

The impact of Six Sigma methodology applications on customer's satisfaction Jordanian Pharmaceutical Companies: A case Study

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Abstract

This study aimed to identify the impact of each factor of the critical success factors in the success or failure of the application of the methodology (six-sigma), as well as to determine the amount of this impact, and study attempted to validate the first hypothesis there is no trace of the critical success factors of (support and management commitment Supreme, the organization's methodology, organizational culture) on the application of Six Sigma methodology in pharmaceutical factories. And also tried to validate the second hypothesis: there is no trace of the critical success factors for the application of the methodology (six-sigma) and of (b support and commitment of senior management, strategic organization, organizational culture) on customer satisfaction and represented by (quality of service, reduce cost, reduce the time) pharmaceutical factories .Ambushed the problem of the main study in the lack of awareness and understanding of many of the Aladarat senior corporate Jordanian industrial importance of the application of 6 Sigma to improve product quality and achieve customer satisfaction and customers in the light of increased attention to customer satisfaction as one of the variables that indicate the success of the organization has been selected a random sample of (400) customers Jordanian pharmaceutical companies, a company Dar Al Dawa and Dar wisdom and company of the Arab Center for Pharmaceutical and Chemical Industries. The study showed no effect statistically significant for the application of the methodology Six Sigma in customer satisfaction in pharmaceutical plants, and the study showed no effect statistically significant at the level of significance (0.05) to apply the methodology of Six Sigma (senior management, suppliers, operations, training) in customer satisfaction in pharmaceutical plants, results of the analysis did not show the presence of the impact of each of (focusing on customers, quality of information, staff) in customer satisfaction in the pharmaceutical factories. The regression results show that the application of Six Sigma methodology explain (81.2%) of the variation in customer satisfaction pharmaceutical factories. The study recommended the need to continue to implement projects Sega six Sigma in the Jordanian pharmaceutical companies in all fields because of its interest on these companies and customers together and dissemination of results. In addition to the views of customers, through conducting surveys on Services Jordanian pharmaceutical companies and the customer's needs and requirements as these views when making decisions.

Keywords: Six Sigma ,customer's satisfaction ,Jordanian Pharmaceutical Companies

1- Problem statement

The top management of any Organization needs to be clear how Six-Sigma methodology can Enhance the achievement of high quality products and customer satisfaction. In a competitive marketplace where businesses compete for customers, customer satisfaction is seen as a key

differentiator and increasingly has become a key element of business methodology. We can summarize the main points of this problem by the following:

- The difficulty of implementing Six-Sigma methodology by top management of industrial companies due to the lack of understanding of Six-Sigma role in changing work behaviors and eventually enhancing the company's overall competitiveness.
- The inability of industrial companies to bring into harmony the different requirements of implementing Six-Sigma methodology (top management, focus on customers, relationship with suppliers, quality of information, employees, operations management, and training).
- The difficulty of identifying the critical factors that affect the successful implementation of Six-Sigma.

2- Research Methodology

The researchers have used Analytical and descriptive methods through literature review, in addition to the Analytical approach through Collecting data and information from expert interviews, and using Questionnaires and distributing them to Jordanian pharmaceutical companies (Dar Al Dawa, Dar Al-Hekma, and the Arab Center for Pharmaceutical and Chemical Industries) and analyze them by using SPSS program.

3- Target Research Population

The Target Research Population contained the customers of the Jordanian pharmaceutical companies which were selected within the Research Sample; the questionnaires were distributed to the pharmaceutical warehouses, pharmacies, private hospitals which deal directly with these companies in Amman. Some of the Jordanian pharmaceutical companies were selected from the enlisted companies in the Jordanian Association of Pharmaceutical Manufacturers which are now 17 companies.

4- Research Sample

A random sample of (400) customers of Jordanian pharmaceutical companies (Dar Al Dawa, Dar Al-Hekma, and the Arab Center for Pharmaceutical and Chemical Industries) was selected. The number of collected, analyzed, statistically approved Questionnaires were (300).

5- Research tools

Questionnaires were used to collect data after being developed to meet the research requirements and to conduct an analytical study on the customers of industrial companies' satisfaction.

6- Hypotheses:

There is no effect of implementing Six-Sigma methodology (top management, focus on customers, relationship with suppliers, quality of information, employees, operations management, and training) on the customers of pharmaceutical companies' satisfaction.

7- Literature Review

Six-Sigma is a methodology that is gaining wide acceptance in industry. Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization who are experts in these methods in manufacturing and business processes. Six Sigma is a breakthrough strategy that gathers improved metrics and a latest management philosophy to considerably reduce defects, which is reflected on the advancement of an organizations' market situation and enhances the profit line (Antony, J., & Banuelas, R, ", 2002.Black, K., & Revere, L, ", 2006) The

central idea behind Six Sigma is that if you can measure how many "defects" you have in a process, you can systematically figure out how to eliminate them and get as close to "zero defects" as possible. To achieve Six Sigma Quality, a process must produce no more than 3.4 defects per million opportunities. An "opportunity" is defined as a chance for nonconformance, or not meeting the required specifications. This means we need to be nearly flawless in executing our key processes. On the other hand, to achieve Three Sigma Quality you have to produce defects free percentage of 99.73%.

In General Electric company and as a result of applying Three Sigma Quality, there are about (54000) defects/year, while applying Six Sigma Quality would result in one defect every 25 years.

Various other definitions include:

Six sigma is a formal methodology for measuring, analyzing, improving, and then controlling or "locking-in" processes. This statistical approach reduces the occurrence of defects from a three sigma level or 66,800 defects per million opportunities (DPMO) to a six sigma level of less than 4.0 DPMO (Bolze, 1998).

Six sigma is a comprehensive, statistics-based methodology that aims to achieve nothing less than perfection in every single company process and product (Paul, 1999).

Six sigma is a disciplined method of rigorous data gathering and robust statistical analysis to pinpoint sources of error and ways of eliminating them (Harry and Schroeder, 1999).

Minitab describes six sigma as an information-driven methodology for reducing waste, increasing customer satisfaction, and improving processes, with a focus on financially measurable results (Goh, 2002). Six Sigma is used to solve the companies' complicated problems in order to meet customer expectations in term of costs, The improvement cycle used for improving, optimizing and stabilizing business processes and designs consist of four phases:

Measure

The purpose of this step is to objectively establish current baselines as the basis for improvement.

Analyze

The purpose of this step is to identify, validate and select root cause for elimination

Improve

The purpose of this step is to identify, test and implement a solution to the problem; in part or in whole. Identify creative solutions to eliminate the key root causes in order to fix and prevent process problems

Control

The purpose of this step is to sustain the gains. Monitor the improvements to ensure continued and sustainable success. Create a control plan. Update documents, business process and training records as required. The concept of six-sigma is totally different from the Quality initiatives that prevailed in the seventies and eighties of the past century, which have focused on continues improvement and Total Quality Management. While the new concept includes controlling,

measuring and improving business processes to assure defect-free products. Thus, six-sigma methodology has received so much attention from researchers, who had different points of view, as one of the modern management concepts in the industrial and services field. The term Six Sigma originated from the Greek letter σ (sigma) associated with statistical modeling of manufacturing processes. The maturity of a manufacturing process can be described by a sigma rating indicating its yield or the percentage of defect-free products it creates. A six sigma process is one in which 99.99966% of the products manufactured are statistically expected to be free of defects (3.4 defective parts/million), (Paul). On the other hand, (Harry, M. J, " 1998) believes that six-sigma is an organizational approach rather than a statistical one because it focuses on the customer and the process of continuous creativeness and improvement. The philosophy of six-sigma as an organizational approach based on the direct relation between the number of defects in the production, operational costs, and customer satisfaction. In health sector, (Woodard) defined six-sigma as an analyzing process for the technical operations to raise the quality of health care and services according to the patient requirements. While (Lazarus, I.R. and Butler, K. (2001), defined it as a structured statistical process to detect and address errors of performance by using six sigma to reduce clinical asphyxia which result in increasing turn around time, high costs and health problems. Reviewing the literature reveals that the organizations that intend to apply Six Sigma have to provide many factors that have been considered as the critical success factors of Implementing Six Sigma. These critical success factors (CSFs) mentioned in the literature are as follows:

- Management Involvement and Commitment: the commitment, support and Enthusiasm of the top management are considered as the most important factor to Implement Six Sigma (Henderson, K. M., & Evans, J. R 2000;)
- Cultural Change: changing the culture is one of the main requirements of implementing Six Sigma . The personal of the organization have to be aware that the change is an essential point to apply Six Sigma successfully (Henderson, K. M., & Evans, J. R 2000) . Antony and Coronado also point out that the substantial change in the organization structure and the infrastructure are also important. Antony and Banuleas highlight that according to the companies that have achieved change successfully, increasing and sustaining the communication, motivation, and education is the best way to tackle resistance. (Antony, J., & Banuelas, R, " , 2002)
- Organizational Infrastructure: there is special infrastructure that has to be applied in the organizations that have decided to apply Six Sigma(Coronado, R. B., & Antony, J, "Critical success factors for the successful implementation of Six Sigma projects in organizations", The TQM Journal 2002). Six Sigma structure is led by CEO or vice-president who is considered as the champion, followed by master black belt, black belt, and green belt respectively .
- Training: quality improvement needs to change, and change depends on individuals (Henderson, K. M., & Evans, J. R, " 2000).The individuals change when they understand the target of the change, and get the necessary skills to apply the change . So, firms have to be ready to assist the employees to get the knowledge, skills, and capabilities required [52]. For that, training is a critical factor in the successful application of Six Sigma project . Through training

programmers, the organization can provide and update the employees with the Necessary related knowledge to achieve the organization's plans

According to (Pande, P. S., Neuman, R. P., & Cavanagh, P. R, " 2000.), The principles supported by many six sigma tools and methods are called "Six Themes of Six Sigma" which are:

- **Genuine Focus on the customer**

In six sigma ,customer focus becomes the top priority . The measures of six sigma performance begin with the customer. Six sigma improvements are defined by their impact on customer satisfaction and value.

- **Data and fact driven management**

Six sigma takes the concept of "management by fact" to a new more powerful level. Six sigma managers will know what data or information do they really need and how to use them for maximum benefit .

- **Process focus , Management, and improvement**

In six sigma , process are where the action is. whether designing the products and services , measuring performance , improving efficiency and customer satisfaction or even running the business six sigma positions the process as the key vehicle of success.

- **Proactive management**

Most simply, being "proactive " signifies acting in advance of events the opposite of being "reactive". Six sigma has tools and practices that replace reactive habits with a dynamic , responsive proactive style of management.

- **Boundary-less collaboration**

It means breakdown barriers and improve teamwork, up, down, and across organizational lines. Six sigma expands opportunities for collaboration as people learn how their roles fit into the "big picture" and can recognize and measure interdependence of activities in all parts of process.

- **Drive for Perfection; tolerance for Failure**

No company will get anywhere close to six sigma without launching new ideas and approaches, which always involves some risk. Any company that makes six sigma its goal will have to constantly pushed to be ever-more-perfect (since the customer's definition of "perfect" will always be changing) while being willing to accept and manage occasional setback.

8- Customer satisfaction

It is essential to differentiate between Customer Satisfaction and Employee Satisfaction as customer satisfaction refers to the external customers while Employee Satisfaction refers to the organization's employees. There are many ways to achieve Employee Satisfaction. Customer satisfaction is defined as " the extend to which products and services supplied by a company meet or surpass customer expectation"(John & Hall,1997).The most comprehensive definition of

satisfaction has been offered by Kotler and Keller who define satisfaction as “person’s feeling of pleasure or disappointment which resulted from comparing a product’s perceived performance or outcome against his/ her expectations” (Kotler,2003:40).Customer satisfaction is an indicator of the perceived and expected performance. If the performance does not meet the customer expectation, he will be unsatisfied and even upset and may stop dealing with that organization, if the performance meets the customer’s expectation he will be satisfied and comfort, and in case the performance surpasses the customer expectation, he will be happy and loyal to that organization (Kotler,2001:36).Bermen (2005) reports that when a customer receives poor service, outrage and pain are experienced, and dissatisfaction occurs since customer’s expectations are not met. Satisfaction occurs when customer’s expectations are met and exceeded. The study notes that delight is the extreme of satisfaction; it is a mixture of happiness and surprise. It is customer delight that creates memorable experiences and repeat purchase intent. Figure 2.1 shows four different types of post purchase responses.

Customer satisfaction creation stage

Customer satisfaction consists of three stages:

- 1- **Understanding of what the customer needs:** marketers should be always connected with existed or potential customers in order to figure out the key factors that identify the purchasing behavior of these customers, understanding the customer’s needs is extremely important to the organization.
- 2- **Seeking Customer Feedback:** this step represents the ways marketers use to get feedback so they know what customers think of their business and to which extend they are satisfied.
- 3- **Customer Satisfaction Measurement:** the final step to achieve customer satisfaction is to establish a specialized program for measuring Customer Satisfaction like " **Customer Satisfaction Matrices (CSM)** " which is a management information system that continuously captures the voice of the customer through the assessment of performance from the customer's point of view.

A- How to Build Customer Satisfaction

There are many strategies through which you can build customer satisfaction such as (al Obaidi,2004: 40):

- Engage customers in discussing quality improvement plans and provide incentives to valuable suggestions.
- Invite customers to visit your organization and be acquainted with its activities and ask them for improvement suggestions.
- Send customers small gifts and cards in different occasions.
- Visit VIP customers every now and then to get their feedback on ground.
- Give a particular attention to the customers who bought the organization’s product just for one and never come back to know the underlying reasons.
- Build strong emotional bonds with customers by making them feel very important.

9- Hypothesis Testing

First Major Hypothesis:

Ho: there is no effect of implementing Six-Sigma methodology (top management, focus on customers, relationship with suppliers, and quality of information, employees, operations management, and training) on the customers of pharmaceutical companies’ satisfaction.

Table No. (1): Analysis of Variance Results

Statistical significance (P-Value)	F-Statistic	Mean Squares	Degrees of Freedom	Sums of Squares	Sources of Variance
0.000*	241.469	13.503	7	94.519	Regression
		0.056	392	21.920	Residuals
			399	116.439	Total

- The effect is statistically significant at ($\alpha \leq 0.05$) “p-value”.

The variance analysis Shows that the application of Six-Sigma methodology has a statistically significant effect on the customers of pharmaceutical companies’ satisfaction as **F-Statistic is** (241.469) and **P-Value** is (0.000).

Table No. (2): Analysis of Multiple Regression to test the effect of Six-Sigma application on the customers of pharmaceutical companies’ satisfaction

Statistical significance (P-Value)	T-Value	Coefficient of Regression	explanatory value	Coefficient of Correlation	Independent Variable
0.000*	3.711	0.122	%81.2	0.901	Top management
0.115	1.579	0.081			Focus on customers
0.000*	3.696	0.127			Suppliers
0.799	0.254	0.010			Quality of information
0.935	0.081	0.004			Employees
0.000*	4.273	0.120			Operations
0.000*	38.581	0.812			Training

- The effect is statistically significant at (0.05) “p-value”.

The analysis of multiple Regression Shows that the application of Six-Sigma methodology (top management, focus on customers, relationship with suppliers, quality of information, employees, operations management, and training) has a statistically significant effect at (0.05) “p-value” on the customers of pharmaceutical companies’ satisfaction, as T-Statistic is higher than T-Score at (399) Degrees of Freedom which reached (1.972).The analysis results didn’t show any effect for (focus on customers, quality of information, employees) on the customers of pharmaceutical companies’ satisfaction.The regression results show also that the application of Six-Sigma methodology explains (%81.2) of customer’s satisfaction variance. Accordingly the alternative hypothesis accepts the idea that there is an effect of implementing Six-Sigma methodology (top management, focus on customers, relationship with suppliers, quality of information, employees, operations management, and training) on the customers of pharmaceutical companies’ satisfaction, and rejects the null hypothesis that specified that there is no effect of implementing Six-Sigma methodology (top management, focus on customers, relationship with suppliers, quality of information, employees, operations management, and training) on the customers of pharmaceutical companies’ satisfaction.

The first sub-hypothesis

Ho: there is no effect of implementing Six-Sigma methodology (top management) on the customers of pharmaceutical companies’ satisfaction.

Ha: there is an effect of implementing Six-Sigma methodology (top management) on the customers of pharmaceutical companies’ satisfaction.

Table No. (3): Analysis of Simple Regression to test the effect of Six-Sigma application (Top Management)on the customers of pharmaceutical companies’ satisfaction

Independent Variable	Coefficient of Correlation	explanatory value	Coefficient of Regression	T-Value	P-Value
Top Management	0.037	0.1%	0.029	0.731	0.465

The analysis of simple Regression Shows that the application of Six-Sigma methodology (top management) has no statistically significant effect at (0.05) “p-value” on the customers of pharmaceutical companies’ satisfaction, as T-Statistic is lower than T-Score at (399) Degrees of Freedom which reached (1.972).The regression results show also that the (top management) explains (0.1%) of customer’s satisfaction variance. Accordingly we accept the hypothesis that says: there is no effect of implementing Six-Sigma methodology (top management) on the customers of pharmaceutical companies’ satisfaction, we reject the hypothesis that says: there is an effect of implementing Six-Sigma methodology (top management) on the customers of pharmaceutical companies’ satisfaction.

The second sub-hypothesis

Ho: there is no effect of implementing Six-Sigma methodology (Focus on Customers) on the customers of pharmaceutical companies’ satisfaction.

Ha: there is an effect of implementing Six-Sigma methodology (Focus on Customers) on the customers of pharmaceutical companies’ satisfaction.

Table No. (4): Analysis of Simple Regression to test the effect of Six-Sigma application (Focus on Customers)on the customers of pharmaceutical companies’ satisfaction

Independent Variable	Coefficient of Correlation	explanatory value	Coefficient of Regression	T-Value	P-Value
Focus on Customers	0.053	0.3%	0.047	1.066	0.287

The analysis of simple Regression Shows that the application of Six-Sigma methodology (Focus on Customers) has no statistically significant effect at (0.05) “p-value” on the customers of pharmaceutical companies’ satisfaction, as T-Statistic is lower than T-Score at (399) Degrees of Freedom which reached (1.972).The regression results show also that the (Focus on Customers) explains (0.3%) of customer’s satisfaction variance. Accordingly we accept the hypothesis that says: there is no effect of implementing Six-Sigma methodology (Focus on Customers) on the customers of pharmaceutical companies’ satisfaction, and we reject the hypothesis that says: there is an effect of implementing Six-Sigma methodology (Focus on Customers) on the customers of pharmaceutical companies’ satisfaction.

The third sub-hypothesis

Ho: there is no effect of implementing Six-Sigma methodology (Suppliers) on the customers of pharmaceutical companies’ satisfaction.

Ha: there is an effect of implementing Six-Sigma methodology (Suppliers) on the customers of pharmaceutical companies’ satisfaction.

Table No. (5): Analysis of Simple Regression to test the effect of Six-Sigma application (Suppliers)on the customers of pharmaceutical companies’ satisfaction

Independent Variable	Coefficient of Correlation	explanatory value	Coefficient of Regression	T-Value	P-Value
Suppliers	0.084	0.7%	0.080	1.690	0.092

The analysis of simple Regression Shows that the application of Six-Sigma methodology (Suppliers) has no statistically significant effect at (0.05) “p-value” on the customers of pharmaceutical companies’ satisfaction, as T-Statistic is lower than T-Score at (399) Degrees of Freedom which reached (1.972). The regression results show also that the (Suppliers) explains (0.70%) of customer’s satisfaction variance. Accordingly we accept the hypothesis that says: there is no effect of implementing Six-Sigma methodology (Suppliers) on the customers of pharmaceutical companies’ satisfaction, and we reject the hypothesis that says: there is an effect of implementing Six-Sigma methodology (Suppliers) on the customers of pharmaceutical companies’ satisfaction.

The fourth sub-hypothesis

Ho: there is no effect of implementing Six-Sigma methodology (Quality of Information) on the customers of pharmaceutical companies’ satisfaction.

Ha: there is an effect of implementing Six-Sigma methodology (Quality of Information) on the customers of pharmaceutical companies’ satisfaction.

Table No. (6): Analysis of Simple Regression to test the effect of Six-Sigma application (Quality of Information) on the customers of pharmaceutical companies’ satisfaction

Independent Variable	Coefficient of Correlation	explanatory value	Coefficient of Regression	T-Value	P-Value
Quality of Information	0.005	0.0%	0.004	0.098	0.922

The analysis of simple Regression Shows that the application of Six-Sigma methodology (Quality of Information) has no statistically significant effect at (0.05) “p-value” on the customers of pharmaceutical companies’ satisfaction, as T-Statistic is lower than T-Score at (399) Degrees of Freedom which reached (1.972).The regression results show also that the (Quality of Information) explains (0.0%) of customer’s satisfaction variance. Accordingly we accept the hypothesis that says: there is no effect of implementing Six-Sigma methodology (Quality of Information) on the customers of pharmaceutical companies’ satisfaction, and we reject the hypothesis that says: there is an effect of implementing Six-Sigma methodology (Quality of Information) on the customers of pharmaceutical companies’ satisfaction.

The fifth sub-hypothesis

Ho: there is no effect of implementing Six-Sigma methodology (Employees) on the customers of pharmaceutical companies’ satisfaction.

Ha: there is an effect of implementing Six-Sigma methodology (Employees) on the customers of pharmaceutical companies’ satisfaction.

Table No. (7): Analysis of Simple Regression to test the effect of Six-Sigma application (Employees) on the customers of pharmaceutical companies’ satisfaction

Independent Variable	Coefficient of Correlation	explanatory value	Coefficient of Regression	T-Value	P-Value
Employees	0.070	0.5%	0.075	1.390	0.165

The analysis of simple Regression Shows that the application of Six-Sigma methodology (Employees) has no statistically significant effect at (0.05) “p-value” on the customers of pharmaceutical companies’ satisfaction, as T-Statistic is lower than T-Score at (399) Degrees of Freedom which reached (1.972). The regression results show also that the (Employees) explain (0.5%) of customer’s satisfaction variance. Accordingly we accept the hypothesis that says: there is no effect of implementing Six-Sigma methodology (Employees) on the customers of pharmaceutical companies’ satisfaction, and we reject the hypothesis that says: there is an effect of implementing Six-Sigma methodology (Employees) on the customers of pharmaceutical companies’ satisfaction.

The sixth sub-hypothesis

Ho: there is no effect of implementing Six-Sigma methodology (Operations) on the customers of pharmaceutical companies’ satisfaction.

Ha: there is an effect of implementing Six-Sigma methodology (Operations) on the customers of pharmaceutical companies’ satisfaction.

Table No. (8): Analysis of Simple Regression to test the effect of Six-Sigma application (Operations) on the customers of pharmaceutical companies’ satisfaction

Independent Variable	Coefficient of Correlation	explanatory value	Coefficient of Regression	T-Value	P-Value
Operations	0.238	5.7%	0.237	4.884	0.000

- The effect is statistically significant at (0.05) “p-value”.

The analysis of simple Regression Shows that the application of Six-Sigma methodology (Operations) has no statistically significant effect at (0.05) “p-value” on the customers of pharmaceutical companies’ satisfaction, as T-Statistic is lower than T-Score at (399) Degrees of Freedom which reached (1.972).The regression results show also that the (Operations) explain (5.7%) of customer’s satisfaction variance. Accordingly we accept the hypothesis that says: there is no effect of implementing Six-Sigma methodology (Operations) on the customers of pharmaceutical companies’ satisfaction, and we reject the hypothesis that says: there is an effect

of implementing Six-Sigma methodology (Operations) on the customers of pharmaceutical companies' satisfaction.

The seventh sub-hypothesis

Ho: there is no effect of implementing Six-Sigma methodology (Training) on the customers of pharmaceutical companies' satisfaction.

Ha: there is an effect of implementing Six-Sigma methodology (Training) on the customers of pharmaceutical companies' satisfaction.

Table No. (9): Analysis of Simple Regression to test the effect of Six-Sigma application (Training) on the customers of pharmaceutical companies' satisfaction

Independent Variable	Coefficient of Correlation	explanatory value	Coefficient of Regression	T-Value	P-Value
Training	0.889	79.1%	0.822	38.836	0.000

- The effect is statistically significant at (0.05) "p-value".

The analysis of simple Regression Shows that the application of Six-Sigma methodology (Training) has no statistically significant effect at (0.05) "p-value" on the customers of pharmaceutical companies' satisfaction, as T-Statistic is higher than T-Score at (399) Degrees of Freedom which reached (1.972).The regression results show also that the (Training) explains (79.1%) of customer's satisfaction variance. Accordingly we accept the hypothesis that says: there is no effect of implementing Six-Sigma methodology (Training) on the customers of pharmaceutical companies' satisfaction, and we reject the hypothesis that says: there is an effect of implementing Six-Sigma methodology (Training) on the customers of pharmaceutical companies' satisfaction.

The Fifth Hypothesis

The prevailing organizational culture in the researched companies do not understand the importance of Six-Sigma application in Enhancing Performance.

Table No. (10): Analysis of Simple Regression to test the importance of Six-Sigma application in Enhancing Performance.

Independent Variable	Coefficient of Correlation	explanatory value	Coefficient of Regression	T-Value	P-Value
Organizational Culture	0.562	65.3%	0.522	36.223	0.000

- The effect is statistically significant at (0.05) “p-value”.

The analysis of simple Regression Shows that the application of Six-Sigma methodology (organizational culture) has no statistically significant effect at (0.05) “p-value” in Enhancing Performance, as T-Statistic is higher than T-Score at (399) Degrees of Freedom which reached (0.522).The regression results show also that the (organizational culture) explains (65.3%) of customer’s satisfaction variance. Accordingly we accept the hypothesis that says: The prevailing organizational culture in the researched companies does understand the importance of Six-Sigma application in Enhancing Performance. And we reject the hypothesis that says: The prevailing organizational culture in the researched companies does not understand the importance of Six-Sigma application in Enhancing Performance.

10- Findings and Recommendations

- **Findings**

There is statistical significance of applying Six Sigma methodology in terms of customer satisfaction in pharmaceutical factories; F-statistic= 241.469 and level of significance= 0.000.

- There is a statistical significance at ($\alpha =0.05$) when applying Six Sigma methodology (top management, suppliers, operations, and training) in terms of customer satisfaction; whereas T-statistic is higher than T-score at freedom degree 399 which reached 1.972. The study didn’t show any statistical significance for each of the following regarding customer satisfaction in pharmaceutical factories; focusing on customers, information quality, and employees. In addition, regression analysis results show that applying Six Sigma methodology explain %81.2 of customer satisfaction variance in pharmaceutical factories.
- There is a statistical significance at ($\alpha =0.05$) when applying Six Sigma methodology (top management) in terms of customers satisfaction; whereas T-statistic is lower than T-score at freedom degree 399 which reached 1.972. Furthermore, regression analysis results show that applying top management explain % 0.1 of customer satisfaction variance in pharmaceutical factories.
- There is a statistical significance at ($\alpha =0.05$) when applying Six Sigma methodology (focusing on customers) in terms of customer’s satisfaction; whereas

T-statistic is lower than T-score at freedom degree 399 which reached 1.972. In addition, regression results show that focusing on customers explain %0.3 of customer satisfaction variance in pharmaceutical factories.

- There is a statistical significance at ($\alpha = 0.05$) when applying Six Sigma methodology (suppliers) in terms of customer's satisfaction; whereas T-statistic is lower than T-score at freedom degree 399 which reached 1.972. In addition, regression results show that suppliers explain %0.7 of customer satisfaction variance in pharmaceutical factories.
- There is a statistical significance at ($\alpha = 0.05$) when applying Six Sigma methodology (information quality) in terms of customer satisfaction; whereas T-statistic is lower than T-score at freedom degree 399 which reached 1.972. In addition, regression results show that information quality explain %0.0 of customer satisfaction variance in pharmaceutical factories.
- There is a statistical significance at ($\alpha = 0.05$) when applying Six Sigma methodology (employees) in terms of customer satisfaction; whereas T-statistic is lower than T-score at freedom degree 399 which reached 1.972. Besides, regression results show that employees explain %0.5 of customer satisfaction variance in pharmaceutical factories.
- There is a statistical significance at ($\alpha = 0.05$) when applying Six Sigma methodology (operations) in terms of customer's satisfaction; whereas T-statistic is higher than T-score at freedom degree 399 which reached 1.972. Besides, regression results show that operations explain %5.7 of customer satisfaction variance in pharmaceutical factories.
- There is a statistical significance at ($\alpha = 0.05$) when applying Six Sigma methodology (training) in terms of customer satisfaction; whereas T-statistic is higher than T-score at freedom degree 399 which reached 1.972. Besides, regression results show that training explain %79.1 of customer satisfaction variance in pharmaceutical factories.

• Recommendations

Based on the study findings, the researcher recommends the following:

- Continue applying six-sigma projects in the Jordanian pharmaceutical companies
- The Top Management should continue supporting Six Sigma projects within Jordanian pharmaceutical companies through providing financial allocations and specialized in green belts GB, black belts BB and master black belts MBB.
- Seek customer's feedback by conducting surveys to find out people's perception of Jordanian pharmaceutical companies services and what the customers need and taking results into consideration when taking decisions.

- Deal with suppliers as work partners and on the bases of mutual trust to assure the success of business processes in these companies and meeting customer expectations.

References

- Antony, J., & Banuelas, R, "Key ingredients for the effective implementation of Six Sigma program", *Measuring Business Excellence*, 2002; 6(4), 20-27.
- Black, K., & Revere, L, "Six Sigma arises from the ashes of TQM with a twist", *International Journal of Health Care Quality Assurance*, 2006; 19(3), 259-266.
- Berman, B., (2005). How to delight your customers. *California Management Review*, Vol. 48 No. 1, pp. 129-51.
- Bolze, S. (1998), "A six sigma approach to competitiveness", *Transmission and Distribution World*, August, available at: http://tdworld.com/mag/power_six_sigma_approach/
- Johnson, A. and Swisher, B. (2003), "How six sigma improves R&D", *Research Technology Management*, March-April, pp. 12-15.
- Harry, M. J, "Six Sigma: A Breakthrough Strategy for Profitability", *Quality Progress* 1998;31(5, May), 60-64.
- Harry, M.J. and Schroeder, R. (1999), *Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations*, Doubleday, New York, NY
- Henderson, K. M., & Evans, J. R, "Successful implementation of Six Sigma: benchmarking General Electric Company", *Benchmarking: An International Journal* 2000; 7(4), 260-281.
- Goh, T.N. (2002), "A strategic assessment of six sigma", *Quality Reliability Engineering International*, Vol. 18 No. 5, pp. 403-10.
- Kotler, P. and Armstrong, G, (2005). *Principles of Marketing Management*, 11th Edn, New Jersey: Pearson Education, Inc., Upper Saddle River.
- Lazarus, I.R. and Butler, K. (2001), "The promise of six sigma – part one", *Managed Healthcare Executive*, Vol. 11 No. 9, pp. 22-6.
- Pande, P. S., Neuman, R. P., & Cavanagh, P. R, "The Six Sigma way: How GE, Motorola and other Top companies are Honing their performance", New York, McGraw-Hill, 2000.
- Paul, L. (1999), "Practice makes perfect", *CIO Enterprise*, Vol. 12 No. 7, January, Section 2