

Production Capacity Utilization Variance and Its Role in the Operating Profitability of a Sample of Iraqi Industrial Corporations

P.D.Mustafa Muneer Isma'eel*

Mustafa Hatwan Rhima**

Abstract

The purpose of this research is embodied in studying the effect of production capacity utilization on the operating profitability, for the company which does not make use of its available production capacity or that which suffer from a deficiency in its production capacity, its production costs rise due to a decrease in the production levels and consequently to a decline in the profits, which proves that there is an expected relationship between the amount of the production capacity utilization and the operating profitability. A non-random intentional sample has been selected including (16) Iraqi industrial corporations listed in Iraq Stock Exchange for period of (10) consecutive years (2006-2015). The research variables have been measured and analyzed quantitatively and statistically in description and explanation using the method of panel data analysis which combines between cross-sectional data including the corporations and the time-series data represented by years, which works on rising the efficiency of estimating the parameters of the studied model in comparison with the model capabilities in case of using the cross-sectional data or the time-series data alone separately, as well as employing the description instruments and statistical inference. The research problem is explained based on one main hypothesis states that the variance in the levels of production capacity utilization results in a statistically significant opposite variance in the operating profitability. The research reached to many conclusions, perhaps the most important of which is what confirms the validity of the research hypothesis, as it becomes clear that the higher

* جامعة بغداد / كلية الإدارة والاقتصاد .

** باحث .

بحث مسنل من رسالة ماجستير

مقبول للنشر بتاريخ 2017/8/20

the levels of the production capacity utilization, the more profitable they will be at the level of both measures used to measure the production capacity utilization.

Keywords: production capacity utilization, Operating Profitability, Panel data Analysis.

المستخلص

تجسد الغرض من البحث الحالي في دراسة تأثير استغلال الطاقة الإنتاجية على الربحية التشغيلية ، فالشركة التي لا تستغل طاقتها الإنتاجية المتاحة أو تلك التي تعاني من عجز في طاقتها الإنتاجية ترتفع تكاليف الانتاج لديها والسبب انخفاض مستويات الانتاج ومن ثم تراجع الارباح ليستدل من ذلك ان هناك علاقة متوقعة بين مقدار استغلال الطاقة الإنتاجية والربحية التشغيلية ، وجرى اختيار عينة قصدية غير عشوائية تضمنت (16) شركة صناعية عراقية مساهمه مدرجة في سوق العراق للأوراق المالية على مدى (10) سنوات متتالية وللمدة (2006- 2015) ، وجرى قياس متغيرات البحث وتحليلها كمياً واحصائياً ، وصفاً وتفسيراً ، باستعمال أسلوب البيانات المزدوجة (Panel Data Analysis) والذي يجمع بين البيانات المقطعية (cross-sectional) والذي يتضمن الشركات، وبيانات السلاسل الزمنية (time-series) المتمثلة بالسنوات ، والذي يعمل على رفع كفاءة تقدير معالم النموذج المدروس مقارنة بمقدرات النموذج في حال استعمال البيانات المقطعية او بيانات السلاسل الزمنية لوحدها بشكل منفصل ، فضلاً عن توظيف أدوات الوصف والاستدلال الاحصائي، وجرى تفسير مشكلة البحث انطلاقاً من فرضية رئيسية واحدة نصت على ان تباين مستويات استغلال الطاقة الإنتاجية يقود الى تباين مقابل معنوي احصائياً في الربحية التشغيلية ، وتوصل البحث الى مجموعة من الاستنتاجات لربما يكون أهمها ما يؤيد صحة فرضية البحث ، اذ تبين كلما ازدادت مستويات استغلال الطاقة الإنتاجية ازدادت الربحية وعلى مستوى المقياسين المستعملين لقياس استغلال الطاقة الإنتاجية.

الكلمات المفتاحية : استغلال الطاقة الإنتاجية ، الربحية التشغيلية ، تحليل البيانات المزدوجة

Introduction:

The decisions of the production capacity are considered as one of the important decisions in the organization and they are within the main decisions of operations and processes, involving the investment in the productive resources and their maximum benefit besides that the capacity decisions have a real effect on the organization's ability to meet the future needs of products.

The variance in the levels of the production capacity utilization for industrial companies will be reflected on their profitability negatively or positively, leading to the necessity of the appropriate investment in the production capacity with the factors it includes on which it depends in generating that capacity, represented by the fixed assets directly associated to the production capacity and in resulting in the expected maximization of the organization's profitability and the investment revenues achieved in it.

Hence, the inappropriate investment in the production capacity or the organization's assets, especially fixed assets, perhaps may expose it to many risks, especially that the surplus unexploited production capacity leads to an increase in the costs and a decrease in the profits on one hand, and the deficiency in the production capacity leads, in turn, to the risk of losing the sales and then a decrease in the organization's profitability on the other hand, which means that the organization's ability to achieve the targeted profits as being the final measurement of efficiency in it is associated with the right balance in the size of the required production capacity with the true existent demand on its products in the market within the studied growth paces that remove the surplus from the unexploited capacity. In order to achieve the main purpose of the current research, has been divided into five sections. The first is related with research approach, including problem statement, objectives and justifications. The second section includes literature review to the development of research hypotheses. The third section dealt with research methodology, the fourth section viewing the results and their discussion, finally, the fifth section dealt with some conclusions and recommendations .

Section One

The Research Premises

First: Problem Statement

The organization growth and the continuity of its different activities in its business environment are a goal it desires since its first establishment imbedded in its mind within a future vision translated by the organization's message and task to be executed later through its various strategies and policies according to specified programs and procedures based on detailed plans of quantitative nature embodied by different budgets laid to execute those activities. Thus, the organization can not achieve that end without achieving the profits or maximizing them being a logical justification for the organization's investments in various assets, preceded by the fixed assets such as machines, equipment, buildings and real estate's being the other face of the production capacity, where without them no organization can generate the outputs of goods or services.

This means that the variance in the levels of the production capacity utilization and the extent of utilizing it will be reflected on its profitability negatively or positively, leading to the necessity of the appropriate investment in the production capacity with the factors it includes on

which it depends in generating that capacity, represented by the fixed assets directly associated to the production capacity and in resulting in the expected maximization of the organization's profitability and the achieved investment revenues.

The problem dimensions can be briefed in a group of questions whose answer may hopefully lead to valid solutions casting in the result of achieving the research aims and its basic ends towards improving the theory and developing the existent knowledge about it:

- 1- Are each of the production capacity, its utilization capacity and the operating profitability characterized with specified meanings and measurements in the managerial thought?
- 2- Does the variance in the production capacity and its utilization efficiency lead to an opposite variation in the organization's profitability?

Second: Research Objectives

The basic aims envisaged from the research are as the following:

- 1- The contribution in displaying an intellectual framework and another practical has its experimental space in the application after combining the research variables: the production capacity utilization and the operating profitability.
- 2- The study of the direct relationship between the levels of the production capacity utilization and the operating profitability for a number of Iraqi companies working in specified industries.
- 3- The accurate scientific investigation about a number of mechanisms that help the Iraqi business organizations of the studied industrial companies to rise the profitability levels in them after studying the effect of the levels of the production capacity utilization.

Third: Research Justifications:

- 1- The organizations' success, their continuity and growth depend on the extent of their ability to control the production capacity, its provision and utilization in the best way due to its positive effect on profitability.
- 2- The urgent necessity of this type of researches with multi cognitive fields that combine both fields of production, operations management and financial management so as to add some very important developments of knowledge based on concepts and measurements that perhaps cannot be achieved unless the benefit of the combination between these two field is achieved as much as the matter is associated with the research topic and its basic thought.

Section Two

Literature Review and Hypotheses Development

First : Literature Review:

1- Production capacity utilization

a- Production capacity and its utilization rates:

Comes to the mind in case of mentioning the production capacity, that it reflects the maximum rate or amount of outputs, but there are some writers and researchers who addressed the production capacity from another perspective, in that each of (Bradley & Arntzen,1999: 795) defined it as the constant amount of auxiliary machines, equipments, labour , and other services which are available at a certain period of time. The production capacity is also defined as the level of resources available to the organization. This definition means that the capacity is a strategic decision defines the level of the resources available to meet the expected demand, and this level in turn becomes a constraint on the operating level, where decisions are taken to specify how to exploit the available capacity more effectively. The capacity utilization plays a key role in improving the profitability (Maruchek & McClelland, 1992: 18).

b- Factors of production capacity utilization improvement:

There are many factors that probably leads to improving the production capacity utilization if they are considered (Antony, 1992: 71-72):

- (1) An effective management towards improving the capacity utilization.
- (2) Conducting modifications in the organization, removing the obstacles and exerting efforts to improve the capacity.
- (3) Taking decisions to solve the problems related to manufacturing.
- (4) The activities of research and development to improve and develop the production.
- (5) The continual endeavor towards increasing the business efficiency through better practices of operation and maintenance.

c- Measures of production capacity:

It is worth mentioning that there is no optimal measure to the production capacity. Before mentioning the measures adopted in the current research, it must be noted that there are two kinds of measures termed as the general measures of capacity; the first kind is the outputs measures which are often used in the organizations producing modular

products, i.e. the organizations focusing on the product. These measures become unhelpful in case of the variety of product mix (Krajewski et al., 2010: 221). As to the second kind of measures, they are inputs measures which are most frequently used in the organizations focusing on the operation and which production is characterized with the variety and difference of products (various product mix). The outputs measures may be insufficient in the following states (Krajewski et al., 2013: 228):

- (1) The products variety and the operation difference are high.
- (2) The product mix changes.
- (3) Productivity rates are expected to change.
- (4) Learning has a great effect.

In such cases, it is more appropriate to calculate the capacity requirements using the inputs measures such as the number of employees, machines, equipments, computers and cars.

For the present research purposes, the measures of the current production capacity and fixed assets turnover were adopted to express the efficiency of the production capacity utilization not the capacity by itself's.

(First): Fixed Assets Turnover:

This percentage measures the management efficiency in managing the fixed assets, hence if the percentage is high, this indicates the effective utilization of the available production capacity, whereas its decrease indicates the non-balance between the sales and the size of investments in the fixed assets, (Pandya,2011:106) and then the organization suffers from surplus production capacity or the accumulation of production in the stores in the form of commodity inventory rather than its discharge in the market and it is calculated through dividing both values of the net sales by the net fixed assets (the gross fixed assets after subtracting the value of depreciation) rather than the gross fixed assets which are sometimes used to measure the percentage (Gibson,2011:312).

(Second): The current production capacity

This ratio is calculated by dividing the net fixed assets (the gross fixed assets from which the depreciation is subtracted) by the gross fixed assets and the low percentage is less than 30%. This points out that the machines and equipments probably became depreciated or consumed. Hence, the organization at the near term may be capable of generating high profit margins, yet the organization should not be deceived by that

because this matter cannot last for long for the organization will face the problem of high manufacturing costs compared to the competitors who probably have new and more developed machines and equipments, resulting in the organization losing its share in the market and then a decrease in its profitability. if the percentage is near to 100%, this means that the production capacity is not utilized completely or that the organization's fixed assets are relatively new (Vernimmen et al., 2014: 192).

2- Operating profitability

a- Concept of profitability and its measurement:

profitability represents a good indicator of business performance, yet the real standard of the organization's performance can not be judged by the absolute size of turnover profit (Bavaria, 2004: 96); therefore, the profitability represents the best indicator of the organizations' performance and measures the results of all managerial decisions about sales, prices and the level of investment, production and invention (Alsyof, 2004: 11), it is also useful for the management, creditors and shareholders as well as for expansion, profit distribution and others (Vala, 2011: 83). Also, profitability is regarded as the strongest factor motivating any commercial business, for the organization objective is maximizing the profit and then the business general objective is achieving satisfactory revenues on the finances invested in that (Barasara, 2013: 90). The profitability can be mentioned as being one of the key goals in any type of economic activity, in other word, profitability is the measure of analyzing whether the business is successful or not (Alahyari, 2014: 18).

Profitability is defined as the book value of the net profit after taxes divided by the total assets (Öhman & Yazdanfar, 2014: 445). (Alghusin, 2015: 387) defined profitability as the final measure of the organization's economic success through the investment in the capital. and that profitability refers to profit ascribed to some elements of the balance sheet or the income statement.

b- Factors affecting profitability:

The verification of the factors specifying the organization's profitability provides useful information for organizations in decision making and strategic planning (Alahyari, 2014: 1), which necessitates diagnosing the most important factors affecting the profitability variance among organizations and temporally at the level of each of them according to the following details of the mentioned factors:

(1) Size:

The economic theory states that the increase of the organization's size allows more additional advantages to the organization which enable to lay barriers before the new entrants as well as size savings to achieve higher profitability (Ramasamy, et al., 2005: 86). Despite that, the findings the researchers arrived at was variant, where they were divided into two groups, some argued that there were a positive relationship between the size and profitability (Asimskopulos, et al, 2009: 937), (Ukaegbu, 2014: 14), and (Nunes, et al, 2014: 705). Among the pioneer studies conducted in this field, Weiss & Hall's study which was based on the experimental analysis of more than 500 industrial companies and aimed to test the relationship between profit rates and the organization's size. The study results has shown that there was a positive relationship between the organization's size and profitability (Ramasamy et al, 2005: 87); (Stierwald, 2010: 16) and the reason was that the presence of a positive relationship between the organization's and profitability may indicate that the large organizations make use of size savings and scope savings. The alternative interpretation for that is large organizations can reach capital with costs lower that small organizations. On the contrary, there are some who argue that there is a reverse relationship between the organization's size and profitability, and their arguments base on the agency theory due to the differences and disputes between shareholders and managers (Salman & Yazdanfar, 2012: 96), (Goddard et al, 2005: 1280) and (Dhawan, 2001: 290).

(2) Growth :

The growth is considered as a necessary matter for the organization even if it is not within the main goals of the organization and the reason is that growth helps in providing the finance to the organization through increasing the size of profits (Vijayakumar & Kadirvelu, 2003: 175). The literature review on the growth relationship with the profitability refers to different results, where the group of the first perspective goes to the positive relationship between growth and profitability, where growth is an introduction to achieve the sustainable competitive advantages and profitability, and large organizations have higher rates of survival compared to small organizations. As to the group of the second perspective, they argue that the great and rapid growth may result in big obstacles that lessen the organization's capacity to generate profits (Markman & Gartner, 2002: 58). The study of (Al-Jafari & Al-Samman, 2015: 309) concluded that there is a positive relationship between the

organization's growth (measured by the growth of assets) and profitability which is similar to what the study of (Salman & Yazdanfar, 2012: 94) arrived at, where it concluded that there is a positive relationship between the organization's growth (measured by the growth of sales) and profitability, and in turn the study of (Hoy et al., 1992 ; Kaen & Baumann, 2003) concluded that there is a negative relationship between the organization's growth and profitability (Yazdanfar, 2013: 154).

(3) Fixed Assets:

The profits can be generated by investing the fixed assets (lands, buildings, establishments, machines and cars) to ensure profitability in the long term (Olatunji & Adegbite, 2014: 79), for the investment in the fixed assets is very important for industrial organizations to generate profits (Al-Jafari & Al-Samman, 2015: 307), as well as investment in the fixed assets contributes in improving the profitability through improving the quality of products, the efficiency of production, access to the most modern technology (Agarwal, 1991: 87), when the percentage of fixed assets to the total assets is high, which means that the percentage of fixed assets to the total costs is high, while the percentage of changeable costs to the total costs is low and then the profit margin increases. The findings of the study of (Iqbal & Mati, 2012: 106) showed that the organization's profitability is correlated to the increase in investing in the fixed assets, which is similar to what the studies of (Abuzayed, 2012: 168), (Bhutta & Arshad, 2013: 21), (Al-Jafari & Al-Samman, 2015: 303), (Vijayakumar & Kadirvelu, 2003: 170) and (Dharmaraj & Velmurugan, 2014: 1001) showed.

(4) Productivity:

The organizations which aim at achieving the maximum profits work to exploit all available resources effectively as well as exploit the opportunities to achieve the maximum profits, also the organizations of the highest productivity have high profitability (Yazdanfar, 2013: 154), for the organizations of the highest productivity have a competitive advantage compared to the organizations of the lowest productivity which is likely to be reflected on profitability (Strierwald, 2009: 1). (Salman & Yazdanfar, 2012: 97) indicated that the organizations which have low productive levels go out of competition in the market. On the contrary, the organizations of high productivity can survive and compete in the market. The explanation of this is that the organizations with high productivity have low average production cost, high product quality and

increased quantities of production with a lower number of inputs and consequently high profits.

(5) Lagged Profitability:

High profits in the past provide opportunities to achieve high profits in the future through the reinvestment of profits in search, development and invention, increasing the profitability in the future (Strierwald, 2009: 14), (Yazdanfar, 2013: 154) pointed to a positive relationship between the previous profitability and the current profitability, justifying that the previous profitability means more resources regarding for example the increased growth opportunities, having liquidity, and better relationships with customers, for example, and not as a limitation, in the case of low current profitability levels compared to what is achieved of it in the past. In this context, it points to what is growth in its content expressing the changes achieved in the organization's performance with its operating, financing and investing aspects and their effects on the organization's profitability. The previous profitability indicates the organization's success in the market till now, it also enable the organization to have more resources and assets to benefit from the profitability. While (Margaretha & Supartika, 2016: 135) referred to the possibility of a negative relationship between the previous profitability and the current

Second- The proposed model and research hypothesis:

Figure (1) shows the proposed model of the study after reviewing the literature, including the previous studies related to the research topic, which explains the direct relationship between the production capacity utilization and the operating profitability.

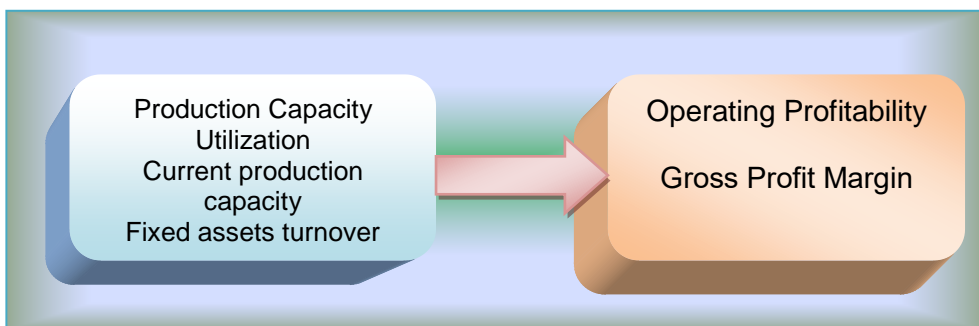


Figure (1)
the proposed model

Based on what has been described in the research model of an expected relationship between the research both variables, a general hypothesis has been formulated for the research as the following:

(The variance of the levels of the production capacity utilization leads to an opposite statistically significant variance in the operating profitability of the Iraqi studied industrial companies).

Section Three

Research Methodology

First : Research Population and Sample

The research population is confined to the Iraqi industrial corporations listed in Iraq Stock Exchange as being pioneer companies which continued practicing their various activities for relatively long periods of time, and they succeeded in achieving acceptable performance levels during the years of their business with the availability of the necessary data for analysis. The research sample has included (16) industrial companies among the industrial corporations listed in Iraq Stock Exchange numbered (21) companies, i.e. a preview ratio of (76%), which is a high percentage probably representing the population from which it has been drawn by the method of intentional or purposeful preview a true representation through which the results of the analysis and the test can be generalized on the research population and not only on its studied sample after the sample companies met the following criteria adopted in the test :

1. The company's practicing its activities throughout the research period.
2. The company's continuity in listing its shares in Iraq Stock Exchange and the regularity of trading them during the research duration.
3. The company's continuity in its ability to achieve the overall operating profits on its sales throughout the research duration in compatible with the research thought as far as the production capacity is concerned as the company's operating activity.
4. The availability of the data required to measure the research variables during its duration and the possibility of testing the expected relationships between them.

Second: Instruments of Analysis and Test

The steps of the quantitative and statistical analysis include three items, the first is the description of the sample characteristics at the level of size, age, fixed assets and the operating profit, while the second was the statistical description including the measures of central tendency and dispersion, and the last item includes testing the hypotheses. Also, the ready-made software was used.

Table (1)
Ready-made software used in the analysis

No.	Ready-made software	Employment
1	Excel 2010,2016	Quantitative measurement-mathematical model
2	SPSS 21	Statistical description, measures of central tendency and dispersion
3	STATA 12 SE	Hypotheses test based on the panel data

Third: Measures

1- Production capacity utilization:

The multiple measures of the production capacity utilization levels call for the use of more than one measure expressing them; therefore, the production capacity has been measured using two measures: the rate of fixed assets turnover (Gibson, 2011: 312) shown in equation (1), and the current production capacity (the ratio of net fixed assets to the gross fixed assets) (Vernimmen, et al, 2009: 206) shown in equation (2):

$$a- \textit{Fixed Assets Turnover} = \frac{\textit{net sales}}{\textit{net fixed assets}} \dots \dots (1)$$

$$b- \textit{Current Production Capacity} = \frac{\textit{net fixed assets}}{\textit{gross fixed assets}} \dots \dots (2)$$

2- Operating profitability:

The operating profitability means the operating profitability resulted from the practice by those organizations of their operating activities the production of which is the primary basis besides the sales. For this reason, the profitability is measured with the operating profitability margin of sales. This percentage refers to the percentage remaining for each Dinar after subtracting each of the cost of the sold goods and the operating costs, where this percentage represents the relationship between the operating profit and the net sales in the form of percentage (Bavaria, 2004: 115). This percentage reveals the extent to which the company achieves profits from its operations (Bragg, 2007: 42). This percentage is calculated so as to obtain the company's operating efficiency (Raval, 2006: 172) and is calculated via dividing the net operating profit (the profits before interests and taxes) by the net sales (Gipson, 2011: 310) as in equation (3):

$$\textit{Operating Profit Ratio} = \frac{\textit{EBIT}}{\textit{Net Sales}} \dots \dots (3)$$

Section Four

Viewing the Results and Their Discussion

First: Describing the sample properties:

This item focuses on describing the properties of the Iraqi industrial companies which have been selected as the research sample on the basis of a number of properties representing them, they are the age, the size, the fixed assets, the annual operating profits achieved for those companies during the ten years of research. The following is the description related to each of them, respectively:

1- Age: Table (2) has been specified to show the results of the quantitative description of the studied sample properties among them the age represents the first . From this table, it is shown that the average age of the sample companies since the institution history of each one was (34.5) years, indicating, to some extent, the seniority of these companies and their ability to continue their activities with disparate success levels which probably justify their selection as the research sample on the basis of this aspect of selection justifications.

Table (2)

Quantitative Research Results of the Characteristics of Industrial Companies Sample Research

No.	company	age (year)	size (million id)	Fixed assets (million id)	million) Operating profit (id)
1	Al-Mansour Pharmaceuticals Industrial	26	4518.75	782.20	355.9059
2	Modern Sewing	26	1347.93	231.25	131.172
3	Iraqi For Tufted Carpets	26	2879.22	117.99	95.13681
4	Baghdad for Packing Materials	54	588.84	272.33	6.248083
5	Baghdad Soft Drinks	26	156415.75	10524.79	7834.745
6	Iraqi Date Processing and Marketing	26	16910.93	1813.37	454.0026
7	Al-Kindi of Veterinary Vaccines	27	4424.34	1135.76	501.1977
8	Fallujah for Construction Materials	26	2919.19	604.68	7.151226
9	Iraqi Engineering Works	31	1457.96	388.92	33.69705
10	Al-Khazer for Construction Materials	26	1593.07	1096.86	41.17402
11	Modern Paint Industries	40	26674.71	4937.72	1701.824
12	Metallic Industries and Bicycles	52	7731.18	1276.28	721.8248
13	Ready Made Clothes Trading	40	2772.92	402.40	164.6862
14	National Household Furniture Industry	30	2079.31	304.90	23.79222
15	North Soft Drinks	26	39281.78	29240.64	518.5424
16	Modern Chemical Industries	70	3660.54	357.46	130.974
	average	34.5	17203.53	3342.97	795.1296

Figure (2) shows the distribution of these companies with respect to the age ranged between (26) years in eight companies of them (Al-Mansour Pharmaceuticals Industrial, Modern Sewing, Iraqi For Tufted Carpets, Baghdad Soft Drinks, Iraqi Date Processing and Marketing, Al-Fallujah for Construction Materials, Al-Khazer for Construction Materials, and North Soft Drinks) and (70) years in the Modern Chemical Industries company alone. It is worth noting that there is a relative clear convergence among the companies in terms of age property, except five of them, including the aforementioned company, that justifies the advantage of measuring the performance and comparison.

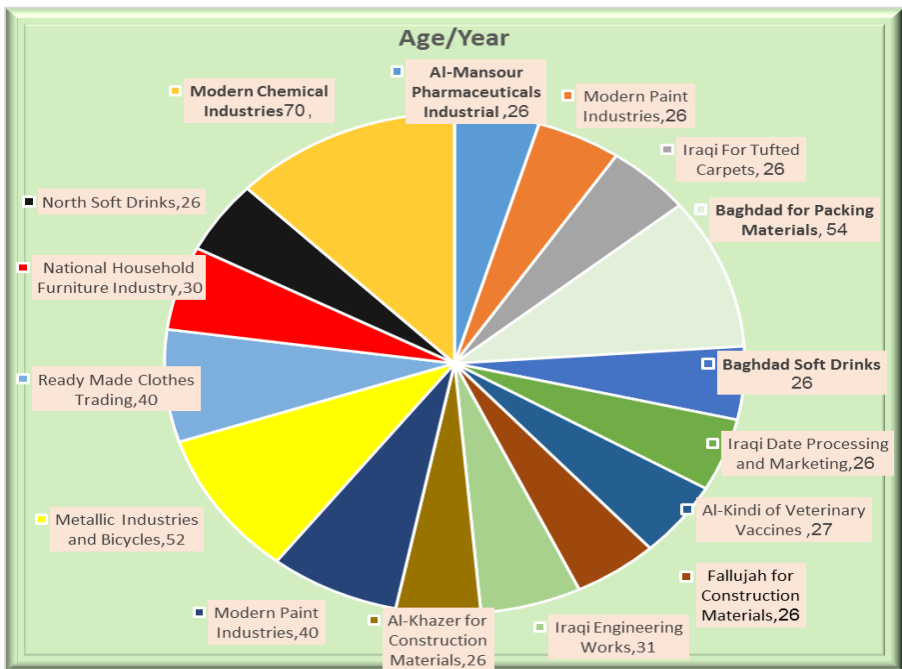


Figure (2)
Distribution of Companies by Age / Year

2- Size: The company size is measured with multi measures, the assets are considered among the most usable size measures in expressing the size of companies' investments and then their various activities. It is shown from table (2) that the general average of size in the light of the value of the total of the studied industrial companies' assets is (17203.53)million Dinars. The aforementioned companies' assets did not exceed the average value except three

companies (Baghdad Soft Drinks, Modern Paint Industries, and North Soft Drinks), as to the remaining companies numbered (13) companies, their gross assets values were below the sample mean, reflecting that there is a relative convergence among the sample companies also in terms of size according to the measure used to express the size, and then the obvious conformity in this property of the sample properties also as shown in Fig. (3).

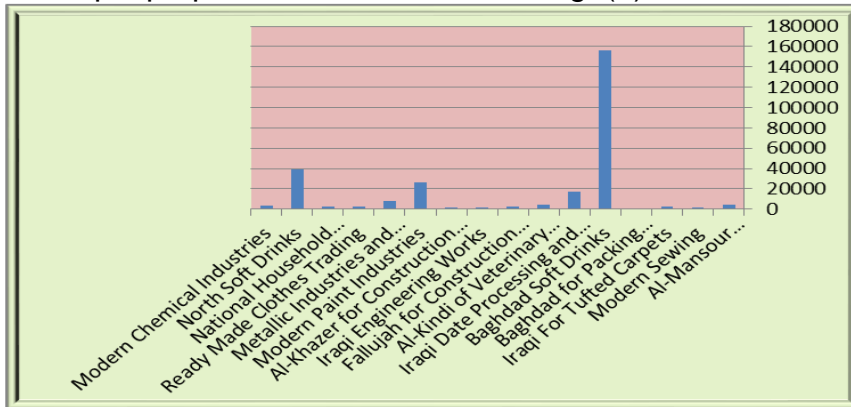


Figure (3)

Size of companies in terms of average assets/million dinars

3- Fixed Assets: The fixed assets are considered as the fundamental foundation to construct the production capacity in industrial companies, for without the lands and buildings, machines and equipment's, tools and instruments, transportations, and other fixed assets, the company cannot manufacture its products or practice its operations in converting the inputs into outputs via the different processes of production and manufacturing. on this basis, the fixed assets of the sample companies were analyzed at the description level as a main property indicating the size of the financial facilitations available for those companies in their production of different products they present. Table (2) shows the results of the statistical description of the studied companies wholly (3342.97) million Dinars which the fixed assets value of the sample companies did not exceed this value except for three of them only (Baghdad Soft Drinks, Modern Paints Industries, and North Soft Drinks) versus (13) companies in which the fixed assets value was below the average with a relative convergence among them in terms of this property which also reflects the presence of an

obvious homogeneity in them at the level of the greatest part of the sample companies, Fig. (4) confirms that.

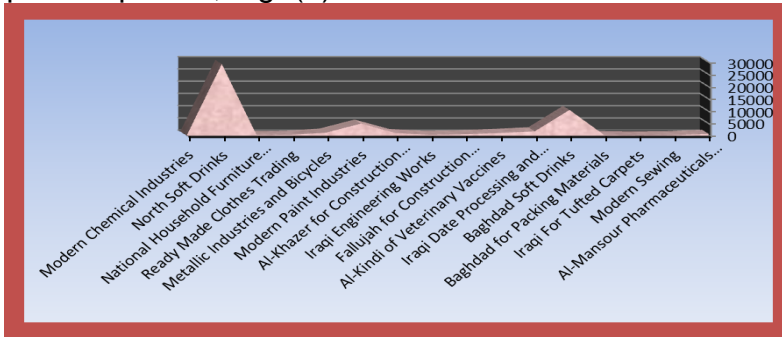
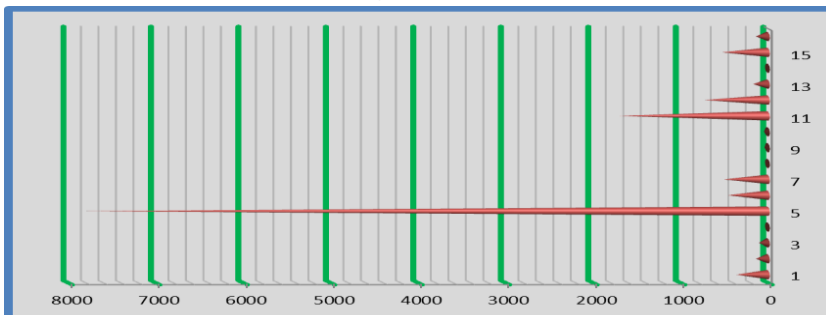


Figure (4)
average of fixed assets / million dinars

4- Operating Profit : The operating profit represents another property of the sample properties and another approach of the approaches of measuring the research variables whose average value was as in table (2) at the total level of the studied Iraqi industrial companies (795.1296) million Dinars. This rate in the operating profits is not exceeded only by two companies (Baghdad Soft Drinks and Modern Paints Industries) among the remaining studied companies and then there has been an obvious convergence among these companies in terms of the property of their ability to achieve the operating profits resulted from practicing their activities in production and sale after exploiting their available production capacity within certain ranges, Fig. (5) shows this conformity between the dominant part of the sample companies in the property of the operating profits.



Figure(5)
Average operating profit / million dinars

Second: The Statistical Description at the Comprehensive macro Level:

This analysis means the description of the research variables according to its panel data which combine the companies with years in an comprehensive framework including (16 companies × 10 years = 160 observations), where table (3) shows the results of the statistical description of the three research variables, from which it is shown the increase of the mean value of the production capacity, with its first measure, represented by the fixed assets turnover (2.540) compared with its mean which was (0.935) with its second measure embodied by the percentage of the net fixed assets to the gross fixed assets, but the standard deviation at the level of the second measure (0.069) decreases in an obvious way other than in the first measure (2.486), and then the difference coefficient in the second measure of the production capacity was lower (0.70) greatly compared to the difference coefficient of the production capacity with its first measure (0.98). These results reflect a lower dispersion in the utilization level of the Iraqi industrial companies the research sample for their production capacity with its second measure during the research duration versus the dispersion of its first measure. This is because the difference between the numerator of the second measure of the production capacity and its denominator, which is the value of the operating costs that are determined by the depreciation, making the numerator value approximate to the denominator value, especially when the utilization level of the production capacity decreases and the hours of operating the production lines decline, including the machines, tools and equipments, and then the need for maintenance, renewal or substitution decreases, i.e. the need for expending high amounts of money on depreciation decreases, which is reflected on the meant convergence between the values of the numerator and the denominator of the second measure of the production capacity, and then the limitedness of the dispersion of its utilization rates according to this measure compared to the dispersion of the first measure.

Table (3)

The descriptive statistics of the research variables at the macro level

Variables	Variable Kind	Number of Observations	Arithmetic mean	Standard Deviation	Coefficient of Variation
Production Capacity/Measure1	Explanatory (Independent or Predicted)	160	2.540	2.486	0.98
Production Capacity/Measure2	Explanatory (Independent or Predicted)	160	0.935	0.069	0.07
Profitability	Dependent (Effect or Response)	160	1.010	0.676	0.67

As to the profitability variable, table (3) shows a dispersion that is also not high due to the decline of the standard deviation value (0.676) in view of the mean value (1.010) for this variable at the comprehensive total level of data and then the limitedness of the dispersion or variance coefficient (0.67) of the operating profitability of the industrial companies under analysis when the study of that dispersion is conducted in terms of spatial analysis represented by the companies (the companies' cross-sections at the level of each year) in coincidence with the temporal analysis embodied by the years of search and analysis (the time-series at the level of each company) simultaneously according to what is called as (the panel data analysis).

Third: Hypotheses Test:

1- Hypothesis of direct effect (the first measure of the production capacity):

Table (4) summarizes the results achieved on the direct effect test of the production capacity, via its first measure, by the variance of the operating profitability levels of the sample companies during the research time duration within a time horizon combining between the companies' data spatially and their data at the level of years temporally within what is known as the method of panel data analysis, on which basis the test of the remaining hypotheses has been conducted. From the aforementioned table, the significance of the production capacity effect with its first measure for the companies under research in their operating profitability is shown . The deviation coefficient Beta in this model was ($\beta=0.078$, $P<.01$), showing with its positive value the direct relationship between both variables in that if the production capacity of the studied companies increases with an increase of one unit, their operating profitability will increase with one Beta coefficient, and vice

versa when the utilization levels of the production capacity for those companies decline and then the profitability decreases accordingly. The production capacity in the total model of this test explains a statistically significant explanation percentage ($R^2= 86.4\%$, $P<.01$) of the profitability variance according to the specification coefficient, and the remaining of this percentage expressed by the non-specification or explanation coefficient ($1-R^2$) which was (13.6%) is coupled with other cause or factors not listed with the test model of this hypothesis. With this amount of analyzing the results of the research first hypothesis test which confirmed its validation, the features of the direct relationship are clear between the utilization rates of the production capacity, at the level of its first measure the rate of fixed assets turnover in the Iraqi industrial companies the research sample and their operating profitability levels, and then the condition of the direct effect significance between the two variables has been fulfilled.

Table (4)

test direct impact of the production capacity / measure (1) on profitability

Profitability(Y)				
Parameters of Regression Model	Regression Coefficient	Standard Error	Test Statistic	Significance
Variables of Regression Model	Coef.	Std. Err.	Z	P> Z
Production Capacity (X)	0.078	0.010	7.56	0.000
Intercept	1.153	0.027	41.61	0.000
Determination Coefficient	0.864			
Wald χ^2	57.09			
Prob > χ^2	0.000			
Number of Observations (n)	154			

2- The Hypothesis of direct effect (the second measure of the production capacity):

The multiple measures of the utilization levels of the production capacity call for using more than one expressed measure, which necessitates the frequency of hypotheses test at the second measure level of the production capacity used in this research (the percentage of net fixed assets to their total). The Table (5) shows the test results of the main of direct effect hypothesis according to the aforementioned second measure of the production capacity which also confirmed the significance of the production capacity effect of the studied companies in their operating profitability, where the deviation coefficient of the production capacity in this model was ($\beta=.739$, $P<.01$), which reflects the direct relationship between the two variables also, for with the increase of the production capacity of the studied companies of an

amount of one unit, their operating profitability increases with an amount of (73.9%) of that unit. Contrary to that, however, according to the test results, from the same table it is noted that the production capacity in the total model of this test explained ($R^2= 87.4\%$) of the variance of the profitability according to the specification coefficient value with an explanatory power higher with (1%) than the previous test model on the basis of the first measure of the production capacity, and the remaining of this percentage (12.6%) is certainly due to other factors that did not enter the test model of this hypothesis. With this level of analyzing the results of the research first hypothesis test which confirmed its validation also by using the second measure of the production capacity, the direct relationship is confirmed between the utilization rate of the production capacity in the Iraqi industrial companies the research sample and the levels of their operating profitability.

Table (5)

test direct impact of the production capacity / measure (2) on profitability

Profitability(Y)				
Parameters of Regression Model	Regression Coefficient	Standard Error	Test Statistic	Significance
Variables of Regression Model	Coef.	Std. Err.	Z	P> Z
Production Capacity (X)	0.078	0.010	7.56	0.000
Intercept	1.153	0.027	41.61	0.000
Determination Coefficient	0.864			
Wald chi ²	57.09			
Prob > chi ²	0.000			
Number of Observations (n)	154			

Section Five

Conclusions and Recommendations

First: Conclusions

- 1- There is a positive relationship between the production capacity utilization at the level of both measures (fixed assets turnover and the percentage of the current production capacity) and the operating profitability, which means that the increase in the rates of the production capacity utilization results in the increase of its operating profitability.
- 2- The variance of the industrial companies (the research sample) capacity to generate net operating profits from their sales of the goods they produce, for the higher the percentage value of the

operating profit margin of sales, the more this indicates a higher efficiency in achieving the profits based on the practice of the mentioned companies for their operating activities associated with production and sale, and vice versa.

- 3- The increase of the operating costs that are determined by the depreciation, especially at the increase of the levels of the production capacity utilization and the decline of the operating hours of production lines including the machines and equipments and then a decrease in the need for maintenance, renewal or substitution, i.e. a decrease in the need for spending high amounts of money on the depreciation which is reflected on the convergence between both values of the numerator and denominator concerning the second measure of the production capacity (the ratio of net fixed assets to the total assets) and then the Limited dispersion rates of their utilization according to this measure compared to the first measure (the fixed assets turnover).

Second: recommendations

- 1- The Iraqi industrial companies must be interested in the maximum benefit from the available production capacity for its great role in achieving the operating profitability.
- 2- The inappropriate utilization of the production capacity is considered as a bad indicator because it results in the increase of production costs and then the decrease of profitability. To achieve the necessary profit margin, the companies perhaps tend to increase the prices which makes the company's products less competitive in front of the competitors.

References

First: Books

1. Bragg, Steven M. (2007) Business Ratios and Formulas: A Comprehensive Guide, 2th.ed, New Jersey: John Wiley & Sons. Inc.
2. Gibson, Charles H. (2011) Financial Reporting & Analysis, 12th Ed., USA, South-Western, Cengage Learning.
3. Krajewski, Lee J. Ritzman, Larry P. and Malhotra, Manoj K. (2010) Operations Management: Process and Supply Chains, 9th Ed. New Jersey, Prentice Hall.
4. Krajewski, Lee J. Ritzman, Larry P. and Malhotra, Manoj K. (2013) Operations Management: Process and Supply Chains, 10th Ed. England Pearson Education Limited.

5. Vernimmen,P., Quiry ,P., Dallochio, M., Le Fur, Y., & Salvi, A. (2009) Corporate Finance Theory and Practice . 2th Ed . U.K, John Wiley & Sons Inc.
6. Vernimmen,P., Quiry, P., Dallochio, M., Le Fur, Y., and Salvi, A. (2014) Corporate Finance Theory and Practice, 4th Ed., U.K.,John Wiley& Sons Inc.

Second: Journals & Periodicals

1. Abuzayed, Bana (2012) Working capital management and firms performance in emerging markets: the case of Jordan, International Journal of Managerial Finance, Vol. 8, No. 2, pp. (155-179).
2. Agarwal, R.N. (1991) Profitability and Growth in Indian Automobile Manufacturing Industry, Indian Economic Review, no.1, pp. (81-97).
3. Al-Jafari, Mohamed Khaled and Al Samman, Hazem (2015) Determinants of Profitability: Evidence from Industrial Companies Listed on Muscat Securities Market, Review of European Studies, Vol. 7, No. 11, pp. (303-311).
4. Alsyouf, Imad, (2004) Cost Effective Maintenance for Competitive Advantages, Thesis for the degree of Doctor of Philosophy (Terotechnology) School of Industrial Engineering, Växjö University, Sweden.
5. Asimakopoulos, Ioannis (2009) Firm-specific and economy wide determinants of firm profitability Greek evidence using panel data, Managerial Finance, Vol. 35, No. 11, pp. (930-939)
6. Bhutta , Nousheen Tariq and Hasan Arshad (2013) Impact of Firm Specific Factors on Profitability of Firms in Food Sector, Journal of Accounting, scientific Research, No. 2, pp. (19-25).
7. Bradley, james R. and Arntzen Bruce (1999) "The simultaneous planning of producing, capacity , and inventory in seasonal demand Environment" operations Research , vol. 47, No. 6, pp. (795-806).
8. Dharmaraj A. and Velmurugan (2014) Determinants profitability in Indian Automobile Industry- using Multiple Regression Analysis, International journal of innovative Research & studies, Vol. 3, No. 4, pp.(993-1003).
9. Dhawan, Rajeev (2001) Firm size and productivity differential: theory and evidence from a panel of US firms, Journal of Economic Behavior & Organization, Vol. 44, pp.(269–293).
10. Goddard, John, Tavakoli, Manouche and Wilson, John O. S. (2005) Determinants of profitability in European manufacturing and

services: evidence from a dynamic panel model, *Applied Financial Economics*, No. 15, pp.(1269–1282).

11. Iqbal , Athar and mati , madhu (2012) Relationship between Non-current Assets & Firms Profitability, *Munich Personal RePEc Archive*, pp. (101-112).
12. Margaretha, Farah and Supartika, Nina (2016) Factors Affecting Profitability of Small Medium Enterprises (SMEs) Firm Listed in Indonesia Stock Exchange, *Journal of Economics, Business and Management*, Vol. 4, No. 2, pp. (132-137).
13. Markman, Gideon D. and Gartner, William B. (2002) The Effects of Hyper Growth on Firm Profitability, *The Journal of Private Equity*, Vol.5, No.4, pp. (58-65).
14. Marucheck, Ann, and McClelland, Marilyn (1992) Planning Capacity Utilization in an Assemble-to-Order Environment *International Journal of Operations & Production Management*, Vol. 12, No. 9, pp. (18 – 38).
15. Nawaf Ahmad Salem (2015) Do Financial Leverage, Growth and Size Affect Profitability of Jordanian Industrial Firms Listed?, *International Journal of Academic Research in Business and Social Sciences*, Vol. 5, No. 4, pp. (385-398).
16. Nunes, Paulo J. Maças, Serrasqueiro, Zélia M. and Sequeira, Tiago N. (2009) Profitability in Portuguese service industries: a panel data approach, *The Service Industries Journal*, Vol. 29, No. 5, pp.(693–707).
17. Öhman , Darush Yazdanfar and Peter (2014) The impact of cash conversion cycle on firm profitability An empirical study based on Swedish data, *International Journal of Managerial Finance*, Vol. 10, No. 4, pp. (442-452).
18. Olatunji, Toyin E., and Adegbite, Tajudeen A. (2014) Investment in Fixed Assets and Firm Profitability: Empirical Evidence from the Nigerian Banking Sector, *Asian Journal of Social Sciences and Management Studies*, Vol. 1, No. 3, pp.(78-82).
19. Ramasamy, Bala, Ong, Darry, and Yeung, Matthew C. H. (2005) Firm size, ownership, and performance in the Malaysian palm oil industry, *Asian Academy of Management of Accounting and Finance*, Vol.1, pp.(81-104)
20. Salman ,Khalik A. and Yazdanfar, Darush (2012) Profitability in Swedish Micro Firms: A Quantile Regression Approach, *International Business Research*; Vol. 5, No. 8, pp.(94-106).

21. Stierwald, Andreas (2009) Determinants of Firm Profitability - The Effect of Productivity and its Persistence, Melbourne Institute for Applied Economic and Social Research, pp. (1-23).
22. Ukaegbu, Ben (2014) The significance of working capital management in determining firm profitability: Evidence from developing economies in Africa, Research in International Business and Finance, vol. 1, pp. (1-16).
23. Vijayakumar, A. and Kadirvelu, S. (2003) determinant of profitability in Indian Public Sector petroleum Industries, Management & Labour Studies, Vol. 28, No.2, pp. (170-181).
24. Yazdanfar, darush (2013) Profitability determinants among micro firms: evidence from Swedish data, international journal of managerial finance Emerald group published, Vol.9, No. 2, pp.(151-160).

Third: Theses & Dissertations

1. Antony, M. T. (1992) Efficiency in central public sector enterprises in Kerala: an analysis of capacity utilisation, profitability, and productivity, Thesis submitted for the award of the Degree PhD. In economics under the faculty of Social Sciences, university of science and technology.
2. Barasara, Rajanish T. (2013) An Analytical Study of Capital structure Vis – A – Vis Profitability of Banking Industry in India, , A thesis submitted to the saurashtra university for the degree of Doctor of philosophy Under The Faculty of commerce, Saurashtra University.
3. Bavaria, Rasik N. (2004) A Comparative Analysis of Profitability Vis-A-Vis Liquidity Performance in Cement Industry of India, A thesis submitted to the saurashtra university for the degree of Doctor of philosophy in accountancy under the faculty of commerce, Saurashtra University.
4. Bavaria, Rasik N. (2004) A Comparative Analysis of Profitability Vis-A-Vis Liquidity Performance in Cement Industry of India, A thesis submitted to the saurashtra university for the degree of Doctor of philosophy in accountancy under the faculty of commerce, Saurashtra University.
5. Pandya, Vipulkumar A. (2011) A Comparative Analysis of Liquidity & Profitability of Indian Car Industry, A thesis submitted to the saurashtra university for the degree of Doctor of philosophy in accountancy under the faculty of commerce, saurashtra University

6. Raval, Dharmesh S. (2006) Analysis of Profitability in Pharmaceutical Industry , thesis PhD, Saurashtra University, College of Information Technology and Management Studies.
7. Vala, Shivubhai C. (2011) A Comparative Study of Profitability vis-à-vis Liquidity of Co-operative Milk Producers' Unions of Gujarat State A thiesis submitted to the saurashtra university for the degree of Doctor of philosophy under the faculty of commerce, Saurashtra University.

.....
.....
.....