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Optimizing of Information Systems in Companies: Support of Sustainable Performance

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Abstract

The company's strategic management should be able to identify areas of its activities with the lowest efficiency and look for ways of correcting these and of keeping the company sustainably successful. In practice, this issue is very often supported by optimizing the corporate information system. Therefore, the strategic management of a company should devote considerable attention to the implementation, expert guidance and development of its information system in a broader context, especially in terms of supporting its sustainable corporate performance. Currently these questions are coming to the forefront and are being widely discussed. This paper points out the possibilities of identifying information system weaknesses and the assessment of its balance as a whole. This has proven to be an important source of the measurement of its effectiveness and efficiency. Furthermore, the paper presents the distribution of the balance levels of the company's information systems measured by the HOS method, due to their number of employees, and it presents a comparison of this distribution in two time periods. The results are the currently selected outputs of a research sample of companies acquired through the Zefis portal.

Introduction

Every organization uses information and communication technologies (ICT) – obviously so as a result of the current fast development. According to (Hřebíček, & Kubásek, 2011) nowadays, information systems are implemented in connection with more and more enterprise activities. They are related not only to the company's

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economic growth, but also to the environment, social responsibility and corporate governance. Many advanced value indicators associated with the success of the company have been defined; for example, the Economic Value Added, the Market Value Added, etc. In the last years, the Sustainable Value Added (Figge, & Hahn, 2004; 2005) plays a very important role. It links to the corporate performance sustainability, and generally, it contributes to sustainable development by the *Brundtland Report*, the United Nations World Commission on Environment and Development (1987); further this concept was supported by the United Nations Conference on Environment and Development (1992) in Rio de Janeiro; the United Nations World Summit on Sustainable Development: RIO+10 (2002) in Johannesburg; the United Nations Conference on Sustainable Development: RIO+20 (2012) in Rio de Janeiro. The concept of sustainability is an important asset towards all stakeholders of every company. By (Katiliūtė, Daunorienė, & Katkutė, 2014) also: "*Higher Education Institutions play a key role in building more sustainable societies and creating new paradigms. As educational institutions, they are responsible for promoting sustainability issues through research and teaching, disseminating new knowledge and building capabilities.*" The company's strategic management should be able to identify areas with the lowest efficiency and look for ways of correctly maintaining the company sustainable successful. Currently in practice, this area is very often supported by the quality of corporate information system (IS). The company's strategic management should devote considerable attention to the implementation, expert guidance and development of IS that would support its sustainable corporate performance. It should continuously measure its own effectiveness and efficiency. Inefficient IS can result in failure. Sustainable performance assessment should be a challenge and an inspiration for appropriate corporate IS innovations. Since the second half of the last century, when ICT has increasingly permeated into the business and production environment, many experts have been dealing with the assessment of efficiency or effectiveness of company IS and with aspects which determining it and contributing to the improvement of assessment, measurement. In (Koch, & Chvatalova, 2014) in the literature review section there is mention of some of them, e.g., (Pather, Erwin, & Remenyi, 2003), whose considerations are related to the economic aspect; (Scott, 1995) points out that companies are frequently very sensitive to the confidentiality of their data and that this has to be reflected in the evaluation. Further, (Hwang, 2011) in his paper develops a practical model of information behavior for providing the fundamental determinants of acquiring information on the workers' performance. (Denzer, 2015) deals with topics in environmental software systems. (Roberts, & Cheeseman, 2015) analyze the performance assessment of the information systems dealing with natural prediction and simulation, etc. Among Czech experts who deal with IS economic efficiency, we mention (Maryška, 2007; Chocholatý 2007), more in (Koch, & Chvátalová, 2014). (Chvátalová, Hřebíček, & Trenz, 2015) in the context of environmental issues, and (Koch, & Chvátalová, 2013; 2014; Chvátalová & Koch, 2013; 2014) presenting results related to the Zefis environmental research web portal; Koch, at the Brno University of Technology (Czech Republic), teaches students about applications, respectively modifications of the HOS method, for use in practice for primary IS evaluation, e.g., Neuwirth, (2010).

1. Selected Results of Research

1.1. The HOS Method - Assessment of the Information System and Company Size

The HOS method takes eight components into account: *hardware* (o1), *software* (o2), *orgware* (o3), *peopleware* (o4), *dataware* (o5), *customers* (o6), *suppliers* (o7), *management IS* (o8). (In the new concept, the HOS method evaluation has been enriched by a separate IS security assessment.) Thus, each one of the eight components is evaluated at the scale in the interval <0; 4> (the higher the number, the better the component evaluation). For each component's level evaluation, we take advantage of a given number of assessment criteria (questionnaire questions) or an expert review (their formulation is related to the examination of the most frequent weaknesses of the monitored components). In using the HOS method, we differentiate: *the overall level* (as the level of the lowest component assessment); *the recommended level* (based on the importance of the IS for the company). Further, we define levels of IS balance: *the balanced IS* - all components have the same rating, or a maximum of three of them are evaluate differently, but each possesses no more than one evaluation point on the value scale in the comparison with the overall level; *the unbalanced IS* has more than three components differing in their assessments of the overall level, but each possesses no more than one evaluation point on the scale of values in the comparison with the overall level; *the heavily unbalanced IS*, whose one or more components exceeds the overall level

assessment more than one evaluation point on the scale of values in the comparison with the overall level. More in detail on this subject in (Koch, & Chvátalová, 2013; Chvátalová, & Koch, 2014; Chvátalová, & Koch, 2013a). The HOS method leads us to the conclusion that we should strive for an IS balance with the goal of achieving the minimum possible costs and the maximum benefit. In our research using the Zefis portal we have evaluated the level of IS balance as caused by the company's size (i.e., to the number of employees). We have created seven categories (also for possibly comparing the results with general statistics, for optimizing IS in companies, etc.). Let us call these categories: (A), (B), (C), (D), (E), (F), (G). They are shown with the calculations of the average value of evaluations of IS components for all these categories, see Tab. 1.

Table 1. Evaluation of IS components by company size (Source: Authors´ elaboration according to (Zefis, 2015))

Number (employees)		Number (companies)	Hardware o1	Software o2	Orgware o3	Peopleware o4	Dataware o5	Customers 6	Suppliers o7	Management o8
<10	(A)	176	2,85	3,07	2,34	2,75	2,81	2,64	2,72	2,74
10-49	(B)	240	2,94	3,11	2,75	2,90	3,07	2,81	2,89	2,95
50-99	(C)	97	3,12	3,11	2,98	2,97	3,14	2,84	2,97	3,10
100-199	(D)	91	3,16	3,22	3,04	2,99	3,34	2,91	2,92	3,05
200-499	(E)	72	3,00	3,21	3,01	2,94	3,18	2,83	2,97	3,10
500-999	(F)	49	3,14	3,20	3,24	3,20	3,41	3,00	3,08	3,16
≥1000	(G)	99	3,18	3,17	3,33	3,15	3,43	3,10	2,99	3,35

Selected results: It has been observed that companies, whose number of employees is less than 10 show the lowest IS components ratings. Companies over 500 employees have the highest score in the IS components evaluation. This is to be expected, because large companies a have greater ability to invest in IS quality. The greatest attention is likely to be devoted to *software* for all company types. It can be explained by the rapid development of ICT and their innovation needs, regardless of company size. Also, *dataware*, *hardware* and *IS management* (with the exception of the smallest firms) are assessed as significant for company performance. In these companies, we can assume a greater respect for the environment and for corporate governance. The areas of *suppliers* and *customers* are evaluated less as well; it is only with companies employing over 500 people where assessment increases. We can explain this by the fact that large companies are more sophisticated in communication with the external environment. Human factors (*peopleware*), except in the case of companies with a staff of over 500, are expected to be variable, and one that the level of IS in companies most often lower. It's about the level of computer literacy of users and their duties and the responsibility related to the IS level of computer literacy of users and their duties and responsibility related to company IS. *Orgware* (i.e., the rules for the operation of information systems, recommended operating procedures, security rules, etc.) increases their quality with an increase in the number of employees in companies.

1.2. The Balance of the Information System and the Size of the Company

In the next step in our research, we follow upon the earlier mapped representation of the balanced/unbalanced and heavily unbalanced IS with regard to company size. This has been, among other, mentioned in a modified form (with the category distinction based on the Czech Statistical Office (CSO), (Chvátalová, & Koch, 2013). Let us first remind ourselves of the situation in 2013 on Fig. 1 (modified in accord with the new outputs).
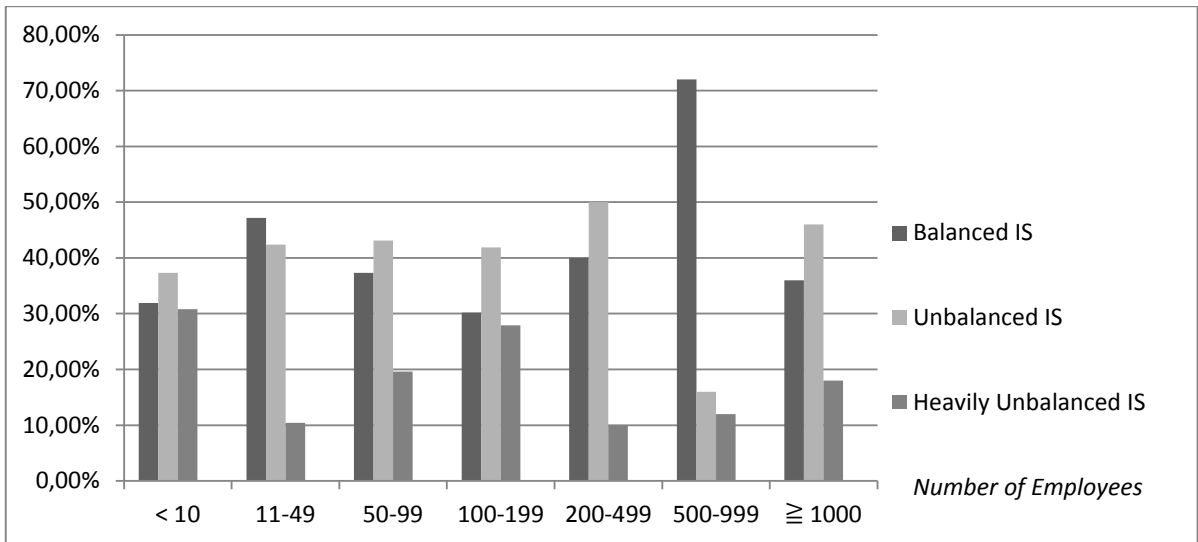
Fig. 1. Evaluation of level IS balance by company size (Source: Authors´ elaboration according to (Zefis, 2013))

Fig. 2 presents the newest 2015 results. For the visualization option and for the comparison of 2013 outputs (with the respondents sample amounting to 425) with the present 2015 outputs (with the respondents sample amounting to 824) we list the corresponding numerical outputs in percentages.
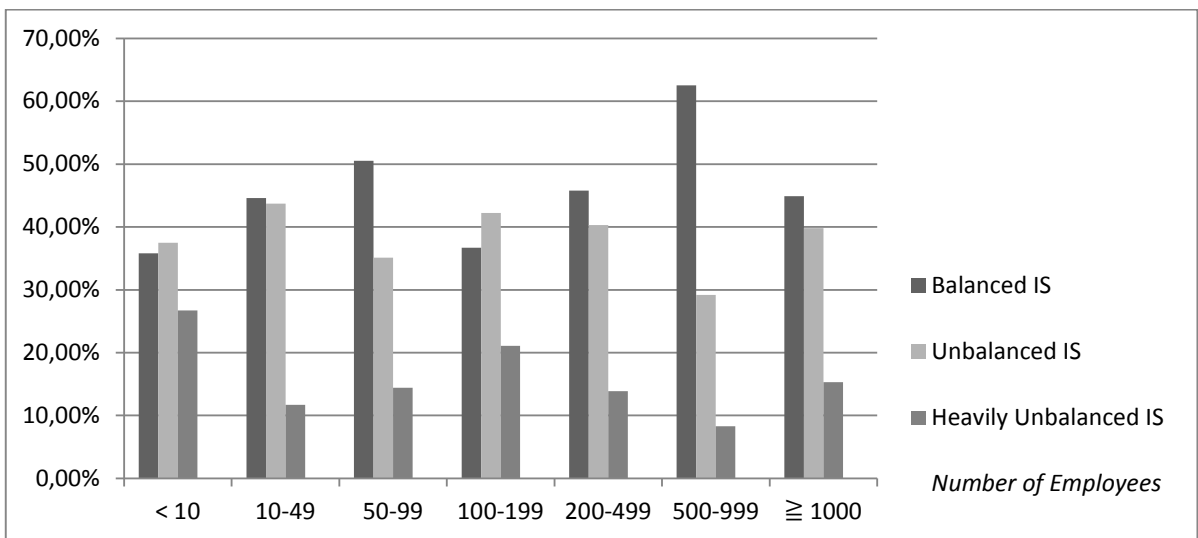

Fig. 2. Evaluation of level IS balance by company size (Source: Authors´ elaboration according to (Zefis, 2015))

Selected results: We can see that with categories (A), (B), (D) the 2015 models approximately copy the models from preceding 2013 research. It is necessary to point out that in the (D) category the balanced IS' state has improved, unfavourably for the heavily unbalanced ISs; like in 2015, however, the unbalanced systems dominate, even though the balanced IS' state has improved. In the (F) category the number of balanced ISs has increased unfavourably for the unbalanced ISs. The (C), (E) and (G) categories are showing worse results, due to the fact that the balance ratios have changed unfavourably for the balanced ISs, which have topped the unbalanced ISs. In long

term perspective, the small companies display the least favourable outputs. This is probably caused by the fact that in these companies, there are other factors that play an important role and that have connection with the small number of employees. Large companies (with the exception of the (F) category) show less favourable results in the 2015 research, compared with 2013. This can be attributed to possible abrupt qualitative changes, which influence IS balance as a whole. In this respect, frequent legislature changes can have an effect, because the company might be exposed to fairly large company processes turbulences.

Note: The research presents further detailed analyses of vertical changes, qualitative management action, etc., which are not listed, given the scope of this article.

Conclusions

The evaluation of the IS (which appears in a whole spectrum of company activities) as a whole plays an important part in company health, prestige, good name and competition. In this sense corporate performance sustainability equals an important advantage – due to the fact that IS quality in a company influences its environmental behaviour, economical performance, social environment quality as well as corporate governance. The effort of company IS optimization speaks about the systematic rules improvement and guidelines and a permanent effort of the management to improve the company processes functioning. This evidently supports sustainable development.

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