Asian Journal of Applied Science and Technology (AJAST)

(Peer Reviewed Quarterly International Journal) Volume 3, Issue 1, Pages 254-265, Jan-March 2019

Impact Assessment of Total Quality Management on Firm Performance: Evidence from Pharmaceutical Companies of Jordan

Dr. Atalla Fahed Al-Serhan

Assistant Professor, Department of Business Administration, Zarqa University, Zarqa, Jordan.

Article Received: 30 August 2018 Article Accepted: 29 December 2018 Article Published: 26 March 2019

ABSTRACT

Total Quality Management (TQM) is the continual process of detecting and reducing or eliminating errors in manufacturing, streamlining supply chain management, improving the customer experience, and ensuring that employees are up to speed with training. The focus of TQM is to improve the quality of an organization's outputs, including goods and services, through continual improvement of internal practices. TQM aims to hold all parties involved in the production process accountable for the overall quality of the final product or service. TQM is a management system for a customer-focused organization that involves all employees in continual improvement. It uses strategy, data, and effective communications to integrate the quality discipline into the culture and activities of the organization. The present research investigates the impact of TQM practices on firm's performance in selected pharmaceutical companies of Jordan. Data has been collected through a field survey and interviews conducted in the year 2018. A total of 400 questionnaires designed on five point likert scale were distributed among the employees wherein 112 were rejected and 388 were accepted for analysis. The sample size of the study has been 388 employees. Linear regression has been used as the statistical tool for analysis. The findings highlighted that there is a significant impact of TQM practices on firm performance in companies under study.

Keywords: TQM practices, pharmaceutical companies, performance, firm.

SECTION A: INTRODUCTION

1. Introduction

The concept of TQM was developed by W. Edwards Deming, Armand V. Feigenbaum and Joseph M. Juran. TQM stands for total quality management. A core definition of TQM describes a management approach to long-term success through customer satisfaction. Initially, TQM was originated in the manufacturing sector but presently, it is applied to all organizations. The concept of TQM states that every employee works towards the improvement of work culture, services, systems, processes and so on to ensure a continuing success of the organization. Moreover, TQM is the continual process of detecting and reducing or eliminating errors in manufacturing, streamlining supply chain management, and improving the customer satisfaction. TQM aims to hold all parties involved in the production process accountable for the overall quality of the final product or service. While TQM shares much in common with the Six Sigma improvement process but it is not the same as Six Sigma. TQM focuses on ensuring that internal guidelines and process standards reduce errors, while Six Sigma looks to reduce defects.

TQM is a management approach for an organization, depending upon the participation of all its members (including its employees) and aiming for a long-term success through customer satisfaction. This approach is beneficial to all members of the organization. Besides, TQM is a structured approach to overall organizational management. The focus of the process is to improve the quality of an organization's outputs, including goods and services, through continual improvement of internal practices. The standards set as part of the TQM approach can reflect both internal priorities and any industry standards currently in place.

CITE THIS ARTICLE: Atalla Fahed Al-Serhan, "Impact Assessment of Total Quality Management on Firm Performance: Evidence from Pharmaceutical Companies of Jordan", *Asian Journal of Applied science and Technology*, Volume 3, Issue 1, Pages 254-265, Jan-March 2019

Industry standards can be defined at multiple levels and may include adherence to various laws and regulations governing the operation of the particular business. Industry standards can also include the production of items to an understood norm, even if the norm is not backed by official regulations.

2. SELECTED PHARMACEUTICAL COMPANIES IN JORDAN

Jordanian Pharmaceutical Manufacturing

Jordanian Pharmaceutical Manufacturing (JPM) is an innovative pharmaceutical company, operating in diversified sectors within the healthcare industry in Jordan. The core operations of JPM are as a developer and producer of brand-generics in its cGMP facilities. Innovation is the main corporate growth driver and has resulted in the expansion of the group's operations beyond the pharmaceutical industry. JPM remains the regional benchmark in innovation with more than 70 patents. JPM carried out its operations across three continents.

Pharma International Company

Pharma International Company is a leading biopharmaceutical corporation dedicated to developing quality branded generic medications that improve health outcomes and the wellbeing of patients across the Middle East and Africa (MEA). It was established in Jordan in 1994. It is one of the fastest growing companies in Saudi Arabia, Iraq and Jordan. It enjoys an enviable market presence in over 25 markets across the Levant, the GCC, Africa and parts of Eastern Europe.

Hikma Pharmaceutical

It was founded in Jordan in 1978 by late Mr Samih Darwazah. The company established the first FDA inspected manufacturing facility in the region. It has passed FDA inspection for manufacturing plants in Saudi Arabia and Portugal. It has acquired Ribosepharm GmbH and Thymoorgan in Germany, West-Ward Pharmaceuticals in Eatontown, New Jersey, Alkan Pharma in Egypt, and Arab Pharmaceutical Manufacturing Company (APM) in Jordan. In 2005, it was listed on the London Stock Exchange raising gross proceeds of US$124 million. From 2005 onwards, the Group has expanded its presence in existing markets and entered new markets in the MENA region. It has also made significant acquisitions in Europe and the United States to strengthen its Injectables business.

Jerash Pharmaceuticals

It was established in Amman in the year 2005. Jerash Pharma is specialized in manufacturing liquid and semisolid dosage forms, and hospital disinfectants. Jerash Pharmaceuticals is part of Khraim Group which is owned and run by Khraim family. Khraim Group started in the pharmaceuticals business in the year 1965 as a pharmacy and nowadays the group consists of the following companies.

SECTION B: REVIEW OF LITERATURE & METHODOLOGY

3. Review of Literature

Amaniampong, Salakpi, and Bonye (2014) in the research paper entitled, *"Total Quality Management and its impact on the level of customer focus within construction project management in Ghana"* tried to find out the link

between TQM and the levels of internal and external customer focuses in project management practices in construction firms in Ghana. Multi-sampling technique was employed and data has been collected through questionnaires. SPSS statistical tool was utilized for data analysis. The sample size of this study is 50 respondents consist of top managers 14 of them were CEOs, 15 were Project Department managers, 8 Section managers, 7 senior engineers and 6 Quality managers of above 30 years of age. This sample size was chosen due to financial, time and other logistics constraints. Survey questionnaire and interview have been used to collect data for the study. It has been revealed that 68% of the construction companies had TQM policy. The companies with or without TQM policies have both customer and employee focused. However, the results after application of chi square test indicated that there is no impact of TQM on customer focus and employee focus among these companies. Nevertheless, the researchers recommended all construction companies should equip their project management team to understand and use knowledge and skills from at least five areas of expertise: The Project Management Body of Knowledge (PMBOK); application area knowledge, standards, and regulations; understanding the project environment; general management knowledge and skills and interpersonal skills. **Akhtar, Zameer, & Saeed (2014)** examined the impact of TQM techniques like leadership, employee's involvement, continuous process improvements, quality management system, training and education on the performance of service organizations in Pakistan. It was found that 90% of people declared leadership as main influencing tool for doing job with maximum efficiency. Besides, continuous process improvement is also important tool to meet the requirements of customers and necessary for customer satisfaction and cost efficiency that leads to increase in customers, profit and market share. **Nassar, Yahaya, and Shorun (2015)** examined the impact of TQM on customers' satisfaction with the services provided by hotels in Ilorin city of Nigeria. Data has been collected with the help of survey questionnaires on 80 customers of hotels in Ilorin Metropolis. The respondents were selected using simple random sampling techniques. Linear regression analysis was used to analyze and test the hypotheses. Overall results showed a positive relationship between TQM and customers' satisfaction. Besides, it has been recommended that modern Accounting techniques such as Enterprise Resource Planning (ERP), Just in Time (JIT), and Activity Based Costing (ABC) should be considered by first-stars hotels in Nigeria to enhance customer's satisfaction. The Nigerian Tourism Development Corporation (NTDC) should issue standard guidelines to all hotels in the country and these should be a pointer to core areas of quality delivery of services in hotel industry. The body should inspect hotels from time to time through visits to ensure adequate facilities are put in place and that quality of service and sustainable development are not jeopardized. Government at all levels should also put in place the necessary facilities such as power and transportation to enhance effective delivery of services and promote sustainable development. Moreover, The research conducted by **Ngambi and Nkemkiafu (2015)** investigated the impact of Total Quality Management (TQM) on organizational performance by collecting data from manufacturing firms in the republic of Cameroon. The variables used to capture Total Quality Management (TQM) were management commitment through leadership, quality control inspection, employee training, customer focus, benchmarking as the basis for enhancing product quality. Organizational performance has been measured by customer satisfaction, corporate social responsibility, cost reduction, and employee satisfaction. The results show that only employment training and empowerment has a significant impact on financial performance and corporate social responsibility;

leadership commitment, quality control and inspection have a significant impact on cost reduction. However, none of the TQM practices appear to have a significant effect on customer satisfaction. Furthermore, Employee motivation plays a vital role to focus on customer satisfaction. Motivated employee can perform better than non-motivated ones. Customer expectations often vary from one customer to another. As part of the continuous improvement, customers' requirements must be consistently measured and satisfied. Therefore, a company should establish a reliable and fast customer feedback system. **Al-Qahtani, Alshehri, and Aziz (2015)** evaluated the impact of TQM practices on organisational performance. TQM is defined as a strategy that establishes and delivers high quality products and services that cover all customers' demands and achieve a high level of customer satisfaction. The researcher found that TQM in Pakistan was implemented in three categories of implementation methods which are quality control, quality assurance and continuous improvement. The findings indicated that TQM has two organizational performances either is TQM practices effect the organizational performance or it hinders organizations to achieve their goals in which this will negatively affect the organizational performance.

4. RESEARCH GAP

The review of literature highlights that numerous studies have been carried out on TQM practices. But, there is a scarcity of empirical studies in the context of Jordan. Therefore, the present study differs from earlier studies because it examines the impact of TQM practices on firm performance in selected pharmaceutical companies of Jordan.

5. RESEARCH QUESTION

What is the impact of TQM practices on firm performance in selected pharmaceutical companies?

6. OBJECTIVE OF THE STUDY

The objective of the study is to evaluate the impact of TQM practices on firm performance in selected pharmaceutical companies of Jordan.

7. HYPOTHESES OF THE STUDY

H_{01}: There is no significant impact of customer focus on firm performance.

H_{a1}: There is a significant impact of customer focus on firm performance.

H_{02}: There is no significant impact of leadership on firm performance.

H_{a2}: There is a significant impact of leadership on firm performance.

H_{03}: There is no significant impact of employee empowerment on firm performance.

H_{a3}: There is a significant impact of employee empowerment on firm performance.

H_{04}: There is no significant impact of benchmarking on firm performance.

H_{a4}: There is a significant impact of benchmarking on firm performance.

H_{05}: There is no significant impact of business performance on firm performance.

H_{a5}: There is a significant impact of business performance on firm performance.

H_{06}: There is no significant impact of teamwork on firm performance.

H_{a6}: There is a significant impact of teamwork on firm performance.

8. RESEARCH METHODOLOGY

The population of this study consists of all skilled employees working in selected pharmaceutical companies. The size of the sample is 388 respondents. A well designed questionnaire set on a five point Likert-scale (5-highly satisfied to 1-highly dissatisfied) has been used for collecting data. The questionnaire was pre tested many times. The period of field survey has been four months from January, 2018 to March, 2018. The variables of TQM used in the current study are customer focus, leadership, employee empowerment, benchmarking, business performance, and teamwork. Figure 1 highlights the research model of the study. Linear regression has been used to analyze the results through Statistical Package for the Social Sciences (SPSS).

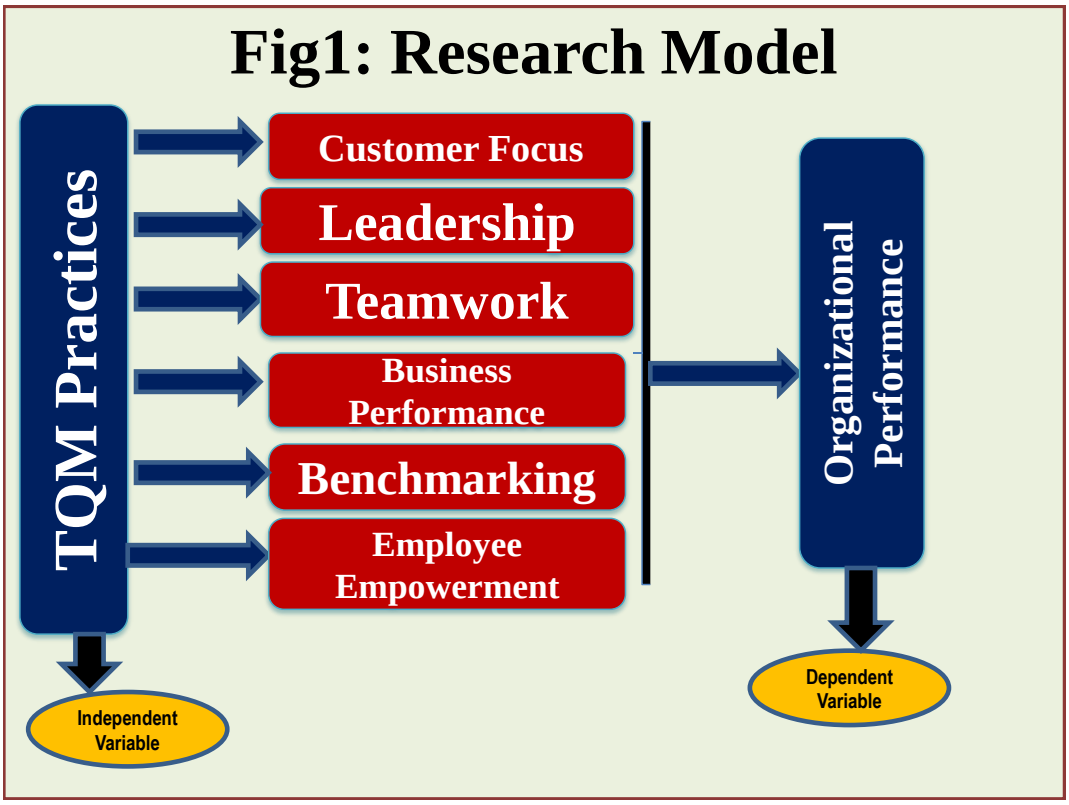
Table 1: Sample Size of the Study

Questionnaires	Selected Pharmaceutical Companies				Total
	JPM	PIC	Hikma	Jerash	
Distributed	150	150	100	100	500
Rejected	32	35	20	25	112
Accepted	118	115	80	75	388

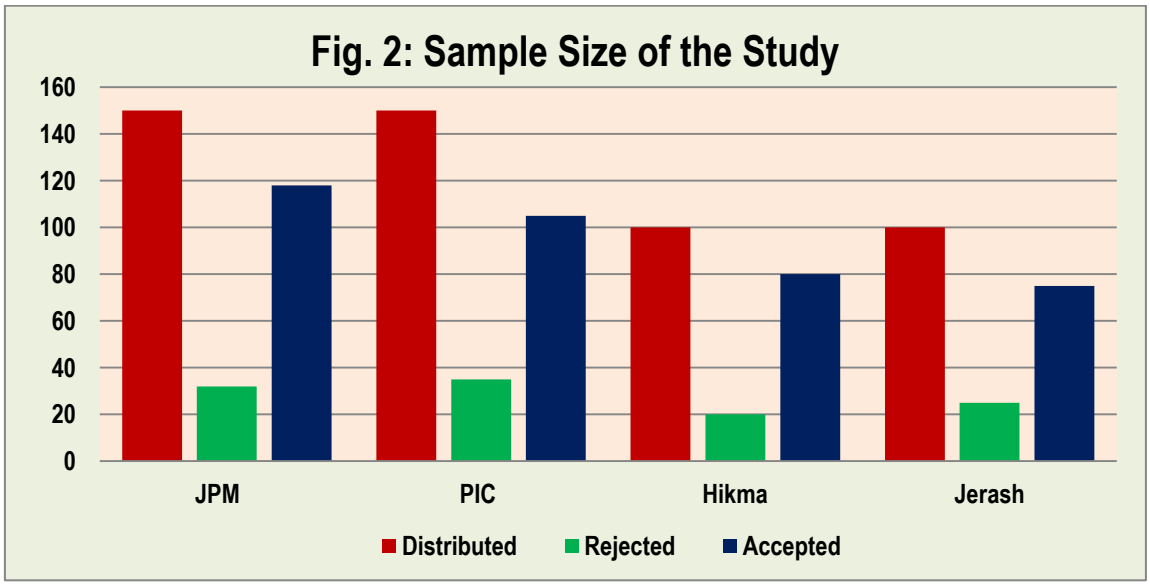
JPM: *Jordanian Pharmaceutical* Manufacturing

PIC: Pharma International Company

Source; Field Survey, 2018



 Online ISSN: 2456-883X



SECTION C: DATA ANALYSIS

9. Hypotheses Testing

Hypothesis 1

H_{01}: There is no significant impact of customer focus on firm performance.

H_{a1}: There is a significant impact of customer focus on firm performance.

Linear regression analysis has been used to check the impact of customer focus (independent variable) on firm performance (dependent variable). The null hypothesis states that customer focus does not have significant impact on firm performance and the alternate states that customer focus has significant impact on firm performance. All the important values of regression model in abridged form are shown in table 2. Adjusted R square shows the variation in dependent variable due to independent variable and ANOVA shows the model fitness.

Table 2: Regression Analysis of Customer focus and Firm Performance

Model	Adjusted R Square	ANOVA Model Fitness	Standard Error	B	t value	P Value
1	0.846	0.009	0.995	0.608	12.451	0.009

B: Unstandardized Coefficient

Source: Output of SPSS_20 version

The value of adjusted R square is 0.846 meaning thereby 84.6 percent variation in firm performance is explained by customer focus and the rest of the variation ($1-R^2$) is an unexplained variation due to variables that has not been considered in this model. ANOVA shows the model fitness. It means that both the variables exactly fulfilled the criteria of model accuracy. Besides, the value of unstandardized beta coefficient is 0.608 which means that one unit change in customer focus brings 0.608 units change in total firm performance of the selected companies. The significant value at 95% confidence level is 0.009 which is less than 0.05 at 95 percent confidence interval.

Therefore, the null hypothesis stands rejected and it can be said that there is a significant impact of customer focus on firm performance in selected pharmaceutical companies in Jordan.

Hypothesis 2

H_{02}: There is no significant impact of leadership on firm performance.

H_{a2}: There is a significant impact of leadership on firm performance.

Linear regression analysis has been used to check the impact of leadership (independent variable) on firm performance (dependent variable). The null hypothesis states that leadership does not have significant impact on firm performance and the alternate states that leadership has significant impact on firm performance. All the important values of regression model in abridged form are shown in table 3. Adjusted R square shows the variation in dependent variable due to independent variable and ANOVA shows the model fitness.

Table 3: Regression Analysis of Leadership and Firm Performance

Model	Adjusted R Square	ANOVA Model Fitness	Standard Error	B	t value	P Value
2	0.798	0.000	1.007	0.554	-2.214	0.000

B: Unstandardized Coefficient

Source: Output of SPSS_20 version

The value of adjusted R square is 0.798 meaning thereby 79.8 percent variation in firm performance is explained by leadership and the rest of the variation ($1-R^2$) is an unexplained variation due to variables that has not been considered in this model. ANOVA shows the model fitness. It means that both the variables exactly fulfilled the criteria of model accuracy. Besides, the value of unstandardized beta coefficient is 0.554 which means that one unit change in leadership brings 0.554 units change in total firm performance of the selected companies. The significant value is 0.000 which is less than 0.05 at 95 percent confidence interval. Therefore, the null hypothesis stands rejected and it can be said that there is a significant impact of leadership on firm performance in selected pharmaceutical companies in Jordan.

Hypothesis 3

H_{03}: There is no significant impact of employee empowerment on firm performance.

H_{a3}: There is a significant impact of employee empowerment on firm performance.

Linear regression analysis has been used to check the impact of employee empowerment (independent variable) on firm performance (dependent variable). The null hypothesis states that employee empowerment does not have significant impact on firm performance and the alternate states that employee empowerment has significant impact on firm performance. All the important values of regression model in abridged form are shown in table 4. Adjusted R square shows the variation in dependent variable due to independent variable and ANOVA shows the model fitness.

Table 4: Regression Analysis of Employee empowerment and Firm Performance

Model	Adjusted R Square	ANOVA Model Fitness	Standard Error	B	t value	P Value
3	0.115	0.557	1.226	0.095	4.558	0.557

B: Unstandardized Coefficient

Source: Output of SPSS_20 version

The value of adjusted R square is 0.115 meaning thereby 11.5 percent variation in firm performance is explained by employee empowerment and the rest of the variation ($1-R^2$) is an unexplained variation due to variables that has not been considered in this model. ANOVA shows the model fitness. It means that both the variables exactly fulfilled the criteria of model accuracy. Besides, the value of unstandardized beta coefficient is 0.095 which means that one unit change in employee empowerment brings 0.095 units change in total firm performance of the selected companies. The significant value is 0.557 which is more than 0.05 at 95 percent confidence interval. Therefore, the null hypothesis stands accepted and it can be said that there is no significant impact of employee empowerment on firm performance in selected pharmaceutical companies in Jordan.

Hypothesis 4

H_{04}: There is no significant impact of benchmarking on firm performance.

H_{a4}: There is a significant impact of benchmarking on firm performance.

Linear regression analysis has been used to check the impact of benchmarking (independent variable) on firm performance (dependent variable). The null hypothesis states that benchmarking does not have significant impact on firm performance and the alternate states that benchmarking has significant impact on firm performance. All the important values of regression model in abridged form are shown in table 5. ANOVA shows the model fitness and adjusted R square shows the variation in dependent variable due to independent variable.

Table 5: Regression Analysis of Benchmarking and Firm Performance

Model	Adjusted R Square	ANOVA Model Fitness	Standard Error	B	t value	P Value
4	0.734	0.005	0.8752	0.667	9.542	0.005

B: Unstandardized Coefficient

Source: Output of SPSS_20 version

The value of adjusted R square is 0.734 meaning thereby 73.4 percent variation in firm performance is explained by benchmarking and the rest of the variation ($1-R^2$) is an unexplained variation due to variables that has not been considered in this model. ANOVA shows the model fitness. It means that both the variables exactly fulfilled the criteria of model accuracy. Besides, the value of unstandardized beta coefficient is 0.667 which means that one unit change in benchmarking brings 0.667 units change in total firm performance of the selected companies. The significant value is 0.005 which is less than 0.05 at 95 percent confidence interval. Therefore, the null hypothesis

stands rejected and it can be said that there is a significant impact of benchmarking on firm performance in selected pharmaceutical companies in Jordan.

Hypothesis 5

H_{05}: There is no significant impact of business performance on firm performance.

H_{a5}: There is a significant impact of business performance on firm performance.

Linear regression analysis has been used to examine the impact of business performance (independent variable) on firm performance (dependent variable). The null hypothesis states that business performance does not have significant impact on firm performance and the alternate states that business performance has significant impact on firm performance. All the important values of regression model in abridged form are shown in table 6. ANOVA shows the model fitness and adjusted R square shows the variation in dependent variable due to independent variable.

Table 6: Regression Analysis of Business Performance and Firm Performance

Model	Adjusted R Square	ANOVA Model Fitness	Standard Error	B	t value	P Value
5	0.645	0.004	0.7094	0.472	6.067	0.004

B: Unstandardized Coefficient

Source: Output of SPSS_20 version

The value of adjusted R square is 0.645 meaning thereby 64.5 percent variation in firm performance is explained by business performance and the rest of the variation ($1-R^2$) is an unexplained variation due to variables that has not been considered in this model. ANOVA shows the model fitness. It means that both the variables exactly fulfilled the criteria of model accuracy. Besides, the value of unstandardized beta coefficient is 0.472 which means that one unit change in business performance brings 0.472 units change in total firm performance of the selected companies. The significant value is 0.004 which is less than 0.05 at 95 percent confidence interval. Therefore, the null hypothesis stands rejected and it can be said that there is a significant impact of business performance on firm performance in selected pharmaceutical companies in Jordan.

Hypothesis 6

H_{06}: There is no significant impact of teamwork on firm performance.

H_{a6}: There is a significant impact of teamwork on firm performance.

Linear regression analysis has been used to examine the impact of teamwork (independent variable) on firm performance (dependent variable). The null hypothesis states that teamwork does not have significant impact on firm performance and the alternate states that teamwork has significant impact on firm performance. All the important values of regression model in abridged form are shown in table 7. ANOVA shows the model fitness and adjusted R square shows the variation in dependent variable due to independent variable.

Table 7: Regression Analysis of Teamwork and Firm Performance

Model	Adjusted R Square	ANOVA Model Fitness	Standard Error	B	t value	P Value
6	0.552	0.000	0.9854	0.415	17.712	0.000

B: Unstandardized Coefficient

Source: Output of SPSS_20 version

The value of adjusted R square is 0.552 meaning thereby 55.2 percent variation in firm performance is explained by teamwork and the rest of the variation ($1-R^2$) is an unexplained variation due to variables that has not been considered in this model. ANOVA shows the model fitness. It means that both the variables exactly fulfilled the criteria of model accuracy. Besides, the value of unstandardized beta coefficient is 0.415 which means that one unit change in teamwork brings 0.415 units change in total firm performance of the selected companies. The significant value is 0.000 which is less than 0.05 at 95 percent confidence interval. Therefore, the null hypothesis stands rejected and it can be said that there is a significant impact of teamwork on firm performance in selected pharmaceutical companies in Jordan.

Table 8: Hypotheses Tested in Abridged Form

No	Hypotheses	R Square	Beta	Sig Value	Results
1	There is no significant impact of customer focus on firm performance.	0.846	0.608	0.009	Rejected
2	There is no significant impact of leadership on firm performance.	0.798	0.554	0.000	Rejected
3	There is no significant impact of employee empowerment on firm performance.	0.115	0.095	0.557	Accepted
4	There is no significant impact of benchmarking on firm performance.	0.734	0.667	0.005	Rejected
5	There is no significant impact of business performance on firm performance.	0.645	0.472	0.004	Rejected
6	There is no significant impact of teamwork on firm performance.	0.552	0.415	0.000	Rejected

SECTION D: CONCLUSION

10. Summing Up

TQM is the continual process of detecting and reducing or eliminating errors in manufacturing, streamlining supply chain management, and improving the customer satisfaction. TQM is a management approach to long-term success

through customer satisfaction. It is applied to all organizations. TQM aims to hold all parties involved in the production process accountable for the overall quality of the final product or service. TQM is a management approach for an organization, depending upon the participation of all its members (including its employees) and aiming for a long-term success through customer satisfaction. This approach is beneficial to all members of the organization. The present research investigated the impact of TQM practices on firm's performance in selected pharmaceutical companies of Jordan. A well designed questionnaire set on a five point Likert-scale (5-highly satisfied to 1-highly dissatisfied) has been used for collecting data. The period of field survey has been three months from January, 2018 to March, 2018. The size of the sample is 388 respondents. Linear regression has been used to analyze the results through Statistical Package for the Social Sciences (SPSS). The findings highlighted that there is a significant impact of TQM practices on firm performance in companies under study.

TQM is a customer-oriented process and aims for continuous improvement of business operations. It ensures that all allied works (particularly work of employees) are toward the common goals of improving product quality or service quality, as well as enhancing the production process or process of rendering of services. However, the emphasis is put on fact-based decision making, with the use of performance metrics to monitor progress. A successful TQM implementation requires a significant training for the employees involved in it. Also, since Total Quality Management tends to result in a consistent series of incremental changes, it can lead to creating an unpleasant response from those employees who prefer existing system, or employees who are afraid of losing their jobs because of it. In nutshell, it can be said that Total Quality Management works best in an environment where there are strong support and commitment from the management.

REFERENCES

1. Ahmed, S.M., Aoieong, R.T. Tang, S.L. and Zheng, D.X.M. (2005). A comparism of quality management systems in the construction industries of Hong Kong and the USA. International Journal of Quality & Reliability Management, Vol. 22 No. 2, 149-61.

2. Ahmad, M., F., Rasi, R.Z., Zakuan, N. & Hisyamudin, M.N.N. (2015). Mediator effect of statistical process control between TQM and business performance in Malaysian Automative Industry. IOP conference series:Material Science and Engineering, 1–7.

3. Ahuja, I.P.S. & Kumar, P. (2009). A case study of total productive maintenance implementation at precision tube mills. Journal of Quality in Maintenance Engineering, 15 (3), 241–258.

4. Aspinwall, E. & Elgharib, M. (2013). TPM implementation in large and medium size

organisations. Journal of Manufacturing Technology Management, 24(5), 688–710.

5. Akhtar, S., Zameer, H., and Saeed, R. (2014). Impact of Total Quality Management on the performance of service organizations in Pakistan. International Journal of Academic Research in Economics and Management Sciences, Vol. 3, No. 6, 109-117.

6. Al-Qahtani, ND, Alshehri, SS, and Aziz, AA. (2015) The impact of Total Quality Management on organizational performance. European Journal of Business and Management, Vol.7, No.36,

7. Amaniampong, E.A, Salakpi, A., and Bonye, F. (2014). Total Quality Management and its impact on the level of customer focus within construction project management in Ghana. International Journal of Business and Management Invention, Vol.3, Issue 7, 36-48.

8. Bryde, D.J and L.Robinson, (2007). The relationship between total quality management and the focus of project management practices. The TAM Magazine, Vol. 19 No.1, 50-61.

9. Bartz, T., Siluk, J.C.M. Bartz, A.P.B. (2014). Improvement of industrial performance with TPM implementation. Journal of Quality in Maintenance Engineering, 20 (1), 2-19.

10. Brah, S. A. & Chong, W.K. (2004). Relationship between total productive maintenanceand performance. International Journal of Production Research, 42 (12), 2383–401.

11. Dow, D., Samson, D. & Ford, S. (1999). Exploding the Myth: Do all quality management practices contribute to superior quality performance?. Journal of Production and Operations Management, 8 (1), 1–27.

12. Fotopoulos, C.B. and Psomas E.L.(2009). The impact of "soft" and "hard" TQM elements on quality management results. International Journal of Quality & Reliability Management, Vol. 26 Issue 2, 150–163.

13. Georgiadis, P. & Michaloudis, C. (2012). Real-time production planning and control system for job-shop manufacturing: a system dynamics analysis. European Journal of Operation Research, 216(1), 94–98.

14. Hua, H., Chin, K.S., Sun, H. & Xu, Y. (2000). An empirical study on quality management practices in Shangai manufacturing industries. Total Quality Management, 11 (8), 11111122.

15. Hides, M.T., Z. Irani, I. Polychronakis, J.M. Sharp, (2000). Facilitating total quality through effective project management. International Journal of Quality & Reliable Management, Vol. 17 Issue 4, 407–422.

16. Korleteya, J.T. & Tetteyb, E.K. (2015). Problem solving abilities of workers: A study of some printing industries in Kumasi. International Journal of sciences: Basic and Applied Research, 20 (2), 12–19.

17. Nassar, ML, Yahaya, KA and Shorun, CY. (2015). Total quality management (TQM) and customers satisfaction in selected service industries in Ilorin, Nigeria. Journal of Sustainable Development in Africa, Vol. 17, No.6, Clarion University of Pennsylvania, Clarion, Pennsylvania.

18. Ngambi, MT, and Nkemkiafu, AG. (2015). The Impact of Total Quality Management on Firm's Organizational Performance. American Journal of Management, Vol. 15(4), 69-85.

19. Prajogo, D.I. and C.M. McDermott. (2005). The relationship between total quality management practices and organizational culture. International Journal of Operations and Production Management, Vol. 25, Issue 11, 101- 1122.

20. Shieh,H.M. and Wu, K.Y. (2002). The relationship between total quality management and project performance in building planning phase: an empirical study of real estate industries in Taiwan. Total Quality Management, Vol. 13 No. 1, 133-51.

21. Siddiqui, D. and Rahman, Z. (2007). TQM principles` application in information systems for empirical goals. A study of Indian organisations. The TQM Magazine, Vol. 19, No. 1, 76 –87.

22. Yamashina, H. (2000). Challenge to world class manufacturing. International Journal of Quality and Reliability Management, 17 (2), 132–143.