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## **The Significance of Information and Communication Technologies in the Development of the Strategic Advantage of SMEs in South-Eastern Poland**

### INTRODUCTION

Contemporary economy is based on the principles of cooperation and inter-organisational connections which developed in the process of competing, leading to the creation of economic “organisms” based on the principles of trust, cooperation of economic entities, created in the context of reduction of costs and risk and increase of competitiveness of entities operating within the system. Gaining competitive advantage in such conditions and reduction of risk is most of all related to the capability to absorb information and communication technologies possessed by entities and their conscious application. This is forced by the exchange of resources such as information (development of a system supporting the process of exchange of information), providing the ability to react quickly to changes appearing in the environment of the organisation, which might bear negative economic consequences for a single entity [Cravens and Piercy, 1994]. This process is particularly important in the context of globalising markets, diffusion of information and communication technologies and development of advantage in these conditions allowing for communication between the participants of interorganisational structures and implementation of strategic principles [Scott et al., 2008, p. 3; Cravens et al., 1996].

### RESEARCH PROCESS

The research was performed based on analysis of information originating from literature sources and a questionnaire was used as a research tool. It is

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worth mentioning that foreign literature was *inter alia* obtained from non-serial publications and electronic databases such as EBSCO [full-text databases: Academic Search Complete; Business Source Complete; Regional Business News; Ebrary, Springer]. The stage of literature selection included the use of keywords for the assigned collection of texts and the collection of texts was supplemented according to the “snowball” procedure [Czakon, 2013, pp. 54–55]. The research questions developed on the basis of studies of literature were presented on a (7-point) Likert scale [Likert, 1932; Singh et al., 1990] constituting a range of equivalent items forming indicators of the measured one-dimensional latent trait. Next, a focused individual interview was conducted with the management staff working in the SME sector in the business lines selected for the research (aviation, automotive industry, informatics). Analysis of the collected material allowed for even better adjustment of questions in the questionnaire by means of survey research and measurement of Cronbach's alpha scale reliability coefficient [Czakon, 2011, p. 113]. Pilot studies (forming a part of research conducted in the cross-border areas) were conducted among the SME managers and owners with the use of the method of direct interview and CAWI – computer assisted web interviewing (the structure of studied entities is illustrated by Table 1). The aim of the research was to characterise the process of adaptation of enterprises to changeable conditions of the environment. This process is to a large extent related to the utilisation of the IT potential of the enterprise in the context of adaptation and increase of competitiveness. The operational database of the survey was constructed on the basis of the REGON (Polish National Business Registry Number) database with the use of delimitation method prepared by the Regional Statistical Office in Rzeszów. The study utilises statistical descriptive methods in the process of characterisation of variables.

#### RESOURCE DETERMINANTS FOR ESTABLISHING ADVANTAGE

Competition is a significant tool and an essential dimension of economic life. The term derives from the word “compete” and means “to seek together” [Rosłanowska-Plichcińska and Jarośniński, 1996, p. 13]. Competition is equated with rivalry, and is also recognised as the source of motivation and creativity for people in every sphere of life [Rosłanowska-Plichcińska and Jarośniński, 1996, pp. 133–134]. The resource approach is an internal-external concept, as it primarily focuses on the resources of an organisation and secondly assesses the activities in the environment of the enterprise. Therefore, development of competitiveness of an economic entity is doubtlessly related to the necessity of identifying resources in the organisation and shaping them in an appropriate manner. A major role in the activities is played by allocation of resources in an enterprise and their development with regard to creation of key competences. Deliberation

of strategic options and selection of an appropriate strategy by an economic entity obliges it to set on managing its resources in order to reinforce its distinctive capabilities or key competences. Owing to such an approach, one can indicate competitive position of an enterprise on the market and introduce activities that will reinforce its long-term competitiveness [Czerniachowicz, 2012, p. 288]. Resource-based theories (RBT) originated from concepts related to the second half of the 20th century [Penrose, 1959], but the widely discussed relation between the structure of resources and competitive advantage appeared in mid-1980s [Wernerfelt, 1984; Barney, 1991; Wernerfelt, 1995]. This is when a very dynamic development of discussion on resource approach being a result of defining an enterprise as a set of different resources and competences distinguishing it from the enterprises with which it competes, which constitutes a source of advantage and the possibility of increasing competitive capability. In resource approach to the process of building competitive advantage one should take into account the characteristics of resources from the point of view of value, scarcity and the difficulty of emulation, as well as for them to significantly contribute to the improvement of situation of the enterprise in competitive space, being a significant source of value of the enterprise and growth [Lev, 2002, p. 35; Zakrzewska-Bielawska, 2013, p. 3] more in [Lev and Daum, 2004; Lev, 2004; Lev et al., 2009]. In the resource concept of building competitive advantages, the significant element are primarily the conditions facilitating the development of solutions that allow a company to compete and achieve a constant competitive advantage; the open question that arises is what allows to achieve a sustained competitive advantage and whether it is possible at all. This is particularly significant in reference to non-material resources, which differ substantially from material resources, especially in: (1) the possibility of using them in various ways, (2) the time of acquisition and accumulation, (3) the lack of depreciation in the process of their use, (4) improvement of knowledge by means of creating standards of conduct in the process of development of advantage of the organisation [Obłój, 2001, p. 222]:

#### ADAPTABILITY OF ENTERPRISES

Adaptation is always related to creative problem solving; leaders of changes make continued success-marked transformation in the nature of relation between the environment and organisation. However, one should distinguish “some” change in an organisation itself and an adaptive change being a result of adjustment processes [Glover et al., 2002, p. 19]. The process of the effective learning of an organisation seems necessary. Therefore, one should characterise the phenomenon of accommodation and assimilation, and in particular the process of learning through assimilation (passive learning, e.g. from books, where the

meaning of information obtained in the process of learning is recognised and remembered) and accommodation (causing deep internal change of beliefs) widely described in the literature [Piaget, 1971; Inhelder et al., 1976, pp. 19–21] it is even more significant in building trans-cultural competences of development of organisation at a time of change [Glover and Friedman, 2014].

Adaptive capabilities of an economic organisation are characterised by adaptive cycle, perceived from the point of view of strategy, structure and process. In the literature on the subject we can find many supporters of the view characterising the perspective of strategic choice, mainly conditioned by environmental elements, which determine the structure and processes.

Of course, there are multiple key variables taken into account in this context and they can be categorised in main groups related to: (1) the entrepreneurial problems – determined mainly in organisations with a very quick growth rate or newly created ones, where the key issue is to characterise their product or service and to select the target market, (2) the engineering problems – these are directly related to development of a system as support (operationalisation of management processes) to a solution of problems related to the selected product and market. The key issue is production and distribution of goods in the most effective manner, (3) administrative problems – the main assumption concerns the reduction of uncertainties in the created organisational system, rationalisation and stabilisation of activities in the organisation that were efficient in solving problems related to the selection of the implemented value (product/service) as well as technical, systemic determinants. It should be emphasised that these activities should ensure the possibility of evolution of the organisation by means of implementation of innovative solutions.

The key problem, which is solved by means of the characterised administration system, is maintaining control over the organisation and making sure that all the activities are characterised by the hallmarks of effectiveness. The typology of the applied strategy assumed dividing them into several main groups: (1) the defenders – maintenance of a stable organisation in a changeable environment, which occurs by means of solving problems concerning the market and the product. This can be done by means of adjustment of the size of production (e.g. short runs) to a very narrowly defined segment of the entire potential market. Such type of strategy assumes that it is possible by means of investing in a technical system, as well as implementing highly effective technology in the context of production and distribution of products. The second type of applied strategy are (2) the prospectors – this approach is very different from the one characterised earlier, as main emphasis is put on finding and using new products and opportunities created by the market (innovative approach). The main problem to solve in the context of selecting the market and product is defined within the scope of the identification and use of new opportunities. On the other hand, in the technical context there is avoidance of long-term obligations related to single

technological processes and coordination of multiple diversified operations. (3) The analysers – the third type of organisations is based on research, it is an indirect link between organisations referred to as defenders and prospectors and it aims to utilise the real capabilities, minimising the risk and maximising the possibility of gaining profit. The main problem is the placement of a new product on the market with simultaneous care for the traditional product and market. The essential issue from the point of administration is to diversify the structure of organisation and processes with the aim of the implementation of constant and dynamic planes of operation. It is also worth mentioning that one more strategic approach characteristic has been defined, (4) the reactors, using models, patterns of regulation in order to adapt to the environment that is incoherent and unstable, this is often related to a late, inappropriate reaction to changes in the environment, it is a “fragmentary” strategy remaining after failed implementation of the three previous ones [Miles et al., 1978, pp. 548–558].

#### STRATEGIC ADVANTAGE AND INFORMATION AND COMMUNICATION TECHNOLOGIES

Development of information and communication technologies (ICT) bears influence on the increase of gross domestic product (GDP). Studies concerning this issue initiated in the second half of the 1990s emphasised the increase of labour productivity; attention was also drawn to the meaning of ICT in the industry, on macro- and micro-scale. The subject of also included the contribution of ICT to the convergence of developing and developed countries [Piatkowski, 2006]. With the development of technology, labour efficiency (productivity) increases, as a result of which the efficiency of management processes rises, the measure of which is productivity. Source literature characterises positive influence of ICT on a strong increase in profits and economic development of developed countries [Oliner and Sichel, 2002; OECD, 2005, pp. 15–17]. On the other hand, developing countries (transition economies) are characterised by a significantly lower rate of return of capital invested in ICT solutions [Dewan and Kramer, 2000], [Pohjola et al., 2001]. By means of increasing efficiency of information processes, appropriate knowledge resources play a special role in the process of adaptation to the changes of competitive environment. Increasing capability of an enterprise within the scope of adaptiveness and innovativeness of companies preconditions survival on the market and gaining competitive advantage.

The occurring technical revolution significantly accelerates technological changes in the context of the increasing significance of knowledge and processes resulting from sharing and acquiring information. This is favoured by globalisation processes related to global economic development and establishment of alliances, as well as the liberalisation of developing countries [Hitt and He,

2008]. This leads to the establishment of a new landscape of (post-modern) competition increasing strategic discontinuity and imbalance, blurring of boundaries between the sectors, hyper-competitive markets and extreme emphasis on the price and quality in the process of satisfying the needs of customers, as well as emphasis on innovations and learning processes. From the internal perspective of an organisation, this process is characterised by change in dynamics of careers and expectations of employees [Hitt et al., 1998, pp. 23–25]. Emphasis on such type of conditions is justified from the point of view of development of appropriate relationship marketing within the enterprise, on one hand directed at motivation and satisfaction of employees, and on the other at raising awareness of the role of the client in the process of development of organisational culture [Wierzbiński, 2012, p. 385]. A network of links created that way consists of a system of nodes and links between them. These nodes can include companies, departments, people, principles, machines and knowledge hubs [Iacobucci, 1998, p. 11]. The development of a post-industrial society and competition processes is predetermined by the development of methods of communication, which determines the socio-economic processes of exchange and also bears influence on creating knowledge, nature of work and involvement [Artandi, 1982, p. 302]. Furthermore, information and theoretical knowledge are a strategic resource of an organisation with certain significant dimensions [Bell, 1980, pp. 500–501]:

- Change of philosophy from production of goods to services,
- Centralised knowledge codification method,
- Establishment of new intellectual technology

The increasingly fast popularisation of technological developments led to an increase in the significance of quality features of work, that is the human capital accumulated in a form of knowledge (a new theory of value has been formulated, based on knowledge, skills derived from experience, motivation to innovation, discoveries of science and empirical studies. The trends observed in practice indicate that presently economic development (development of technology coincides with socio-economic development) [Bell, 1973, p. 190] is most of all determined by human and real capital [Woźniak, 2004, p. 23].

Modern approach to enterprise management requires using current information on the resources of the organisation, environment and competition in the sector in order to make optimised decisions. These needs have become a base for the development of the first IT systems supporting the process of the fulfilment of economic objectives [Śmigielska, 2013, p. 54]. This is related to innovative activity in enterprises, from product, organisational and process innovations to marketing innovations [Wierzbinski, 2012]. Modern enterprises cannot survive on the market without an efficiently operating information system used to acquire and disseminate information in an economic organisation. This is possible by means of development of information and communication technologies, which grants new possibilities of information development and innovative sup-

port via the Internet [Levy and Powell, 2005, p. 37]. Information is a strategic resource for a company and this is why IT is so important in an enterprise, due to support for implementation of strategy and the process of competition [Sandhu and Gunasekaran, 2010, p. 773]. At the same time, the role of organisational identity, shaping processes related to ICT in an organisation, should also be emphasised [Tyworth, 2014, p. 75]. In the modern economic conditions, a significant role is played by intellectual capital of an enterprise, consisting of information resources and non-material resources related to people and organisational culture (skills). The value of intellectual capital of an enterprise is equally dependant on uniqueness and value of information resources and the ability to involve people, their intellectual potential and the method of motivation. The elements of intellectual capital in an enterprise are formed by data, information, knowledge and wisdom. Proper management of these elements in an enterprise allows to gain advantage in terms of innovation, but also in the field of reputation, structure and architecture of the company, that is all the elements which create additional values forming a source of competitive advantage. It is particularly important to utilise the available “soft” resources in the context of SMEs, which mainly differ from large enterprises with their specialisation – they use niches which are of low significance to large enterprises, operate mainly on the local market, are characterised by flexibility and quick reaction to changes, and have limited resources. Companies in the SME sector are characterised by diversified approach to technology, and the result is a lack of a coherent strategy for the use of information and communication technologies (ICT) in the development of strategic advantages. However, the possessed skills allow them to react to changes in business environment properly [Hoyer, 2008, pp. 48–49]. Table 1 presents the structure of examined SMEs in south-eastern Poland.

**Table 1. Structure of examined enterprises**

Employing entities	Number	Accumulated	Percentage	Accumulated
		Number		Percentage
up to 9	96	133	63.16	87.50
10-49	37	37	24.34	24.34
50-249	19	152	12.50	100.00

Source: own work based on pilot studies.

Cronbach's alfa: 0.898431 signifies good adjustment of variables characterising the capabilities of SMEs to build an IT platform allowing to achieve strategic advantage. Descriptive statistics were used to describe the phenomenon (Fig. 1). Also, hypothesis H0 is stated: regarding a lack of relation between the ability

to create an information system based on an IT platform and building strategic advantage of SMEs.

The statistical tool allowing to verify the stated conjecture regarding the relation of the studied qualities is the chi-square test of independence. The value of the calculated test statistics was Chi square = 187.9286, and test probability  $p = 0.008158$ , therefore, it can be concluded that there is a statistically significant relation between the ability to create an information system based on an IT platform and building strategic advantage of SMEs.

Variables describing the degree to which IT resources are used by SMEs were analysed (Tab. 2), and therefore the implementations of assumptions of strategies and development of competitive advantages by means of utilisation of information and communication technologies.

**Table 2. Use of information and communication technology resources by smes (n=152)**

Variable	Mean	Median	Mode	Mode Size	S.d.	CV
Automation of processes related to reduction of costs and increasing production volume	3.03	3	1	41	1.82	59.93
Application of information and communication technologies in management, accounting, reporting, planning and analysis of statistical data	3.80	4	5	32	1.67	43.87
Strategic support for entering new market (implementing new services, products)	3.26	3	1	33	1.75	53.77
Skills of employees related to IT in the enterprise	4.57	5	5	53	1.56	34.11
IT skills possessed in the company influence the quality of performed tasks	4.52	5	5	53	1.60	35.37

Source: own work based on pilot studies.

It should be noted that they belong to different planes describing the studied phenomenon, in the literature on the subject we can find the term “IT assets”, which are divided into (1) infrastructure granting the possibility of flexible base determining future activity. Another asset is (2) transactionability causing automation of processes, decreasing costs. (3) Information assets granting possibilities in the process of management, accounting, reporting, planning, analysis and data analysis. Finally, (4) strategic assets related to Information and Communi-



cation Technologies enabling support in the course of entering new markets, providing new services and products [Aral and Weill, 2007, p. 765]. Research shows that almost one third of small and medium companies on the market does not use IT services at all. This definitely more often applies to small than to medium enterprises (31% in comparison to 18% in the case of medium enterprises). The frequency of using IT services also strongly depends on the income of a company – in a group of companies with the highest income – over PLN 50 million – almost 100% of companies used IT services in 2009, whereas in the group of companies with income of up to PLN 2 million – only two-third did so. Installation, technical support and maintenance of equipment and software are most often selected external IT services used by the Polish SMEs (Raport, n.d.).

Analysis of the findings allows us to state that the skills of employees that are significant to the SME owners and managers are those related to information and communication technologies in an enterprise (mean 4.57; SD 1.56) and IT skills possessed in the company influence the quality of performed tasks (mean 4.52; SD 1.59), these skills, related to mastering information and communication technologies in SMEs, are of crucial importance in the process of implementation of strategies and in the improvement of competitive position. According to the owners, the ability to use information and communication technologies in management, accounting, reporting, planning and analysis of statistical data is also crucially important (mean 3.80; SD 1.67). It is different in the case of characteristics of variables concerning strategic support for entering new market (mean 3.26; SD 1.75). This can be a consequence of insufficient use of information and communication technologies in the strategic activities of an enterprise. On the other hand, the lowest significance among the analysed variables is that of automation of processes related to reduction of costs increasing production volume (mean 3.03; SD 1.81). This can indicate the limitations related to the possibility of building an IT platform in an enterprise. Possession of such a platform leads to automation of processes and reduction of costs, and also grants support during entering new markets.

## CONCLUSION

Management processes are to a large extent based on the principles of cooperation and interorganisational relations. Gaining strategic advantage in the environment of hypercompetition is most of all preconditioned by the capabilities of entities to absorb information and communication technologies, which is dictated by the need to exchange resources and adapt to changes in the environment. This forces enterprises to build IT platforms supporting the process of building strategic advantage and ensuring proper functioning in the business ecosystem. This is particularly significant from the point of view of SMEs, as one of limita-

tions to development in comparison to large enterprises with an established position on the market are very limited resources and often operating on the border of financial liquidity. In conclusion, development of an appropriate IT system being a platform for exchanging information within an enterprise by a SME allows to build strategic advantage. It should also be mentioned that, from the point of view of interorganisational relations, it should be compatible with the systems of other entities, particularly the ones the enterprise interacts with.

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### Summary

Gaining strategic advantage by SMEs is strongly associated with their absorption capacity of information technology by the entities. It is associated with activities such as exchange of resources, i.e. information, and building the system supporting the management process, which provides the capacity to quickly respond to emerging changes in the environment of the organisation. The article analyses the collected material in the context of the thesis concerning the importance of SMEs' skills and their ability to use ICT to build IT platforms in the process of developing strategic advantage in a competitive market. This study is based on resource based theory (RBT) approach related to the concept of characteristics of the endo- and exogenous determinants of development, while focusing on the resources of organisation. This process has been carried out to allow for the identification of the ability to create strategic advantage for SMEs. This is contingent on raising the efficiency of information processes in the organisation (the construction of a suitable IT platform for information exchange) and to adapt to changes in the competitive environment. Such involvement increases the potential of a company in terms of adaptability and innovation, which also allows to achieve strategic

advantage. Proper management of these components in the enterprise helps to gain advantage primarily in terms of innovation, but also in the field of reputation, structure and architecture of the company or of all the elements that create additional values, which have a source of competitive advantage. SMEs that are characterised by insufficient engagement in the IT absorption approach tend to lack a coherent development strategy and fail to use information and communication technologies (ICT) in building a strategic advantage.

*Keywords:* strategical advantage, IT resources, SME

### **Znaczenie technologii informacyjnych w budowaniu przewagi strategicznej przedsiębiorstw MSP południowo-wschodniej Polski**

#### *Streszczenie*

Uzyskanie przewagi strategicznej przez przedsiębiorstwa MSP jest w dużej mierze związane z posiadanymi zdolnościami absorpcji technologii informacyjnej przez podmioty. Jest to związane z takimi aktywnościami jak wymiana zasobów takich jak informacje oraz poprzez budowę systemu wspierającego proces gospodarowania, dający możliwość szybkiej reakcji na powstające w otoczeniu organizacji zmiany. W artykule poddano analizie zebrany materiał badaczy w kontekście postawionej tezy o znaczeniu dla przedsiębiorstw sfery MSP zdolności i umiejętności wykorzystania ICT do budowy platformy IT w kontekście budowy przewagi strategicznej na konkurencyjnym rynku przedsiębiorstw. W opracowaniu wykorzystano podejście zasobowe związane z koncepcją charakterystyki endo- oraz egzogennych uwarunkowań rozwoju, skupiające się na zasobach organizacji oraz pozwalające ocenić aktywność organizacji w jej otoczeniu. Proces ten został przeprowadzony, by możliwa była identyfikacja zdolności tworzenia przewagi strategicznej przedsiębiorstw MSP. Jest to uwarunkowane podnoszeniem sprawności procesów informacyjnych w organizacji (budowę odpowiedniej platformy informatycznej wymiany informacji) oraz dostosowywania się do zmian konkurencyjnego otoczenia. Takie zaangażowanie zwiększa możliwość przedsiębiorstwa w zakresie adaptacyjności i innowacyjności, co pozwala także osiągnąć przewagę strategiczną. Firmy sektora MSP, które charakteryzują się niewystarczającym zaangażowaniem w podejściu do absorpcji IT charakteryzują się brakiem spójnej strategii rozwoju oraz wykorzystania informacyjnej oraz komunikacyjnej technologii (ICT) w budowaniu przewag strategicznych.

*Słowa kluczowe:* przewaga strategiczna, zasoby IT, MSP

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