Factors Affecting Continual Process Improvement in Iranian Social Security Organization’s Hospitals

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Abstract: Process improvement is one of the new approaches in managerial topics which is recently considered by the Iranian Healthcare Centers. The present study aimed to identify the main factors of continual process improvement in Iranian Social Security Organization’s hospitals. This study was descriptive and applicable. It is done through analysis of a questionnaire designed after recognition of the main variables in ISO 9001 standard. Forty eight Iranian Social Security Organization Hospitals (the major governmental health institutions in Iran) which were known to have applied at least one of the process orientated models were chosen as for the purpose of the study. The members of research community were in charge of quality improvement and quality improvement experts of these hospitals (n=96). Content validity and construct validity were assured with expert judgment and the reliability of the questionnaire was determined using Cronbach’s alpha and Pearson correlation (first and second times). Cronbach’s alpha coefficient was respectively 0.889 and Pearson correlation was 0.961 (p<0.001). After the sample size was proved to be sufficient, the exploratory and confirmatory factors were analyzed. The findings of the present research showed that after conducting the factor analysis of "continual process improvement" one factor was extracted which named "continual improvement". The calculated fitness indexes proved the desirability and appropriateness of the factor and its structural relations. It may be concluded that this factor has substantial roles in the performance of continual process improvement approach and are considered to be the main factor while performing process improvement approach in these organizations.

Key words: Process Improvement · Iranian Healthcare · Social Security Organization · Health management

INTRODUCTION

Organizations are continually under competitive pressures and forced to re-evaluate their business models and underlying business processes. McCormack and Johnson mentioned that managing a business means managing its processes [1]. Daft argued that the organization should be designed to provide both vertical and horizontal information flow as necessary to accomplish the organization’s overall goals [2]. By focusing on the optimization and continuous improvement of business processes, organizations can establish a solid competitive advantage (to accomplish the organization’s main goals) by reducing cost, improving quality and efficiency and enabling adaptation to changing requirements [3].

Siha and Saud mentioned that quality and customer satisfaction are major items on each company’s agenda. The effort has to start internally, by continuously improving the business processes in every area, to reflect the changes in customers’ needs [4]. Ramesh et al. argued that, explicit representation of the context governing business processes is essential during (re)design and improvement tasks [5]. Some studies showed that in order to increase the competitiveness and the efficiency and effectiveness of the business processes, global operating companies have a constant preoccupation on continuous process improvement [6-11].

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Balzarova et al. said that in doing process improvement, the organization must be able to manage its operations and tasks based on the analysis of its key processes [12].

Total quality management (TQM), business process reengineering, business process improvement and business process orientation are some of the techniques that are used extensively by organizations to improve operational efficiency. [13-18]. Sidikat and Ayanda mentioned that today organizational development is a continuous process improvement [19].

Some studies showed that business process improvement (BPI) is introduced to provide an effective and comprehensive means to improve a company’s performance [20-22].

Improvement of the process (es) has focused on attempts to change practices to be more responsive to customers and to improve performance in quality, time, speed and reliability, while reducing production costs [23]. Carpinetti et al. argued that continuous improvement has been defined as a companywide process of focused [24].

Over the years, process improvement has become more important for manufacturing. Today and in the future, the service sector (like healthcare centers) will also increasingly use process management techniques and technologies for health care, banking, government and retail [25, 26].

Hamidi and also Nikniaz mentioned that, although numerous health care centers have developed ongoing programs for the implementing process orientation approaches and many process orientation surveys have been published, few researches has been devoted to factors that may affect continual process improvement [27, 28].

Even though some of healthcare centers are applying process orientation, but it can be said, the factors that affect continual process improvement in Iranian hospitals are not fully recognized and studied till now. Therefore, the present research was performed with objectives such as the identification of factors affecting continual process improvement in the Iranian Social Security Organization’s hospitals and the research question was “what were the main factors that affect continual process improvement in these hospitals?”

Conceptual Framework: Some extensive literature suggests that organizations can enhance their overall performance by adopting a process view of business [29-31]. But some of the literature on business process management lacks research or an empirical focus on process improvement [32].

According to Stoddard and Jarvenpaa business process are simply a set of activities that transformed a set of inputs into a set of outputs (goods or services) for another person or process using people and equipments [33]. Business process involves a wide spectrum of activities procurement, order fulfillment, product development, customer service and sales [34].

Business processes view is expressed in a classical definition of business process made by Hammer and Champy: A collection of activities that takes one or more input and creates an output that is of value to the customer [29]. Other similar definitions are made by Johansson et al., Rummler and Brache, Schutta, Zaheer et al. [35-38].

Over the last 25 years, a variety of BPI methodologies and frameworks have been proposed and sometimes applied but seldom were actual results integrated into a coherent body of knowledge. BPI gained prominence in the early 1990s through a series of breakthrough books and research papers [39].

Hammer defines continual process improvement as “A structured approach to performance improvement that centers on the disciplined design and careful execution of a company’s end-to-end business process” [40]. Some studies showed that continuous improvement has been defined as a continuous incremental innovation [41].

Continual process improvement is a structured approach to analyze and continually improve fundamental activities of a company’s operation by simplifying and streamlining business processes. According to Harrington, the process improvement refers to making businesses efficient, effective and flexible to meet customer expectations in products and services [42]. In general, improvement initiatives are grouped under three categories: defect prevention, improvement actions and cost of quality deficiencies. [21]. This emphasis makes it essential that the organizations pay attention to the overall effectiveness of its processes and Improvement actions refer to continual upgrading of the quality standard targets in business processes.

MATERIALS AND METHODS

Design of the Study: This study was descriptive and applicable. Forty eight Iranian Social Security Organization’s Hospitals, which were known to have applied at least one of the process orientated models,
were chosen for the purpose of this study. The members of research community were in charge of quality improvement and quality improvement experts of these hospitals (n=96). There was no sampling and all of the research communities were asked.

**Design a Questionnaire and Data Collection:** The researchers developed a questionnaire based on variables impacting continual process improvement in ISO 9001 standard (these variables was shown in result chapter). Expert judgment method was applied to assess the validity of the questionnaire. So the designed questionnaire, were presented to five university professors, three managers in the ministry of health and two officials in charge of quality improvement in hospitals and they were asked to express their views on its construct, content, formal appearance and writing mode. Then the necessary amendments were made and the validity of its content and construct were assured.

To determine the reliability of the questionnaire, the questionnaire was filled out by all of the research community two times within an interval of 14 days. Then the reliability of the questionnaire was determined using Cronbach’s alpha and Pearson correlation (first and second times). Cronbach’s alpha coefficient of the component “continual process improvement”, was respectively as 0.889 and Pearson correlation was 0.961(p<0.001). It showed that the questionnaire was reliable.

**Sufficiency of Sample Size and Meaningfulness of Correlation Matrix:** Before conducting the factor analysis method, the Sufficiency of sample size and meaningfulness of correlation matrix should be calculated. Sufficiency of sample size was used to establish whether the number of data that has collected was sufficient or not. Kaiser-Meyer-Olkin (KMO) was used to determine the sufficiency of sample size. Bartlet test of sphericity was used to establish whether the correlation matrix has meaningful difference with zero or not.

**Data Analysis:** The exploratory factor analysis was performed with maximum probability approach while the variables were interpreted with Variamax rotation approach. The results showed that one factor was extracted for the component “continual process improvement” with a special value greater than one. The factor showed 56.483 percent of the total variances of variables. All of the corresponding variables of the component “continual process improvement” were formed on the factor. The following variables formed the factor:

- Identification of reasons for potential nonconformities
- Identification of reasons for actual nonconformities
- Identification of nonconforming services
- Corrective actions
- Preventive actions
- Process auditing
- Reviewing preventive action taken
- Compilation of improvement design (Table 2).
Table 1: Frequency distribution of research community in accordance with demographic characteristics

<table>
<thead>
<tr>
<th>Demographic factors</th>
<th>Frequency percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>44%</td>
</tr>
<tr>
<td>Male</td>
<td>56%</td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
</tr>
<tr>
<td>Below 30</td>
<td>6%</td>
</tr>
<tr>
<td>30-39</td>
<td>54%</td>
</tr>
<tr>
<td>40-49</td>
<td>37%</td>
</tr>
<tr>
<td>50 and above</td>
<td>3%</td>
</tr>
<tr>
<td>Educational degree</td>
<td></td>
</tr>
<tr>
<td>Associate’s degree</td>
<td>10%</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>59%</td>
</tr>
<tr>
<td>Higher</td>
<td>31%</td>
</tr>
<tr>
<td>Acquaintance with process improvement topics</td>
<td></td>
</tr>
<tr>
<td>Very high</td>
<td>14%</td>
</tr>
<tr>
<td>High</td>
<td>47%</td>
</tr>
<tr>
<td>Medium</td>
<td>33%</td>
</tr>
<tr>
<td>Low</td>
<td>3%</td>
</tr>
<tr>
<td>Very low</td>
<td>3%</td>
</tr>
</tbody>
</table>

Table 2: Recycled matrix of factor

<table>
<thead>
<tr>
<th>Process improvement</th>
<th>Variables</th>
<th>Factor</th>
<th>t</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Code</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BH1</td>
<td>Identification of reasons for potential nonconformities</td>
<td>0.693</td>
<td>4.40</td>
<td>0.48</td>
</tr>
<tr>
<td>BH2</td>
<td>Identification of reasons for actual nonconformities</td>
<td>0.545</td>
<td>4.64</td>
<td>0.30</td>
</tr>
<tr>
<td>BH3</td>
<td>Identification of nonconforming services</td>
<td>0.651</td>
<td>4.49</td>
<td>0.42</td>
</tr>
<tr>
<td>BH4</td>
<td>Corrective actions</td>
<td>0.615</td>
<td>4.55</td>
<td>0.58</td>
</tr>
<tr>
<td>BH5</td>
<td>Preventive actions</td>
<td>0.873</td>
<td>3.28</td>
<td>0.76</td>
</tr>
<tr>
<td>BH6</td>
<td>Process auditing</td>
<td>0.656</td>
<td>4.48</td>
<td>0.43</td>
</tr>
<tr>
<td>BH7</td>
<td>Reviewing preventive action taken</td>
<td>0.820</td>
<td>3.83</td>
<td>0.67</td>
</tr>
<tr>
<td>BH8</td>
<td>Compilation of improvement design</td>
<td>0.765</td>
<td>4.16</td>
<td>0.58</td>
</tr>
</tbody>
</table>

* t > 1.96

The confirmatory factor analysis was made with the use of the software “Lisrel 8.7” to verify the fitness of the factors achieved by the explanatory factor analysis. Figure 1 showed path diagram of continual process improvement component.

The fitness indexes of RMSEA, GFI, CFI, NNFI, IFI, AGFI and RMR were respectively 0.045, 0.92, 0.93, 0.91, 0.93, 0.90 and 0.029 for the component “process improvement”. The findings of confirmatory factor analysis showed that these fitness indexes calculated for the component “continual process improvement” were desirable. NFI and RFI were respectively 0.88 and 0.83 and Pvalue was less than 0.05 in the component “continual process improvement”. Nevertheless, other fitness indexes are evidences of desirable and appropriate fitness (Table 3).

Then, in the component “continual process improvement” the factor was named respectively “continual improvement”. Findings of this research identified one factors regarding process improvement.

The findings of the study done by Siha and Saad stated that the framework design for process improvement consists of three main phases: Specify; analyze; and monitor closely. Accordingly, it is denoted by SAM [4].
Table 3: Fitness indexes calculated for each component

<table>
<thead>
<tr>
<th>Component / index</th>
<th>Root mean square error of approximation (RMSEA)</th>
<th>Goodness of fit index (GFI)</th>
<th>Comparative fit index (CFI)</th>
<th>Normed fit index (NFI)</th>
<th>Non-normed fit index (NNFI)</th>
<th>Incremental Fit Index (IFI)</th>
<th>Related Index (RFI)</th>
<th>Adjusted Goodness of fit index (AGFI)</th>
<th>Adjusted Root mean square residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process improvement</td>
<td>0.045</td>
<td>0.92</td>
<td>0.93</td>
<td>0.88</td>
<td>0.91</td>
<td>0.93</td>
<td>0.83</td>
<td>0.90</td>
<td>0.029</td>
</tr>
</tbody>
</table>

Also they argued that the success factors for process improvement comprise two categories: specific, tool-based and general; system-based. In our research the continual improvement factor was system-based factor. Thus it can be said that the findings of this research, somewhat correspond with Siha and Saad in some respects.

Harmon argued that the ISO 9000 family of standards is used the variables such as “identification of reasons for potential nonconforming”, “identification of reasons for actual nonconforming”, “identification of inconsistent services”, “Corrective actions”, “Preventive actions”, “Process auditing”, “Reviewing preventive actions taken” and ... for continual improvement [31]. Dalmaris et al. who have also performed a research to recognize main component regarding process improvement, have implicitly referred to some main factors. One of these components was process auditing [23]. So it can be concluded that the findings of the present study is, therefore, in conformity with the findings of Harmon’s and Dalmaris et al.

Carpinetti et al. stated that main elements of improvement include “performance assessment (for identify nonconforming)”, “improvement actions” and .... The improvement actions element is like the improvement plan variable in this study [24]. Thus it can be said that the findings of this research correspond with Carpinetti et al. in some respects.

Rezaiea et al.1 have recognized main factors impacting process management in their research. They have identified continual improvement as one of main factor and “evaluating appropriate improvement ideas for implementation suitable to achieve high performance processes for identifying nonconforming”, as one of main variables involved in continual improvement.

According to the study of Balzarova et al. measures of performance (system and process level) are one of the key success factors for implementing process improvement [12]. This factor can appear the nonconforming of system. Thus it can be said that the findings of this research, correspond with Rezaiea et al. and Balzarova et al. in some respects.

CONCLUSION

Findings of this research identified one factor regarding process improvement. The factor has been called “continual improvement”. The confirmatory factor analysis, too, indicated that the structural model of this factor was proper.

Based on the results achieved through the present research and taking into account that the factor “continual improvement” have been given high points by the people in charge of quality improvement and quality improvement experts in the Social Security Organization’s hospitals, we may concluded that this factor has substantial roles in the performance of continual process improvement in these organizations.

ACKNOWLEDGEMENTS

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