8th International Scientific Conference
"Business and Management 2014"
May 15–16, 2014, Vilnius, LITHUANIA
Section: Enterprise Management
http://www.bm.vgtu.lt

ISSN print 2029-4441 / ISSN online 2029-929X
ISBN print 978-609-457-650-8 / ISBN online 978-609-457-649-2
Article number: bm.2014.001
http://dx.doi.org/10.3846/bm.2014.001

SALES BRANCHES PERFORMANCE EVALUATION: A MULTIPLE ATTRIBUTE DECISION MAKING APPROACH

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Abstract. Many companies have sales branches in order to sell its own products in different places. Sales branches of companies play an important role in profit of every organization and evaluating sales branches is very important. This paper deals with the problem of sales branches evaluation by using multiple attribute decision making approach. Stepwise weight assessment ratio analysis (SWARA) was applied to prioritize and calculate the relative importance of the criteria and weighted aggregated sum product assessment (WASPAS) methodology was used to evaluate the branches. A case study in a sales and distribution company shows the performance of the proposed methodology.

Keywords: marketing, sales branches performance evaluation, multiple attribute decision making (MADM), stepwise weight assessment ratio analysis (SWARA), weighted aggregated sum product assessment (WASPAS).

JEL classification: C63, G11, L25.

1. Introduction

Sales branches play an important role in sales process of numerous companies. Many organizations apply sales branches in order to be able to receive feedback of the consumers and improve their direct relationship with them. In addition, feedback of the customers can be used for designing new products, changing packages, upgrading services, making promotion plans and pricing analysis. Besides, direct relationship with consumers might help to explore new opportunities. In many cases, when a company is not able to manufacture as efficiently as their competitors, by directly selling its products it can keep the price competitive. Also, in some industries an organization needs to sell through established branches because its customers want to be able to purchase through hundreds of outlets.

By analyzing sales branches performance managers can make changes to optimize sales forces going forward and aseess their marketing plans and strategies. Additionally, they can understand what is working and what is not working in the marketplace.

Sales branches performance evaluation is one of the critical, sophisticated and time consuming tasks, due to many feasible alternatives and conflicting objectives. Many potential qualitative and quantitative criteria for evaluating a branch, such as sales net weight, sales net profit, number of new customers, number of customers, average number of items in each sold bill, total diversity of products, etc. must be considered in evaluation of pro-

cedure of sales branches. Thus, sales branches performance evaluation can be viewed as a multiple criteria decision making (MCDM) problem.

The MCDM methods deal with making decisions in presence of multiple criteria and objectives which are often in conflict. A decision maker (DM) needs to assess different alternatives by considering potential factors in decision process. The MADM methods deal with the process of finding the best option from all feasible alternatives in the presence of multiple, usually conflicting, decision criteria. There are a lot of MADM methods in the literature, however, stepwise weight assessment ratio analysis (SWARA) is one of the brand new ones. SWARA was developed by Keršuliene *et al.* (2010) and it is a suitable technique to calculate the weights of the criteria in decision making process. Another new method which is used for ranking the alternatives is weighted aggregated sum product assessment (WASPAS). Briefly, in this paper two MADM methods were integrated. At first, SWARA method is applied to gauge and weigh the criteria of sales branches and then, WASPAS is used to evaluate and rank them. A case study on a dairy company in Iran is illustrated to show the applicability of the proposed model.

The rest of the paper is organized as follows. Section 2 presents the proposed integrated SWARA-WASPAS approach. Besides, SWARA and WASPAS methods are elaborated as well. In section 3 "Case study", a real-world example is given to prove the applicability of the proposed method on a very large sized sales and distribution enterprise in the Middle East. The results are also discussed in this section. Finally, the paper is concluded in section "Conclusion".

2. Proposed methodology

In this paper we proposed a combined SWARA and WASPAS approach for sales branches performance evaluation issue. After identifying a new project about evaluating performance of sales branches, candidate branches as the alternatives are identified. Next the most important criteria of sales branches are chosen. Then, the hierarchical structure of the problem is created. Based on these criteria, the required data are collected from the database and for qualitative criteria, experts' evaluations are applied. The weights of criteria are calculated with SWARA. Finally WASPAS is employed to achieve the final ranking of performance results.

2.1. Step-wise weight assessment ratio analysis (SWARA) method

There are various types of MADM methods for weight calculation in the literature. A decision maker (DM) usually finds it more difficult to evaluate different criteria in decision making process. In addition, in some methods, the numbers of calculations are very large and the accuracy of the method is not very good. SWARA is a method in which an expert uses his or her own implicit knowledge, information and experiences. Also, it is not complicated and time consuming and experts in many fields (Zolfani *et al.* 2013). The main feature of SWARA method is the possibility to estimate experts or interest groups' opinion about significance of the attributes in the process of their weights determination (Keršulienė *et al.* 2010). The most significant criterion is given rank 1, and the least significant criterion is given the last rank (Aghdaie *et al.* 2013b). The final ranks to the group of experts are determined according to the average value of ranks (Kersuliene, Turskis 2011). The all past and recent researches applying with SWARA methodology are:

Keršuliene *et al.* (2010) in rational dispute resolution method selection; Keršuliene and Turskis (2011) for architect selection; Zolfani *et al.* (2013a) in product design; Zolfani *et al.* (2013b) in selecting the optimal alternative of mechanical longitudinal ventilation of tunnel pollutants; Zolfani *et al.* (2013c) in investigating on the success factors of online games based on explorer; Zolfani *et al*. (2013d) in Decision making on business issues with foresight perspective; Zolfani and Zavadskas (2013) in sustainable Development of Rural Areas' Building Structures Based on Local Climate; Zolfani and Saparauskas (2013) in Prioritizing Sustainability Assessment Indicators of Energy System; Zolfani and Bahrami (2014) in Investment Prioritizing in High Tech Industries; Aghadie *et al.* (2013a) in the machine tool selection; Aghadie *et al.* (2013b) in market segmentation and selection; Alimardani *et al.* 2013 in agile supplier selection.

The procedure for the criteria weights determination is presented in Figure 1.

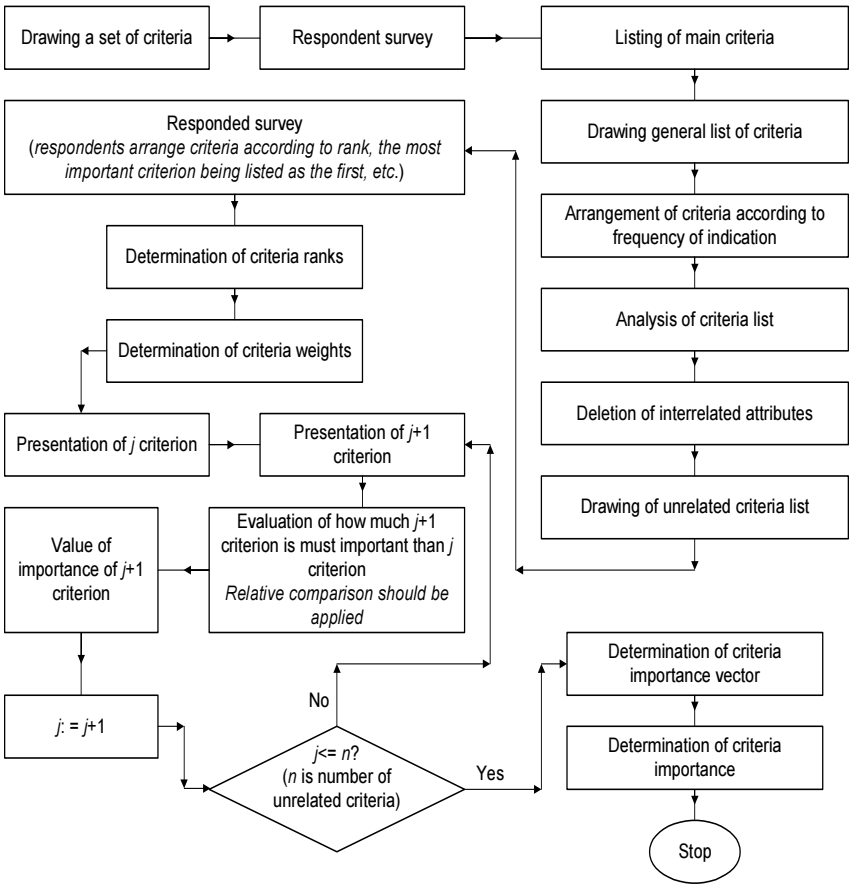

Fig. 1. Determining of the criteria weights based on SWARA (source: Keršulienė & Turskis, 2011)

2.2. Weighted aggregates sum product assessment (WASPAS)

In the following section the WASPAS methods is explained. This method is presented recently and it is known as one of the newest methods proposed by scientists. The method is based on weighted sum model (WSM) and weighted product model (WPM) (Zavadskas *et al.* 2012).

All researches based on the WASPAS method up to now are described in several sources:

Zavadskas *et al.* (2012) developing WASPAS as a new methodology; Staniunas *et al.* (2013) in the Ecological – economical assessment of multi-dwelling houses modernization; Bagočius *et al.* (2013) in Selection of a Deep-Water Port; Zavadskas *et al.* (2013a) in Assessment of Facades' Alternatives: Peculiarities of Ranking Methodology; Zavadskas *et al.* (2013b) in Verification of robustness of methods when assessing alternative solutions; Zolfani e*t al.* (2013d) in Decision making on business issues with foresight perspective and Dejus and Antucheviciene (2013) in Assessment of health and safety solutions at a construction site.

WASPAS calculation is based on these steps:

Normalized decision making matrix:

$$\overline{x}_{ij} = \frac{x_{ij}}{\underset{i}{opt}\, x_{ij}}, \quad (1)$$

where $i = \overline{1,m}$; $j = \overline{1,n}$

If opt value is max.

$$\overline{x}_{ij} = \frac{\underset{i}{opt}\, x_{ij}}{x_{ij}}, \quad (2)$$

where $i = \overline{1,m}$; $j = \overline{1,n}$

If opt value is min.

Calculating WASPAS weighted and normalized decision making matrix for summarizing part:

$$\overline{\overline{x}}_{ij,sum} = \overline{x}_{ij} q_j, \quad (3)$$

where $i = \overline{1,m}$; $j = \overline{1,n}$

Calculating WASPAS weighted and normalized decision making matrix for multiplication part:

$$\overline{\overline{x}}_{ij,mult} = \overline{x}_{ij}^{q_j}, \quad (4)$$

where $i = \overline{1,m}$; $j = \overline{1,n}$

Final calculating for evaluating and prioritizing alternatives based on:

$$WPS_i = 0.5\sum_{j=1}^{n} \overline{\overline{x}}_{ij} + 0.5\prod_{j=1}^{n} \overline{\overline{x}}_{ij}, \qquad (5)$$

where $i = \overline{1,m}$; $j = \overline{1,n}$.

3. Case study

A real case study is illustrated in Bonny Chow to depict the application of the proposed model. Bonny Chow is a very large sized distribution and sales enterprise which has more than forty branches inside of Iran. It has over 6000 emloyees with an annual turnover of $450 million. In addition, the company is very active in food and related industries. Besides, it works in fast moving consumer goods (FMCG) business and sells dairy, meat, ice cream, beverages and sauce. The customers are different retailers from all around the country and even outside of Iran. Historically, the company assesses its sales branches just by considering the net profit of every branch. Managers and salespeople earnings are based on this result.

Therefore, a good branch with average level of profit in an area with limited or low income customers cannot gain fair earnings; however, in reality the performance of the branch is reasonable. In addition, efforts of some branches to reach higher levels of grades cannot be seen easily. For these shortcomings and improving the motivation of managers, a new sales branches performance evaluation project was defined. Therefore, a three phased methodology was planned to tackle the problem of sales branches performance evaluation process (see Fig. 2).

Figure 2 describes the evaluation procedure of this study which consists of three main phases:

Phase I. A project team consisted of two marketing managers, three sales area managers and CMO working for the company was constructed. They had more than 10 years experience in FMCG industries and they were male.

They reached the consensus on the conducting a new evaluation process for seven branches. Next, after a lot of face to face meetings, the most important criteria for sales branches performance evaluation were identified. Then, the qualitative and quantitative criteria were selected. The proposed criteria related to the sales branches performance evaluation problem are presented in Table 1.

The seven criteria were selected to perform the analysis. They are: sales net weight, sales net profit, number of new customers, number of customers, average number of items in each sold bill, total diversity of products, and total number of sold bills. Only the first criterion was qualitative, so 1-9 scoring scale was used to score sales net profit of the selected branches. In this study all the criteria are benefit criteria.

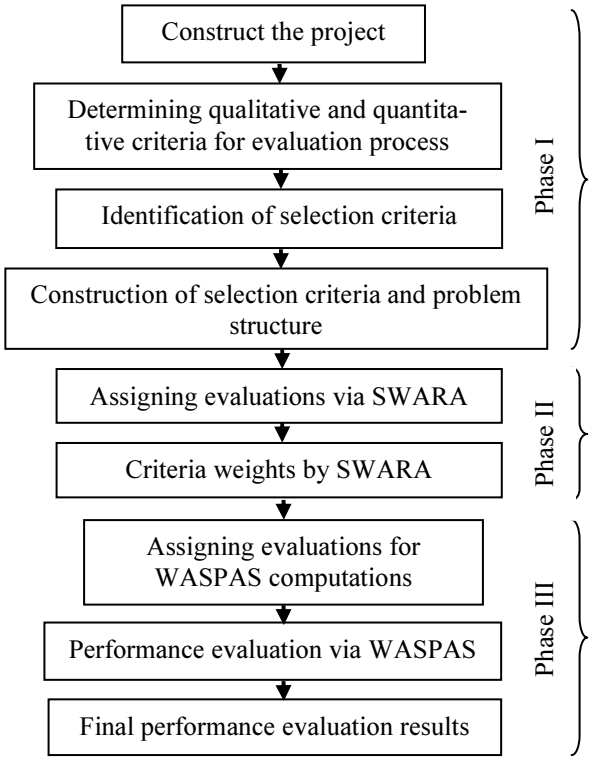

Fig. 2. A three phased methodology for sales branches performance evaluation (source: compiled by authors)

Table 1. The sales branches performance evaluation criteria (source: compiled by authors)

Criteria	Definition
C1: Sales net weight (Ton)	The net weight of sold products based on ton unit during the last month.
C2: Sales net profit	The net profit of sold products based on dollar unit for the last one month.
C3: Number of new customers	How many new retailers have bought from the branch for the last six months?
C4: Number of customers	How many customers have bought from the branch during the last month?
C5: Average number of items in each sold bill	The average number of items in a consumer bill during the last month.
C6: Total diversity of products	The different number of goods which are bought by all consumers during the last month.
C7: Total number of sold bills	All number of bills which are purchased by all customers for the last one month.

Finally, the project team reached the consensus and constructed the selection criteria and prob-

lem structure. In this study customers are retailers. As depicted in Fig. 3, on the second level, there are seven criteria for evaluation process. Sales branches alternatives denoted as SB1, SB2, SB3, SB4, SB5, SB6, and SB7, respectively.

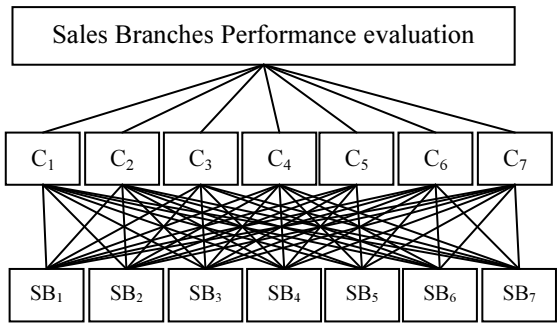

Fig. 3. Problem structure, selection criteria and alternatives (source: compiled by authors)

In phase II the criteria weights were calculated by applying SWARA method and based on experts 'evaluations. This phase can be names SWARA phase.

In the third phase, seven branches were evaluated by project team and based on real data. The real data was collected based on the company's data base. All the data for the phase were collected through database in January 2014 and WASPAS method was applied to achieve the final performance results.

4. Results

After representing the case study, proposed model, selecting the project team, identifying most important criteria for evaluating, representing the decision model and using analytical techniques, the last part of the study will focus on the obtained numerical results. Then, all selection criteria and alternatives, SWARA method was used to tackle the ambiguities involved in the process of the linguistic assessment of the data. Like other similar methods (AHP and ANP), SWARA is also based on expert's ideas or thoughts but experts can participate without difficulty in this method. Table 2 shows the results of criteria weights. The rank of all criteria was shown in the fifth column.

The hierarchical structure of decision problem consists of three levels: at the high level the objective of the problem is situated while in the second level, the criteria are listed. The goal is sales branches performance evaluation for the company. At this stage of the application, the group of experts evaluated each alternative according to each criterion and finally the decision matrix was filled.

Table 2. Final results of SWARA method in weighting criteria and decision matrix of WASPAS (source: compiled by authors)

Criterion	Criteria weights based on SWARA			
	Comparative importance of average value s_j	Coefficient $k_j = s_j + 1$	Recalculated weight $w_j = \frac{x_{j-1}}{k_j}$	Weight $q_j = \frac{w_j}{\Sigma w_j}$
C_2		1	1	0.2050
C_1	0.15	1.15	0.8696	0.1782
C_4	0.1417	1.1417	0.7616	0.1561
C_5	0.1167	1.1167	0.6820	0.1398
C_6	0.1417	1.1417	0.5974	0.1225
C_7	0.15	1.15	0.5195	0.1065
C_3	0.1583	1.1583	0.4484	0.0919

Table 2. Final results of SWARA method in weighting criteria and decision matrix of WASPAS (continued) (source:compiled by authors)

Criterion	Decision matrix						
	SB_1	SB_2	SB_3	SB_4	SB_5	SB_6	SB_7
C_2	9	6	5	3	4	2	1
C_1	7033	1588	1673	1421	1344	1860	1232
C_4	17789	6970	4117	5997	6702	7689	5229
C_5	7.43	7.38	6.96	5.91	5.22	7.09	6.14
C_6	79	114	92	110	78	94	89
C_7	133733	51470	28644	35470	35007	54520	32116
C_3	120	68	100	48	21	58	12

Table 3. WASPAS normalized decision making matrix (source: compiled by authors)

	$C_{1\text{-}1\text{-}1}$	$C_{1\text{-}1\text{-}2}$	$C_{1\text{-}1\text{-}3}$	$C_{1\text{-}1\text{-}4}$	$C_{1\text{-}1\text{-}5}$	$C_{1\text{-}2\text{-}1}$	$C_{1\text{-}2\text{-}2}$
	0.033	0.048	0.042	0.059	0.03	0.047	0.07
	Max	Max	Max	Max	Max	Max	Max
A_1	1.0000	0.6667	0.5556	0.3333	0.4444	0.2222	0.1111
A_2	1.0000	0.2258	0.2379	0.2020	0.1911	0.2645	0.1752
A_3	1.0000	0.3918	0.2314	0.3371	0.3767	0.4322	0.2939
A_4	1.0000	0.9933	0.9367	0.7954	0.7026	0.9542	0.8264
A_5	0.6930	1.0000	0.8070	0.9649	0.6842	0.8246	0.7807
A_6	1.0000	0.3849	0.2142	0.2652	0.2618	0.4077	0.2402
A_7	1.0000	0.5667	0.8333	0.4000	0.1750	0.4833	0.1000

Based on the results of Table 4, the rank of the seven branches is $SB_1 > SB_4 > SB_2 > SB_3 > SB_6 > SB_5 > SB_7$. Hybrid approach results indicate that SB_1 has the best performance with the highest score and it is the best sales branches of the company.

Table 4. Final results (source: compiled by authors)

	$0.5\sum_{J=1}^{N}\overline{\overline{x}}_{ij}$	$0.5\prod_{j=1}^{n}\overline{\overline{x}}_{ij}$	**WSP_i**	**Ranking**
A_1	0.4812	0.4780	0.9592	1
A_2	0.2962	0.2612	0.5574	3
A_3	0.2608	0.2200	0.4808	4
A_4	0.4513	0.1949	0.6463	2
A_5	0.2050	0.1817	0.3867	6
A_6	0.2412	0.2097	0.4509	5
A_7	0.1729	0.1267	0.2996	7

5. Conclusions

The aim of this paper is designing a new approach to performance evaluation of sales branches. The findings of this study have contributed towards providing significant and advanced new MADM approach by a simple, efficient method in which decision makers can enhance their ability to evaluate their sales branches performance. Also, in this paper, a novel hybrid approach for sales branches performance evaluation and with integrating MADM methods was proposed. The SWARA method was used to weigh the criteria of sales branches performance analysis. This method is efficient method that is easily understood by practitioners and researchers. In addition, SWARA method was applied as a decision making tool for extracting weights of criteria which is needed in WASPAS method. The proposed SWARA-WASPAS integrated approach can be viewed as another meaningful contribution of the study.

This study results show that decision criteria significantly influence the performance of sales branches performance evaluation. However in this paper the most important criteria were selected based on the expert's opinions; another study can be designing a new hierarchical problem structure form in-depth literature survey with other criteria, sub-criteria and assessing alternatives with a new

structure. Also, further research can apply this proposed approach to other managerial issues or adding more criteria in the decision process.

6. Acknowledgment

The authors would like to thank the CMO of the company for their support and assistance with this project. Special thanks also go to the anonymous reviewers for their helpful comments in preparing this paper.

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