Management Science Letters 3 (2013) 1255–1260

Contents lists available at GrowingScience

Management Science Letters

homepage: www.GrowingScience.com/msl

Performance measurement in governmental agencies using BSC-AHP: A case study of Civil Registry Office in Tehran

Ahmad Valashjerdi Majd Abad Kohneh[a*], Badrodin Oorehee Yazdani[b] and Aminreza Kamalian[b]

Department of Industrial Engineering, Zahedan Branch, Islamic Azad University, Zahedan, Iran
Associate Professor of Governmental Management, University of Sistan and Balouchestan, Zahedan, Iran

C H R O N I C L E

Article history:
Received October 27, 2012
Received in revised format
29 January 2013
Accepted 19 February 2013
Available online
February 24 2013

Keywords:
Balanced Score Card
Analytical Hierarchy Process
Civil Registry Office in Tehran

A B S T R A C T

Measuring the performance of governmental organizations plays an important role on increasing public satisfaction in any society. One of the effective models for assessing the organizations performance is balance scorecard (BSC) model, which investigates all aspects of organizations. In this paper, we use a hybrid of analytical hierarchy process along with BSC to measure the performance of five different civil registry offices in Tehran, Iran. We use fuzzy terms to handle uncertainty in input numbers and using some technique convert fuzzy numbers into crisp values. The results of our survey indicate that learning and development is number one priority with relative importance of 0.491, followed by customer with relative importance of 0.293, internal process with relative importance of 0.173 and financial affairs comes at last with relative weight of 0.043. The study uses organizational researchers, training, quality, customer satisfaction, performance measurement, expenses and annual budget as major components for analyzing five regions. We have also performed sensitivity analysis to see the effects of different changes on ranking.

1. Introduction

Balance scorecard (BSC) method is a strategic planning system, which has been used in many governmental and non-governmental organizations, significantly. BSC is actually a management system, which capables organizations to specify their objectives and strategies and apply them within the organization (Olson & Slater, 2002). Kaplan and Norton (1996) are believed to be the first people who introduced BSC concept in 1992 and applied it as a performance evaluation system, especially for 12 companies in USA in 1992. The primary objective of BSC is to replace and to make necessary changes on the traditional performance evaluation model, which are merely concentrated on financial indexes to find more complete and effective evaluation of organizational performance. Note that financial perspective is the only part of organizational performance evaluation in BSC and other

Corresponding author.
E-mail: v.ahmad1987@gmail.com (A. Kohneh)

doi: 10.5267/j.msl.2013.02.021

aspects of traditional model are also considered such as customer, internal business processes and employee's growth and learning, so that performance evaluation model can achieve more balance and efficiency compared with past. These aspects are necessary for perception and implementation of a perfect performance evaluation system and formation of a general set of organization performance indexes for strategic investigation of all objectives and activities of a particular firm. The concept and meaning of the four aspects are as follow,

1. Financial aspect: this perspective examines how firms benefit from their strategic activities.
2. Customer aspect: this perspective concentrates on the issue that organizations should benefit of their inherent and available resources for the distinction among their competitors.
3. Internal business process aspect: all the strategic activities in any firm performed to satisfy stockholder and customer's expectations are studied in this perspective. General process is started by perception of customer's needs and the operational and sale processes are performed after that.
4. Growth and learning aspect: if firms wish to maintain permanent activity and development, they need to focus on constant growth and innovation.

Kaplan and Norton (2000) stated that organizations had to emphasize on some principals such as promotion of employee's capabilities and abilities, information system performance, persuasion, etc. This perspective includes three main criteria including employee satisfaction, employee continuity and efficiency. Companies and organizations need to build performance evaluation indexes by these criteria. Performance indexes should always be chosen properly based on organizational objectives. Index selection plays an important role for studying the required industry performance, since we consider efficiency of manufacturing operations and create significant advantages by accurate investigation of these indexes. Performance key indexes should be studied for achievement of strategic objectives in every four aspects of BSC (Wang et al., 2011). Relationships among various aspects of BSC are indicated in Fig. 1.

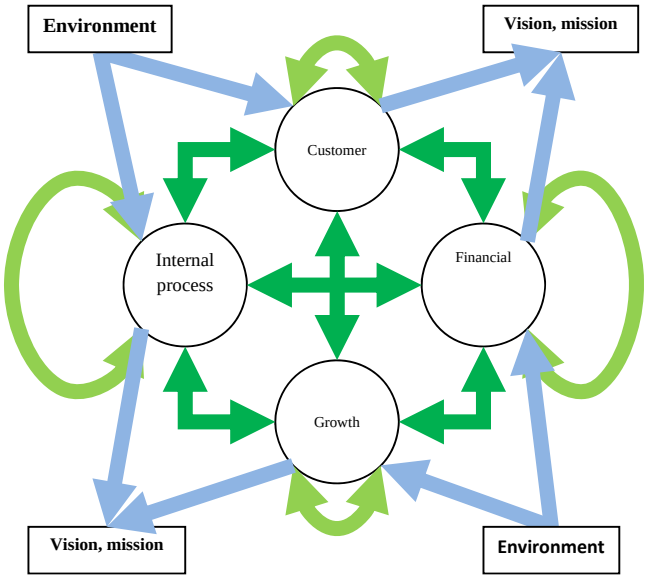

Fig.1. Relations among different aspects of BSC

Kaplan and Norton believed that BSC includes influencing and influenced relationships among various indexes in selected aspects. Others expressed experimental evidences in support of causal relationships among various aspects of BSC (Schmidberger et al., 2009). BSC has also been used for propose good strategy for building lean organizations (Seyedhosseini et al., 2011). These

relationships point to the correlations among financial and nonfinancial indexes. A structured BSC method normally includes mutual relationships among different perspectives and measuring indexes of these aspects (Wang et al., 2010).

Grigoroudis et al. (2012) used BSC for measuring performance measurement in healthcare systems. Huang et al. (2009) designed a knowledge based system using BSC system. Huang et al (2011) developed strategic measurement and improvement for the biopharmaceutical firm based on the implementation of the BSC hierarchy. Lin and Wu (2008) proposed a causal analytical method for group decision-making under fuzzy environment. Yuksel and Dag deviren (2010) implemented the fuzzy analytic network process (ANP) for BSC for a case study in manufacturing industry. BSC is normally a multi criteria concept for measuring organizational performance measurement (Tseng, 2010).

In this paper, we present an integrated BCS and analytical hierarchy process (AHP) to measure the relative performance of different Civil Registry Office in Tehran. The organization of this paper first presents details of proposed study in section 2 while section 3 explains details of our results and the paper ends with concluding remarks.

2. The proposed study

The proposed study of this paper uses AHP method to rank four perspectives of BSC method. The results of our survey indicates that learning and development is number one priority with relative importance of 0.491, followed by customer with relative importance of 0.293, internal process with relative importance of 0.173 and financial affairs comes at last with relative weight of 0.043. Table 1 demonstrates detail of internal process components in standard time.

Table 1
Details of some of internal processes

Row	Description	Time (minutes)
1	Birthday registration and issuing identification	29
2	Processing application for changing identification	13
3	Replacement of identification	31
4	Issuing national identification card	23
5	Issuing death certificate	26
6	Registering four major classifications	7
7	Picture installation	10
8	Board votes to issue and enforce arbitration	36
9	Changing last name	34
⋮	⋮	⋮

The proposed study uses the following hierarchal flow chart for BSC implementation.

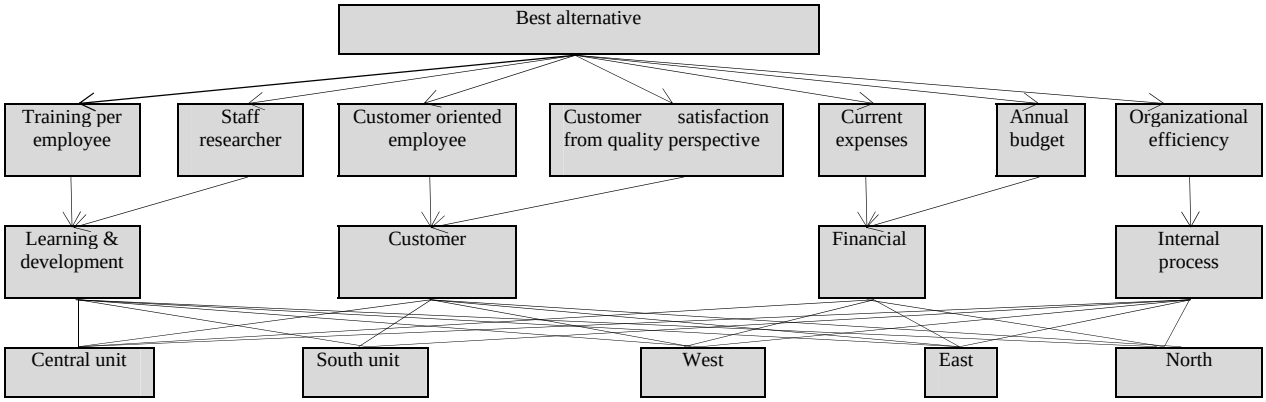

Fig. 2. The proposed structure of the proposed model

In order to measure different attributes described in Fig. 2, we use two different questionnaires where the first one is associated with customer oriented and the second one is associated with customer satisfaction. We first ask five employees and ten customers to validate the questionnaires and Cronbach alpha were calculated as 0.794 and 0.961, respectively. Next, we distributed the questionnaire in five different regions and calculated the average person-hour work of all units and Table 2 shows details of relative efficiency of various units.

3. The results

We first measure the performance of internal processes of five different regions and Table 2 shows the results of our survey.

Table 2
The results of relative efficiency of various units

	East	West	North	South	Center
Number of employees	58	65	39	50	58
Total work hours	5355.06	7357.85	4407.46	5833.01	5161.76
Working hours	132	132	132	132	132
Work per person	97.36	113.197	113.012	116.66	88.99
Efficiency	73.76%	85.75%	85.61%	88.37%	67.42%

In order to measure the relative performance of internal processes in five different regions we have used pair-wise comparison and Table 3 demonstrates the results of our survey.

Table 3
The results of pair-wise comparison

	Center	South	North	West	East
Center	1	1/9	1/7	1/7	1/6
South	9.00	1	3.00	3.00	4.00
North	7.00	1/3	1	10.00	3.00
West	7.00	1/3	1/10	1	3.00
East	6.00	1/4	1/3	1/3	1

Consistency ratio = 0.03

The consistency ratio has been calculated as 0.03, which is less than 0.1 and this means the information are reliable. In addition, the consistency ratios for learning organization, training, quality perspective, customer satisfaction, performance, expenses, and annual budget are calculated as 0.01, 0.03, 0.05, 0.07, 0.05 and 0.06, respectively. Therefore, the final ranking of all regions are summarized in Table 4 as follows,

Table 4
The results of scores of each region

Region	Organizational researchers	Training	Quality	Customer satisfaction	Performance measurement	Expenses	Annual budget	Point	Rank
Center	0.052	0.273	0.044	0.543	0.102	0.095	0.205	0.192	3
South	0.052	0.036	0.071	0.031	0.030	0.220	0.087	0.046	5
North	0.333	0.440	0.044	0.160	0.454	0.599	0.547	0.336	1
East	0.512	0.176	0.603	0.042	0.207	0.044	0.126	0.133	4
West	0.052	0.075	0.238	0.224	0.207	0.044	0.035	0.293	2

As we can observe from the results of Table 4, unit north is number one priority in terms of performance followed by west region, center, east and south. Since two regions of north and west are ranked very closely, we need to perform some sensitivity analysis. The implementation of Expert Choice for sensitivity analysis of different options have indicated that financial maintains the minimum weight change (-4.3%) followed by customer (+5.9%), performance (-7.4%) and training

represents the maximum change (-45.7%). In terms of influential factors, exchanges in middle level management as well as political and social change maintain an average rate of importance. Lack of employee motivation and resources have higher impact and lack of budget has the highest impact on performance of regions. Table 6 shows details of our ranking different performance measures when the figures are defuzzified.

Table 6
The results of ranking of different perspectives

Performance measurement criteria	Defuzzified numbers	Rank
Performance	5.2658	1
Customer satisfaction	5.2658	1
Quality perspective of services	5.2567	4
Financial expenses	4.7614	7
Budget	4.7749	6
Organizational research	5.2610	3

The results of defuzzified numbers also indicate that performance as well as customer satisfaction plays the most important role followed by organizational research, quality perspective of services and financial expenses comes at last in terms of ranking.

4. Conclusion

In this paper, we have presented an empirical study to find important factors in five different regions of Civil Registry Office of Tehran, Iran. The proposed study of this paper used balanced scorecard for measuring all perspectives of these organizations and, using analytical hierarchy process as well as fuzzy logic, we have gathered decision makers' insights and ranked important factors. The study used organizational researchers, training, quality, customer satisfaction, performance measurement, expenses and annual budget as major components for analyzing five regions. We have also performed sensitivity analysis to see the effects of different changes on ranking various regions.

Acknowledgment

This paper has been supported by the management of Civil Registry Office in Tehran and the authors would like to thank them for their efforts on sharing their insights, comments and suggestions.

References

Grigoroudis, E., Orfanoudaki, E., & Zopounidis, C. (2012). Strategic performance measurement in a healthcare organization: A multiple criteria approach based on balanced score. *Omega*, 40, 104–119.

Huang, H. C. (2009). Designing a knowledge-based system for strategic planning: A balanced scorecard perspective. *Expert Systems with Applications*, 36(1), 209–218.

Huang, H. C., Lai, M.C., & Lin, L. H. (2011). Developing strategic measurement and improvement for the biopharmaceutical firm: Using the BSC hierarchy. *Expert Systems with Applications*, 38, 4875–4881.

Kaplan, R. S. & Norton, D. P. (1996). Using the balanced scorecard as a strategic management system. *Harvard Business Review (Jan-Feb), 74* (1), 75-85.

Kaplan, R. S. & Norton, D. P. (2000). *The strategy-focused organization*. USA: Harvard Business School Press.

Lin, C. J., & Wu, W. W. (2008). A causal analytical method for group decision-making under fuzzy environment. *Expert Systems with Applications*, 34(1), 205–213.

Momeni, M., Khodaei, S., & Bashiri, M. (2010). Evaluation of performance of society assurance organization by used of combination FDEA and BSC. *Journal of Industrial Management*, 3, 137-152.

Olson, E.M., & Slater, S.F. (2002). The balanced scorecard, competitive strategy, and performance. *Business Horizons*, 45, 11–16.

Schmidberger, S., Bals, L., Hartmann, E., & Jahns, C. (2009). Ground handling services at European hub airports: development of a performance measurement system for benchmarking. *International Journal of Production Economics*, 117, 104–111.

Seyedhosseini, S.M., Taleghani, A.E., Bakhsha, A., & Partovi, S. (2011). Extracting leanness criteria by employing the concept of Balanced Scorecard. *Expert Systems with Applications*, 38, 10454–10461.

Tseng, M.L. (2010). Implementation and performance evaluation using the fuzzy network balanced scorecard. *Computers & Education*, 55, 188 –201.

Wang, C.H., Lu, I.Y., & Chen, C.B. (2010). Integrating hierarchical balanced scorecard with non-additive fuzzy integral for evaluating high technology firm performance. *International Journal of Production Economics*, 128, 413–426.

Yuksel, I., & Dag deviren, M. (2010).Using the fuzzy analytic network process (ANP) for Balanced Scorecard (BSC):A case study for a manufacturing firm. *Expert Systems with Applications*, 37, 1270–1278.