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Innovations within knowledge management☆

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ABSTRACT

The research aims at studying the scope of innovative knowledge management. It uses the concept of eight processes of knowledge management and identifies three broad categories of knowledge management innovations in an organizational context. It tries to verify outcomes of these innovative efforts. The research considers four aspects of organizational effectiveness: enterprise competitiveness, revenues, buyers' satisfaction, and business partners' satisfaction. The analysis covers small, medium, and large companies in Poland. The main conclusion is that studied enterprises are little innovative in the area of knowledge management.

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1. Introduction

Nowadays, it is crucial for companies to be innovative. Considering challenges they face in the knowledge economy, organizations are constantly striving to capture and secure their competitive advantage. They are balancing between formulating and implementing growth strategies and, at the same time, initiating innovative, high-risk activities. Harsh competition, changing consumer preferences, disruptive technologies, and new business models shape their environment and force them to rethink their processes and practices, including those related to knowledge management.

A company's innovative capacity is linked to the knowledge it possesses or acquires externally. Another relevant question is how innovative companies should be when designing, implementing and maintaining their knowledge management structures and systems. The gap between recognizing the need to develop knowledge management systems and the ability to generate innovations in this domain is unstudied. The type of innovations in this area may matter just as much as the companies' motivation, that is the benefits they expect to get from their innovative efforts. The paper addresses these issues in trying to figure out:

- What is the level of knowledge management innovations in the researched companies?
- What is the influence of knowledge management innovations on a company's competitiveness, revenues, its business partners' satisfaction, and its buyers' satisfaction?
- Is there a statistically relevant association between the type of knowledge management innovations (if they are organizational, social or technological) and the benefits they bring?
- What is the motivation for knowledge management innovations?

2. Theoretical framework

2.1. Diversity of innovation

Many approaches exist to defining innovation. Bogdanienko, Haffer, and Popławski (2004), DeCenzo, Robbins (Nowacki, 2010a). Amabile, Conti, Coon, Lazenby, and Herron (1996) define innovation as a creative process of devising a useful product, service or mode of action from a pure concept located within a company. According to Burnett (1953) and Damanpour (1991), anything new may be perceived as innovation, if its qualities or attributes distinguish it from its existing counterparts. An idea, approach, method, behavior, attitude and culture, technology, and capability may constitute an innovation. Here, the objective novelty is irrelevant, only the act of perception makes a difference (Kotler, 1994; Rogers, 1962). Narver and Slater (1990) and Zhou, Yim, and Tse (2005) stress the strategic potential of innovation. Drucker (1992) points to changes in product design, marketing techniques, and management methods, and Farazmand (2004) goes even further and makes direct references to knowledge management practices. He claims that innovation may reside in the knowledge that is used in a new product

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manufacturing process, and in the ways of managing and controlling networks and communities.

2.2. Knowledge management as a channel for innovation

An increasing number of companies choose to implement knowledge management strategy in the knowledge-based economy, realizing that knowledge is an important intangible resource (Skrzypek, 2004). In effect, they take on the creation of knowledge management processes which play an important role in the overall management system (Bitkowska, 2010; Drucker, 1992).

Probst, Raub, and Romhardt (2002) propose a concept of eight knowledge management processes: localizing, acquiring, developing (creating), sharing, disseminating, leveraging, and storing knowledge. They stress the linkage between internal and external processes and assume that managers know where knowledge resources lie in the organization and that every employee should be engaged in the knowledge management processes. Employees serve as transmitters of knowledge. To enable free information sharing, it is also necessary to adopt the right organizational culture and structure.

Knowledge management processes and systems should be designed to leverage the expertise of the workforce and to add new value by making people collaborate on new information, extract vital data and process it appropriately to the organizational needs. Smart processes and systems may help recognize upcoming trends, anticipate possible scenarios, reduce uncertainty, gain new skills and allies, and streamline daily operations. Having in mind these potential benefits, companies are willing to experiment with new approaches to knowledge management, such as design thinking (Beckman, & Barry, 2007; Bachnik, 2011; Bitkowska, Nowacki, & Zaleśna, 2012; Brown & Katz, 2009; Martin, 2009).

The paper focuses on efforts regarding knowledge management processes undertaken by companies in order to implement innovative solutions. For the purpose of the research, innovative knowledge management is defined as a company's willingness to introduce innovative knowledge management processes and its ability to execute this strategy.

3. Methodology

3.1. Scope of innovation and motivation

The paper discusses three broad categories of innovations within knowledge management processes. Based on an EIRMA report (1999), works of Riege (2005) and Mierzejewska (2004), and the results of a pilot study, the authors identify social, organizational and technological innovations within knowledge management. The pilot study was organized in early 2009 in order to verify working hypotheses and reveal the understanding of the concept of innovation. 50 subjects (managers) took part.

A company's innovativeness depends on whether it possesses or wants to develop three resources: human resources able to grasp and manage knowledge, effective organizational structures which support individual and group work, and technology. Accordingly, social innovations relate to employee development, knowledge sharing among employees, building organizational culture, and stimulating teamwork. Organizational innovations involve units, teams, and positions. Technological innovations deal with information systems, intranets, and web portals.

The pilot study revealed a link between innovative efforts and related expectations (expected outcomes). The subjects identified four basic effects they expected after implementing innovative knowledge management processes: enterprise competitiveness, revenues, buyers' satisfaction, and business partners' satisfaction. The motivation factor in the field of innovation is strong (Bachnik, 2010; Bos-Brouwers, 2010; Damanpour, 1991; Hurley & Hult, 1998; Talke, Salomo, & Kock, 2011; Van de Vrande, De Jong, Vanhaverbeke, & De Rochemont, 2009) and had to be included in the research.

3.2. Hypotheses

The juxtaposition of the scope of knowledge management innovations and the expected outcomes of innovative efforts leads to five hypotheses:

H1. A company's size (measured by the number of employees) is positively correlated to its innovativeness in the area of knowledge management.

H2. A company-favored type of knowledge management innovations (whether the company invests most in organizational, social or technological innovations) is positively correlated to the managers' assessments of the impact of these innovations on the company's competitiveness.

H3. A company-favored type of knowledge management innovations is positively correlated to the managers' assessments of the impact of these innovations on the company's revenues.

H4. A company-favored type of knowledge management innovations is positively correlated to the managers' assessment of the impact of these innovations on the satisfaction of the company's buyers.

H5. A company-favored type of knowledge management innovations is positively related to the managers' assessments of the impact of these innovations on the satisfaction of the company's business partners.

To verify the above hypotheses the authors use a chi-square test (χ^2) and apply Tschuprow's T to measure the association between the studied variables. The analysis applies structural indicators to reflect the percentage of enterprises which agree with certain concepts and practices. The respondents assess the impact of innovative knowledge management on the four aspects of organizational effectiveness using a 5-point scale, where 1 is very low impact and 5 is very high impact. This data is used to calculate the central tendency (weighted arithmetic average), dispersion (standard deviations), and the kurtosis and skewness (Pearson's coefficients).

3.3. Data

The stratified research sample comprises 608 randomly selected enterprises which represent every category of companies (manufacturers, service providers, trading companies, micro, small, medium, and large enterprises). Researchers conduct direct one-on-one interviews with managers of the selected companies. The interviewees answer questions about management innovations introduced by their companies, including knowledge management innovations. They identify the scope, scale, form, and effects of the innovative activities.

On verifying the hypotheses, two additional variables prove important: the company size and industry. Numerous studies show that there is no significant difference between small and large enterprises in their innovative efforts, measured by the quality of innovative solutions and their attributed importance (Van Dijk, Den Hertog, Menkenveld, Thurik, 1997). Although some researchers point out few differences arguing that innovative small businesses can gain competitive advantage over large organizations due to their flexibility and adaptability (Cao, Gedajlovic, Zhang, 2009; Ebben, Johnson, 2005; Knight & Cavusgil, 2004; Pelham, 1999). On the other hand, large companies have more resources, which means their innovative activities may have greater scope and spread (Harmancioglu, Grinstein, & Goldman, 2010). That is why the authors ensure that the sample is balanced to account for the differences between how companies in various categories think and act. The research sample consists of 270 production

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enterprises (44.4%), 170 trading companies (42.8%), and 168 service organizations (27.6%). As for their size, there are 176 microcompanies (28.9%), 152 small (25%), 154 medium (25.3%), and 126 large companies (207%). Polish Ministry of Science and Higher Education financed the research.

4. Interpretation of results

4.1. The level of knowledge management innovations in the researched organizations

Only 24.3% of the enterprises pursue knowledge management practices, and 11.3% plan to build appropriate frameworks to start applying the practices. Other organizations do not manage their knowledge resources for various reasons: They believe it is not useful, they see no chances for implementing such practices, or the top management does not know this concept. The results are quite consistent for all the industry sectors. Differences appear when looking at companies grouped by size.

The analysis of the association between innovative activity (measured by current and intended innovative projects regarding knowledge management) and the company's size suggests a statistical correlation between these variables. The finding confirms hypothesis H1. The chi-square test value is 25.399, and the value of asymptotic significance (two-sided) α does not exceed 0.05. This result allows the rejection of the null hypothesis. The percentage of enterprises which claim to be introducing knowledge management innovations increases as the number of the company employees goes up. Table 1 shows the distribution of managers' responses. Tschuprow's T equal to 0.156 suggests a weak correlation between the analyzed variables.

4.2. Motivation for introducing innovations

If only one third of companies declare to have embraced knowledge management frameworks, it is interesting to dig deeper into the reasons which made them adopt these practices in the first place. The companies do not specify a single reason. Over 40% report that they hope for higher innovativeness (45%), better cooperation with clients (42.5%), stronger competitive position (41%), and more flexibility (40%). A few less expect employee development (38%), and higher profits (35.5%). Improved marketing activities are the least important reason for focusing on knowledge management (31%).

When it comes to industry differences, service companies emphasize the connect between knowledge management and better cooperation with clients (54.5%), trading companies focus on higher profits (45.1%), whereas producers expect stronger competitive positions (44.8%) and more efficient marketing activities (37.9%).

When analyzing the results arranged by company size, none category of the respondents puts a premium on flexibility. Micro companies do not perceive higher innovativeness as a crucial factor for embracing knowledge management practices (15.6%), either. Profits (46.7%) and better relations with clients (46.7%) are their biggest motivators, though better relations with clients are assessed as the most important reason by small companies (42.9%) and the second most important reason by medium organizations (42.3%). Small companies list employee development (40%) as a sound reason to embrace knowledge management, while medium and large organizations emphasize a stronger competitive position (46.2% and 50% respectively). It seems that the companies' expectations are closely linked to their stages of development as well as typical barriers and threats associated with a company size. In Polish conditions different organizational activities come into play, when a company has secured its financial foundations.

Table 1
Verification of H1 hypothesis.
Source: Authors' research, Warsaw, 2009–2010.

		Not innovative companies	Innovative companies
Total		64.4%	35.6%
Number of employees	5–9	73.0%	27.0%
	10–49	73.0%	27.0%
	50–249	58.4%	41.6%
	250 and more	49.2%	50.8%

4.3. Three dimensions of innovations

Out of the three broad categories of knowledge management innovations, social innovations seem to be pursued most frequently. Almost 60% of the subjects point to them. The numbers of managers who mention organizational and technological innovations are about the same (46.5% and 44.8% respectively).

Social innovations have the greatest scope of all innovations introduced in the companies (according to 38.7% managers). However, more managers approve of the greater scope of technological innovations (29.6%) than social innovations (27.4%), which seems inconsistent with their perceived relevance. This finding may result from the popular opinion that technological infrastructure is priority nowadays, which justifies more emphasis on technological innovations in knowledge management. The tendency is strongest among medium-size enterprises, manufacturers and service companies.

The levels of investments in different types of innovations reflect the above insights. Financial support is the highest for social innovations, lower for technological innovations and the lowest for organizational initiatives. Managers seem convinced that organizational transformations would follow the social and technological changes: It is enough to ignite social and technological innovations and they will spread across organizational structures. Trading enterprises invest in social innovations much more than production and service companies do. It makes sense as their core operations hang on relational bonds and their market success depends, to a great extent, on their employees. Therefore investments in a desired organizational culture may pay off well. Technological innovations, on the other hand, may give production and service organizations a greater advantage, which is the main reason why they direct their attention and money there.

4.4. Knowledge management processes

More than half of the surveyed companies implement innovations regarding three knowledge management processes: acquiring, leveraging and sharing. Definitely fewer choose innovations in developing and creating knowledge (31.7%), storing it (24.8%), disseminating (21.3%) and localizing (14.3%). As for the scope of innovative efforts and level of investments, managers give the localization of knowledge top priority. 27% view the process of knowledge localizing as the most extensive and complex, and 22.2% as the most expensive.

The industry does not seem to influence the companies' innovativeness in the area of knowledge management. The most important insights are:

- Production companies less frequently implement innovations in developing and creating knowledge and spend less on localizing knowledge.
- Trading companies more frequently invest in innovations in sharing and disseminating knowledge and prefer a wider scope of knowledge acquisition.
- More service companies pursue innovations in developing and creating knowledge; they prefer a smaller scope of knowledge acquisition, and put less emphasis on acquiring, developing, and creating knowledge than on localizing.

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4.5. Four business outcomes

The research reveals that managers do pursue knowledge management innovations. They recognize the positive influence of innovations on all four elements of organizational effectiveness: enterprise competitiveness, revenues, buyers' satisfaction, and business partners' satisfaction (Table 2). They assess the impact on the competitiveness highest (3.41), and the impact on revenues lowest (3.20).

The standard deviation, which shows how much the assessments by individual managers differ from the average, ranges from 1.04 (impact on competitiveness) to 1.10 (impact on buyers' satisfaction).

The kurtosis for all four aspects of organizational effectiveness is negative, which means a small concentration of results around the mean. The distribution of the results is the flattest for the revenues (kurtosis minus 1.134), and the sharpest for business partners' satisfaction (kurtosis minus 0.879).

The analysis of Pearson's coefficient of skewness shows that the skew is negative (the results are skewed to the left) for all four elements of the organizational effectiveness or close to zero (the skew for the company competitiveness is minus 0.375). Generally speaking, it means that the assessments of the majority of companies fall below the mode.

The researchers do not find any significant deviations of the mean values of the assessments in cross-sectional studies. The biggest difference between averages is:

- 0.18 among the assessments of the impact on business partners' satisfaction across industries.
- 0.37 among the assessments of the impact on buyers' satisfaction across company groups organized according to the size.

The diversity of standard deviations in the individual sections of the cross-sectional studies is relatively small and of little importance. Notice the high kurtosis when subjects assess the impact that knowledge management innovations exert on the competitiveness of service companies (minus 0.338) and on the satisfaction of business partners of trading companies (minus 0.378). In both cases, the kurtosis suggests a relatively high concentration of assessments. Small companies (with 10–49 people) show a weak positive skew (to the right) equal to 0.114.

The chi-square test enables verification of the H2–H5 hypotheses (Table 3). The chi-square[2] test value is 17.257 (for the impact of innovative knowledge management on the level of enterprise competitiveness), 17.617 (for the impact on the revenues), 17.922 (for the impact on the buyers' satisfaction) and 18.321 (for the impact on the business partners' satisfaction). The asymptotic significance (two-sided) α does not exceed the assumed level of 0.05. These results allow the rejection of the null hypothesis and to confirm the H2–H5 hypotheses.

The analysis of Tschuprow's T shows a weak association between the variables. The measure ranges from 0.197 (the association between the type of knowledge management innovations and the enterprise competitiveness) to 0.203 (the association between the type of knowledge management innovations and the business partners' satisfaction).

5. Conclusions

It is not enough for a company to embrace knowledge management frameworks or tools if it wants to reap ongoing benefits. Business environment is too volatile and disruptive; customers are too hesitant and willing to switch between providers when the purchase experience does not satisfy them; competitors eagerly leverage first-mover advantages and exploit their rivals' mistakes. All these circumstances force companies to think outside the box and look for improved or even innovative solutions that will guarantee them superior results, if only for some time. This truth applies to knowledge management as well.

Table 2
Benefits of introducing knowledge management innovations.
Source: Authors' research, Warsaw, 2009–2010.

The innovation influences		Enterprise competitiveness				Revenues				Buyers' satisfaction				Business partners' satisfaction			
		Average	Standard deviation	Kurtosis	Pearson's coefficient	Average	Standard deviation	Kurtosis	Pearson's coefficient	Average	Standard deviation	Kurtosis	Pearson's coefficient	Average	Standard deviation	Kurtosis	Pearson's coefficient
Companies total		3.41	1.04	−.991	−.375	3.20	1.09	−1.134	−.152	3.30	1.10	−1.040	−.263	3.29	1.06	−.879	−.286
Industry	Production	3.45	1.01	−1.155	−.331	3.26	1.09	−1.247	−.134	3.25	1.11	−1.161	−.247	3.28	1.10	−1.223	−.100
	Trade	3.39	1.11	−1.111	−.294	3.12	1.09	−1.172	−.014	3.41	1.13	−.774	−.415	3.41	1.05	−.378	−.519
	Services	3.43	1.01	−.338	−.677	3.25	1.08	−.884	−.347	3.31	1.08	−1.201	−.066	3.23	1.08	−.752	−.349
Number of employees	5–9	3.34	1.07	−1.092	−.244	3.15	1.21	−1.266	−.031	3.25	1.10	−1.232	−.063	3.28	1.09	−.726	−.403
	10–49	3.33	1.06	−.707	−.495	3.25	1.02	−.956	−.156	3.31	1.11	−.841	−.179	3.31	.88	−.654	.114
	50–249	3.49	1.03	−.827	−.513	3.20	1.08	−1.333	−.013	3.49	1.07	−.708	−.560	3.32	1.18	−1.017	−.245
	250 and more	3.43	1.04	−1.224	−.272	3.19	1.07	−.965	−.390	3.12	1.11	−1.169	−.185	3.27	1.04	−1.113	−.418

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Table 3
Verification of H2–H5 hypotheses.
Source: Authors' research, Warsaw, 2009–2010.

	Chi-square test: χ^2	The asymptotic significance (two-sided): p	Df	The decision by $\alpha = 0.05$	Tschuprow's T
Enterprise competitiveness	17.257	0.002	4	Discard the hypothesis of variable independence	0.197
Revenues	17.617	0.001	4	Discard the hypothesis of variable independence	0.199
Buyers' satisfaction	17.922	0.001	4	Discard the hypothesis of variable independence	0.201
Business partners' satisfaction	18.321	0.001	4	Discard the hypothesis of variable independence	0.203

Companies in the sample are not yet highly innovative in this area — only 35.6% pursue knowledge management innovations.

These companies are only just beginning to embrace and develop the concept of knowledge management. They are slow and inflexible in their efforts to design and implement knowledge management processes. Managers are not fully aware of the benefits (i.e. better results in the four aspects of organizational effectiveness), which they may gain from speeding things up. Only one in five companies (21%) implements or plans to implement knowledge management innovations. Neither the company's industry, nor its size has any impact on the scale of this engagement.

Research conducted in the Polish market usually focuses on either organizational innovativeness itself or the scope of knowledge management. Studies rarely combine these two issues and analyze how companies apply knowledge management innovations. It could be interesting to dig deeper into these questions. Researchers should use tools which enable more precise measurements of the impact of knowledge management innovations. They also need to design a tool for precise calculation of the competitiveness level, which might combine relative profitability and cost level, market share, product differentiators, company reputation, and the buyers' loyalty. Time series analysis of a fixed sample would yield particularly useful results.

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