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Anis Ali (Saudi Arabia)

# INDUSTRIAL DEVELOPMENT IN SAUDI ARABIA: DISPARITY IN GROWTH AND DEVELOPMENT

## Abstract

Industrial development in any nation plays a vital role in the strengthening of the economy and employs human resources as per specifications and directly towards the mainstream of the nation. In Saudi Arabia, there was rapid industrialization for four decades. Some manufacturing industries performed well, while some internal and external business environment factors influenced the others' performance. The study focuses on historical development, as well as recent trends of well-performing and poor-performing industries of Saudi Arabia. Small manufacturing industries in Saudi Arabia are underdeveloped and need more attention to attain sustainable and progressive growth rate in the form of the number of establishments to enjoy the potential. Manufacture of tobacco, computer, electronics and optics, pharmaceuticals and transport equipment are the deprived and underdeveloped industries of the manufacturing sector. There should be some easy credit schemes for the development of deprived or underdeveloped manufacturing industries. To attain sustainable growth and development of the manufacturing sector, a positive attitude of the government towards underdeveloped manufacturing industries, favorable labor laws, and entrepreneurial awareness, technical and financial assistance are necessary. The growth and development of the manufacturing sector of Saudi Arabia will be helpful in the attainment of goals of Vision 2030.

## Keywords

manufacturing industry, movement analysis, economy, MSMEs, entrepreneur, growth variations, economic activity, financial performance

## JEL Classification

O14, L70

## INTRODUCTION

Development is a continuous process backed by resources and entrepreneurial skills. The industrialization of an economy assures sustainable development and contributes to the economy, while the growth and development of all manufacturing sectors allow speedy development. Industrialization refers to transformation of processes or methods of converting all inputs into finished products or services. In Saudi Arabia, there was rapid industrialization in all sectors of the economy in the last few decades. The speedy industrialization reflects the government's attitude towards the growth and development of the economy. The Saudi government is committed to overall growth and development of the economy and develops various industrial sectors for balanced contribution to gross domestic product. Saudi industrial development fund and national industrial development logistics program were initiated by the government to assist the industrial sector multi-dimensionally. The government of Saudi Arabia encouraged industrial development and promoted all sectors of manufacturing or production. It was evident that the manufacturing sector of Saudi Arabia noted remarkable growth during the last four decades. In Saudi Arabia, some manufacturing industries are growing positively, while other industries can achieve expected rate of growth of develop-

ment. The manufacturing unit, which is related to minerals and natural resources, is successfully scaling heights and growth of development in Saudi Arabia, except for the manufacture of food products, which indicates that all the inputs, entrepreneurs, and regulatory framework of Saudi Arabia promote the manufacturing of food industry. Externally, mineral products demand at the global level is governed by other factors that lead to growth and development of mineral resources manufacturing units. Some industries of the manufacturing sector are comparatively less developed than the mineral resources based on economic units in Saudi Arabia. In Saudi Arabia, industries based on leather, equipment, and medicine are undeveloped due to unavailable resources for production, lack of entrepreneurial skills, or cheaper imports from other countries. There are differences in the growth rate of various units of manufacturing sector. Overall, Saudi Arabia achieved significant growth in the manufacturing industry, as it was SAR 32 billion in 1974 and increased to around SAR 319.5 billion in 2018, backed by a satisfactory average growth rate of 5.2% per annum for the period from 1974 to 2018 (Saudi Industrial Development Fund (SIDF)). The contribution of the industrial sector to GDP increased by 9% and arrived at 12% between 1974 and 2018 (SIDF). There was a change of composition in the GDP of Saudi Arabia in the last four decades, as the share of non-oil manufacturing industries increased from 32% to 70% in the total contribution in manufacturing industries. It indicates that the Saudi manufacturing industry considers non-oil sectors additionally, which will enhance the volume of Saudi Arabian GDP. Food products, building materials, and machinery and equipment are the contributing sectors in non-manufacturing industries in Saudi Arabian GDP. There is a remarkable growth of 9.3% in Saudi industrial exports, while chemical and plastic exports constitute two-third of total Saudi non-oil industrial exports. There was significant growth in non-chemical and plastic products from 1995 to 2017 (SIDF).

There is disparity in the growth and development of the manufacturing industries in Saudi Arabia, which is the objective of the analytical study. The study aims to identify the growth rate disparity among the various manufacturing industries of the industrial sector based on the number of establishments, earning capacity, operational expenses, operational surplus, employees engaged, and capital formation. So, the study will identify poor-performing industries and well-performing industries, and recent trends of the Saudi manufacturing sector. This study is also carried out to establish logical relationship between the factors, which are positively or negatively governing the growth and development of various industries in the manufacturing sector of Saudi Arabia in an established way. Ultimately, the study will facilitate suggestions for industries to attain expected rate growth and development, which help minimize the disparity among the manufacturing industries in Saudi Arabia.

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## 1. LITERATURE REVIEW

In a working paper of SAMA, Al Bakr (2015) suggested reviewing the finance schemes, streamline linkage of small industry with the large industry regarding research, development, and manufacturing, minimizing the reliance of private sector on the public sector to improve the overall productivity of industrial sector in Saudi Arabia. Kaur and Kiran (2008) observed in their study that in the Indian manufacturing industry, there is underutilization of financial resources, lack of suitable training, and labor problems are the factors responsible for lower growth and development. Mehta and Rajan (2017) stated in their research paper that world-class infrastructure is necessary for the development of the manufacturing industry in Saudi Arabia. They

further added that the connectivity of big cities or industrial cities is essential for the smooth conveyance of raw materials, as well as finished goods. Almosabbeh and Almoree (2018) found in their research paper that GDP growth will affect the production of Saudi Arabia positively, and ultimately it will increase the productivity of labor. They further suggested that the policymakers of Saudi Arabia should consider the industrial sector for social and economic development. Alzahrani (2018) stated that SMEs of Saudi Arabia are facing the challenges of e-commerce of the world, and there is a positive relationship between e-commerce and development of the SMEs sector of Saudi Arabia. Sadi and Henderson (2011) observed in their research that franchising is a good way for SMEs to gain profit, while some problems are arising between the rela-

tions of franchisors and franchisees. They further suggested that policymakers of Saudi Arabia must consider SMEs and franchisees while formulating policies for the development of the economy. Kayed and Kabir Hassan (2011) focused on the entrepreneurs' development in Saudi Arabia and indicated that the Saudi government must consider the entrepreneurship skills of Saudi citizens. The contribution of Saudi citizens in various sectors is necessary for sustainable development. Shifting from oil to non-oil economy is also a great factor in the development of Saudi Arabia. Maghrabi, Jefery, and Sabbaan (2009) observed that SMEs in Saudi Arabia is playing a significant role, contributing to the economy and owned by the Saudi nationals. The relationship of SMEs of Saudi Arabia with the suppliers is satisfactory. SMEs may be a better option for Saudi Arabia as oil prices are decreasing globally. The MSMEs of Saudi Arabia are facing problems of bureaucracy, financial assistance, lack of credit options, lack of proper training, and unsupportive business environment. Ahmad (2012) suggested that the government, NGOs, and other stakeholders can launch some promotional schemes for the development and growth of the MSMEs in Saudi Arabia. The size of the business organization, trained managers and employees, financing, and relationship with other related businesses affects the growth and development of SMEs (Rafiki, 2018). Gupta, Guha, and Krishnaswami (2013) revealed many factors affecting the growth and development of the enterprises and vary according to geography and stage of the firm. Mandhachitara and Allapach (2017) found that the market orientation of firms establishes the relationship between affirmative leadership and performance of the enterprises. Non-availability of advisory services, only profit-oriented commodities, no change in the existing culture of marketing and production, etc., are the variables affecting the performance of the small businesses. Further, Saleem (2012) suggested that the government should provide opportunities to develop their businesses. Rafiki, Hidayat, and Al-Mana (2018) found that size and network, training, and knowledge of the firms positively affect the internationalization of the firms. However, there is no positive relationship between age, experience, and education of the managers and internationalization of the SMEs or family businesses of Saudi Arabia. Taiwo, Awolaja, and Bako (2012) explained that SMEs are more important for an economy as

they are utilizing the local inputs and technology for production and achieving the goal of self-reliance, employment, and income generation. They suggested that the government should form policies to enhance the growth and development of SMEs. Hakeem (2019) indicated that Islamic banks are not focusing on financing for SMEs due to the association of high risk in the business activities of SMEs. He suggested that there should be some program like KAFALAH to promote the financing for the SMEs to achieve the ultimate objectives of the Vision 2030. Hashim (2015) found that SMEs in Malaysia are encountering some internal and external problems, which are hindrances in the path of development of SMEs internationally. Lack of skilled workers and physical infrastructure, increased competition in the domestic markets, and poor government assistance, high level of bureaucracy and poor communication are the factors affecting the development and growth of the SMEs. Various regional, national, international, and enterprise factors affect the performance of the SMEs (El-Khasawneh, 2012). The enterprises' factors are controllable, while national or external factors are the factors that can be controlled politically or through the government system or change in regulations. International factors are unpredictable and fully uncontrollable and can only be adjusted. Thakkar, Kanda, and Deshmukh (2011) advocated the importance of supply chain management and explained that supply chain management is becoming important for SMEs, and it provides the ability to product design and new processing technology through faster access. Ali and Husain (2014) revealed that in India, MSMEs face the problems of unavailability of raw materials, lack of awareness of entrepreneurship skills, poor financial support, high-cost credit facility, lack of innovations and research, and complex labor laws, etc. They suggested that mutual exchange of technology by the MSMEs, financial and technical assistance by the government and liberal labor laws will help Indian MSMEs in attaining rapid growth and development. Maghrabi, Jefery, and Sabbaan (2009) indicated that small manufacturing companies have the potential for growth and ultimately increase oil revenue and economy. They further added that most of the small manufacturing companies owned by the Saudis and the relationship of the small industries are positive with the suppliers, which are significant indications for potential growth.

## 2. RESEARCH METHODOLOGY

The study is based upon the secondary data obtained from the website of General Authority for Statistics (GAS), SIDF (Saudi Industrial Development Fund), and Ministry of Energy, Industry and Mineral Resources. To know the developed and undeveloped industries of the manufacturing sector of Saudi Arabia, data available on the website of Ministry of Energy, Industry and Mineral Resources are to be used to get the variations from 1974 to 2018, while in recognition of industries, number of manufacturing units, finance, and number of workforce are the criteria. To know the financial performance and growth potential, financial ratios are calculated from the consolidated data available economic activity-wise on the website of GAS for the period from 2011 to 2017. To know variations in growth among all industries (classified as activity-wise), co-efficient of variations (CV) of averages of chain-based numbers (CBI) of the number of establishments, employees engaged, manufacturing expenses, operational surplus, gross earnings, and capital formation are computed. The average growth rate of all industries (classified activity-wise) is calculated as follows:

$$A_{av.gr.} = \frac{(A_{av.year} - A_{based})}{A_{based}} \cdot 100, \quad (1)$$

where base year – 2011, and years under consideration – 7 years (2011–2017),  $A_{av.gr.}$  – average growth rate of an industry,  $A_{av.year}$  – average of amount for the year under consideration,  $A_{based}$  – amount of the based year.

To know comparative growth and development, average of ranks is calculated based on individual ranks of all industries. Individual ranks are calculated using averages of absolute data of the number of establishments, employees engaged, operational surplus, and capital formation. Multiple correlations are calculated to know the correlation between or among the variables. Chain-based index of economic activities of each year reflects yearly growth. Logically, the relationship was calculated between employees engaged, gross earnings, and the number of establishments to know the impact of yearly growth of establishments on employees' strength and gross earnings.

Where, Gross Earnings = Total Revenue– Manufacturing Exp., Wages, and Administrative expenses etc., and

$$O_{ex} = G_e - O_s, \quad (2)$$

where  $O_{ex}$  – operational expenses,  $G_e$  – gross earning,  $O_s$  – operational surplus.

Gross/ Net Earnings Ratio is calculated from the following formula:

$$R_{G/N} = \frac{E_{G/N} \cdot 100}{T}, \quad (3)$$

where  $R_{G/N}$  – gross/net earnings ratio,  $E_{G/N}$  – gross/net earnings,  $T$  – total revenue.

### 2.1. Limitations of the study

The study is fully based on the secondary data available on the websites of the Saudi Government. Only seven-year (2011–2017) financial data are to be considered to get the financial performance rankings of growth and development of the MSMEs and manufacturing sector of Saudi Arabia. In the study, there is only consideration of financial variables, while some other non-financial and external factors affect the growth and development of the manufacturing sector. The results of the study will depend on the length and logical relationships of the variables.

### 2.2. Hypotheses of the study

Following are the hypotheses of the study:

- H1: *There are no significant differences among the average growth of all manufacturing establishments classified as economic activity-wise.*
- H2: *There are no significant differences among the average growth of the gross earning capacity of all manufacturing establishments classified as economic activity-wise.*
- H3: *There are no significant differences among the average growth of operational expenses of all manufacturing establishments classified as economic activity-wise.*

- H4: *There are no significant differences among the average growth of the operating surplus of all manufacturing establishments classified as economic activity-wise.*
- H5: *There are no significant differences among the average growth of capital formation of all manufacturing establishments classified as economic activity-wise.*
- H6: *There are no significant differences among the average growth of employees engaged in all manufacturing establishments classified as economic activity-wise.*
- H7: *There are no significant differences between yearly average growth of all manufacturing establishments and yearly average growth of absolute gross earnings of all manufacturing establishments.*
- H8: *There are no significant differences between yearly average growth of all manufacturing establishments and yearly average growth of employees engaged in all manufacturing establishments.*

### 3. DATA ANALYSIS AND INTERPRETATION

For the analysis point of view, the study can be divided into three categories, i.e., variations of average growth of all manufacturing establishments classified as economic activity-wise, relationship of growth (number-wise) of manufacturing establishments with absolute gross earnings and employees engaged, and recent growth and development of manufacturing industry in Saudi Arabia.

#### 3.1. Variations in the growth of all manufacturing establishments

Sustainable and progressive development requires balanced growth in all industries of the manufacturing sector. Normally, in any economy, it is assumed that all the establishments of the manufacturing sectors' rate of growth are equal until other related factors do not influence it. The following table considers six growth indicators to measure the symmetrical growth and development of all industries (classified activity-wise) of the manufacturing sector of Saudi Arabia.

From the above growth movement analysis of manufacturing industries of Saudi Arabia, it is obvious that earning capacity and capital formation of all manufacturing industries (classified activity-wise) are not growing equally. There are no significant differences in the average growth of the number of establishments and employees, operational expenses, and operating surplus in all manufacturing industries from 2011 to 2017. Hence, Hypotheses 1, 3, 4, and 6 are accepted, while 2 and 5 are rejected. The above implies that there are some industries of the manufacturing sector in Saudi Arabia whose earning capacity ( $CV = 1.07$ ) and capital formation ( $CV = -22.40$ ) growth are insignificantly different, i.e.,  $-1.74$ ,  $-10.23$ , and  $-0.58$  (Appendix A). There is extreme negativity in the average growth rate of capital formation of many industries like the manufacture of textiles ( $-37.06$ ), leather products ( $-55.10$ ), non-metallic products ( $-56.98$ ), and manufacture of electrical equipment ( $-52.11$ ) (Appendix A). In the short run, there is an unexpected and negative relationship in the average growth rate of manufacturing establishments with gross earning capacity ( $r = -0.01$ ) and net earning capacity ( $-0.04$ ) (Appendix B). Also, there is a weak and unexpected correla-

**Table 1.** Yearly growth movement analysis of all industries of the manufacturing sector of Saudi Arabia

Source: General Authority for Statistics (2011–2017).

Statistical tools	Growth indicators of the manufacturing sector of Saudi Arabia (2011–2017)					
	No. of establishments	Earning capacity	Operational exp.	Operating surplus	Capital formation	Employees
Standard deviation ( $\sigma$ )	5.45	5.31	10.98	12.76	57.36	4.05
Mean ( $\mu$ )	16.95	4.97	46.77	28.02	-2.56	19.76
Coefficient of variation (CV)	0.32	1.07	0.23	0.46	-22.40	0.21
$H_0$ , accepted if $CV \leq 1$	Accepted	Rejected	Accepted	Accepted	Rejected	Accepted

**Table 2.** Relationship (long-term and short-term) between the number of establishments and gross earnings

Source: General Authority for Statistics (2011–2017).

Year	No. of establishments	Gross earnings ('000SR)	Average of CBI of no. of establishments (activity-wise)	Average of CBI of gross earnings (activity-wise)
2011	90,683	240,845,676	100	100
2012	95,148	269,207,929	105.07	100.05
2013	98,687	280,285,552	104.24	100.0497
2014	102,981	300,031,793	109.10	107.05
2015	104,031	298,527,964	103.28	99.5
2016	108,045	297,705,348	104.32	99.72
2017	108,815	350,420,890	102.37	117.71
r	0.9		0.05	

tion of capital formation with gross earning capacity ( $r = 0.7$ ) and net earning capacity ( $-0.02$ ) in yearly fluctuations (Appendix B).

### 3.2. Relationship of average growth (number-wise) of manufacturing establishments and absolute gross earnings

It is normally expected that the relationship between the number of establishments and gross earnings will be positive and linear. Some factors like the size of the manufacturing units, cost variations of inputs in the manufacturing process, demand, or sale prices of the product may affect the positive and linear relationship of the number of establishments and earning capacity of manufacturing industries.

The above analysis shows a positive and high degree correlation between the number of establishments in the manufacturing sector and gross earnings of all establishments in the long run.

This reflects that there is a scope for new establishments in all sectors, as the gross earnings ratio is satisfactory, which is above 40% on an average of the period from 2011 to 2017 (Appendix A). In the short run, there is a very weak positive relationship ( $r = 0.05$ ) between the number of establishments and gross earnings, which shows a significant difference between average growth in the gross earnings and the number of establishments. Hence, Hypothesis 7 is rejected. The growth of establishments is not directly governing the gross earnings in the short run.

### 3.3. Relationship of growth (number-wise) of manufacturing establishments and employees engaged

Normally, it is expected that there will be positive and linear growth in the number of establishments and employees engaged in manufacturing establishments until this relationship is not influenced by some other factors, i.e., increased me-

**Table 3.** Relationship (long-term and short-term) between the number of establishments and employees engaged

Source: General Authority for Statistics (2011–2017).

Year	No. of establishments	Employees engaged	Average of CBI of no. of establishments (activity-wise)	Average of CBI of gross earnings (activity-wise)
2011	90,683	736,255	100	100
2012	95,148	773,100	105.07	105.34
2013	98,687	800,358	104.24	101.84
2014	102,981	897,573	109.10	99.55
2015	104,031	959,642	103.28	96.77
2016	108,045	977,944	104.32	99.48
2017	108,815	993,530	102.37	106.12
r		0.97		-0.08

chanical production, technological developments, labor laws and regulatory restrictions, unavailability of the required workforce, etc.

From the above analysis, it can be explained that there is a positive and high degree correlation ( $r = 0.97$ ) between the number of manufacturing establishments and employees engaged in the establishments in the long run. This reflects that manufacturing establishments provide employments that contribute to attaining the goals of Vision 2030 in Saudi Arabia. However, in the short run, there is a low and negative relationship ( $r = -0.08$ ) between yearly average growth of establishments and employees engaged, which shows an insignificant relationship. Hence, Hypothesis 8 is rejected. The yearly growth of establishments does not govern the number of employees directly and instantly. It means some other factors affect the growth of employees engaged in manufacturing establishments.

### 3.4. Recent growth and development of manufacturing industries in Saudi Arabia

In Saudi Arabia, the growth and development of manufacturing industries enhance the development of the economy. The last four decades witnessed significant growth in manufacturing industries. Recently, manufacture of food products, other non-metallic mineral products, fabricated metal products, furniture, chemicals, and chemical products and manufacture of wearing apparel were significantly developing based on the number of establishments, employees engaged, operational surplus, and capital formation for the period from 2011 to 2017. Growth and development of manufacture of tobacco products, computer, electronic and optical products, products and medicines, manufacture of other transport equipment are lower and challenging in Saudi manufacturing industry (Appendices A and B). Poor-performing industries' contribution is insignificant due to a few establishments, while low earning capacity and high operational costs are observed in some industries. Possibly, regulatory restrictions, unavailability of raw material or inputs, lack of entrepreneurship skills, or lack of assistance by the government or low demand of the products are the factors responsible for low growth and development of the abovementioned industries in Saudi

Arabia. In Saudi Arabia, food industries and petrochemicals and industries based on petrochemicals, furniture, and wearing apparel industries contribute significantly to the manufacturing sector.

## 4. RESULTS OF THE STUDY

From the above, it can be concluded that there are some industries of the manufacturing sector in Saudi Arabia whose earning capacity and capital formation growth are insignificantly different and not equally (Table 1). The yearly average growth rate of earning capacity of some industries like printing and reproduction of recorded media, manufacture of coke and refined petroleum products and manufacture of other non-metallic mineral products is negative. There is extreme negativity in the average growth rate of capital formation of many industries like the manufacture of textiles, leather products, non-metallic products, and manufacture of electrical equipment (Appendix A). In the short run, there is an unexpected and negative relationship in the average growth rate of manufacturing establishments with gross earning capacity and net earning capacity (Appendix B). Also, there is a weak and unexpected correlation of capital formation with gross earning capacity ( $r = 0.7$ ) and net earning capacity ( $-0.02$ ) in yearly fluctuations (Appendix B). Several manufacturing establishments and the gross earnings of all establishments, in the long run, are moving positively and in almost the same proportion ( $r = 0.9$ ). So, there is a scope for new establishments in all sectors, as the gross earnings ratio is satisfactory, which is above 40% on an average of the period from 2011 to 2017 (Appendix A). However, the growth of the establishments is not directly governing the gross earnings of manufacturing industries in the short run, as the correlation ( $r = 0.05$ ) is very weak (Table 2). There is a lead time in the manufacturing establishments and their impact on gross earnings. There is positivity in the number of manufacturing establishments and employees engaged in the long run (2011–2017), while it is not ( $r = -0.08$ ) in yearly movement (Table 3). This reveals that there is a lead time in the manufacturing establishments and their impact on the strength of employees engaged. In the long run, there is a positive relationship between the number of establishments



and employees engaged in manufacturing, which indicates growth in employment opportunities. Recent growth and development of manufacturing industries reveal that industries based on petrochemical products, food products, furniture, and wearing apparel perform well and contribute positively to the manufacturing sector in Saudi Arabia. Manufacture of tobacco, computer, electronics and optics, pharmaceuticals and transport equipment are the deprived and underdeveloped industries of the manufacturing sector need attention, financial and technical assistance by the Saudi government (Appendix C).

## 5. DISCUSSION

The earning capacity and the capital formation of some industries of manufacturing sector is significantly different reveals the disparity among the growth and development rate of manufacturing industries and indicates that some industries like manufacture of textiles, leather products, non-metallic products and manufacture of electrical equipment are performing well. In contrast, printing and reproduction of recorded media, manufacture of coke and refined petroleum products and manufacture of other non-metallic mineral products is negative. So, there is a need to consider the negativity of poor-performing industries to enhance their rate of growth for the contribution in the Saudi economy. Possibly, the easy availability of raw material and other inputs can play a vital role in cost efficiency and production at a larger scale, which will help attain expected rate of gross earnings in manufacturing industries in Saudi Arabia. The capital for-

mation is also depending upon earning capacity of the industry up to a great extent. The growth rate of capital formation of many industries like the manufacture of textiles, leather products, non-metallic products, and manufacture of electrical equipment is negative. There is a need to focus upon the earning capacity, as it is the key factor to remove the disparity in capital formation industries of the manufacturing sector of Saudi Arabia. There is unexpected correlation between gross earnings and the number of manufacturing establishments, and gross earnings and capital formation in the short run, which is insignificant and may be due to some unavoidable factors. There is a positive relationship between gross earnings and the number of establishments, indicating scope for new establishments for well-performing industries in the manufacturing sector. As expected, in the long run, the number of establishments is positively correlated with the number of employees engaged in manufacturing industries. This is also an indicator of job creation and a step towards the attainment of goals of vision 2030. The external factors, i.e., sales prices or cost of the production of the products, are not affecting the earning capacity, which indicates a scope to earn more profit by creating new establishments or enhancing the capacity of existing organizations. Recently, in Saudi Arabia, industries based on petroleum, food, furniture, and wearing apparel products perform well. So, there is a need to enhance the capacity or establish new units of well-performing industries, and still, there is potential in deprived industries after analyzing their situation and providing them financial and entrepreneurial assistance for growth and development.

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## CONCLUSION

Based on the analysis and discussions, it can be concluded that some manufacturing industries in Saudi Arabia are underdeveloped, and there is a disparity among the growth rate of industrial sector. So, there is more attention needed to attain sustainable and progressive growth rate in the form of the number of establishments. Food products, petrochemicals and petrochemical products, manufacture of other non-metallic mineral products, manufacture of fabricated metal products industries perform well. In contrast, the manufacture of tobacco, computer, electronics and optical, pharmaceuticals and transport equipment are the deprived and underdeveloped industries of the manufacturing sector (Appendix C). In the long run, there is a positive and strong relationship between the number of establishments and gross earnings, the number of establishments and employees engaged, and gross earnings and operational surplus, but yearly fluctuations reflect

weak relationship or negativity, which is possibly due to some unavoidable factors. The growth of manufacturing industries is positively correlated and indicates further scope for growth and development beneficially. Small and medium enterprises in Saudi Arabia have more potential for the growth and development of the economy. The positive attitude of government and other business organizations towards underdeveloped industries will minimize the growth rate disparity among the industries. There should be some easy credit schemes for the deprived and underdeveloped manufacturing industries in Saudi Arabia, as the Islamic banks are not providing easy loans to small and medium enterprises. For sustainable growth and development of small and medium manufacturing business organizations, government, and NGOs can assure financial support, favorable labor laws, entrepreneur awareness, technical assistance, and financial innovations. There is scope for further research to find out internal and external factors that are responsible for the growth of underdeveloped industries of the manufacturing sector in Saudi Arabia.

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# APPENDIX A

**Table A1.** Variations in growth in all manufacturing establishments (activity-wise) and average gross earnings, net earnings, and operational ratio

Source: General Authority for Statistics (2011–2017).

S. no.	Economic activity	Average growth of the number of establishments	Average growth of employees	Average growth of manufacturing salary, wages etc.,	Average growth of operational expenses	Average growth of capital formation	Average growth of gross earnings ratio	Average growth of net earnings ratio	Average of gross earnings ratio	Average net earnings ratio	Average operational expenses ratio
1	Manufacture of food products	9.51	16.81	25.78	45.54	-33.84	6.46	22.61	46.96	39.02	7.93
2	Manufacture of beverages	16.29	21.24	30.67	43.48	12.21	1.64	31.13	49.14	38.12	11.01
3	Manufacture of tobacco products	21.79	25.38	30.45	61.57	69.69	0.99	6.43	37.91	21.04	16.86
4	Manufacture of textiles	13.20	28.01	31.90	74.50	-37.06	1.90	43.70	49.23	45.45	3.78
5	Manufacture of wearing apparel	9.72	18.53	24.85	47.17	-25.23	2.81	29.80	56.80	41.74	15.06
6	Manufacture of leather and related products	22.47	20.55	16.64	54.77	-55.10	5.35	26.19	58.56	48.12	10.43
7	Manufacture of wood and of products of wood and cork	7.54	14.56	20.32	32.21	-38.96	4.73	31.24	47.39	38.67	8.72
8	Manufacture of paper and paper products	23.11	18.67	28.28	51.64	-46.10	3.59	28.64	56.98	50.61	6.37
9	Printing and reproduction of recorded media	13.36	15.82	17.26	26.94	-28.38	-1.74	19.19	45.13	36.36	8.77
10	Manufacture of coke and refined petroleum products	25.52	20.60	14.10	44.68	57.89	-10.23	-6.29	55.43	48.60	6.83
11	Manufacture of chemicals and chemical products	18.45	24.58	43.70	53.11	35.01	0.95	25.84	52.57	45.34	7.23
12	Manufacture of products and preparations pharmaceutical	24.24	25.46	40.01	45.36	51.46	5.97	36.79	37.67	21.79	15.88
13	Manufacture of rubber and plastics products	17.38	22.90	31.02	55.56	-47.65	8.15	46.54	52.93	47.37	5.56
14	Manufacture of other non-metallic mineral products	11.21	15.71	25.32	38.09	-56.93	-0.58	12.91	49.30	34.27	15.03
15	Manufacture of basic metals	20.97	21.44	40.87	49.35	-48.02	7.08	39.52	44.42	31.29	13.13
16	Manufacture of fabricated metal products	13.51	22.17	26.33	39.43	-47.43	3.33	23.03	53.62	41.24	12.38
17	Manufacture of computer, electronic and optical products	25.36	22.49	42.25	60.09	78.78	14.34	51.65	44.72	31.99	12.73
18	Manufacture of electrical equipment	18.44	20.62	31.67	46.88	-52.11	6.22	23.24	44.46	39.49	4.96
19	Manufacture of machinery and equipment n.e.c.	13.20	12.60	18.65	32.35	-48.71	5.36	23.45	46.77	37.09	9.68
20	Manufacture of motor vehicles, trailers and semi-trailers	19.71	17.70	13.64	51.06	-17.04	11.49	32.84	55.86	47.44	8.42
21	Manufacture of other transport equipment	20.00	15.19	7.73	28.91	74.67	10.14	18.23	38.83	32.42	6.41
22	Manufacture of furniture	8.42	13.22	14.82	40.39	-36.11	10.97	31.22	42.45	31.69	10.77
23	Other manufacturing	16.76	19.14	34.42	45.20	22.72	12.83	35.71	42.16	25.36	16.80
24	Repair and installation of machinery and equipment	16.52	20.76	33.91	54.17	154.60	7.50	39	47.68	27.61	20.06
	Mean ( $\mu$ )	16.95	19.76	26.86	46.77	-2.57	4.97	28.03	48.21	37.59	10.62
	Standard deviation ( $\sigma$ )	5.45	4.05	10.98	12.76	57.36	5.31	12.76	6.16	8.53	4.33

## APPENDIX B

**Table B1.** Multiple correlations among growth in all manufacturing establishments (activity-wise) and average gross earnings, net earnings, and operational ratio

Source: General Authority for Statistics (2011–2017).

Growth determinants of Manufacturing Sector	Average growth of the number of establishments	Average growth of employees	Average growth of manufacturing salary, wages	Average growth of operational expenses	Average growth of capital formation	Average growth of gross earnings ratio	Average growth of net earnings ratio	Average of gross earnings ratio	Average net earnings ratio	Average operational expenses ratio
Average growth of the number of establishments	1.00	–	–	–	–	–	–	–	–	–
Average growth of employees	0.50	1.00	–	–	–	–	–	–	–	–
Average growth of manufacturing salary, wages	0.26	0.68	1.00	–	–	–	–	–	–	–
Average growth of operational expenses	0.37	0.78	0.53	1.00	–	–	–	–	–	–
Average growth of capital formation	0.44	0.29	0.22	0.17	1.00	–	–	–	–	–
Average growth of gross earnings ratio	–0.01	–0.15	0.15	0.09	0.07	1.00	–	–	–	–
Average growth of net earnings ratio	–0.04	0.25	0.51	0.39	–0.02	0.70	1.00	–	–	–
Average of gross earnings ratio	–0.01	0.02	–0.19	0.19	–0.36	–0.32	–0.04	1.00	–	–
Average net earnings ratio	–0.01	–0.02	–0.29	0.14	–0.49	–0.31	–0.07	0.87	1.00	–
Average operational expenses ratio	–0.01	0.06	0.31	0.00	0.45	0.17	0.08	–0.30	–0.72	1.00

## APPENDIX C

**Table C1.** Growth and development of manufacturing industries in Saudi Arabia

Source: General Authority for Statistics (2011–2017).

S. no.	Economic activity	Average no. of establishments	Ranks	Average employees	Ranks	Average operational surplus	Ranks	Average capital formation	Ranks	Average of ranks	Rank of average of ranks
1	Manufacture of food products	11,166	4	101,427	3	26,311,046	3	5,371,157	3	3	1
2	Manufacture of beverages	922	11	26,039	9	3,774,668	13	708,997	17	13	15
3	Manufacture of tobacco products	72	23	202	24	5,643	24	1,134	24	24	24
4	Manufacture of textiles	2,226	8	19,635	14	4,270,935	11	1,136,645	12	11	14
5	Manufacture of wearing apparel	30,994	1	74,303	5	3,744,117	14	929,073	13	8	6
6	Manufacture of leather and related products	126	19	1,979	23	277,858	22	502,296	18	21	20
7	Manufacture of wood and of products of wood and cork	4,754	6	26,006	10	2,658,801	15	913,131	14	11	13
8	Manufacture of paper and paper products	303	17	15,174	17	7,848,998	8	1,570,910	10	13	16
9	Printing and reproduction of recorded media	1,300	10	17,039	15	2,640,637	16	711,548	16	14	17
10	Manufacture of coke and refined petroleum products	112	21	16,801	16	57,134,240	2	4,458,008	4	11	11
11	Manufacture of chemicals and chemical products	1,341	9	84,494	4	67,993,011	1	21,166,569	1	4	4
12	Manufacture of products and preparations pharmaceutical	82	22	6,366	20	618,085	20	163,523	22	21	22
13	Manufacture of rubber and plastics products	709	12	24,586	11	7,730,050	9	1,323,669	11	11	9
14	Manufacture of other non-metallic mineral products	4,313	7	122,503	1	11,952,537	4	10,674,003	2	4	2
15	Manufacture of basic metals	527	14	42,893	8	8,631,972	7	869,112	15	11	12
16	Manufacture of fabricated metal products	19,627	2	122,324	2	11,709,908	5	2,170,297	6	4	3
17	Manufacture of computer, electronic and optical products	123	20	2,493	22	224,417	23	158,596	23	22	23
18	Manufacture of electrical equipment	550	13	20,302	13	9,176,105	6	2,315,786	5	9	7
19	Manufacture of machinery and equipment n.e.c.	342	16	24,354	12	4,543,119	10	1,743,098		10	8
20	Manufacture of motor vehicles, trailers and semi-trailers	293	18	7,182	18	2,008,768	17	322,499	19	18	18
21	Manufacture of other transport equipment	42	24	2,608	21	756,216	19	263,699	20	21	21
22	Manufacture of furniture	9,454	5	53,540	7	4,205,646	12	1,853,873	7	8	5
23	Other manufacturing	466	15	6,906	19	365,475	21	251,433	21	19	19
24	Repair and installation of machinery and equipment	11,355	3	57,757	6	1,976,811	18	1,641,023	9	9	6
Total		101,199	–	876,915	–	240,558,415	–	61,220,081	–	–	–