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ECONOMIC CRISIS AND IT STRATEGIES OF ENTERPRISES IN POLAND. RESULTS OF A SURVEY WITH A FOCUS ON POLISH SME SECTOR

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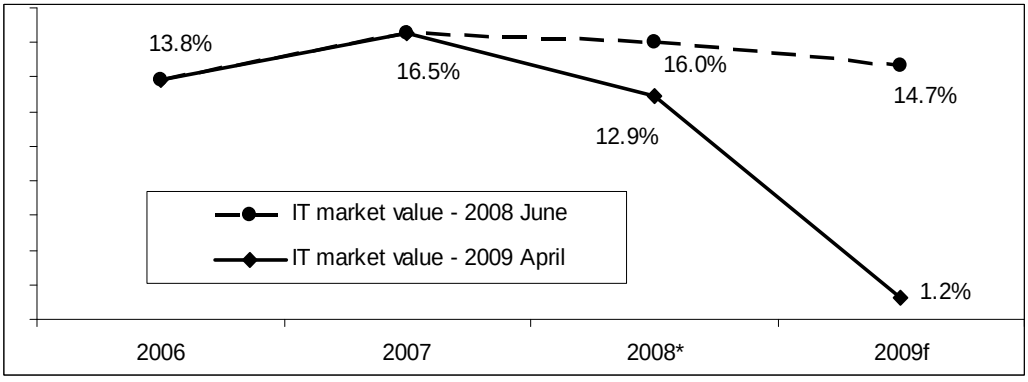
ABSTRACT
The paper discusses results of a survey – carried out in 2009 – which aimed at analysing how the recent economic crisis affected IT strategies of Polish small and medium sized enterprises (SMEs). The special attention is paid to SMEs, due to their importance to the Polish economy. The initial part presents assumptions for the research project. It is followed by multidimensional statistical analysis of 78 collected sets of data (each comprising: 38 characteristics describing how the crisis affected IT strategies and what changes in strategies were adopted, and 6 features of the surveyed objects). The results are presented in the following sequence. In the beginning it is examined whether, and – if yes – to what extent, companies modified their IT strategies and IT projects – firstly, within groups distinguished by size, and secondly, at certain IT levels. Subsequently, it is analysed how changes in economic situation of companies influenced their IT strategies and ongoing IT projects. Finally, the most important symptoms of changes in IT strategies are detected and depicted in reference to the whole SME cluster and to those objects only where IT strategies were changed. The results obtained support a working hypothesis that the economic crisis affected – to smaller or greater extent – short- and long-range IT strategies in the majority of SMEs. Visible signs of that situations include: decreasing budgets and employment in IT departments, limited spendings on IT investments, reduced scopes of ongoing projects, postponed or suspended IT investments, abandoned investment plans, or substantial cuts in seminars and trainings related to information technology.
Keywords: economic crisis, Polish SME sector, multidimensional statistical analysis, IT strategies, survey results

1. INTRODUCTION

The global financial crisis, which has affected the Polish economy since the second half of 2008, resulted in deteriorating economic situation in majority of companies. Evidence was provided by: current business statistics, economic and social analyses, or monitoring of changes in the economy. Implications of the crisis were observed in information technology domain, too. Clear signals came from producers and providers of IT products and services, as well as from their customers. They were also acknowledged by nearly all the major companies monitoring IT industry in Central and Eastern European countries, including: DiS, Gartner, Forrester Research, IDG or PMR, which issued revised market forecasts in the first half of 2009. The report of PMR, entitled "Revision of forecasts for IT markets in Poland, Russia and Ukraine" [4], may serve as an example here (see Figure 1).



* - forecast estimate respectively f - forecast

Figure 1. Year-on-year rate of change of IT market value in Poland (%), according to PMR data and forecasts as of June 2008 and April 2009 (based on [4, p. 4]).

In order to gather more information on the discussed subject, the author of this paper carried out a survey in April and May 2009. It was designed to assess an impact of the economic crisis on informatization strategies and IT projects in selected companies. The survey followed the author's main research projects, including analytical and diagnostic studies on: current status and changes in Polish IT project management practices, IT projects assessment (with focus on effectiveness), or key success factors for IT projects. Research methodology, data collected and results obtained were presented at numerous specialised, nationwide and international conferences. They were published in several papers and research reports as well (see for example [1], [2] and [3]).

This paper presents various data breakdowns and analyses which help to assess an impact of the economic crisis on informatization strategies. The attention will be paid to small and medium sized enterprises (SME's) in particular – due to their importance to the Polish economy.

2. ASSUMPTIONS FOR THE STUDY

The selection of the study area stems from the author's conviction that awareness of ways in which business organisations respond to the economic crisis (with the focus on IT-related activities) is important in order to counteract effects of the crisis more effectively. Such knowledge should enable the IT industry to get back on track of dynamic growth observed in recent years (see Figure 1) much quicker, which is essential when considering long-range strategies for developing e-society and e-economy in Poland. For the author – an academic – the information collected, beside its cognitive and utilisable aspects, has a certain educational value (both in didactic and in advisory or consulting activities).

The study has an interregional reach, and reflects situation of companies located mostly in Warsaw/Mazovia or in Wroclaw/Lower Silesia. The survey was carried out by students of postgraduate managerial programme "IT Projects Management" at the Faculty of Management of the Warsaw University, and by part-time master-level students of Information Technology and Econometrics at the Faculty of Management, Computer Science and Finance of the Wroclaw University of Economics.

The study was carried out in April/May 2009 – as already mentioned in the introduction. The selection of that period resulted from the author's conviction – substantiated by other sources – that at that time forecasts drawn up at the turn of 2008 and 2009 were modified, and already incorporated information on crisis development, figures from financial statements of 2008 and data from closing reports for the first quarter of 2009. The companies reflected newest data in their strategies, including those from IT area, by either sticking to or modifying prior plans (see for example [4], [5], [6], [7] and [8]).

The overall number of collected – and duly filled in – questionnaires amounted to 139; 52 were delivered by students from Warsaw, and 87 by students from Wroclaw. As mentioned in the introduction, the importance of SME's to the Polish economy was a decisive factor for paying closer attention to this group in this paper. Due to the substantial share of SME's in the surveyed group (78 out of 139, i.e. 56.12%), a selection of this subset for further analysis was not only possible but also statistically valid. Even though the composition of the sample did not reflect the structure of the Polish economy, a variance for the SME cluster was much lower than in case of large and the largest companies.

All questionnaires formed a repository comprising in each case: 38 quantitative and qualitative characteristics, describing how the economic crisis affected IT strategies and what changes in strategies were adopted, 6 descriptive and typological features of the surveyed objects, and 5 other, which helped to verify collected data (including sources of information). The repository was stored and preceded in two formats: primarily as workbooks of Statistica, and secondly as MS Excel files. Since the repository contains data on a very diverse group of companies, a detailed presentation of the group is required. Detailed information on the repository and numerous analyses were published in several papers and research reports (see for example [3]).

3. ASSESSING INFLUENCE OF THE ECONOMIC CRISIS ON INFORMATISATION STRATEGIES OF POLISH SMALL AND MEDIUM SIZED COMPANIES

3.1. General characteristics of the surveyed objects

Before results of the study are discussed, the surveyed companies will be presented in brief. The Table 1 shows a breakdown of examined objects by areas of their operations (sectors and subsectors). It includes: number of objects in particular clusters, importance of clusters in the whole sample, and dominating values (cells shaded in grey).

Table 1. Structure of the surveyed SME's by sector and subsector

Sector/subsector	number	%
public (administration and services)	5	6.41
banking, finance, insurance	2	2.56
commerce (commodity trade)	16	20.51
industry	8	10.26
other sectors, with following subsectors:	47	60.26
ICT companies (software houses, IT providers, telecommunication etc.)	33	70.21
consulting and services (accounting, legal etc.)	7	14.89
other subsectors (transport, geodesy, architecture, agriculture, vindication)	7	14.89

The information presented in Table 1 requires short comment. The author is aware that the sample reflects neither sector- nor subsector-related profiles of the Polish economy. Considering areas of operation, the category "other" prevails, what was a consequence of professional profiles of students who carried out the survey. The data in Table 2 shows high informatization level for the SME sector (70.51% of objects selected the answers: "high" or "very high"). Nevertheless, this level is slightly lower than the one for the whole sample. The assessment presented in Table 3 shows, in turn, that the economic crisis affected SME sector less severely than large and the largest companies (55.13% of SME's indicated "slight" or "substantial" deterioration here, with 62.30% share for large and the largest companies).

Table 2. Size and an informatization level of the surveyed SME's

Informatization level	Object size						Total	
	micro		small		medium			
	number	%	number	%	number	%	number	%
very low (< 30%)	1	1.28	0	0.00	0	0.00	1	1.28
low (≥ 30%)	1	1.28	0	0.00	0	0.00	1	1.28
some (≥ 45%)	1	1.28	4	5.13	1	1.28	6	7.69
medium (≥ 60%)	1	1.28	5	6.41	9	11.54	15	19.23
high (≥ 75%)	5	6.41	4	5.13	12	15.38	21	26.92
very high (≥ 90%)	7	8.97	15	19.23	12	15.38	34	43.59
Total	16	20.51	28	35.90	34	43.59	78	100.00

Table 3. Size and influence of the crisis on economic situation of SME's

Influence of the crisis on economic situation of an object	Object size						Total	
	micro		small		medium			
	number	%	number	%	number	%	number	%
it is much worse	2	2.56	1	1.28	3	3.85	6	7.69
it is slightly worse	10	12.82	11	14.10	16	20.51	37	47.44
nothing has changed	2	2.56	12	15.38	12	15.38	26	33.33
it is slightly better	2	2.56	4	5.13	3	3.85	9	11.54
Total	16	20.51	28	35.90	34	43.59	78	100.00

Having considered the basic characteristics of SME's, for which data were collected, the following part of the paper will analyse influence of the economic crisis on IT strategies.

3.2. Assessing influence of the economic crisis on IT strategies

Taking into account additional information on the surveyed SME's, it may be examined whether, and – if yes – to what extent, the companies have modified their informatization strategies and IT projects – firstly, within groups distinguished by size (Table 4), and secondly, at certain informatization levels (Table 5). Subsequently, it will be analysed in which ways changes in economic situation of companies influenced their informatization strategies and ongoing IT projects (Table 6). Finally, the most important symptoms of changes in informatization strategies will be identified and depicted in reference to the whole SME cluster and to those objects only where IT strategies were modified (Table 7).

Table 4. Influence of the crisis on IT strategies in the surveyed SME's according to their sizes.

Influence of the crisis on informatisation strategies and projects	Object size						Total	
	micro		small		medium			
	number	%	number	%	number	%	number	%
no change	6	7.69	12	15.38	8	10.26	26	33.33
slight change	9	11.54	15	19.23	23	29.49	47	60.26
radical change	1	1.28	1	1.28	3	3.85	5	6.41
Total	16	20.51	28	35.90	34	43.59	78	100.00

Table 5. Influence of the crisis on IT strategies in the SME's according to informatization levels

Informatisation level	Influence of the economic crisis on IT strategies and projects							
	no change		slight change		radical change		Total	
	number	%	number	%	number	%	number	%
very low (< 30%)	1	1.28	0	0.00	0	0.00	1	1.28
low (≥ 30%)	1	1.28	0	0.00	0	0.00	1	1.28
some (≥ 45%)	3	3.85	2	2.56	1	1.28	6	7.69
medium (≥ 60%)	4	5.13	11	14.10	0	0.00	15	19.23
high (≥ 75%)	7	8.97	13	16.67	1	1.28	21	26.92
very high (≥ 90%)	10	12.82	21	26.92	3	3.85	34	43.59
Total	26	33.33	47	60.26	5	6.41	78	100.00

Table 6. Crisis-related changes in economic situation of the SME's and their influence on informatization strategies and projects

Influence of crisis on economic situation of an object	Influence of crisis on informatization strategies and projects							
	no change		slight change		radical change		Total	
	number	%	number	%	number	%	number	%
it is much worse	1	1.28	1	1.28	4	5.13	6	7.69
it is slightly worse	7	8.97	30	38.46	0	0.00	37	47.44
nothing has changed	14	17.95	11	14.10	1	1.28	26	33.33
it is slightly better	4	5.13	5	6.41	0	0.00	9	11.54
Total	26	33.33	47	60.26	5	6.41	78	100.00

Table 7. The structure of identified symptoms of informatization strategy changes in SME sector.

Symptoms of IT strategy changes	The structure of identified symptoms of IT strategy changes [%]	
	Whole SME's group	SME's which modified their IT strategy
Budgets of IT departments were reduced	25.64	38.46
Spendings related to IT investments decreased	30.77	46.15
New projects were abandoned	11.54	17.31
Ongoing projects were halted	8.97	13.46
A scope of projects was reduced	12.82	19.23
IT investments were postponed	20.51	30.77
IT services outsourcing was intensified	5.13	5.77
IT personnel was made redundant	21.79	30.77
Number of IT seminars and trainings dropped	23.08	34.62
IT was financed with external funds	1.28	1.92
IT costs were streamlined (using TCO)	11.54	17.31
Other	5.13	5.77

The data presented in Tables 4-7 requires explanation. First of all, the study showing that 66.67% of the surveyed objects adjusted their informatization strategy and IT projects due to the crisis (60.26% slightly, and 6.41% in a radical way) supports results of similar analyses carried out in Poland in 2009. For example, the study conducted by IDG in March [6] showed that 63.16% of the polled companies were of the opinion that the crises would influence IT industry. The report of PMR issued in April [4] stated that 76% of IT managers found acute worsening of economic situation in Poland and in the world the major restraint to increase of the local IT market, whereas 88% believed that some segments of the market would negatively respond to the crisis.

Secondly, small and medium sized companies modified their informatization strategies and IT projects in result of the crisis more often than other surveyed objects (66.67% for SME's, with 63.31% for the whole sample and 59.02% for large/largest companies). Adjustments were introduced by medium sized companies the most frequently (in 76.47% of cases).

Thirdly, the crises affected informatization strategies and IT projects of the companies characterised by higher informatization levels more often than in case of other objects (see shaded range in Table 5). These changes were usually "slight", though.

Fourthly, for SME's – like for other surveyed objects – a correlation between magnitude of changes in economic situation and modifications in informatization strategies and IT projects was detected (see shaded cells in Table 6). With regard to data depicted in Table 7, it should be noticed that the surveyed SME's declared the following symptoms of informatization strategy changes the most frequently (in over 20% of cases):

- decreasing spending on IT investments (30.77% of questionnaires),
- reduced budgets of IT departments (25.64%),
- reduced number of IT seminars and trainings (23.08%),
- redundancies in IT personnel (21.79%),
- postponed IT investments (20.51%).

The results obtained for these SME's which declared changes in their IT strategies were similar, and differed only – what is obvious – in percentage levels (see third column in Table 7). It must be added that both lists differ – in their composition, order and percentage levels – from those referring to the whole analysed group of surveyed companies [3]. Among SME's which modified their informatization strategies the most significant decreases were observed in:

- IT investment budgets (57.69% of answers indicated "decrease" or "substantial decrease"),
- equipment purchases for IT departments (55.77%),
- current spending on IT (51.92%).

Just as for the whole surveyed group, only in case of own IT projects a noticeable growth could be observed (23.08% of answers indicated "increase" or "substantial increase"). In other areas such indications did not exceed 10%-level. Considering IT applications affected by changes in informatization strategies the most noticeable decreases, for the SME's which modified their IT strategies, were observed in the following domains:

- purchases, stock management and supply chain management – that is in case of SCM applications (28.85% of answers indicated "decrease" or "substantial decrease"),
- information systems – that is in case of MIS/EIS software (25%), as well as in sales/distribution (23.08%).

The biggest growth was observed in case of marketing information systems of CRM class (21.15% of answers indicated "increase" or "substantial increase") and in case of MIS/EIS applications (17.31%) – located among most negatively affected areas, too. This leads to a conclusion that in times of crisis small and medium sized companies had to face a dilemma whether they should cancel or intensify such projects.

3. CONCLUSIONS

The results of the analysis of data collected in the survey, with a focus on an impact of the economic crisis on IT strategies, enable to formulate the following conclusions.

Firstly, the results supported a working hypothesis that the economic crises did affect, to smaller or greater extent, long- and short-term informatization strategies in most of the examined objects. Observed modifications in IT strategies (in 63.31% of all the surveyed objects, in 66.67% of SME's, and in 59.02% of large and the largest companies) are the most evident indicator for this situation. In majority, though, the adjustments had a limited scope. The answer "there was a slight change in the informatization strategy" was chosen by 87.50% of the surveyed objects, including 90.38% of SME's and 83.33% of large and the largest companies, which declared modifications in their informatization strategies. The obtained results indicated that SME's responded to the crises by redefining activities in the IT area quicker and to the larger extent than other objects, which is typical for this sector.

Secondly, the observed frequency and magnitude of changes in IT strategies was – as expected – correlated with informatization level, in reference both to the whole sample and to the SME sector (see Table 4). The major symptoms of IT strategy and projects modifications were similar for both groups. They included (see Table 7):

- reduced scope of IT seminars and trainings (by 33.09% for the whole surveyed group and by only 21.79% for the SME sector – where this was a fourth top signal),
- decreasing spending on IT investments (30.94% and 30.77% respectively),
- reduced budgets of IT departments (25.90% and 25.64% respectively),
- postponed IT investments (20.86% and 20.51% respectively).

Two important differences between the entire sample and the SME subset were observed, though. Redundancies in IT personnel, common for the SME's (23.08% of answers – third position), were less relevant for the whole sample (15.83% and 5th-6th position). On the other hand, IT cost streamlining, important for the entire group, and even more in case of large and the largest companies (15.83% and 5th-6th position) was not so common among SME's (11.54% and 7th-8th position). Thirdly, restricting analysis to those objects only which modified their informatization strategies due to the crisis, the most important decreases – in quantitative and monetary terms – were observed in:

- IT investment budgets (61.36% of answers indicated "decrease" or "substantial decrease" for the entire group, and 57.69% in the SME sector),
- equipment purchases for IT departments (53.51% and 55.77% respectively),
- current spending on IT (51.14% and 51.92% respectively).

The difference can be observed in reference to IT seminars and trainings, where substantial decrease in the whole group (59.09% – second position), and even more rapid decline among large and the largest enterprises, was less relevant for the SME sector (40.38%, which is less significant than

"equipment purchases for end-users", equal to 42.31%). Lower expenses of the SME sector related to seminars and trainings, even in times of prosperity, account for that difference.

The fourth conclusion is that own projects carried out by IT departments were the only area of growth (in other domains a 10%-level was not exceeded), where 20.45% of all the surveyed objects and 23.08% of the SME's indicated "increase" or even "substantial increase". This means that companies looking for cost cuts resigned, to some extent, from offers of external consultants and decided to continue key projects with their own resources.

Finally, considering applications of information technologies affected by changes in informatisation strategies, the most important modifications – in those objects which decided to verify their IT policy – included:

- purchases, stock management and supply chain management – and consequently SCM applications (34.09% of answers indicated "decrease" or "substantial decrease" for the whole group, and 28.85% in the SME sector)
- information systems – that is in case of MIS/EIS applications (26.14% and 25.00% respectively).

The latter group was the one which experienced the biggest growth (15.91% of answers indicated "increase" or "substantial increase" for the whole group, and 17.31% in the SME sector). The second area of increase in number of projects and spending included marketing information systems of CRM type (increase of 14.77% in the entire group, and 20.15% in the SME sector). This situation suggests that despite crisis companies debated whether they should abandon or intensify such projects.

The author believes that by observing behaviour of companies and their responses to the economic crisis in IT domain, the following two objectives were achieved. On the one hand, the findings presented in other reports and analyses were confirmed and supplemented. On the other – due to evidence gathered – negative consequences of crisis in IT area may be effectively counterbalanced. All these should, at least indirectly, help in achieving goals of long-range strategies for developing e-society and e-commerce in Poland, both more effectively and much quicker.

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