economically more appropriate to handle letters electronically.

[15] The Czech Republic's legal system permits some letters to be deemed delivered based on a legal delivery fiction. This may occur with some types of letters if their storage period expires and they return to the sending body without the addressee becoming familiar with the contents. It is clear from the description that this is not the desired condition, which is why the goal is to minimize the metric value.

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act, lower proportion of deliveries made fictitiously[16]), the goal is being achieved from the goal-result perspective.

A different approach is needed if a specific public administration electronization project only incurs investment costs and does not result in any improved goal-result indicators. That would indicate an inefficient project, and its undesirable results would have to be subjected to detailed scrutiny at the top management level in public administration.

It is not customary in the Czech Republic for public administration bodies to quantify the benefits of projects and savings due to them during the implementation of e-Government projects. It is often so with the justification that efficiency in public administration can only be measured with a high inaccuracy. However, some studies confirm that savings achieved can be measured. An example may be a comparison of all the costs of accepting and dispatching a letter in the paper form and in the electronic form. By reflecting the costs of postage, time costs of SPAM sorting, and consumption of materials used in the mail rooms (paper, stationery vs. HW and SW equipment), the minimum required volume of communication for which it is more efficient to send letter electronically can be determined (Lechner, 2007). Another study confirms that when data on expenditures by public authorities are readily available, the financial saving arising from deliveries to data boxes can be evaluated. In the first 2 months of the operation of data boxes, various public administration bodies have cut their postage costs by approximately one fifth (Rieger, 2010). However, if we add the costs of operating the data box information system (fees for data messages sent plus a flat rate of CZK 15 million per month), the sum of the fees for the data box operation added and the postage costs will exceed the price of postage prior to the introduction of the data boxes. A similar measurement can be performed in early 2011, when the latest data on public budget expenditures are published. Only then will we be able to infer more reliably whether the operation of data boxes really leads to public budget savings.

CONCLUSION

The nearly twenty years of development of e-Government in the Czech Republic has been accompanied by numerous problems. These were mostly the political and economic fluctuations, which affected changing priorities and goals in the area of IS/ICT introduction and methods of achieving them. They ranged from a centralistic effort to set up a comprehensive and compact SIS, where the state would bear the main investment costs, to the currently preferred relatively liberal attitude. The state provides a conceptual and legislative environment above all, or only deals with selected spheres of the data base and infrastructure.

Unfortunately, minimal attention has been paid to inspection and assessment of the achievements throughout the period. They were made in a non-systemic fashion, and the prevalent evaluation was verbal with a high degree of subjectivity.

The Czech Statistical Office and several other institutions have begun to monitor certain indicators of IS/ICT development. Some of the indicators may be misleading, however, and may allow ambiguous interpretation. First of all, this is due to the methodological approaches, including definitions[17], examination methods, choice of respondent samples, etc. This results in ambiguity in comparisons of measurement results for different entities, incl. international comparisons.

Nevertheless, the assessment should be not only objective, thus as exact as possible, but also adequately simple, thus transparent. This may be achieved by selecting indicators, so-called metrics. In the ideal case, metric calculations make use of data generated in the database during the information system operation (e.g., the total number of data messages sent within a database can be used to deduce the costs of operating the data box information system). The advantage of this approach to metrics is nearly zero costs of the measurement. Compared to common data collection methods (e.g., questionnaire surveys), the indicators can be measured at virtually any time as needed. Moreover, such data will not be encumbered with respondents' subjective estimates, the lengthy questionnaire collection and interpretation will be eliminated, and quite accurate values will be achieved for most of the defined metrics.

The paper focuses on issues of assessing the success of e-Government development and its potential benefits to various entities. It asks what effect the various factors have on the trend of a given metric. The same indicator can be affected by various factors, only some of which are caused by the e-Government activities. The trend is affected by numerous additional external factors (external to e-Government), and some of those can be very significant, even decisive, in certain periods. The assessment of trends in household broadband connections and increasing numbers of tax returns are examples of this.

The issues of efficiency of financial resources (which can usually be traced) and their rate of return (for which insufficient data are available) are a specific problem. A meaningful solution is to assess the operating savings in the selected area of IS/ICT introduced. The examples of electronic delivery quoted in the paper demonstrate that the savings (or losses) can be monetarized and that their timely (ex-ante) quantification would make it possible to optimize the operation of the service in question. In the case quoted, it would be a more appropriate monthly flat rate so that the data box operation would entail financial savings.

It has to be said that the social, thus political, demand for such assessment is not very high in the Czech Republic. This results in disagreement concerning the introduction of some e-Government services (e.g., data boxes) and, more importantly, a virtually non-existent central database of information which could be used for making the assessment. Experts have to confine their assessment to existing data, or conduct their own surveys. Such research is capacity-demanding, as was in our case when measuring the potential postage savings following the introduction of the data boxes. Verifying Solow's paradox that "you can see the computer age everywhere but in the productivity statistics" (Solow, 1987) would be a difficult feat indeed in this type of environment.

[16] According to a Czech Post press release, approximately 96.6% of data messages were delivered by acceptance as of 20 Dec 2010 (Česká pošta, 2010). If only 3.4% of the data messages are delivered fictitiously, the delivery via data boxes would be about 10 times more successful in this metric than delivery of paper letters. For more, see http://www.ceskaposta.cz/cz/aktualne/tiskove-zpravy/2010/mate-pocit--ze-datove-schranky-pracuji-pomalu--datove-schranky-nove-poskytuji-informace-o-svem-vytizeni--id32127/.

[17] In addition to the differing definitions of broadband capacity, we must understand that the declared Internet connection speed may decrease by several orders in reality.

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