International Journal of Innovation, Creativity and Change. www.ijicc.net
Volume 9, Issue 2, 2019

The Role of the Quantitative and Descriptive Approach in Optimising the Use of Production Elements to Support Financial Results

Ahmed Miri Ahmed[a], Muiead . A . Al -fadel[b], [a,b]Technical College of Management /Kufa – Department , Al- Furat Al-wsat Technical university , 31003 Al- Kufa, Iraq,

The management of operations in the laboratory data of the study, requires research into the opportunities and possibilities necessary to calculate what is required of the production requirements within the production lines available in the work in question. Where the focus here is on the quantity of raw materials required and the amount of electrical energy needed to operate machines and equipment within production lines. The quantitative approach will be adapted as this method supports the decision makers in the senior management of the laboratory in order to improve the final financial results. The descriptive approach has been oriented towards providing the necessary data to rationalise decisions. Results have been reached at the end of the research concerning how to calculate the raw materials, labour and operating hours of machinery and equipment for a certain volume of production

Key words: *Quantitative Research, Descriptive Research, Financial Results*

Introduction

Within the management of production processes in business organisations, it is necessary to search for the opportunities and possibilities necessary to calculate what is required of the inputs of the production of raw materials and electrical energy to operate the machines and equipment. The operation of what is required in the workforce within the production lines, will inevitably support the decisions that they adopt in senior management or executive management to reduce costs by achieving the optimal utilisation of the inputs of the three main components (raw materials, operating capacity, labor). Our research is for this purpose through the search for a role or the same quantitative approach or the proper descriptive approach in supporting the decisions adopted by the organisation in achieving the optimal

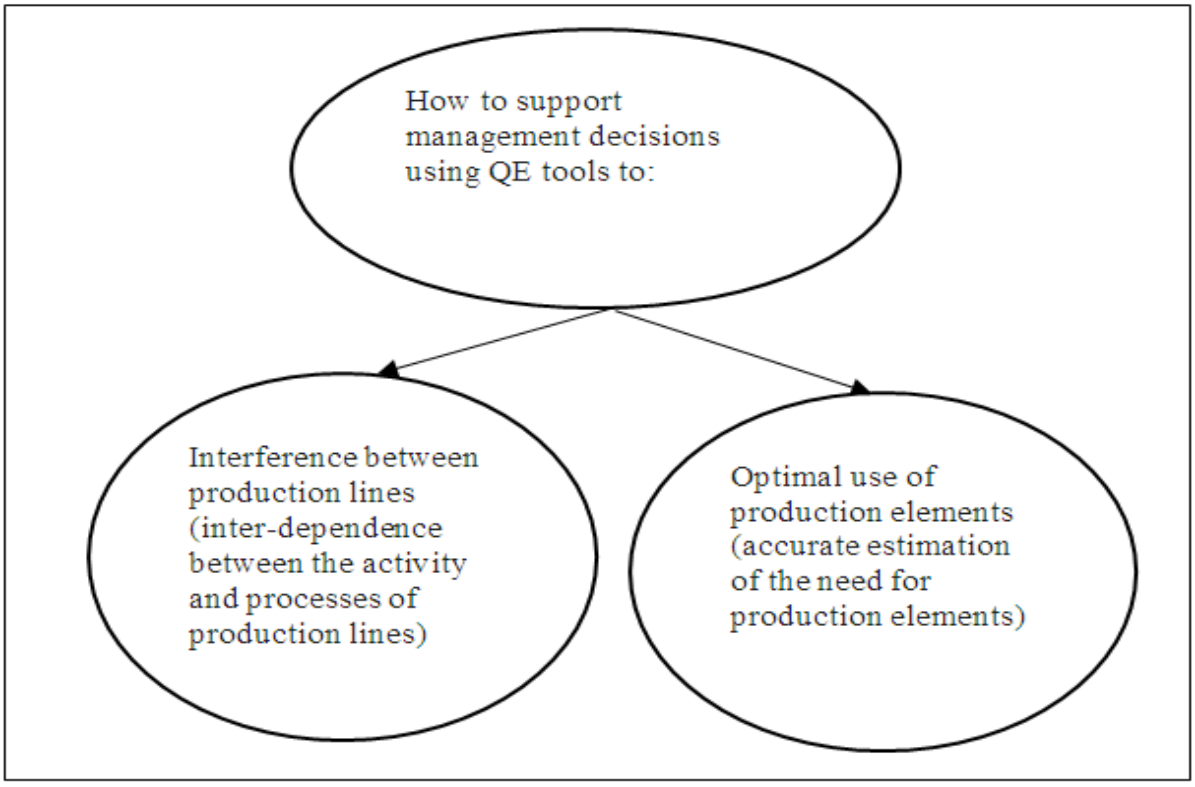
independence of the inputs of production while maintaining the process of overlap between production lines and in this case and as far as the quantitative approach. One of the tools of the quantitative approach to business management is the calculation of matrices. By using this method, decision makers are supported to optimise the consumption of the resources represented by the above mentioned production elements. This is ultimately in the interest of the laboratory, especially in improving the outcome of the results. It is also related to the adoption of this method, which is available among the management tools descriptive approach, which is related to the survey of the market to know the opinion of the customer and the diversity of the reality of the internal and external environment that our research occurred in four sections. The first is to reflect the scientific methodology, and previous research in the same direction. The second section is devoted to the statement of the theoretical framework of this type of studies. Section three is devoted to the application of one of the tools of the quantitative approach with reference to the importance of the descriptive approach with a presentation about the laboratory sample study and the conclusions and recommendations in section four. We hope that the dear Bari will help us in this scientific endeavor to serve our dear Iraq.

Section One: Scientific Methodology of Research and Previous Research

Scientific methodology of research

Research problem

In Najaf, there is no case of optimal utilisation of the elements of production, namely raw materials, operational energy, and labour. The calculations are based on experience and comparative measurements that are used in other cases. Therefore, this research addresses this problem by applying mathematical matrices to support optimal use decisions. For the elements of production and integration of productive lines, that is:



Research Objectives

This research aims to achieve the following:

1. Appreciation and accurate calculation of the need for the elements of production:
    a. Basic raw materials for production (fabrics, lining, threads, etc.).
    b. Electrical energy and operational capacity of machinery and equipment used in sewing and other production processes.
    c. The amount of wages and salaries paid to workers in different categories (skilled worker, unskilled, engineers, etc.).

    This need is estimated in the light of work orders issued by the Operations Department as well as the value of contracts with stakeholders.

2. Determine the requirements for success of the work of the lesson according to the perspective and tools descriptive approach, whether the seasonal survey of the head of the customer in the framework of the requirements of the internal and external environment.

Research Assumptions

The following hypotheses were set for achieving the research objectives:

1. The adoption and application of matrices within the quantitative approach enables decision makers to estimate the exact need for the elements of production and thus to optimise their use.
2. Integrity and interdependence can be achieved through the quantitative and descriptive tools needed to support the activities and operations of the four production lines used in the production hall of the ready-made men's clothing factory (men's winter suit, jacket, shorts, summer men's suit).

Research Importance

The importance of research is as follows:

1. Addressing such a problem means standing up to traditional methods of calculating and estimating the need for the elements and requirements of the production process.
2. This kind of research leads towards the adoption of the quantitative approach and descriptive approach in studying the wishes of customers in the process of calculating and estimating the optimal need of the quantities of production elements.
3. The adoption of tools of quantitative approach with the reliance on the tools of the descriptive method calculation of matrices will lead to the optimisation of raw materials and operational energy and wages of workers.

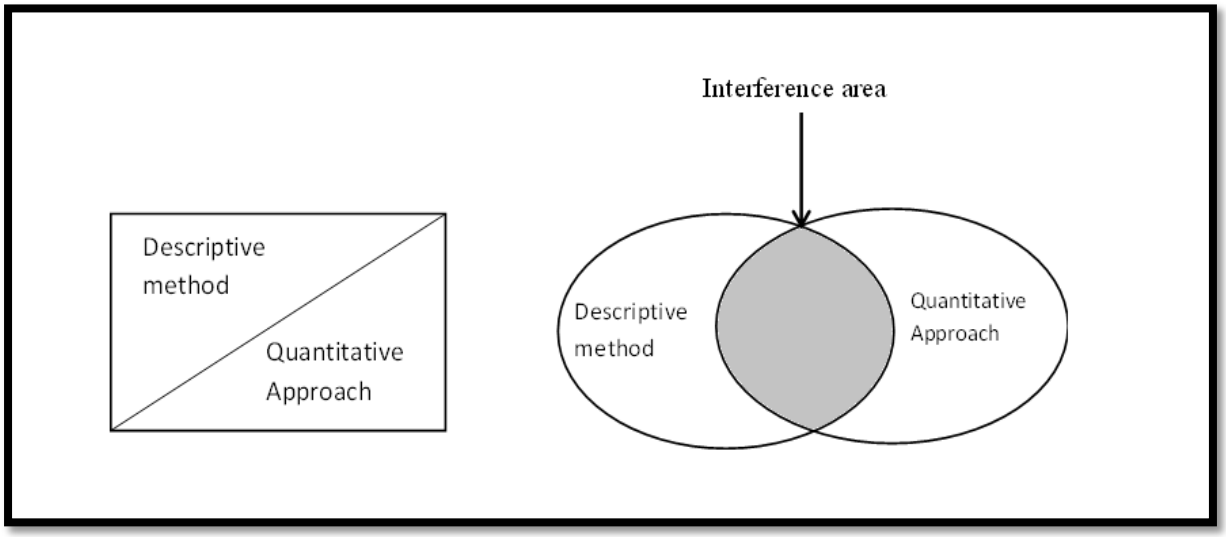
Method Used in Search

Our research depends on two types of research methods and scientific analysis in addressing the business problem:

1. Quantitative Analysis Methods.
2. Qualitative Analysis Methods.

For the first type, the matrix analysis is adopted in determining the degree of reliability and the need for each type of production element and requirement. For the second type of analysis, it depends on entering the production base of the clothing factory, opening records, viewing data and figures, listening to the views of engineers and workers on the lines of productivity.

Figure 1. Interference of quantitative and descriptive analysis techniques in problem analysis and decision support



Research Constraints

Researchers faced the following constraints

1. The lack of sufficient data, apart from the difficulty of obtaining it in terms of the necessary approvals.
2. The difficulty of dealing with the quantitative approach methods included in the quantitative approach and their incompatibility with the reality of the situation, which results in the rehabilitation of the data to fit the calculation of matrices.

Society and Sample Search

The study community can be large or medium business organisations based on the process of production, on the basis of the order of work and depending on the production lines that can benefit each production line (from the other production line). In this description of the study society, it has such specifications, where the focus will be on four production lines, namely:

- Production line No. 1 (A) for the production of men's winter suit.
- Production Line No. 2 (B) is dedicated to the production of the jacket.
- Production Line No. 3 (C) is intended for the production of casual trousers.
- Production line No. 4 (D) for the production of men's summer suit.

Methods of data analysis

1. Methods of quantitative analysis: the matrix analysis is adopted in determining the degree of reliability and the need for each type of elements and inputs of production.
2. Methods of descriptive analysis: it depends on the adoption of the study and analysis of the market and consumer desires through the seasonal survey.

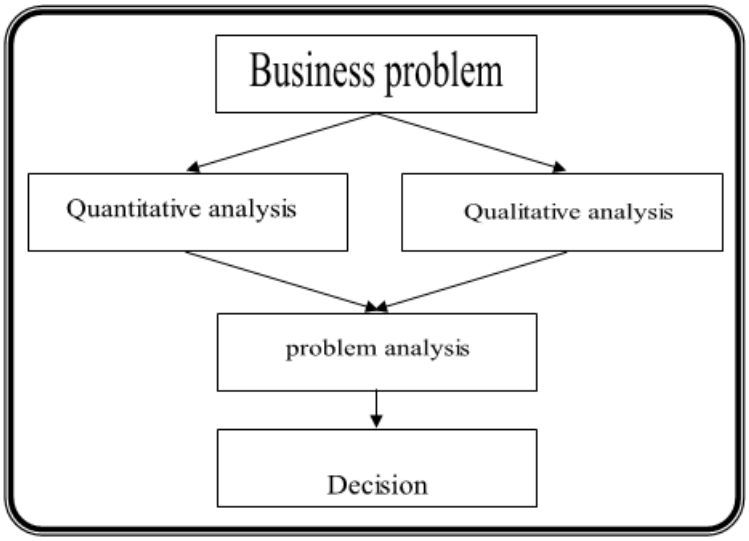


Figure 2. Decision-making process involving the methods of quantitative analysis and methods of descriptive analysis

Basic requirements for operations management

The management of operations as one of the functions of the management of the enterprise or the organisation of productive work, depends on the process of organising its functions on a set of factors that constitute the basic requirements for the production of one unit on the product. As far as our current research is concerned, the Operations Department of the Organisation of Productive Works needs the following basic requirements:

1. Raw materials: This paragraph is divided into two basic types, as follows:
    1. The basic raw materials, as an example, in the case of specialised laboratories in the garment industry, is the different types of cloth and semi-miscellaneous and how follows:
        i. Sof: 100% pure wool.
        ii. Coton: 100% pure cotton.
        iii. Wool blend + different polyester (%).
        iv. Cotton blend + different polyester (%).
    2. auxiliary raw materials, which are secondary to the manufacture of the product, including:
        i. Lining.
        ii. Strings.
        iii. Fasteners.
        iv. Adhesive.
        v. Other.
2. Operational power: This means the amount of electrical energy as well as the amount of operating hours of the machines and equipment of difference. It is known that the machines and equipment are distributed in the production hall sequentially and

organised according to the process of production processes and to specific sites with fixed codes according to the production lines as shown in Figure (2); which represents the map of the distribution of machinery and equipment in the production hall and consumes each machine a calculated amount of electricity.

3. Labour: The labour force is divided into two main types:
    1. Unskilled labour: It is used in marginal production processes and to help regularise and support the production process.
    2. Skilled labour: that is the category of the basic workers of the production process and the cost of the completion of basic production processes and complex operations.

Both types of workers are worth wages, in addition to the existing staff and staff in the administrative and service support sites, which in total are estimated in a specific accounting and cost structure and added to the cost of each unit of production.

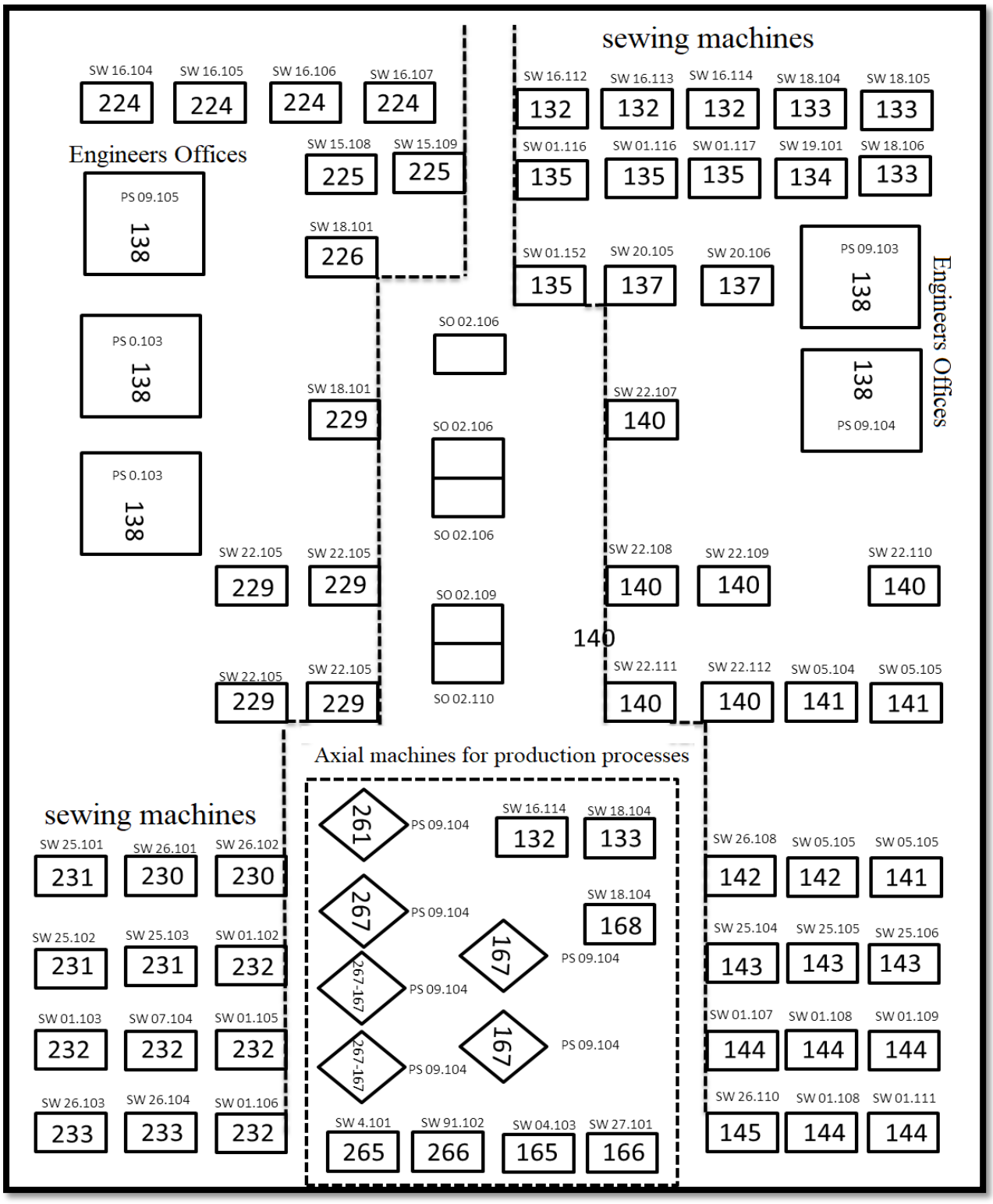


Figure 3. A section of the map illustrating the locations of machines and equipment inside the production hall of the ready-made clothes factory in Najaf. Source: *Prefabricated Apparel Factory.*

Some of the specialists in administrative sciences, particularly the Department of Operations, tend to add a fourth element in addition to the above, the element of management, where successful production processes cannot be envisaged without.

Quantitative approach in supporting decisions to calculate and estimate the need for basic requirements for operations management

The Quantitative Approach is one of the inputs of the Business Management study, especially in regard to operations management as one of the functions in the production of the organisation. Under this approach quantitative methods are used to support decisions to estimate the need for basic requirements for operations management. In this case:

1. Four processes (multiplying, collecting, subtracting and dividing matrices).
2. Inverted matrix of Matrix.
3. Multiply vectors (rows and columns) in matrices.

In general, the matrix used as a quantitative method is defined as an order of real numbers in rows and columns enclosed in parentheses without any spaces. To distinguish matrices, it is given a broad line such as A, B, C, D. Arrays are divided into the following types:

1. Zero matrix.
2. Squared matrix.
3. The Matrix Matrix.
4. Transpose Matrix.
5. Symmetric Matrix.
6. Diagonal Matrix.
7. Vector Matrix.

The calculation of the matrices above is used in estimating the need for the basic requirements of production mentioned in the previous paragraph. This will be indicated by the data on the sample of the study, the men's wear factory in Najaf.

Descriptive approach in supporting decisions on optimal use of production elements

The descriptive approach is based on a number of activities and activities that support the decisions of optimal use of the elements of production that have already been discussed, within the framework of overlapping production lines. This is done in an integrated manner with the above mentioned in activities within the quantitative approach to support the decisions of the organisation. The most important activities in the descriptive approach, is descriptive survey of consumer opinion, especially for new products. The market survey of consumer opinion is one of the important methods in the process of marketing new products to the market, where the survey can be done using the messages mentioned above. In particular:

1. Questionnaire in its various forms.
2. Direct interview and recording notes.
3. The Internet and social media.

Where the opinion of the consumer is the basic rule in the process of determining the type and specifications of the new product, and generally prevails as an important rule in the organisations of the productive business; especially as the new product cannot remain the same for a long period of time when there are competing goods. So, that evolution and change must enter the product, whether in terms of content, shape, color, price, weight, and or packaging. Of course, the development process is not arbitrary, but is the result of the study and analysis of many of the positions and consequences of the process of selling products that require development and change, whether for the continuation of the sale or to keep pace with developments in the production of those goods in addition to what can. In addition to the reasons behind the failures of the various activities of the organisation, advocates of the descriptive approach, and through the application and adoption of descriptive methods based on analysis, research and investigation, the following were found:

1. The error in estimating the expected demand in the market for the commodity, perhaps due to the weakness or inaccuracy of the information obtained and thus its reflection on the adequacy of the market analysis.
2. Incorrect signature in the introduction of the product to the market, especially for new goods.
3. Serious competition to which the product is exposed by alternative goods or competition, which may be removed from the market.
4. There is a defect in the production process that will affect the safety of the product.
5. The inability and adequacy of distribution outlets and salesmen to recommend the item in time and form appropriate.
6. Increasing the costs related to the evaluation of the new project more than specified in the standard and standard accounts.
7. The absence of a suitable and correct market study that determines the appropriate atmosphere for the marketing process of the product.

In addition to the topic of the consumer survey, descriptive tools are the study and analysis of internal and external research indicators. These indicators indicate the organisation's ability to predict future events that affect its performance and the importance of the organisation's response to these changes. Which determines the building of the organisation's capacity and the nature of its objectives. (Hussein, 2002: 2) This phase represents the process of discovering the strengths and weaknesses of the organisation by focusing on its resources in terms of quantity and quality through the integration of the quantitative approach and the descriptive approach. Moreover, the efficiency, creativity and the responsibility of the organisation towards the customer can lead these trends to the highest level of strength and access. To the competitive advantage through them, while trying to avoid weakness in the resources and potential of the organisation. (Hill & Jones, 2001: 8). The analysis of the internal environment notes that it is complementary to the analysis of the external environment on which strategic planning is based. Therefore, the process of analysis is a

coherent and interconnected process between the internal and external environments (Neilly & Gessner, 2002: 2).

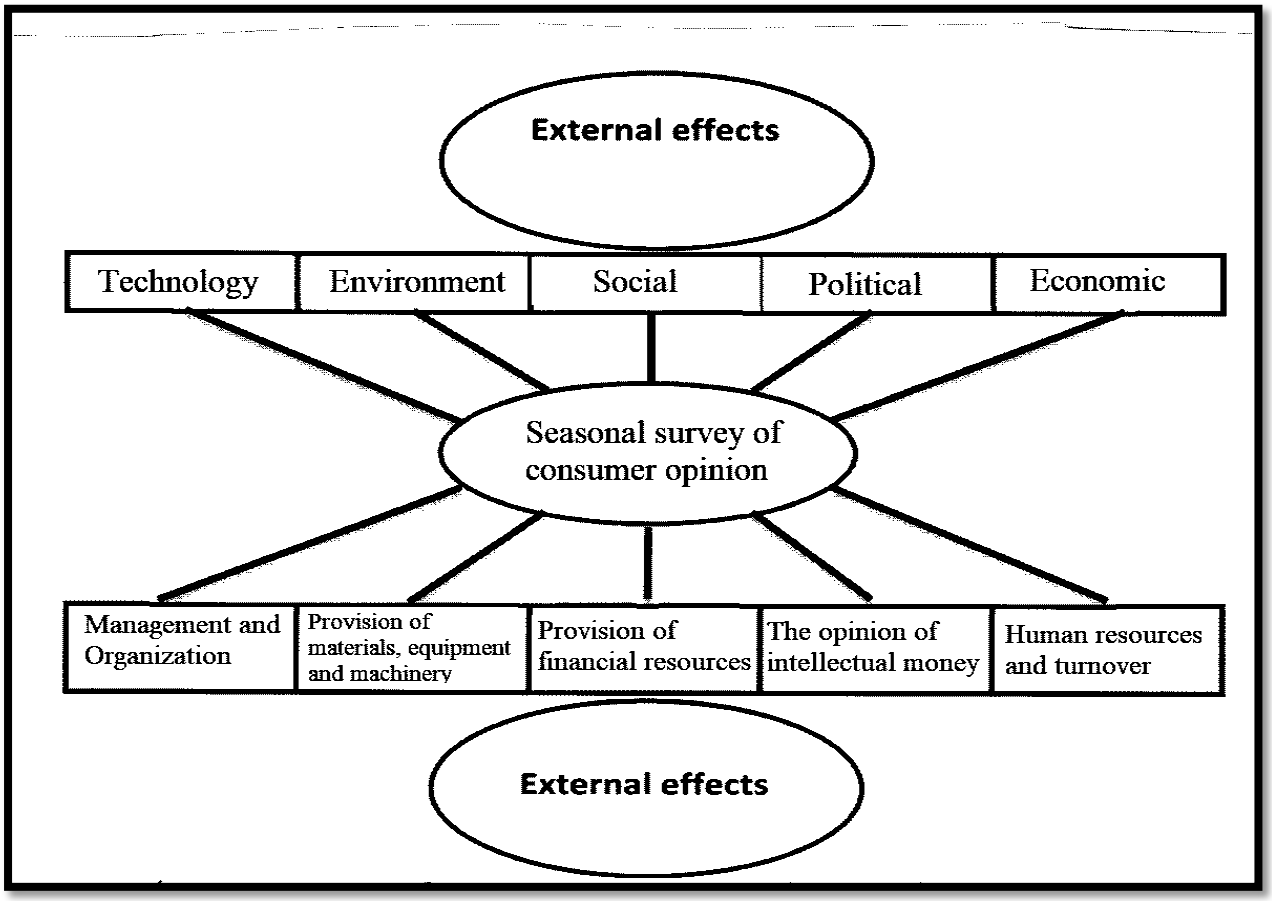


Figure 4. Internal and external influences and their role in determining the shape and nature of the seasonal survey of consumer opinion. Source: Hill & jonos, op, cit 2001, p

Section 3: About the laboratory of men's clothing in Najaf with the application of the application of matrices.

Data for the men's clothing factory in Najaf

Establishment Data and Operations Management Specifications

The men's clothing factory in Najaf is one of the factories of the State Company for the manufacture of ready-made garments under the Ministry of Industry and Minerals. It was established in Najaf in 1984 with a capital of $12,500,000. The experimental operation started in 1986 with four production lines (see Figure 3 below). Where it is clear from the above mentioned overlap between production lines, and consists of the masculine laboratory of several sections, the most important:

- Production management.
- Engineering and services.

- Quality control.
- Commercial Section.
- Finance Section.
- Planning and follow-up.
- Materials Management.

The data of the Operations Department, particularly those in the production hall, were reviewed in the period after July 1, 2017. The Department has prepared four work orders, each of which relates to a specific production line of the four lines. Four basic products are required:

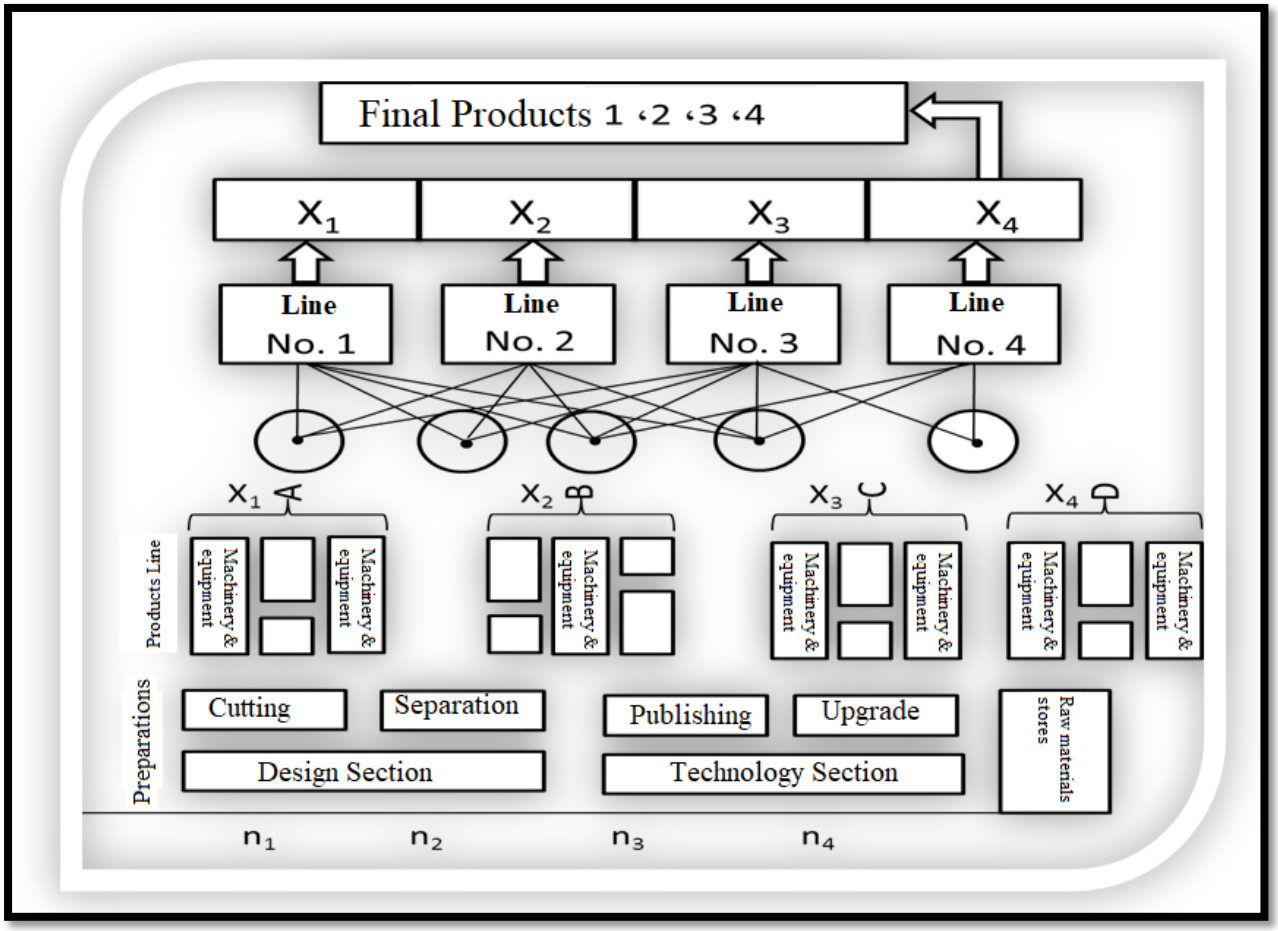


Figure 5. Production line locations in the laboratory according to the flow chart of the products collection. Source: Prefabricated Apparel Factory.
Product No. 1 (X1) Men's winter suit.
Product No. 2 (X2) Jacket Sport.
Product No. 3 (X3) Mens Casual Pants.
Product No. 4 (X4) Men's Summer Suit.

In the production hall, the elements of production for this objective are harnessed within the limits of operations management. These elements are as in Figure 6:

1. Basic raw materials and assistance.
2. Machinery, equipment and machinery used.
3. Individuals and employees in the production process.

These three elements are explained below:

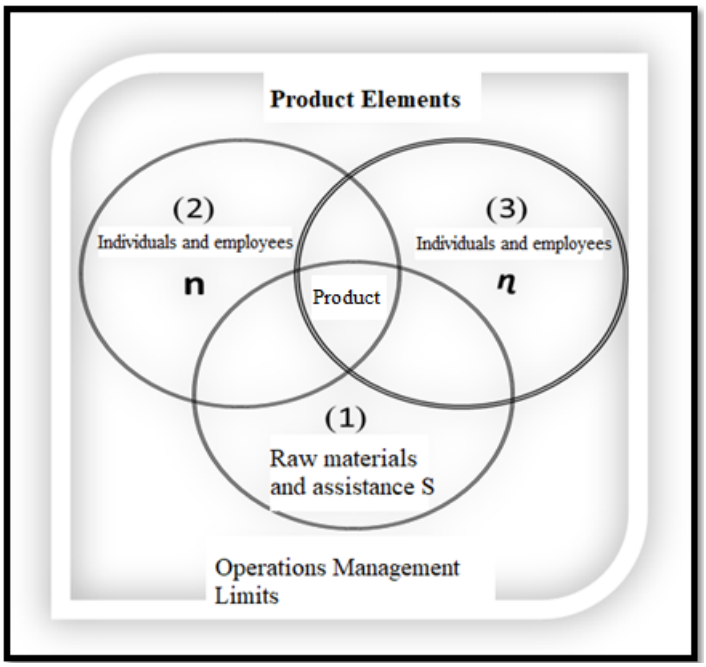


Figure 6. Production elements within Operations Management limits

1. It is divided into two types as follows:
2. Raw materials:
    a. The basic raw material (S2) is the cloth which is the basis of the production process for all four kinds of products and all production lines.
3. Auxiliary raw materials
    a. S1 = winter lining, consisting of different textile materials, with a polyester of varying proportions (20-50%) and only used in the production of winter suits, i.e. only used in production line No. (1).
    b. S3 is a summer liner and is used in different proportions only in the production line (2) and the production line No. (4) for the second product and the fourth product only with a small percentage of the polyester (10-20%).
    c. S4 = Other raw materials other than the above.

The use of raw materials (S2) and assistance (S1, S3) are used in the four production lines and products in the form and quantities are clear and defined in advance as in the matrix of the following use:

$$\begin{array}{c} \\ S_1 \\ S_2 \\ S_3 \end{array} \begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{bmatrix} S_{11} & S_{12} & S_{13} & S_{14} \\ S_{21} & S_{22} & S_{23} & S_{24} \\ S_{31} & S_{32} & S_{33} & S_{34} \end{bmatrix} \end{array} = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 2 & 3 & 1 & 4 \\ 0 & 2 & 0 & 5 \end{bmatrix}.$$

In order to clarify this idea and the disincentives of production lines, we present below the correlation between the production lines of consumption of these raw materials as in Figure 7:

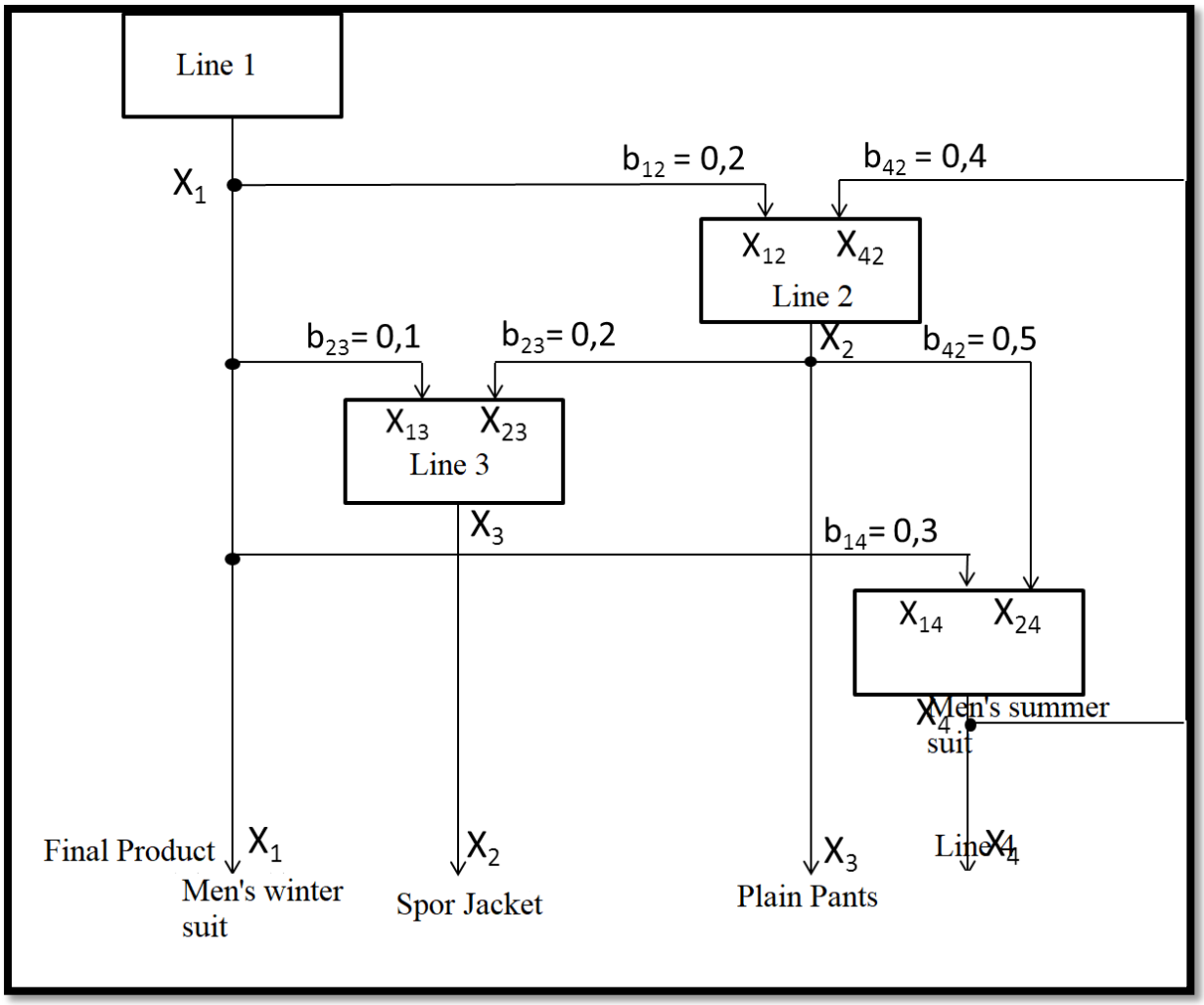


Figure 7. The reciprocal relationship between production lines

2. Operational capacity of machinery, equipment and machinery used (ŋ)
The operating capacity in this case is calculated for each unit in each production line of the four lines as follows:
n1 = Operational Power (10) Unit (KW)
n2 = Operational Power (30) Unit (KW)
n3 = Operational power (20) units (KW)
n4 = Operational power (50) unit (KW)
The amount of energy consumption per unit of time is calculated as follows:
(KW) 60 = n

3. The amount of value of work submitted by individuals and employees.
Each unit of production is calculated as follows:
n1 = (2) monetary unit
n2 = (2) monetary unit
n3 = (3) monetary unit
n4 = (2) monetary unit
On this basis, the amount paid to employ workers calculated in time units is:
Mt = 200

From the working records, the following data were obtained:

1. The management of the plant, namely production and operations management, aims at determining the matrix relationship between the production capacity of the main pieces that will form the final product later, as well as the consumption column of the raw materials (S1, S2, S3) Their wages, on the one hand and on the other end column products.
2. The plant management wishes to determine the relationship between the final production column and the consumption of raw materials (S1, S2, S3), the energy and the volume of payments to the workers, on the basis that the production capacity of each production line within one working hour is as follows:
    a. Production Line No. 1 → 400 pieces
    b. Production Line 2 → 300 pieces
    c. Production Line 3 → 200 pieces
    d. Production Line No. 4 → 200 pieces

That is, from the laboratory records and based on all of the above, the production department wishes to identify arrays and vectors (columns and rows) as follows:
العمود Column showing the production capacity of partial pieces.
- Consumption of raw materials (S1, S2, S3, S4).

Operating power consumption of machinery and equipment.

استهلاك Consumption of wages paid to employees.
Depending on what is planned of finished products (complete) under the total available time of work (T), where the column that expresses what is targeted for each production line is:
Production Line No. 1 → (100) final product
Product Line 2 → (200) final product
Production Line 3 → (300) final product
Production Line No. 4 → (300) final product

The hypotheses necessary to apply arithmetic:
Assume that:
X1, X2, X3, X4 → Production capacity of the section per production line
x1, x2, x3, x4 → Final output amount produced in production lines 4,3,2,1

Suppose that:
Xij is the amount of production produced in the production line (i) which is consumed in the production line (j). Assume that bij is the ratio of the conversion of raw materials in the production line (i) to the production line (j) as shown in Figure 5.

Assume that:
N = total energy consumed.
n = the amount of total allocations specified to pay workers' wages.
T = total time unit.
Sij = (i, j = 1,2,3,4) Consumption of raw materials (i) in production line (j).
Nj = (j = 1,2,3,4) Energy consumption proportional to the output volume in (j) production line.
N0 = The power consumption of a given production relative to the time units.
Pj = (j = 1,2,3,4) The size and amount of wages paid commensurate with the output volume in the (j) production line.
P0 = Paid from wages in proportion to time units.
Formulate the mathematical relationships necessary to solve the problem based on arithmetic calculation:
For the application of arithmetic calculation, the following mathematical relationships are initially formulated:
X1 = x12 + x13 + x14 + x1
X2 = x23 + x24 + x2
X3 = x3
X4 = x24 + x4
whereas:
x12 = b12 x2, x =23 x3
x13 = b13 X3, x24 = b24 X4

x14 = b14 x4, x42 = b42 x2
By compensation we get the following
B12 X2 + b13 X3 + b14 X4 + x1 = X1
B23 X3 + b24 X4 + x2 = X2
x3 = X3
B42 X2 + x4 = X4

Where: bX + x = X

whereas:
bij = conversion rates of raw materials from production line (i) to production line (j)
(1,2,3,4 = i, j)
The column of the volume of partial production that represents the non-ready (semi-finished) goods is as follows for each production line:

$$\mathbf{X} = \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \end{bmatrix}$$

The size column of the final output quantity is as follows for each production line:

$$x = \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \end{bmatrix}$$

From the foregoing we can conclude the following mathematical relationship:
x = X - b X

or

x = (1-b) X
From this we conclude the following after compensation in the language of matrices:

x = (1-b) X
From this we conclude the following after compensation in the language of matrices:

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 1 & b_{12} & b_{13} & b_{14} \\ 0 & 1 & b_{23} & b_{24} \\ 0 & 0 & 1 & 0 \\ 0 & b_{42} & 0 & 1 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \end{bmatrix}$$

In general, based on previous definitions, the following mathematical relations can be formulated:

$S = S_{11}$

$S_2 = S_{21} + S_{22} + S_{23} + S_{24}$

$S_3 = \quad S_{32} \quad + S_{34}$

$N = N_1 + N_2 + N_3 + N_4 + N_0$

$n = P_1 + P_2 + P_3 + P_4 + P_0$

Note that the process of integrating and compensating for the foregoing and the delayed relations of sports we get the following:

$S_{11} = s_{11} X_1$	$N_1 = n_1 X_1$	$P_1 = n_1 X_1$
$S_{21} = s_{21} X_1$	$N_2 = n_2 X_2$	$P_2 = n_2 X_2$
$S_{22} = s_{22} X_2$	$N_3 = n_3 X_3$	$P_3 = n_3 X_3$
$S_{23} = s_{23} X_3$	$N_4 = n_4 X_4$	$P_4 = n_4 X_4$
$S_{24} = s_{24} X_4$	$N_0 = n\ T$	$P_0 = n_t\ T$
$S_{32} = s_{32} X_2$		
$S_{34} = s_{34} X_4$		

When simplifying the relationships above we get the following:

$S_1 = s_{11} X_1,$

$S_2 = s_{21} X_1 + s_{22} X_2 + s_{23} X_3 + s_{24} X_4,$

$S_3 = \quad s_{32} X_2 \quad + s_{34} X_4,$

$N = n_1 X_1 + n_2 X_2 + n_3 X_3 + n_4 X_4 + n\ T,$

$\eta = \eta_1 X_1 + \eta_2 X_2 + \eta_3 X_3 + \eta_4 X_4 + \eta_1$

In developing the above-mentioned mathematical relationships in a matrix framework as follows:

$$\begin{bmatrix} S_1 \\ S_2 \\ S_3 \\ N \\ \eta \end{bmatrix} = \begin{bmatrix} S_{11} & 0 & 0 & 0 & 0 \\ S_{21} & S_{22} & S_{23} & S_{24} & 0 \\ 0 & S_{32} & 0 & S_{34} & 0 \\ n_1 & n_2 & n_3 & n_4 & n \\ \eta_1 & \eta_2 & \eta_3 & \eta_4 & \eta_t \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \\ T \end{bmatrix}$$

It is worth mentioning here that matrices related to final production are :

Final Products

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 1 & -b_{12} & -b_{13} & -b_{14} & 0 \\ 0 & 1 & -b_{23} & -b_{24} & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & -b_{42} & 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \\ T \end{bmatrix}$$

$$\begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \\ S_1 \\ S_2 \\ S_3 \\ N \\ \eta \end{bmatrix} = \begin{bmatrix} 1 & -b_{12} & -b_{13} & -b_{14} & 0 \\ 0 & 1 & -b_{23} & -b_{24} & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & -b_{42} & 0 & 1 & 0 \\ S_{11} & 0 & 0 & 0 & 0 \\ S_{21} & S_{22} & S_{23} & S_{24} & 0 \\ 0 & S_{32} & 0 & S_{34} & 0 \\ n_1 & n_2 & n_3 & n_4 & n \\ \eta_1 & \eta_2 & \eta_3 & \eta_4 & \eta_t \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \\ T \end{bmatrix}$$

The mathematical matrices can be collected above and we get the following:
The above matrices illustrate the reciprocal relations between vectors related to final production, consumption of raw materials and energy, as well as wages paid to workers.

$$R = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ s_1 \\ s_2 \\ s_3 \\ N \\ \eta \end{bmatrix}$$

And the launch of the symbol (U) on the vector, which expresses the production lines production of semi-finished goods, that is :

$$U = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ T_1 \end{bmatrix}$$

By compensation, we obtain:

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ s_1 \\ s_2 \\ s_3 \\ N \\ \eta \end{bmatrix} = \begin{bmatrix} 1 & -0,2 & -0,1 & 0,3 & 0 \\ 0 & 1 & -0,2 & -0,5 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & -0,4 & 0 & 1 & 0 \\ 2 & 0 & 0 & 0,3 & 0 \\ 2 & 3 & 1 & 0,4 & 0 \\ 0 & 2 & 0 & 5 & 0 \\ 10 & 30 & 20 & 50 & 60 \\ 2 & 2 & 3 & 3 & 200 \end{bmatrix} \begin{bmatrix} 400 \\ 300 \\ 200 \\ 200 \\ 1 \end{bmatrix} = \begin{bmatrix} 260 \\ 160 \\ 200 \\ 80 \\ 800 \\ 2700 \\ 1600 \\ 27060 \\ 2600 \end{bmatrix}$$

Final outcome vector

Where it is known previously that the final production volume per hour is:
Production line No. 1 - 400 units
Production line No. 2 - 300 units
Production line No. 3 - 200 units
Production line No. 4 - 200 units

Therefore, the production of each production line of semi-ready goods is as follows:
x1 = 260 units
x2 = 160 units

x3 = 200 units
x4 = 80 units

Consumption of raw materials in each line (3,2,1) is as follows:
S1 = 800 units
S 2 = 2700 units
S 3 = 1600 units
S 3 = 1600 units

$$A = \begin{bmatrix} 1 & -b_{12} & -b_{13} & -b_{14} & 0 \\ 0 & 1 & -b_{23} & -b_{24} & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & -b_{42} & 0 & 1 & 0 \\ S_{11} & 0_{12} & 0 & 0 & 0 \\ S_{21} & S_{22} & S_{23} & S_{24} & 0 \\ 0 & S_{32} & 0 & S_{34} & 0 \\ n_1 & n_2 & n_3 & n_4 & n \\ \eta_1 & \eta_2 & \eta_3 & \eta_4 & \eta_t \end{bmatrix}$$

In order to determine the matrix or vector of vertical output and the consequent consumption of raw materials, energy and wages of workers in relation to the production volume of semi-finished goods in each production line in the time period T, matrix A is divided as follows:

$$A = \left[\begin{array}{cccc:c} 1 & -b_{12} & -b_{13} & -b_{14} & 0 \\ 0 & 1 & -b_{23} & -b_{24} & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & -b_{42} & 0 & 1 & 0 \\ \hdashline S_{11} & 0_{12} & 0 & 0 & 0 \\ S_{21} & S_{22} & S_{23} & S_{24} & 0 \\ 0 & S_{32} & 0 & S_{34} & 0 \\ n_1 & n_2 & n_3 & n_4 & n \\ \eta_1 & \eta_2 & \eta_3 & \eta_4 & \eta_t \end{array}\right]$$

$$A_1 = \left[\begin{array}{cccc|c} 1 & 0,4 & 0,18 & 0,5 & 0 \\ 0 & 1,25 & 0,25 & 0,625 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0,5 & 0,1 & 1,25 & 0 \\ \hline 2 & 0,8 & 0,36 & 1 & 0 \\ 2 & 6,55 & 2,51 & 7,875 & 0 \\ 0 & 5 & 1 & 7,50 & 0 \\ 10 & 66,5 & 34,3 & 86,25 & 60 \\ 2 & 4,3 & 4,06 & 4,75 & 200 \end{array}\right]$$

From our previous matrices:

$$\begin{bmatrix} x \\ V \end{bmatrix} = A_1 \begin{bmatrix} X \\ T \end{bmatrix}$$

Where we have:

$$\begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ X_4 \\ S_1 \\ S_2 \\ S_3 \\ N \\ \eta \end{bmatrix} = \begin{bmatrix} 1 & 0,4 & 0,18 & 0,5 & 0 \\ 0 & 1,25 & 0,25 & 0,625 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0,5 & 0,1 & 1,25 & 0 \\ 2 & 0,8 & 0,36 & 1 & 0 \\ 2 & 6,55 & 2,51 & 7,875 & 0 \\ 0 & 5 & 1 & 7,50 & 0 \\ 10 & 66,5 & 34,3 & 86,25 & 60 \\ 2 & 4,3 & 4,06 & 4,75 & 200 \end{bmatrix} \begin{bmatrix} 100 \\ 200 \\ 300 \\ 300 \\ 1 \end{bmatrix} = \begin{bmatrix} 384 \\ 512,5 \\ 300 \\ 505 \\ 768 \\ 4625,5 \\ 3550 \\ 50525 \\ 3903 \end{bmatrix}.$$

Where the final output is as follows:
Production line No. 1 - 100 units.
Production line No. 2 - 200 units.
Production line No. 3 - 300 units.
Production line No. 4 - 300 units.

In one hour the production volume of semi-finished goods (semi-finished) is as follows:

Icon	Amount	Production Type
X1	384 units.	Men's winter suit
X2	512.5 units	Jacket Sport
X3	300 units	Men's Pants
X4	505 units	Men's summer suit

Consumption of raw materials is:
S1 = 768 units.
S 2 = 4625.5 units.
S 3 = 3550 units.
The total energy consumption is:
N = 50525 units (KW).
The total amount of wage allocations is:
η = 3903 monetary unit.
Thus, these allocations are considered optimal and will support the current situation of work in the lesson, so that the structure of the cost per unit of production bears the minimum amount of wages as well as the rest of the costs.

Conclusions and recommendations

Conclusion

The researchers concluded with the following conclusions:

1. The adoption of quantitative approach, specifically matrix method is an effective mathematical method in calculating the optimal use of the elements of production and integration of production lines.
2. The matrices can achieve the final production of each production line.
   - Line No. (1) ` 100 units of production
   - Line No. (2) ` 200 units of production
   - Line No. (3) ` 300 units of production
   - Line No. (4) ` 400 units of production
3. Calculation of matrices in the quantitative approach reveals quantitative indicators such as the quantity of goods describing the manufacturer (semi-finished) for each type of product, which supports the decision maker in rationalising decisions regarding the calculation of the required futures.
4. The calculation of matrices in the quantitative approach also reveals the total amount of energy consumption and the amount of the total allocations necessary to pay the workers' wages.

5. The optimisation can be achieved through the application of the quantitative approach with a description of methods descriptive approach to support the work of various operations.

Recommendations

1. The researchers suggest the use of the quantitative approach in determining the need for the elements of production, especially the raw materials, energy and hours of operation of the machines and equipment, while relying on the descriptive approach in studying the customers' behaviour.
2. Stay away from intuition and guesswork in estimating the need for elements of production requirements, as this will lead to cost deviations.
3. Provision of the necessary techniques (software ready and computers for the application of the method of matrices), in addition to what is required of basic data, according to a database of cost and accounting.
4. The introduction of workers in quantitative methods (especially engineers) in the production base who supervise the formation of production lines.
5. Work on this approach as an important tool to rationalise decisions in general and decisions to form production lines to provide products required by customers.

REFERENCES

1- Abu Saleh, Subhi, Statistical Methods, Dar Al-Masirah Publishing and Distribution, Jordan, Amman, 2008.
2. Jassim, Aqil, Al-Marhoun, Musa, Contemporary Administrative Issues, Al-Israa University of Administrative Sciences, 2003.
3 - Farid Fahmy, Principles and Principles for Management and Business, Al-Shaab Press, Jordan, Irbid, 2006.
4- Al-Shammari, Hamoud, Al-Fadl, Mo'ied Abdul-Hussain, Statistical Methods in Decision Making Applications in Production and Service Organisations, Dar Majdalawi Publishing and Distribution, Amman, Jordan, 2005.
5- Al-Obaidi, Hamoud, Al-Fadhel, Muayad Abdul-Hussain, Operations Research and Applications and Establishment Object, Al-Warraq Publishing and Distribution Foundation, Jordan, Amman, 1999.
Ali, Hussein Ali, Al-Fadhel, Moayad Abdul-Hussein, Modeling of Administrative Decisions, Al-Yazuri Publishing and Distribution, Jordan, Amman, 1999.
6- Ali, Hussein Ali, Al-Fadhel, Moayad Abdul-Hussein, Modeling of Administrative Decisions, Al-Yazuri Publishing and Distribution, Jordan, Amman, 1999.
7. Al-Fadl, Mo'ied A. Al-Hussein, Quantitative and Qualitative Methods in Supporting the Organisation's Decisions, Al-Warraq Publishing and Distribution, Jordan, Amman, 2009.
8. Al-Fadl, Moayad Abdul-Hussein, Quantitative Approach in Business Management, Al-Warraq Publishing and Distribution, Jordan, Amman, 2009.
9. Karim, Adnan Najmuddin, Statistics for Economics and Management, Dar Wael Publishing and Distribution, Jordan, Amman, 2003.
10- Najem, Aboud Najm, Quantitative Methods in Management, Al-Warraq Publishing and Distribution, Jordan, Amman, 2006.

SECOND: ENGLISH SOURCES

e. H. Krynski, A. Badach, "Zastosowania Matematyki do podejmowania decyzji ekonomicznych, pwn, wa-w9, 1998.
f. R. Hogg, A. Craig, "Introduction to mathematical Statistics" 4th, collier Macmillan Publishing company, New York, U.S.A., 2006.
g. E. Mahs field " Statistics for Business and Statistics", 7th ed., New York, U.S.A., 2015.
h. M. Wisniewski "Constitutive Methods for Decisions Makers", FT, Prentice Hall, U.S.A., 2009.
i. S. Dandr, "Quantitative Analysis for Management", Prentic Hall, U.S.A., 2012.
j. J. Heizer, B. Render, "Operation Management Sustainability and Supply Chain Management" 11th ed Pearsin, U.S.A., 2011.
k. J. Hanke, "Understanding Business Statistics", IRWIN, Boston, U.S.A., 2008.

l. W. Srebenson W., "Business Statistics" International edition, New York, U.S.A.,2003.
m. H. A. TAHA, Operation Research – An Introduction Seris, Mc Graw Hall Book Prentice Hall,New York, U.S.A., 2005.
n. D. Salvatori "Statistics and Economics", Schism's Wtline Company, New York, U.S.A., 2015.