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Organisational structure, environment and management innovation

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Abstract

Increasing health care marketisation may be, in broader sense, perceived as a mechanism providing the foundation for seeking new ways to rationalise operations in this area. These efforts aim to increase the efficiency of the health care sector, to better adjust health care services to social needs and to improve the management of scarce resources. The core of the process is treating a health care organisation as a partner for other actors and examining its strategic partners. The study aims to present the relationships among the characteristics of the environment, organisational structure and innovation management.

Keywords: Health care, Poland, organisational structure, environment, management innovation.

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1. Introduction

The modern practice in the health sector, especially in highly developed countries, confirms the significant changes in the management of its entities and new forms of management behaviour, leading to innovative solutions. Changes in the functioning of modern health care institutions create a strong need for strengthening their competitiveness through the introduction of broadly defined innovations. Innovations are identified with systematically implemented actions taken to increase the efficiency of an enterprise, to involve the use of new processes, technologies and materials and to create complex, innovative business visions and strategies.

2. Theoretical background

2.1. Innovation management

Innovation in health care can be defined as the introduction of a new concept, idea, service, process or product, which will contribute to the improvement in treatment, diagnosis, education, better access, better prevention, along with long-term growth in quality, safety, performance, efficiency and cost. Thakur, Hsu & Fontenot (2012) define innovation in health care as changes that help improve the productivity of an organisation as a whole and its particular medical professions. Porzsolt, Ghosh & Kaplan (2009) refer to innovation in health care as changing or replacing the old mode of operation with a new one that is more sustainable and contributes to improving competitive advantage. The paper focuses on innovation management. The review of the state of knowledge on management innovation clearly shows that it is generally understood as generating and implementing meaningfully new solutions for processes, rules and methods of operation, and organisational management structures, which significantly change the ways of achieving organisational goals (Birkinshaw, Hamel & Mol, 2008) and, presumably, improve long-term organisational performance (Mothe & Thi, 2010). These are meaningfully new solutions, which mean that either they have not been used in a given enterprise yet or they have been adapted (e.g., management methods already used in other organisations) or developed exclusively for the organisation. Innovation in management involves changes that affect the organisation in its entirety (or in its significant areas). Innovation management is a manifestation of the innovativeness of the organisation's management, especially its top level, although it may also involve lower-level managers.

2.1.1. Organisational structure

A variable that directly affects innovation management in an entity in the adopted model is its organisational structure. Organisational structures, which reflect the division of responsibilities and tasks of modern enterprises, are the background for key decisions and various actions and processes that ensure the creation and maintenance of competitive advantage. They provide, therefore, a natural context influencing the model of strategic behaviour, which then translates into a level of innovation. Organisational structure is treated as a multidimensional construct, the elements of which are formalisation, centralisation, specialisation, configuration and standardisation. Research into organisational structure involves the analysis of its individual dimensions. Damanpour's study (1991) includes the analysis of such structural variables as formalisation, centralisation, professionalism, specialisation, functional differentiation and vertical differentiation. Aiken and Hage (1971) presented a similar analysis of organisational structure parameters, which include decentralisation, formalisation, professionalism, complexity and communication styles. Another study conducted by Nahm, Vonderembse & Koufteros (2003) focused on the analysis of the following factors: formalisation, a number of levels in the organisational hierarchy and degree of vertical and horizontal integration in an organisation.

2.1.2. Environment

The environment of organisations, in particular health care units, is becoming increasingly turbulent. In the domains of strategic management, different approaches to the description of the task environment fall into three main categories: dynamism, hostility and complexity (Dess & Beard, 1984). The dynamism of the environment is reflected in the level of unpredictable (caused by connections between the components of the environment) and rapid changes in consumer tastes, products or services, technology and the intensity of competition. All these raise the level of uncertainty faced by the participants of the organisation (Sharfman & Dean, 1991). Hostility is manifested in difficulties in accessing external resources and in competition for these resources. Finally, complexity refers to the level of complexity of knowledge needed to understand the environment. Strictly speaking, the complexity of the environment should be assessed with the level of heterogeneity (different environmental components require different organisational practices), an increase in which makes understanding more difficult and strengthens the need for information processing.

3. Hypotheses

Literature offers few studies examining the impact of organisational structure on an organisation's innovation management. According to some researchers, organisational structure based on formal control can increase innovation efficiency by enabling the coordination of activities between functional units to reduce the risk of error (Schultz et al. 2013). On the other hand, other studies (Kalay & Lynn, 2015; West, 1990) revealed a negative relationship between the level of formalisation and innovation. Increased formalisation reduces the freedom of action of employees by establishing rigid procedures (Raub, 2007). Lewis, Welsh, Dehler & Green. (2002) found that a high degree of formalisation leads to discouragement and lack of flexibility in action, suppressing the creativity of workers. Shepard (1967) argues that the flexibility of structure can be implemented thanks to the low level of formalisation, while flexibility is the key to generate ideas. It can, therefore, be argued that the effectiveness of innovation in management is determined by well-designed organisational structure and, in particular, the low level of its formalisation (Kalay & Lynn, 2015; Raub, 2007; West, 1990).

Therefore, based on the literature review, we can adopt the following hypothesis:

Hypothesis 1: A relationship exists between organisational structure and the level of innovation management in health care units.

The analysis of the impact of the environment on innovation and development showed that hostility, dynamism and complexity are directly related to organisational effectiveness (Rosenbush, Bausch & Galander, 2007). In view of the above, it can be assumed that the environment of the organisation influences its performance indirectly – as an intermediate or moderating variable. For example, balanced explorative and exploitative activities, which lead to the financial effectiveness of an organisation, depend on the environment (Uatila, Maula, Keil & Zahra, 2009). Other studies point to the moderating role of the environment, which means that the dynamic environment weakens the regulatory effect of managerial diversity, whereas it strengthens the impact of shared vision on the relationship between entrepreneurial orientation and organisational innovation (van Doorn & Volberda, 2009). In turn, Wiklund and Shepherd (2005) argue that the environment also influences the relationship between strategy and organisational effectiveness. Gonsalves and Gray (2008) explicitly associate strategy development, learning, uncertainty in the competitive environment and competitive advantage.

Therefore, based on the literature review, we can adopt the following hypothesis:

Hypothesis 2: A relationship exists between the characteristics of the environment and the level of innovation management in health care units.

4. Research methodology

4.1. Sample and measurement

The research results presented here are part of a more extensive study into the innovativeness of health care entities. This article discusses the results concerning the relationships among organisational structure, environment and innovation management of health care entities.

The survey was conducted in health care entities in October and November 2016, and it was followed by coding and statistical analysis. The sample selection was made on a random basis.

The survey questionnaire was completed mostly by executive employees. The characteristics, according to selected criteria, of the health care entities where the survey was conducted are presented as follows:

The survey was held in 100 health care entities.

The largest proportion of entities in the sample comprises provincial hospitals (27) and university hospitals (26). There are also 16 county hospitals and 14 municipal hospitals among the respondents. The breakdown of the entities participating in the survey by the type of activity is presented in Figure 1.

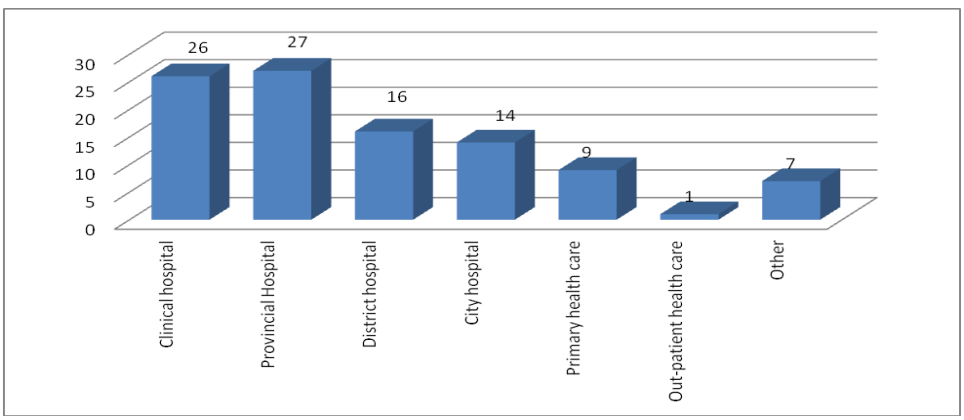

Figure 1. The breakdown of entities by the type of activity.

The breakdown of the respondent entities by the period of their existence reveals that the majority have been operating for more than 10 years (68). 25 entities have been active for 6–10 years, while the remaining 7 entities have been in the market for no longer than 5 years.

One of the questions in the background information section of the questionnaire concerned revenue generated in 2016. It was answered by 65 entities. 28 of them had revenue of PLN 10-50 million, 17 generated revenue of PLN 1-5 million.

In 18 entities, the questionnaire was completed by the president/managing director of the entity. Over the half (55), it was a middle manager who provided responses, while in the remaining entities (27)—persons holding other positions (e.g., hospital department head and a nurse manager).

5. Measurement

Out of many tools for studying organisational structure, we opted for the empirically tested Oldham and Hackman proposition, assuming the analysis of this element of the construct through the prism of the degree of formalisation, standardisation, centralisation, configuration and specialisation, the five basic characteristics of organisational structure (James & Jones, 1976). This tool consists of seven questions that are rated on a 7-item Likert scale (where 1 does not fit, 7 fits perfectly), and one question about the number of organisational levels in an

enterprise, describing an enterprise's configuration. Peng, Tan and Tong's (2004) concept was adopted to assess an enterprise's environment. According to this method, three aspects of the environment were analysed: dynamism, hostility and complexity. Each aspect was represented by the statements to which the respondent was asked to evaluate on a 7-item scale. Innovation management was measured with the tool proposed by Vaccaro, Jansen, Van Den Bosch & Volberda (2012).

6. Results

6.1. The results for the environment

In the first stage of the assessment of the nature of the organisation's environment, factor analysis was performed (KMO = 0.923, the sphericity test statistically significant).

Table 1 summarises the results for each dimension of the environment. It should be assumed that all three tested dimensions were evaluated at an average level.

Table 1. The arithmetical mean of the assessment of the environment

Hostility (1 – very friendly, 7 – very hostile)	3.93
Dynamism (1 – it has not changed much, 7 – it has changed significantly)	3.75
Complexity (1-the sector is not complex, 7 – the sector is very complex)	4.41

6.2. The results of organisational structure

In the first stage of the assessment of organisational structure, factor analysis was performed (KMO = 0.725, the sphericity test statistically significant).

The value of the K-M-O statistics indicates the possibility of applying exploratory factor analysis. Its results indicate that there are grounds for separating the two factors that make up the scale. The latter comprised five statements, the former – two statements. As a result, it was assumed that organisational structure was described by two factors – dimensions – called 'formalisation, standardisation and specialisation' and 'centralisation'.

Table 2 shows the partial results of the factor analysis of the individual statements in the adopted dimensions.

Table 2. Dimension I of organisational structure

The document on 'rules and procedures' exists and is available within the organisation	0.801
Members new to the organisation are offered an induction scheme	0.723
The organisation has a great number of written rules and procedures	0.717
The organisation keeps a written record on the performance of almost every employee	0.650
Most positions in the organisation have job descriptions (defining a scope of responsibilities)	0.619

Table 3. Dimension II of organisational structure

Only a limited number of people from the organisation's top executive level are involved in decision making concerning the organisation's relationships with other organisations	0.951
The organisation can be characterised as highly centralised	0.622

The questions on the number of written rules and procedures (6.11 on the 7-item scale) and the job descriptions for particular positions (6.10) ranked the highest. An induction scheme, on the other hand, ranked the lowest (5.07). It should be emphasised, however, that all statements obtained above-average scores for the occurrence of particular phenomena in the units under study.

6.3. The results of implemented innovation management

The study concerns meaningful changes that are new to an entity (they have not yet been applied/implemented) and that have occurred in the last 3 years within the indicated areas of management. The changes are as follows:

a) were implemented upon the initiative of the senior executive management or with their significant involvement;
b) affect the entire organisation or its substantial part; their consequences go beyond a given functional area (they are not limited to one functional area, e.g., logistics or finance).

The statistical analyses started, as was the case with previous variables, with the reliability of the tool verified. At this stage, it was tested using the Cronbach alpha test and factor analysis (Kaiser–Meyer–Olkin statistics). The Kaiser–Meyer–Olkin test yielded a value of 0.652, which allowed for the application of exploratory factor analysis. The own value criterion revealed two factors. The share – what percentage of variance in a variable was explained by a given factor (the total of the two areas was 71.30%).

Table 4 presents the values of Cronbach's alpha coefficient for particular statements used in the research tool. These statements constituted the first dimension of management innovation, which—in the further stages of the analysis—is referred to as the dimension of communication policy and remuneration rules.

Table 4. Dimension I of innovation management—the dimension of communication policy and remuneration rules

Statement	Cronbach's alpha
Our organisation regularly implements new management systems.	0.546
The remuneration policy has been changed in the last three years.	0.876
Communication structures inside the organisation are undergoing regular change.	0.891
We are constantly modifying/changing selected elements in the organisational structure.	0.687

Table 5 introduces the statements constituting another dimension of innovation management and presents their Cronbach's alpha statistics. The statements make up the second dimension of innovation management further referred to as the dimension of organisational rules and procedures.

Table 5. Dimension II of innovation management—the dimension of organisational rules and procedures

Statement	Cronbach's alpha
Rules and procedures followed in our organisation are reviewed on a regular basis.	0.847
Our organisation regularly implements changes concerning performed tasks and positions held by our employees.	0.888

Based on the results, it can be concluded that the respondent organisations implement changes in the existing rules and procedures on a regular basis (5.51). On the other hand, changes concerning remuneration policies (3.62).

6.4. The relationship between organisational structure and innovation management

In order to examine the relationship between the parameters defining organisational structure and the level of innovation management, Pearson's correlation coefficient was applied. In addition to the correlation analysis, two stepwise regression models were calculated to examine how much of independent variable (organisational structure) explain the variation of the dependent variable (innovation management). Analysis of data was conducted with SPSS-PC.

Table 6. Pearson's correlation coefficients for innovation management and organisational structure

Pearson's correlation	Innovation management I	Innovation management II
Organisational structure Dimension I	−0.311**	−0.123*
Organisational structure Dimension II	−0.022*	−0.297**

**Correlation is significant at the 0.01; *Correlation is significant at the 0.05 level.

For the results of the regression analysis, we observed a statistically significant relationship between the following dimensions:

- organisational structure dimension I and innovation management dimension I – coefficient R^2 = 0.390 (statistics F = 0.000)
- organisational structure dimension II and innovation management dimension II – coefficient R^2 = 0.358 (statistic F = 0.004)

Based on the conducted regression analysis, no grounds exist to reject hypothesis H1, which assumes that there is a relationship between organisational structure and innovation management.

6.5. The relationship between environment and innovation management

In order to examine the relationship between the environment's characteristics and the level of innovation management, Pearson's correlation coefficient was applied. In addition to the correlation analysis, three stepwise regression models were calculated to examine how much of independent variable (environment) explain the variation of the dependent variable (innovation management). Analysis of data was conducted with SPSS-PC.

Table 7. Pearson's correlation coefficients for the environment's characteristics and innovation management

Pearson correlation	Innovation management I	Innovation management II
Hostility	0.285**	0.332*
Dynamism	0.202**	0.301*
Complexity	0.295*	0.421**

**Correlation is significant at the level of 0.01; *Correlation is significant at the 0.05 level.

Table 8 presents the cumulative results, treating innovation management as one of the variables. Results from the test of model 1 show that the hostility of the environment was a predictor for innovation management (adjusted R^2 = 0.283, F = 0,008). In the second model, the dynamism of the environment accounts for 0.264 changes in the level of the implementations of innovation management (adjusted R^2 = 0.264, F = 0.000). The complexity of the environment, in turn, accounts for 0.278 changes in innovation management (adjusted R^2 = 0.278, F = 0.000).

Table 8. The impact of environment on innovation management using regression analysis

Model summary									
Model	***R***	***R* Square**	**Adjusted *R* Square**	**Std. error of the estimate**	**Change Statistics**				
					***R* Square Change**	***F* Change**	**df1**	**df2**	**Sig. *F* Change**
1	0.480[a]	**0.283**	0.267	1.19724	0.283	18.196	3	96	**0.008**

a. Predictors: (Constant), Hostility ; Dependent Variable: Innovation management

Model	*R*	*R* Square	Adjusted *R* Square	Std. error of the estimate	Change Statistics				
					R Square Change	*F* Change	df1	df2	Sig. *F* Change

2	0.513[a]	**0.264**	0.248	1.29185	0.264	17.354	2	97	**0.000**

a. Predictors: (Constant), Dynamism; Dependent Variable: Innovation management

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	*F* Change	df1	df2	Sig. *F* Change
3	0.527[a]	**0.278**	0.263	1.00962	0.278	18.681	2	97	**0.001**

a. Predictors: (Constant), Complexity; Dependent Variable: Innovation management

Based on the conducted statistical analysis, no grounds exist to reject hypothesis H2, which assumes that there is a relationship between the characteristics of the environment and the level of innovation management in health care units.

7. Conclusion

Based on the empirical survey conducted in health care units, we can conclude that the driving forces driving the implementation of innovation management are the changes occurring in the environment. These changes are caused, to a large extent, by the difficulties of the transition period—unstable, imprecise and inconsistent legislation regulating health care. Another factor in the environment concerns low financial outlays allocated to health care entities from self-government and budgetary resources. The operation of the entities is constantly assessed in light of the increasing demands of the authorities. These factors determine the introduction of innovation management primarily aimed at greater flexibility of operation.

On the other hand, studies show that the high level of formalisation, specialisation, standardisation and centralisation reduces the level of innovation management pursued within an organisation. Therefore, in order to improve the implementation of innovations in management, the following steps should be initiated:

- the improvement in the flexibility of organisational structure,
- the maintenance of regular meetings with managers and encouraging active participation of managers in the life of individual departments or branches,
- building mutual trust through informal relationships both within the departments and branches and outside the organisation,
- the introduction of an incentive scheme that expresses appreciation for the efforts and commitment of employees.

The adoption of the proposed solutions may—in the long run—result in the implementation of new management solutions that can contribute to minimising the negative impact of the environment.

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