
**A METHOD FOR MEASURING THE COEFFICIENT OF ORIENTATION TOWARDS INNOVATION:
A study on high-performance Brazilian and Portuguese public service organizations**

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ABSTRACT

This article describes the creation of a Coefficient of Innovation Towards Orientation to assess public service organizations in Brazil and Portugal. The construct Orientation Towards Innovation refers to what extent an organization is open to new ideas and willing to change through the use of new technologies, resources, competence-building and management systems. The main gaps identified in the literature review refer to the difficulties in measuring innovation in services, besides the small number of studies on the public sector. The methodology involved document analysis, interviews and a survey. The study focused on service sector organizations evaluated by the Federal Government Quality Program (Gespública), in Brazil (10 organizations), and by the Performance Evaluation Integrated System (Siadap) and the Deloitte Innovation Award, in Portugal (18 organizations). During the investigation 32 people were interviewed, and 123 people answered the survey. Recommendations of theoretical, methodological and practical order are also offered.

Keywords: *innovation, performance, public organizations, services*

1. INTRODUÇÃO

Innovation has been studied under diverse theoretical views, particularly those emerging from Economics, Administration and Sociology, and has been regarded both as an engine for socio-economic development and crucial for business competitiveness (Schumpeter, 1997). The Organization for Economic Cooperation and Development (OECD, 2005) defines innovation as the implementation of a new or significantly improved good or service, comprehending technical specifications, components, materials, embedded software and user-friendliness. The OECD also describes four types of innovation: product innovation (good and services, including new products and improvements in existing ones), process innovation (significantly improved production or delivery method, including techniques, equipment and software); organizational (new organisational methods, such as new business practices, workplace organization or external relation); marketing (significant changes in marketing methods, including product design or packaging, product placement, product promotion and pricing).

The concept of innovation adopted for this study includes the search for and the discovery, experimentation, development, imitation and adoption of new products, new services, new processes and new organizational set ups, and is thus similar to Dosi's (1982). Under services, many studies agree with Gallouj (2002) who views innovation in the final characteristics of a service, as a result of technical capacity, supplier's competence and the client's own competence in delivering the service.

This concept of innovation reaches a higher degree of complexity when applied to the area of public organizations, which the focus of this study. This is due to the specific features of public organizations and the challenges posed by their management. Only a handful of studies on innovations have been carried out with a focus on public organizations and even fewer have related innovation practices to organization performance. Research focusing on public services has been limited to surveying the perceptions of the parties involved in the organization (service users, employees, suppliers, society and government), in line with Gespública's (2008) concept of organizational performance. This construct was conceived as an expression of the resulting assets of the organization as manifested by its results, following Penrose (1959) and Figueiredo (2003).

In this sense, this article aims at describing a methodology that would help identify the degree of Orientation towards Innovation in public organizations. The Innovation Orientation construct is defined by openness to new ideas through new technologies, resources, skills and management systems (Zhou, Yim & Tse, 2005). The corpus of the study was comprised by both Brazilian and Portuguese services organizations, assessed by Gespública (Brazilian Quality Program) and Portugal's SIADAP (Performance Evaluation Integrated System) respectively.

Although organizational innovations are closely related to types of innovations (product, service and process innovation), innovation types focus on the internal dimensions of the organization, which might not be directly perceived by clients, service users, and citizens in general. Besides maintaining the conceptual framework, the identification and implementation of organizational innovations must take into consideration the elements surrounding ecology, including a) the institutional conditions for developing and socializing innovation; b) the cultural conditions that may support the supply and delivery of new management ideas; and c) the roles of managers in the creation and implementation of new management practices.

Next, the theoretical contributions from the literature on services innovation and performance of organizations will be presented, followed by the methodology, main findings and conclusion.

2. THE STATE -OF- THE ART IN SERVICE INNOVATION

A comprehensive search was undertaken using high-impact indexed journals in the area as database: *SAGE Journal on Line*, *JSTOR*, *SpringerLink*, *Emerald* and *Oxford Journals*, *PROQUEST*, *ABI/Inform Global* and *Scielo*. Additionally, well-reputed non-indexed Brazilian journals covering the areas of Management and Economy were surveyed. The key words *innovation* and *services* were searched separately in order to extend comprehensiveness, along with words and expressions in English with potential similar meanings. Inclusion criteria for sample selection of the articles were: a) articles discussing service innovation; b) articles resulting from empirical research; and c) articles published between January 2005 and August 2011. 74 articles were found to meet the criteria.

For the creation of categories, the frequency of the main words of the title, abstract, key words and introduction of the articles was analyzed, as suggested by Bardin (2002). Thus, categories were defined *a posteriori*, emerging from the common meaningful elements of the texts. The results of our search can be described as follows: 24 studies (32% of the total) discussed innovation and technological strategies, 13 (18%) focused on economic performance and company productivity, and 13 (18%) analyzed the antecedents and determinants of innovation. Another 12 (16%) explored capacity building networks and collaborative work between organizations, 7 (9%) examined service quality, innovation taxonomies, flexible systems and regional systems of innovation, while 6 (8%) investigated intensive knowledge, research and development.

As to knowledge areas of the articles, engineering and technology predominated, with 23 articles, followed by the multi-sectoral hospitality industry (culture, hospitality, food and education) with 18 (24%) and telecommunications, with 9 (12%). Less prominent were health, with 6 articles (8%), retail, with the same number (8%), finance and insurance, with 5 (7%), public management with 4 (5%), and public services, with 3 articles (6%).

Geographically, most of the articles were published in Europe (35% of the articles), Brazil (26%), the US (23%), Australia, China and Taiwan (3% each). Argelia, Canada, Gana, Hong Kong, Japan e Thailand contributed with 1% each of the articles surveyed. The high number of Brazilian articles found was due to the search criteria adopted. The international journals sampled were all indexed, while a less restrictive selection was adopted for Brazilian journals, allowing well reputed non-indexed Administration and Economy academic publications to be part of our corpus.

Next, the categories obtained a *posteriori* from content analysis will be presented, following Bardin (2002), highlighting the studies which more closely met the categories found, according to the frequency and distribution of words, expressions of the title, abstract, introduction and concluding remarks of the articles.

3. THE STATE OF THE ART OF PERFORMANCE ASSESSMENT OF PUBLIC ORGANIZATIONS.

The performance construct in this research is discussed under the organizational perspective, which views performance as the expression of the overall assets of the organization rather than on individual or team performances. According to Gerspública (2008), organizational performance should be measured as the extent to which the performance meets the needs of the concerned parties of the organization, i.e., service users, employees, providers, society and government. Le Boterf (1999) sees organizational performance as collective competencies emerging from cooperation, exchanges and articulation undertaken by the organization components. These collective competences may be more general, covering the whole spectrum of the organization, or more specific to areas, units, organizational processes, groups or work teams.

Kaplan and Norton (1997) have argued that an organization should have a balanced set of performance indicators which would reflect both the performance dimensions and the organization's systemic vision. Performance measurement practices may vary between different organizations and different sectors of the same organization.

This study concurs with the measurement of organizational performance as proposed by the well-established assessment device *Balanced Scorecard* (BSC). This model views organizations from four perspectives: financial, customer, processes and learning and growth. According to its proponents, this method allows for a systemic vision and promotes balanced measures and results regarding strategic areas of the organization. The model is grounded in an integrated system of indicators relating results to processes across different levels of an organization.

In order to review the organisational performance construct, the following high impact indexed sources were surveyed: *NSPA (National School of Public Administration)*, *CAPEs*, *PROQUEST*, *SAGE Journal on Line*, *Emerald and Oxford Journals*. *Organisational performance* and *public services* were selected as key words to be searched in database, along with expression in English which carried the same meaning. Inclusion criteria for sample selection were as follows: a) articles discussing organizational performance; b) articles resulting from empirical research; and c) articles published between January 2005 and August 2011.

Articles found to meet the criteria totaled 34, of which 85% used a quantitative methodology, while the remaining 15% adopted a qualitative one. Mixed methods studies were not found. Thus, 34 empirical articles covering performance of public service organizations were used as our sample. 16 of the 34 studies (47% of the articles) discussed the determinants of organizational performance and 4 (12%) examined the practices related to organizational learning and R&D, in the context of organizational performance. Another four studies (12%) analyzed organization performance strategies, while two articles (6%) looked at performance indicators and another two (6%) investigated quality management. One study (3% of the articles) looked into information technology, while another one (3%) analyzed public organization networks.

The following sectors were identified in our study: federal and municipal agencies (14 articles, 41% of the total number of articles selected), ONGS (6 articles, 18%), Judiciary (4 articles, 12%), Education, Management Schools (4 articles, 12%), state-run industries (4 articles, 12%), and Public Hospitals (2 articles, 6%). Most of articles were published in Europe (41%) and the US (41%). The remaining of the articles were from Latin American countries (with research involving more than 17 countries, including Brazil), South Korea, Iran, Jordan, Malta and Mexico, each of them with 3% of the sample.

4. METODOLOGY AND RESULTS

4.1 Description of the Study and Sample

The research was carried out in 2011 using document analysis, group and one-to-one interviews, and a survey to study 75 public organizations of which:

- 32 were Brazilian public organizations that made the final of the 2008 cycle of *Gespública*
- 29 were Portuguese public organizations assessed as excellent, according to performance data from *SIADAP* (*Sistema integrado de gestão e avaliação do desempenho – Portugal’s official Performance Evaluation Integrated System*, 2008 cycle)
- 14 organizations which were granted the *Innovation in the Public Sector Leadership Awards - Deloitte*, 2008 cycle

The respondents from Brazilian organizations had to meet at least one of the following requirements: (a) Hold an expert in Management with operational knowledge of organizations; (b) Hold an expert in Public Governance Excellence Model (MEGP); (c) Have acted in the Management Report; (d) Have presented on management practices before a panel of examiners during the visitation stage.

The respondents from the Portuguese organizations had to meet at least one of the following requirements: (a) Hold an expert in Management with operational knowledge of organizations; (b) Show expertise in the assessment model of management by which organization was evaluated.

Interviews and focal groups involving 21 organizations were carried out, and the data collected through mediated exchanges grounded the meaning- forming from the statements voiced by the main participants of the management and innovation processes of the organizations studied. From the mediated exchanges emerged the *zones of meaning*, which attempt to capture the dynamic, complex and unstable meanings assigned by people in the social context.

Zones of meaning group a wide range of meanings, express contents, doubts, concerns, complaints, compare the expected perception of the organization with the situations the staff actually experience, which are central to define the organization and the subjects. Such zones of meaning are extracted from words, discourse, and the interactions participants engage in. Discourse analysis explored the actual words/sentences used along with more nuanced aspects, such as tone, hesitation, assertiveness and emphasis.

4.2 Data Collection and Analysis

Data collection was divided in stages as shown in Figure 1.

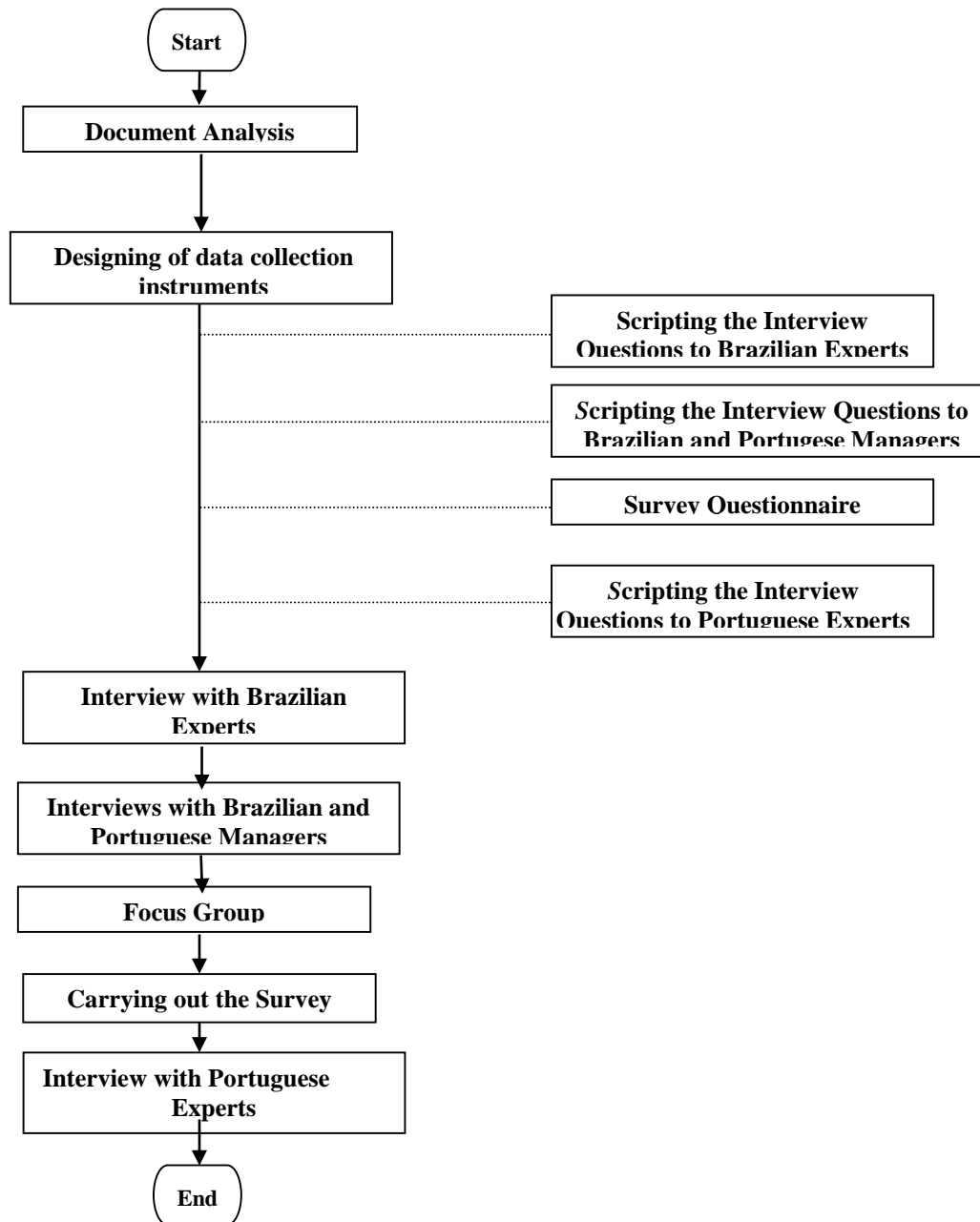


Figure 1. Flow of data collection procedures.

The Coefficient of Orientation Towards Innovation (COTI), a model this research aimed to propose, was created using the data from the survey and involves the following stages:

- 1) Application of Innovation- scale of measurement (ISM), i.e, *survey*;
- 2) Extracting relevant factors , using exploratory factor analysis with the data collected from the ISM, and extracting the items of each factor
- 3) Extracting factors from confirmatory factor analysis ;
- 4) Identifying the weight of explanation of each factor in the confirmatory factor model
- 5) Calculating the weighted average of the items of each factor;
- 6) Measuring the Coefficient of Orientation Towards Innovation of each organization , by adding all the weighted averages

The procedures for stages 1-4 and the results for stages 5 e 6 are described below:

Stage 1

An online survey questionnaire was developed with aid of the *Survey Monkey software (Gold Version)* for 123 participants: 45 from Gspública model, 53 from SIADAP model and 25 from Deloitte model. Participants

answered the 42 item questionnaire with a rating scale, from '1' = I fully disagree to '10' = I fully agree. For questionnaire item construction, it was followed the criteria laid out by Pasquali (2010) and used: a) document analysis; b) tests of a similar nature; and c) interviews with experts working in public organizations. For a test of similar nature, OCA (Scale of Cultural Orientation Towards Learning, developed by Rebelo, 2006) was used

In this sense, this study made use of very precise sentences for behavior description, with simple and unambiguous wording, expressing a single behavior per item, avoiding jargon, negative or atypical statements. Table 1 shows the 42 items of the survey and they describe behaviors related to orientation towards innovation in public organizations.

Table 1

Questionnaire items of the survey

Items
1. Leaders devote time to study ideas and suggestions put forward by employees.
2. Failures are viewed as a chance to try out new ideas.
3. There are communication channels between managers and employees to discuss new ideas.
4. The Company sponsors initiatives to expand employees' qualifications, which will be later translated into improved visible processes and services to clients.
5. Employees are aware of the limits of their freedom to experience new methods in the work process.
6. Knowledge-sharing is a common practice in the workplace.
7. Employees are acknowledged for their contributions towards a more effective work process.
8. Leaders encourage employees to participate in work-related problem-solving issues.
9. Suppliers are given systematic support to contribute toward improved products and services.
10. User- training is offered on a regular basis.
11. Professional development is encouraged.
12. Leaders take concrete measures to keep a successful relationship with partner organizations
13. Leaders demonstrate its trust and confidence in the employees and their performance.
14. Problem-solving through group discussions is a common practice.
15. Clear guidance on carrying out the assigned job is readily available.
16. There is a general awareness of the interdependence between the different areas of the organization.
17. Users' complaints are readily addressed
18. New ways of performing a task are tried out.
19. Employees acknowledge the importance of knowing how other organizations do their work in order to improve their own work.
20. People are open to criticism
21. Leaders encourage changes in the work process
22. Leaders are committed to improving the work process
23. Leaders value the implementation of improvements
24. All levels of the organization agree that the ultimate goal of the work they develop is to improve service delivery to users.
25. Implementation of improvements in both processes and services aim at meeting the needs of the users.
26. Knowledge-sharing across different sectors the organization is encouraged.
27. Competency based hiring defines the recruitment policy of the organization
28. Working hours are flexible and thus allow employees to participate in learning activities.
29. Continuing education programs offered to employees are aligned with the organization's strategies.
30. Continuing education programs offered to employees are planned.
31. Continuing education programs planned are carried out.
32. Suggestions for improvements put forward by employees are dealt with.
33. Suggestions for improvements put forward by clients are dealt with.
34. Suggestions for improvements put forward by suppliers are dealt with.
36. Clients are encouraged to make suggestions for improvements in the organization.
37. Suppliers are encouraged to make suggestions for improvements in the organization.
38. Service-Sector Research and Development (R&D) is encouraged
39. New working methods are implemented drawing from successful experiences of other organizations.
40. Other organizations are regularly monitored.
41. Employees are hired to attend the future needs of the organization.
42. Evaluation of outputs makes use of external parameters

Content validity of the instrument was assessed by employing a panel of judges, following Hernández-Nieto (2002), along with semantic and statistical validation. In order to determine the content validity coefficient (CVC) of each item of the questionnaire, items should meet the following criteria: a) clarity of language, b) practical relevance and c) theoretical relevance. The degree of agreement between judges was also measured.

Four exploratory factor analyses were conducted with five, four, three, and two factors. For factor analysis, the 42 continuous variables used in the questionnaire were measured. Hair & cols. (2009) suggest that the sample should consist of more than 50 observations, and 100 cases would ensure more robust results. Correlation matrix points to 99% of the coefficients with results >0,30, thus indicating the high degree of factorability of the data.

As to the missing data, Hair e cols (2009) and Tabachnick e Fidel (1989) argue that they should be below 5-10% of the total. The percentage of missing data in our sample was as low as 1.4%, but it was decided to exclude these cases anyway. Histogram analysis demonstrated that 14 of 42 variables were compatible with normality of data. However, Pasquali (2005) sees factor analysis as a robust and effective technique for dealing with violations of normality in data distribution, and therefore this issue was correctly addressed.

For the identification of extreme cases, multivariate outlier detection was determined using Mahalanobis distance, whereby the subject identification (ID) was used as dependent variable, while the 42 items assessing management practices were considered independent variables. Using chi-square value, for 42 degrees of freedom (number of independent variables) and $p < 0.001$ probability level, 76,084 would be the Mahalanobis distance value, the distance from which outliers become multivariate outliers. 8 subjects were found to be multivariate outliers. Even with the potential impact of outliers on the correlation matrix (increasing or decreasing the magnitude of associations), it was decided to exclude these cases from the analysis to follow, as this would affect sample size. In this sense, in factor analysis, those variables presenting too conflicting data tend to present lower factorial, according to Neiva, Abbad and Tróccoli (2009).

The Kaiser-Meyer-Olkin (KMO) index was 0.949, an excellent result for factor creation, as suggested by Pasquali (2005). Based on the test results of the four models using Exploratory Factor Analysis, Amos 18.0 software was used to carry out a Confirmatory Factor Analysis. This type of analysis, based on structural equation modeling, allows adjustments to items and factors, and either confirms or disconfirms the factorial models obtained from the Exploratory Factor Analysis.

The selected model, according to Hair and cols. (2009), should present results as follows: a) Chi-square/degree of freedom ratio (χ^2 /df) with values below 5.0 indicate that the model is suitable for data description .This requirement was met for the three models; Comparative Fit Index (CFI) is an incremental fit index. Values below 0.90 are not associated with a well-adjusted model. The best indexes obtained derived from models 4 and 5 (0.81); c) the Tucker-Lewis Index (TLI) is conceptually similar to CFI. Typically, well-adjusted models have values close to 1. Once again, models 4 and 5 had the best fit, with vales =0.79 d) The *Root Mean Square Error of Approximation* (RMSEA) assesses errors related to the saturated model using the same set of data. Lower values indicate a better fit, and values should be below 0.1. For the three models, the index was 0.11.

The two-factor model, the best fit both theoretically and from the factor analysis point of view, presented the following results, according to the contribution of each factor: Factor 1 = 9.1% and Factor 2 = 9%. It should be noted that these results were not due to the quantity of variables of each factor, but to degree of explanation of the factor in relation to the model.

4.3 Results

The Coefficient of Orientation Towards Innovation (COTI) is calculated by adding the sum of the weighted averages by the weigh corresponding to the factor to which it belongs.

$$C_{oi} = \sum_{i=1}^2 \left(\left(\frac{\sum_{k=1}^{n_k} \sum_{j=1}^{n_j} x_{j,k_i}}{n_i} \right) \times P_i \right)$$

C_{oi} = Innovation coefficient ;
 i = factor;
 j = respondent;
 k = questionnaire item;
 $P_i =$

x_{j,k_i} = answer given to k item by respondent j,
 factor i
 n_i = total number of factor i answers;
 n_k = total number of items; and,
 n_j = total number of respondents.

The Coefficient of Orientation Towards Innovation (COTI) of the organizations dealt with in on our study is shown on Table 1.

Table 1
Coefficient of Orientation Towards Innovation of the organizations surveyed according to the model of management assessment

Assessment Model	Organization	Orientation Towards Innovation
Gespública	1	7.6
	2	9.6
	3	6
	4	7.1
	5	7.7
	6	8.6
	7	5.5
	8	6.8
	9	7.4
	10	4.1
Siadap	11	5.5
	12	7
	13	6.3
	14	4.1
	15	7.5
	16	8.9
	17	6.6
	18	7
	19	6.4
	20	8
Deloitte	21	5.4
	22	6.6
	23	5.5
	24	9.4
	25	6.2
	26	8.4

As demonstrated in both exploratory and confirmatory analyses, the best fit, after three iterations, produced two factors (1) a working environment which systematically encourages learning and (2) Competence management and systematic monitoring of the external environment.

From the description of the theoretical model, the review of literature, the analysis of the contents generated by the zones of meaning detected in the interviews and focal groups, a high adherence to exploratory and confirmatory factors was observed. For the organizations regarded as benchmarks, on the basis of the qualitative analysis carried out, there seems to be a convergence between cultural and organizational elements and the factors obtained.

5. CONCLUSION, RECOMMENDATIONS AND STUDY LIMITATIONS

Concerning studies on state-run organizations, the scale here designed may be regarded as a first of its kind, in that it seeks to determine factors of orientation towards innovation in both Brazilian and Portuguese public organizations, well-known for their overall complexity, using management performance assessment.

In general, the interviews revealed resistance towards more radical innovation, and the opposition was even higher regarding well-structured and systematized organizational learning. Very few organizations acknowledged the potential role of middle managers. These managers are the lifeblood of an organization, since they are able to deflect the political interferences found in top management.

Both the data from organizations participating of qualitative phase of the study and the meanings collected from the experts in public management help us understand the complexity of the public sector. Leadership in public organizations is viewed as factor of either continuity or discontinuity of innovation, and innovation is the result of changes with added value as perceived by citizens. If the customer does not recognize the value of innovation, no real innovation took place. The interviews conducted made it clear that there is a dire need of new leaders emerging from solid leadership development programs, if a new dynamism is to be introduced in public organizations. The analysis of the zones of meaning stressed the strong role leaders may play on mobilizing organizations and making them more flexible and dynamic, regardless of laws and regulations. This, in turn, may positively impact knowledge-sharing among employees.

Benchmarking was not observed as a systematic, generalized and encouraged practice. Once public organizations known for organizational excellence embrace this concept, it may become more widespread. Without mediating experts, benchmarking implementation across the majority of public organizations remains quite unlikely. The Federal Government could intervene to make the exchange of competences and experiences less complex. The participation in organizational excellence recognition awards may work as competitive stimulus.

Document and interview data collected in this study indicate that, even in organizations with a high coefficient of orientation towards innovation, innovation is often just incremental and lack of efforts, methods, and models conspire against more radical innovations in the public sector. Rarer still are the much-needed breakthrough initiatives that would change the face of public services, and this calls for solid government-led cross-sectoral policies. Discontinuity is a serious risk if these initiatives are carried out by isolated public organizations.

According to the data gathered in this study, the three organizations which attained benchmark performance explicitly demonstrated a causal link between their results and the systematized management practices grounded on sensible strategic choices. Hallmarks of organizations open to exchanges with external environments are error tolerance as innovation practices are taking place, interest in new ideas, and a collaborative learning culture. These virtues, while scarce in the public service, have been embraced by other organizations, which are changing old paradigms in their particular area of business by adopting new management culture and practices and new delivery systems to their users.

Innovation can only offer sustainable added value for the public sector (service users, employees, providers [suppliers], society and government) if the management model adopts practices that encourage the orientation towards innovation, making it an integrative part of the overall organizational system. Otherwise, innovation would only take place for innovation's sake, a set of random practices without any real connection with users.

Given the lack of empirical research on innovation in the public sector (as demonstrated by document analysis), particularly in Brazil and Portugal, this study offers theoretical, methodological and practical contributions to this area of investigation. Our main contribution lies in creating a method to assess orientation towards innovation, using both qualitative and quantitative techniques – the Coefficient of Orientation Towards Innovation (COTI).

Organizations with higher COTI were found to regularly invest in innovation-related competence building, establish a channel of communication with their employees, users and suppliers, and acknowledge their contributions to the solution of problems and their suggestions for improvement. With few exceptions, the organizations which attained benchmark performance in the management assessment models studied here seem to have given the first steps into roadmapping, a method which allows for establish strategic goals at both the organization level and the sectoral level, taking into account the different expertise and interests of the parts involved in the value chain. However, the process still needs fine-tuning to systematize the peculiarities of the public sector, the current and future services for the stakeholders and the current and future resources and supplies.

As with any research, this study has some limitations. Firstly, it is a cross-sectional investigation with the core of our analysis based on the results for 2008, and as such, it was not possible to observe the innovations and orientation towards innovation practices in the preceding years. Secondly, our findings cannot be generalized to the public service, since both the Brazilian and the Portuguese samples were selected from models which excluded high performance organizations. Therefore, the findings presented are restricted to the organizations participating in the respective models for the 2008 cycle, and should not be extrapolated to other cycles and sectoral contexts.

Following the sampling criteria, 123 cases in the two countries were analyzed. Further research would demand a larger sample and the reapplication of the Scale for Orientation Towards Innovation, and the Coefficient of Orientation Towards Innovation itself, in order to refine the Scale using other contexts. Of the 75 organizations which comprised the population of the study, 28 agreed on participating in the data collection phase(s). Some organizations refused to participate in any of the phases.

The composition of the sample of high performance organizations was based on three different models of management assessment. Though they share similar requirements, different scales and criteria assessing contexts of different countries were dealt with. Although the profile of the survey respondents was defined within a particular scope, there is no way to ensure that the evaluations carried out by the participants represent reliable indexes for orientation towards innovation, since estimations based on self-perception may be biased. Some of the variables used to test the orientation towards innovation model presented distributions with moderate deviations from normality, despite the robust statistic techniques employed.

These limitations are common in studies on organizations and do not invalidate the investigation, methods and findings in the light of the analyses and the data treatment undertaken.

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