
Proposed Models for Shaping Pro-Innovative Organizational Culture in Public Hospitals

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Abstract:

Purpose: The main goal of the article is an attempt to select measurement constructs of pro-innovative organizational culture in public hospitals.

Design/Methodology/Approach: First, as a result of a database search, a set of theoretical variables was identified that could measure pro-innovative organizational culture in public hospitals. Then, empirical exploration was carried out on a sample of 570 respondents (doctors, nurses and managers) in 3 public hospitals operating in Poland with different reference levels: clinical care (A), voivodeship (B) and powiat (C). The theoretical model was verified on the basis of a descriptive data mining project with a cross-sectional approach using factor analysis.

Findings: The findings have been found from a descriptive data mining project with a cross-sectional approach using factor analysis. The results of the research allowed for the identification of 5-factor models for each type of hospital. The most important factors in shaping a pro-innovative organizational culture include variables regarding the strategy and goals of the hospital, organizational trust and patient orientation of the staff.

Practical Implications: In practice, the created models may constitute guidelines for measuring and purposefully shaping a pro-innovative organizational culture in public hospitals.

Originality/value: Although there are over a dozen scientific reports in the world literature on the relationship between organizational culture and innovation in the context of shaping pro-innovative organizational culture, few of them concern the public health care sector. Therefore, an attempt was made to fill this gap.

Keywords: Organizational culture, innovation, pro-innovative organizational culture, exploratory factor analysis, public hospitals, Poland.

JEL classification: I10, I11.

Paper Type: Research study.

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1. Introduction

In the current economic context, innovation is defined as a learning process in which public organizations try to meet social challenges that can be solved through the development of new services, technologies, organizational structures, management methods, management processes (Bekker, Edelenbos, and Steijn, 2011; Crossan and Apaydin, 2010; Dobni, 2012; Jończyk, 2014; Kożuch and Sienkiewicz-Małyjurek, 2016; Frączkiewicz-Wronka, 2009).

Research on the organization's ability to innovate covers many areas of knowledge, but for reliable results in practice, high expenditure on research and development is not enough, but it is also necessary to identify and evaluate other factors that affect innovation, such as organizational culture (Bendak, Shikhli, and Abdel-Razek, 2020; Botelho, 2020; Büschgens and Balkin, 2013; Jaskyte and Kisieliene, 2006; Kimberly and Evanisko, 1981; Tushman and O'Reill, 1997).

A robust and appropriate culture leads to positive results by creating common goals and practices also in generating change and innovation in public organizations (Buchelt, 2017; Bekker, Edelenbos, and Steijn, 2011; Gorzelany, Gorzelany–Dziadkowiec, Luty, Firlej, Gaisch, and Dudziak, 2021; Koc and Ceylan, 2007; Abdel-Razek and Alsanad, 2014). Taking this into account, it seems justified to search for relationships between organizational culture and innovations, and thus to identify factors enabling the measurement and shaping of pro-innovative culture in public hospitals.

Therefore, the aim of this publication is to develop a set of factors enabling the measurement and shaping of a pro-innovative organizational culture in public hospitals with different reference levels (poviat, voivodeship and clinical). This study attempts to make an additional contribution to the conceptualization and measurement of pro-innovation culture in public organizations. The research used the results of the analysis of the literature on the subject and quantitative research.

2. Literature Review and Applied Research Methodology

Many published studies have provided evidence of a significant relationship between organizational culture and innovation (Chang and Lee, 2007; Tellis, Prabhu, and Chandy, 2009; Joseph, 2015; Aboramadan, Albashiti, Alharazin, and Zaidoune, 2020). Jaskyte and Kisieliene (2006) and Schein (2004) found that the impact of organizational culture on innovation depends on the content of culture.

Therefore, it is necessary to shape an innovation culture in every company so that its members can look for new products, services or processes (Skerlavaj, Song, and Lee, 2010). Thus, the innovation of any organization requires a cultural climate and innovative behavior that enhances creativity (Büschgens, Bausch, and Balkin, 2013; Tellis, Prabhu, and Chandy, 2009).

At the same time, emphasis is placed on that the positive effects of implementing innovations relate to human resources, which, in combination with an appropriate organizational culture, create a pro-innovative work environment that creates opportunities for greater job satisfaction and commitment at work (Hogan and Coote, 2014; Crossan and Apaydin, 2010; McLean, 2005; Sulkowski and Sulkowska 2011; McLean, 2005).

However, to the best of the author's knowledge, no published study has introduced a clear framework for pro-innovation organizational culture in public organizations such as hospitals. Therefore, it was considered important to take up such a challenge. The concept of Martins, which uses the theory of open systems, emphasizing the interdependence of various subsystems and elements in the organization, and the works of Schein (2004), were considered the closest from the point of view of achieving the objectives of the publication (Schein, 2004).

The author, examining the relationship between organizational culture and innovation, pointed to the need to combine activities covering eight areas, i.e., strategy, goal orientation, trust relationships, behavior stimulating innovation, work environment, customer orientation and management support (Martins and Martins 2002; Martins and Terblanche, 2003).

The study used a descriptive exploration project with a cross-sectional approach. The research was conducted in 2018-2020. The respondents included representatives of key professional groups, i.e. doctors, nurses, managers who worked in deliberately selected hospitals. The research sample included 570 employees of 3 public hospitals with different reference levels operating in Poland.

For the purposes of the study, 3 hospitals differing in terms of both the scope of activities and the organizational and financial potential were selected on purpose. The clinical hospital (A) is responsible for providing health services and promoting health in connection with the implementation of teaching and research tasks. In addition, he participates in the preparation of people for medical professions and training of people practicing medical professions. In turn, the poviats hospital (C) conducts medical activities based on 5 wards, 1 treatment room.

The assumption was to check whether the measurement constructs of pro-innovative organizational culture in these units are the same or different. In order to identify the importance of individual factors, exploratory factor analysis was used. This analysis is based on the assumption that measurable and observable variables can be reduced to fewer hidden variables that share a common variance, known as dimensionality reduction (Bartholomew, Knotts, and Moustaki 2011; Gatnar, 1998). These unobservable factors are not measured directly, but are essentially hypothetical constructs that are used to represent variables. Based on the correlation between the variables, this method distinguishes a group of factors that are unavailable as a result of direct observation.

These factors retain a large part of the information contained in primary variables and have a different substantive interpretation (Harrman, 1976; Gulc, 2021). Data collection was carried out using the author's questionnaire. This tool was developed on the basis of the concept of E and N. Martins using the theory of open systems and emphasizing the interdependence of various subsystems and elements in the organization and Schein's work (Martins and Martins, 2003; Tellis, Prabhu, and Chandy, 2009).

Respondents were asked to agree to a series of 19 statements on a seven-point rating scale from "1 strongly disagree" to "7 strongly agree." The research sample included 570 employees of 3 public hospitals operating in Poland. The study involved 570 people, and the analysis used information from 242 employees from hospital A, 220 from hospital B and 108 from hospital C. Among the respondents were doctors (there were 144), nurses (339) and people holding managerial positions (87).

Data analysis was performed using the program Statistica 13.3. In the first step of the adopted procedure, the scale reliability analysis was carried out using the Cronbach's alpha measure. For hospital A, this measure was 0.9570, for hospital B 0.9378 and for hospital C 0.9160. Based on the theoretical findings on the conceptualization of shaping pro-innovative organizational culture, it was assumed that performance indicators are reflective indicators. This means that they causally reflect the measured feature, and the causal relationships are directed from the hidden variable to the indicator. As part of this approach, an exploratory factor analysis (EFA) was performed on the set of indicator variables selected to measure the latent phenomenon.

This analysis enables the detection of the structure of relations between the indicator variables, explaining the number of dimensions and their interpretation (in the case of a complex structure) and introducing modifications to the indicator list (Wieczorkowska, Wierzbiński, 2005; Gulc, 2021) It was expected to distinguish five factors (dimensions of performance assessment determined by the 3V rule), with the analyzed 19 variables (Table 1).

Table 1. *The list of variables*

| | |
|----|--|
| 1. | The hospital has a strategy that takes into account the development and implementation of innovations. |
| 2. | The mission and vision of the hospital focus on finding new solutions to improve the quality and safety of the services provided. |
| 3. | Innovation in a hospital is seen as an organizational value. |
| 4. | The hospital provides the resources necessary to implement innovations. |
| 5. | There is consistency in the norms and values of employees in the hospital. |
| 6. | In the hospital, there is a conscious building of an organizational community integrated around the goals and tasks of the hospital. |
| 7. | There is support for change and innovation among hospital staff. |
| 8. | In the process of selecting employees, an important criterion is openness to changes. |

| | |
|-----|---|
| 9. | Hospital staff are encouraged to experiment and take risks. |
| 10. | In the hospital, employees are encouraged to develop and share knowledge. |
| 11. | The employee evaluation system takes into account, among others, the criterion of staff creativity. |
| 12. | There is an incentive system in the hospital that rewards innovative activities of employees. |
| 13. | Professional information and communication management is observed in the hospital. |
| 14. | There are interpersonal relationships based on trust in the hospital. |
| 15. | The organizational structure of the hospital is adjusted to its changing goals and tasks. |
| 16. | In the hospital, there is team cooperation that manifests itself in mutual understanding for different views. |
| 17. | Employees accept hospital rules and regulations. |
| 18. | In the hospital, the staff orientation towards the patient's needs is observed. |
| 19. | There is tolerance in hospitals for minor shortcomings in work that are natural in the learning process. |

Source: Own elaboration based on literature.

An analysis of the correlation between the studied variables was also carried out. On the basis of the correlation matrix, it was noticed that there is a significant relationship between the studied variables. This is confirmed by the determinants of the correlation matrix amounting to respectively hospitals A, B and C: 0.00000005990; 0.00000535; 0,0000313. A very low value of these determinants means that there are many significant correlations between the analyzed variables and probably there are factors linking them. Similar information is provided by the Bartlett sphericity test and the K-M-O measure. Presented in Table 1 values confirm that it is possible to perform a factor analysis using the collected data.

Table 2. *Characteristics of the correlation matrix*

| Characteristics | Hospital A | Hospital B | Hospital C |
|-----------------|------------|------------|------------|
| K-M-P Measure | 0.8335 | 0.930 | 0.846 |
| Bartlett | 3888.793 | 2571.304 | 1265.204 |
| sphericity | 171 | 171 | 171 |
| test | <0.0001 | <0.0001 | <0.0001 |

Source: Own elaboration based on the conducted research.

Also the high value of the Kaiser-Mayer-Olkin measure, which can take values from 0 to 1, indicates good properties of the data. The analysis of the results of the above tests - the correlation matrix allowed to conclude that an exploratory factor analysis based on all 19 variables can be performed on the collected data.

Taking into account the Kaiser criterion (Eigenvalue greater than 1), five factors were distinguished. Together, these factors explain, respectively, for hospital A over 80% of the variance, for hospital B 74% and for hospital C 73% of the variance of the baseline variables. Also the method of determining the number of Cattell factors (based on the scree plot) in each showed that a five-factor solution should.

For the five-factor solution, a factor analysis was performed using the principal axis method. The standardized Varimax method was used for the rotation of the obtained factor solution. This method is used when the factors are expected to be correlated with each other (Harman, 1976). Using the matrix of factor loadings, the insignificant indicators were removed, i.e. those with no factor load in any dimension with an absolute value greater than 0.6.

3. Results

The final results of the exploratory factor analysis for individual hospitals are presented below. The application of the above analysis in the case of hospital A made it possible to distinguish 5 dimensions (hidden variables) and grouping of observable variables, they determine the formation of a pro-innovative organizational culture (Table 3).

Table 3. Results of exploratory factor analysis using the principal axis method with Varimax rotation normalized - factor load matrix for hospital A

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
|----|----------|----------|----------|----------|----------|
| 1 | | 0.780800 | | | |
| 2 | | 0.797227 | | | |
| 4 | | 0.793696 | | | |
| 5 | | 0.738912 | | | |
| 6 | | 0.755130 | | | |
| 7 | | | | | 0.787369 |
| 8 | | | | | 0.782331 |
| 9 | | | | | 0.604230 |
| 11 | 0.641283 | | | | |
| 12 | 0.801964 | | | | |
| 13 | 0.719721 | | | | |
| 14 | 0.680997 | | | | |
| 15 | 0.819406 | | | | |
| 16 | 0.693463 | | | | |
| 17 | 0.639070 | | | | |
| 18 | | | 0.904258 | | |
| 19 | | | | 0.898250 | |

Source: Own elaboration based on the conducted research.

The observable variables were grouped into factors giving them a descriptive character. Thus, in the case of hospital A, the following set of factors was created:

A1. Encouraging employees to develop knowledge and trust relationships in terms of professional cooperation; **A2.** The strategy, mission and vision of the hospital are focused on innovative activities, resources and consistent values improving the

quality and safety of services; **A3**. In the hospital, the orientation of the staff to the needs of the patient is observed; **A4**. Tolerance to minor shortcomings in the learning process; **A5**. Integrating the staff around the goals and tasks of the hospital for change and innovation.

In the case of hospital B, the set of grouped factors is defined in Table 4.

Table 4. Results of exploratory factor analysis using the principal axis method with Varimax rotation normalized - factor load matrix for hospital B

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
|----|-------------|-------------|-------------|-------------|-------------|
| 1 | | 0.804691 | | | |
| 2 | | 0.841044 | | | |
| 3 | | 0.770914 | | | |
| 4 | | | | | 0.732343 |
| 5 | | 0.646841 | | | |
| 6 | 0.822948 | | | | |
| 7 | 0.804317 | | | | |
| 8 | 0.631444 | | | | |
| 9 | | | | 0.669539 | |
| 10 | | | | 0.774196 | |
| 11 | | | | 0.608570 | |
| 14 | 0.724619 | | | | |
| 16 | 0.763167 | | | | |
| 17 | | | 0.767409 | | |
| 18 | | | | | 0.644053 |
| 19 | | | 0.708055 | | |

Source: Own elaboration based on the conducted research.

In the case of hospital B, the following set of factors was derived:

B1. Integrating the staff around the goals and tasks of the hospital for change and innovation in an atmosphere of trust; **B2**. The strategy, mission and vision of the hospital focused on innovative activities, resources and consistent values improving the quality and safety of services; **B3**. Compliance with rules and regulations with tolerance to minor shortcomings in the learning process; **B4**. Encourage employees to experiment and build trust relationships in the context of assessment that takes into account creativity; **B5**. Providing resources to be innovative and orienting employees to the patient's needs.

In the case of hospital C, the set of factors is specified in Table 5.

Table 5. Results of exploratory factor analysis using the principal axis method with Varimax rotation normalized - factor load matrix for hospital C

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
|-----------|---------------------|---------------------|---------------------|---------------------|---------------------|
| 1 | 0.659430 | | | | |
| 2 | | | | | 0.863802 |
| 3 | | | | | 0.689928 |
| 4 | 0.763083 | | | | |
| 5 | 0.791160 | | | | |
| 6 | | | | 0.850554 | |
| 7 | | | | 0.741219 | |
| 8 | | | | 0.731897 | |
| 9 | | | 0.809074 | | |
| 10 | | | 0.721736 | | |
| 11 | | | 0.622900 | | |
| 12 | 0.647575 | | | | |
| 13 | | 0.667438 | | | |
| 14 | | 0.625178 | | | |
| 15 | | 0.799300 | | | |
| 16 | | 0.676724 | | | |
| 17 | | | | 0.654273 | |

Source: Own elaboration based on the conducted research.

In the model for hospital C, the following set of factors was distinguished:

C1. Strategic focus on innovation and rewarding employees for innovative activities; **C2.** Team work and communication based on trust and tolerance; **C3.** Integration of staff around the objectives and tasks of the hospital for change, risk-taking and creativity; **C4.** Integrating the staff around the goals and tasks of the hospital for changes and innovation in the context of the patient's needs; **C5.** Focusing the mission and vision of the hospital on innovation as a common value that improves the quality and safety of services.

4. Discussion and Conclusions

As confirmed by the results of the research cited in the theoretical part, organizational culture can influence the innovativeness of an organization. This statement also applies to public hospitals. The set of variables used in this study describing the pro-innovative organizational culture in enterprises was validated in 3 different public hospitals (A, B, C).

The results of the research led to the identification of a set of five-factor models of shaping pro-innovative organizational culture in each of the hospitals. By analyzing individual models, it can be noticed that all three hospitals appreciated the strategic

behavior improving the quality and safety of patients, trust relationships, and orientation towards changes and innovations for the benefit of patients. In the case of the factor related to the area of strategy and organizational goals, the role of managers is to make employees aware of the importance of the vision and mission of the hospital (Arad, Hanson, and Schneider, 1997).

Supporters support innovation in order to increase their courage in favor of more pro-innovative activities (Mayondo and Farrell, 2003; Poczowski, 2007; Lock and Kirkpatrick, 1995; Shattow, 1996; Buchelt, Ziębicki, Jończyk, and Dzieńdziora, 2021). By allowing staff more leeway rather than control, management demonstrates that they trust and believe their staff. In other words, empowering them rather than controlling them (Judge, Fryxell, and Dooley, 1997; Rogers, 2003; Subramanian and Nilakanta, 1996).

One of the dimensions identified is patient orientation. It focuses on understanding the needs of internal and external customers, improving customer service and flexibility in customer service. For managers, this means taking care of innovative staff behavior in order to develop the staff's ability to offer quality medical services. At the same time, it is emphasized that the response to needs should be flexible. The variables indicated in the models concern: organizational strategies and goals, organizational structures, mechanisms of encouraging and supporting staff, patient orientation of staff and tolerance to minor mistakes in the staff learning process.

Being aware of the imperfections of the study, resulting mainly from the fact that it was carried out in only 3 hospitals, the aim of the study can be considered as achieved. The distinguished measurement constructs of pro-innovative organizational culture in public hospitals largely coincide with the constructs indicated in the literature (Dobni, 2012). It can also be considered that this study makes an additional contribution to the conceptualization of pro-innovation organizational culture in public hospitals and the theory public management.

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