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THE EVALUATION AND IMPROVEMENT PERFORMANCES OF MARKETING PROCESS

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Abstract: *The aim of this paper is to explain a model for evaluating performance of marketing process in production enterprises. These production enterprises operate in an uncertain and variable environment. Key performance indicators (KPIs) of marketing process are identified by management team. The relative importance of KPIs and their values is assessed by management team. They used linguistics expressions which are modelled by triangular fuzzy numbers. Improvement strategy is based on results which are obtained by applying Genetic algorithm.*
Keywords: *marketing process, evaluation of KPIs, fuzzy sets, Genetic algorithm*

1. INTRODUCTION

The different changes in the business world, for instance, competitive pressures, force industrial organizations to demand from strategic managers the continuous improvement of business processes. It is presented one of requirements ISO 9000:2008. The considered problem has become a topic of research for both industry and academia in the last decades. The most important prerequisite for defining an adequate improvement quality strategy is a clear understanding of business process quality [1].

The defining of business processes is based on mission statement, critical success factors (CSFs) could be identified – what the organization must accomplish to achieve the mission, by examination and categorization of the impact [2]. The defining of key performance indicators (KPIs) is based on the selected CSFs, which need to be clear, simple and easy to comprehend. Proper selection of KPIs is essential for effective performance measurement because too many KPIs can cause an unnecessary waste of time and money.

It can be mentioned that performance measurements can be objective and subjective. The objective performance measurements are based on independently observable facts and are easily quantifiable. The subjective performance measurement is complex and often difficult. Almost all authors of the presented papers suggest a framework which includes qualitative and quantitative KPIs.

The qualitative KPIs are described by linguistic variables. Modelling of linguistic variables can be performed by using the theory of fuzzy sets because [3]: (1) the fuzzy sets theory resembles human reasoning in its use of approximate information and uncertainty to generate decisions, and (2) fuzzy sets theory could be used as an appropriate and efficient approach in modelling linguistic expressions.

Different methods for evaluation of KPIs are developed in the literature. Those methods are developed on a different mathematical and logical framework, so that between these methods there is no consensus, indicating the difficulty of this research field [4].

The main aim of this research is to develop an assessment method that can be used to evaluate marketing process and identify management initiatives priorities for improvement in production enterprises. In these eneterprises marketing cost are very high [5]. In the literature, there are no papers in which the considered problem is solved. There are many reasons. It is necessary to make a difference between long-time and short-time effects of marketing initiatives, there are difficulties in measuring brand, very hifg importance of financial measure which are defined by strategic management team.

The paper is organized in the following way. Section 2 reviews a short overview of related research. The proposed algorithm is given in Section 4. Conclusions are presented in Section 5.

2. LITERATURE REVIEW

One of the most important requests of the standard ISO 9001:2008 can be defined as introducing a

management review for measurement and analysis and improving KPIs of business objectives.

In the literature and practice, there is no systematic grouping of the business process KPIs. It is realistic to assume that identification of KPIs depends on the size of the enterprise, as well as the type of activity and business sector where the enterprise belongs. Coccoa and Alberti [6] suggest that KPIs can be collected according to best practices.

In the literature, there are many proposed methods for the measurement of KPIs. Some of them are presented in Nudurupati *et al* [7]. For instance, in Coccoa and Alberti [6], a new self-assessment tool of KPIs for SMEs is proposed. In this, a model maturity scale with multiple descriptions is proposed and used. In [8] the authors used a fuzzy linguistic scale for the describing of government performance measurement. The linguistic scale was used to convert the subjective assessment of managers into an information entity. Hakimollahi *et al* [9] developed the performance measurement approach based on Balanced Score-card (BSC) [10] with a fuzzy interference IF-THEN rules. The judgments of experts are based on knowledge and experience.

Neely *et al* [11] suggested that performance measurement could be defined as the process of quantification of efficiency and effectiveness of action.

In many papers, the measurement of KPIs is stated as a multi-criteria decision making problem ([12], [13]). Evaluation of the relative importance of KPIs and their preference are obtained by using an interview method. A questionnaire is distributed among managers of the treated industrial companies. The overall priority is given using the fuzzy Analytic Hierarchy Process (FAHP). Evaluation and ranking of business objectives for four BSC perspectives is performed by applying FAHP [13].

In the literature, there are many papers in which different measurement methods for marketing process are developed ([14], [15], [16], [17]). It can be mentioned that there are differences between measurement methods of KPIs production and service enterprises ([18], [19]). Ambler and Puntoni [20] suggest a framework for measurement KPIs of marketing process. The obtained results must at least provide development a new perspectives in treated domain. In [21] a new organizational model for marketing process KPIs information handling is proposed. They investigated the effects of processing conditions on the satisfaction measurement system.

With respect to the recommendation of ISO 9001:2008 that each enterprise should develop an approach to improvement of processes, the issue of assessment of affectivity of KPIs and business objective effectiveness of KPIs could be stated as an important issue.

By comparing papers which propose a model for determining the effectiveness of business processes and KPIs, certain differences could be noted, which are further described. This analysis, at the same time, shows the advantages of the proposed model.

In this paper, KPIs are defined for each business sub-process. Experts define the list of possible KPIs; this is determined by literature data, results of good practice, and experts' knowledge of the importance of KPIs for the production enterprises. The presented model is novel because it combines determination of the relative importance of the identified KPIs for each business sub-process and their current values using the fuzzy approach. All existing uncertainties are described by linguistic expressions which are modelled by triangular fuzzy numbers (TFNs). The determining of vector weights of the identified KPIs is stated as fuzzy group decision making problem [22]. The aggregation opinions of decision makers into a group consensus can be performed by applying different methods. In this paper, the fuzzy ordered weighted averaging (FOWA) operator is used [23]. In this paper, an effort is given to observe simultaneously both crisp and uncertain KPIs in the problem of evaluation of KPIs.

3. THE PROPOSED FUZZY MODEL FOR MEASUREMENT OF KPIs OF MARKETING PROCESS

In process approach, the marketing process can be decomposed into sub-processes. Formaly, these sub-processes can be presented by set indices $K = \{1, .., k, .., K\}$. The total number of sub-processes is denoted as K and k, k=1,..,K is index of sub-process. These sub-processes are: planning of sales and marketing (k=1), promotion and propoganda (k=2), research market (k=3), arranging sales (k=4), the realization of contracts with customers and monitoring implementation (k=5), and resolving complaints from customers (k=6). KPIs of the sub-processes are presented by set indices $P_k = \{1, .., p, .., P_k\}$. The total number of KPIs of the sub-process k, k=1,..,K is denoted as P_k and p, p=1,.., P_k is index of KPI p of the sub-process k, k=1,..,K. The KPIs of the sub-process planning of sales and marketing (k=1) are: implementation of the plan of sales which is expressed in quantity (p=1), implementation of the plan of sales which is expressed in money (p=2), implementation of the marketing plan (p=3). The KPIs of the sub-process promotion and propoganda (k=2) are: success (p=1), and changing the current revenues compared to income before the promotional period (p=2). The KPIs of the sub-process research market (k=3) are: market positioning (p=1), timeliness of getting information (p=2), completeness of information (p=3), and usability obtained information (p=4). The KPIs of the sub-process arranging sales (k=4) are: percentage implemented offer (p=1) and time (p=2). The KPIs of the sub-process the realization of contracts with customers and monitoring

implementation (k=5) are: realization (p=1), delay (p=2) and success (p=3). The KPIs of the sub-process resolving complaints from customers (k=6) are: customer satisfaction (p=1) and complaints (p=2). The relative importnace of KPIs are assessed by management team at the level of each enterprise. It can be assumed that management team make decision by consensus. Formaly, considered enterprises are presented by set indices $E = \{1,..,e,..,E\}$. The total number of considered production enterprises is denoted as E and e, e=1,..,E is index of enterprise.

We calculate the overall weighted coefficients of: an enterprise, $r_e, e = 1,..,E$, sub processes with respect to all considered enterprises, $r_p, p = 1,..,P$ and KPIs with respect to all enterprises, $r_{kp}, k = 1,..,K_p; p = 1,..,P$. These values are given in terms of maximization function of the ranks' sum, S_{total} and minimization function of the ranks' variance of the corresponding variables, Var. At first place in the rank is the company which is associated with the highest value r_e, and it is labelled as e^* and at last place in the rank is the SME which is associated with the lowest values $r_e, e = 1,..,E$. In a similar way, the rank of sub processes of the production process and rank of KPIs are determined.

Determining the optimal strategy for improving marketing process quality in any enterprise. The considered enterprise, e, $e = 1,..,E; e \neq e^*$ is selected randomly.

In this case, the optimal increase of KPI values is obtained from the condition of the minimum proposed function f. The variables of function f are the sum of KPIs' ranks for the SME, e^* which is placed at first place in the rank, S_{max}, $S_{max} = \sum_{p=1}^{P}\sum_{k=1}^{K_p} w_p w_{kp} \cdot r_{kp}^{e^*}$ and the sum of KPIs' ranks of a randomly selected SME, S', $S' = \sum_{p=1}^{P}\sum_{k=1}^{K_p} w_p w_{kp} \cdot r_{kp}^{e}$ the parameter α and α_{kp} which are referred to as the total increase of the selected KPIs, i.e. the increase for KPI k, $k = 1,..,K_p$ of the randomly selected enterprise. The optimal increase of KPI values is obtained from the condition of the minimum proposed function f:

$$\min(f) = \min\left[S' + \alpha \cdot \left(S_{max} - S'\right)\right] - \sum_{k=1}^{K_p} \alpha_{kp} \cdot S'$$

The marketing process quality can be improved if appropriate management initiatives that lead to an increase in the value of one or more KPIs of the treated marketing process are applied. In practice, KPIs whose values should be increased are selected according to the stakeholder requirements. Each solution achieved in an exact manner is less influenced by subjective attitudes of decision makers, so it is more precise. With respect to this fact, we can conclude that decision makers could develop an appropriate and reliable improvement strategy for any enterprise type.

4. CONCLUSION

Improvement of the marketing process can be realized through measurement of their KPIs, improvement of personal motivation, checking the data collected and realization of appropriate preventive measures which led to improvement of marketing process.

The main contribution of this paper is the introduction of a model for assessment of marketing process effectiveness in production enterprises which exist in uncertain environment. The relative importance of KPIs of identified sub-processes of the considered business process, as well as determining their values is performed by using linguistic expressions. These linguistic variables are modelled by using the fuzzy sets theory. By using genetic algorithm (GA), improvements of KPIs are determined.

This paper contributes to both practice and research. As a contribution to real-life practice, the method could be very useful for: (1) management teams of manufacturing SMEs to increase the quality of products and efficiency of their businesses, (2) customers, and (3) other stakeholders.

The proposed method is flexible: (1) changes in the number and/or kind of KPIs, (2) changes in their relative importance, and (3) can be easily extended to the analysis of other management decision problems in different research areas.

The general limitations of the model are scoped to: (1) the need for well-structured sub-processes and and (2) the need for well-structured KPIs of identified sub-processes. It need may be fulfilled by implementation of a Quality management system according to ISO 9001:2008.

Future research should cover analysis of different KPIs of marketing process in different enterprise types. This should enable knowledge transfer amongst enterprises that belong to the same industry sector and as a final consequence improve sustainable development.

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