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METHODOLOGIES THAT COULD BE USED FOR GETTING QUALITY INITIAL SOLUTIONS FOR BUSINESS PERFORMANCE PROBLEMS RELATED TO REAL INDUSTRIAL ENTITIES[1]

Ivo Kuzmanov[1], Silvana Angelevska, Zore Angelevski
Department for Industrial Engineering and Management
Faculty for Technical Science in Bitola, Makedonska Falanga 33
Bitola, R. Macedonia
ivo.kuzmanov@tfb.uklo.edu.mk

Abstract

The basic aim of the paper is to represent a real problem of a modern industrial entity, which can be primary resolved with an initial solution (primary solution than in other fazes could be optimized) in terms of minimizing the cost of procurement of suitable raw materials that could be used for smooth operations into the industrial entity. For that purpose the paper represents methodologies such as: methodology that combines the lowest purchase price and the northwest corner methodology.

Keywords - transport problem; decision making; initial solution

INTRODUCTION

The basic aim of the paper is to represent a real problem into a business entity which is spotted while purchasing raw materials for smooth functioning of business processes at lowest cost. In practice most of the industrial entities for smooth operations cooperate with suppliers that bring them quality raw materials that are necessary for the smooth functioning of business processes. But on the other hand considering the business philosophy for optimal operations in terms of supplying raw materials within the requirements of the industrial entity and optimizing the same processes in a matter of minimizing the costs associated with the purchase of the raw materials (transport costs and the cost of raw materials), new techniques and methodologies which could lead to business savings and improving the

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business performance could be used. This is the reason why in addition to the paper a business problem which considers the problem of purchase of raw materials for smooth functioning combined with the possible distribution centres where raw materials could be purchased is presented. So this is the basic reason why two methodologies are presented into addition. Both of them are methodologies which are used in operation research as a science, especially in solving transport problems such as: methodology that considers lowest prices and the northwest corner methodology.In addition to the paper, using both of the previous mentioned methodologies and comparing the costs for purchasing the necessary raw materials (including cost of transport per piece and a single purchase price of the piece), a simulation of the initial decision making of the business processes is presented. The same one means a significant financial savings, but also a possibility for continuous business improvements and finally a competitive purchase product price (less than previous).In the considered case the sale price would be reduced if projected savings from procurement of raw materials are used to create a competitive sale price or the same one could be used to detect potential product development and proper development of the same one (rather reinvestment in the production processes). In addition of the paper the process of initial solutions and getting an solution in terms of defining the purchase price is shown.

PRESENTING A TRANSPORT PROBLEM

In addition to this part of the paper, we will present a problem that takes in mind the purchasing of raw materials necessary for smooth operations of the specified business process. The problem presented in to the paper is a part of the goal of every single company that in terms of business problems means how to reduce the costs in terms of supply of raw materials, while the quality of the raw material is identical as well as before. Considering the business problem shown into the paper the same one could be shown also in a matter of the supply solutions – for example there are multiple suppliers which offer raw materials with different prices. At the moment most of the companies considering the way of purchasing raw materials have the same considerations – business entity that could be seen as a significant business companion form which they can purchase as many as possible products for their needs and at the same time to shorten the delivery time. After that, most of the companies consider different business entities as distribution centres to fulfil their needs that aren’t fulfilled from the business entity that is a full time business partner. The same one as an example is presented into addition where into the lower part the demand of terms of raw materials is represented (1,2,3,4) and into the right corner corresponding suppliers which have the

capacity to meet the needs with appropriate number of pieces are presented (in the case 5 suppliers).Also in order to perform the process of getting the initial solution considering the cost of purchasing in any of the fields into the presented matrix into the upper left corner the purchase per unit's costs are given (the same one includes costs of raw materials, but also calculates the cost of transporting costs of the same unit as one of the key criteria's).

Table 1. Overview of the transport problem

17	12	14	16	**50**
16	13	15	12	**60**
17	14	10	9	**30**
15	17	12	11	**30**
13	11	15	17	**20**
40	**50**	**40**	**60**	**/**

The problem presented into the tabular view number 1, classically is resolved into the business entity in a way with lowest number of contacts with distribution facilities which solve the problem of supplying the necessary raw material (for example in a distribution capacity which is cooperating the business entity takes as possible raw materials, and even when the same one does not fulfils the needs the business entity contacts other distribution centres). Best example for presentation of the previous said is the tabular view number 2, which represents the northwest corner strategy for the chosen problem.

Table 2. Solution of the problem by applying the methodology of northwest corner

17 **40**	12 **10**	14 /	16 /	**50**
16 /	13 **40**	15 **20**	12 /	**60**
17 /	14 /	10 **20**	9 **10**	**30**
15 /	17 /	12 /	11 **30**	**30**
13 /	11 /	15 /	17 **20**	**20**

40	**50**	**40**	**60**	**/**

In fact the standardized way of purchase of raw materials from suppliers known in general is the way of purchasing raw materials from known suppliers. The same methodology represented into the tabular view bellow brought us to the total amount of 2580 monetary units, presented into the equation bellow. (1)

$$Z= 17x40 + 12x10 + 13x40 + 15x20 + 10x20 + 9x10 + 11x30 + 17x20 = 680 + 120 + 520 + 300 + 200 + 90 + 330 + 340 = 2580 \text{ monetary units} \quad (1)$$

However, guided by the current market trends of business competition in terms of quality and sales price, any business enterprise must think about ways to reduce the costs associated with business processes. Therefore as a suggestion to apply the methodology than considers the lowest cost prices, the process of getting an initial solution for the process of supplying (better than the previous one) is led by the lowest cost of the raw material at the same level of quality of the delivered material, which is the initial solution at the moment and the same one could be optimized using other methodologies such. For this purpose the best illustration of reducing the purchasing costs is given into the tabular view number 3 in which the same transport problem is solved by withdrawing raw material from distribution centres on the principle of the same quality and the lowest price.

Table 3. Overview of the transport problem solved by the methodology that considers the lowest cost prices

17 /	12 **30**	14 **20**	16 /	**50**
16 **40**	13 /	15 **20**	12 /	**60**
17 /	14 /	10 /	9 **30**	**30**
15 /	17 /	12 /	11 **30**	**30**
13 /	11 **20**	15 /	17 /	**20**
40	**50**	**40**	**60**	**/**

Whit the process of getting an initial solution that could be better at the moment of procurement conducted actually with consideration of the lowest purchase price for the same number of resources with the principle of

withdrawal of resources from various distribution facilities, the same purchase leads to the total purchase price of in total 2400 monetary units, represented into the following equation. (2)

$$Z= 12x30 + 14x20 + 16x40 + 15x20 + 9x30 + 11x30 + 11x20 = 360 + 280 + 640 + 300 + 270 + 330 + 220 = 2400 \text{ monetary units} \quad (2)$$

Considering the fact that the total savings of 180 monetary units are more than significant for the business entity, and on the other hand that this is a repeatable process it is more than significant the application for this kind of a methodology. Having in mind that the business entity despite this process has other relevant business processes, the implementations of this kind of methodologies are more than important. Therefore the application of methodologies such as the presented one is more than significant for business entities in a matter to get a better solution at the moment (that could be optimized by using other methodologies), to create a proactive business process and to develop the business capacities.

CONCLUSION

Into the paper a segment of everyday business operations from an industrial entity is presented. The purpose why this segment from the business operations is presented is because it is one of the segments where most of the savings could be done. On the other hand the paper presents the way how the business entity could drag a raw materials from multiple distribution centres on the principle of minimum purchase price, and the same one could lead to crucial and significant business savings.

This fact certainly in combination with methodologies for quality control of raw material at intake can lead to development of business entity to a higher business level. For this point into the paper a significant application is presented. The same one is only a one of few that could bring significant savings with appropriate reinvestment in the company's development, and the same one's could lead to business results which the company could raise to a completely different level.

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