

## **Impact of Optimized Production Technology (OPT) Implementation in Egyptian Pharmaceutical sector**

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### **Abstract:**

This study aims to identify the Impact of Optimized Production Technology Implementation in Egyptian Pharmaceutical companies, so it concerns with identifying the main Requirements of implementing OPT and expected benefits from implementing OPT. To do that successfully a questionnaire was used as a tool to collect data needed. The research hypotheses are the result of a pilot study and literature review and testing a number of assumptions and relationships which are connected to the Research problem. The results of statistical analysis identify the Significance of difference among Employees in Egyptian Pharmaceutical Sector regarding the impact of OPT Implementation.

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## الملخص :

تهدف هذه الدراسة الي التعرف علي تاثير تطبيق نظام تكنولوجيا الانتاج في شركات الادوية المصرية لذا فهي تهتم بتوضيح المتطلبات الرئيسية لتطبيق نظام تكنولوجيا الإنتاج الأمثل والفوائد المتوقعة من تطبيق هذا النظام. وللقيام بذلك بنجاح تم استخدام استبيان كأداة لجمع البيانات اللازمة. وتعتبر فرضيات البحث هي نتيجة لدراسة تجريبية ومراجعة الأدبيات واختبار عدد من الافتراضات والعلاقات المرتبطة بمشكلة البحث. وتحدد نتائج التحليل الإحصائي أهمية الفرق بين العاملين في قطاع الادوية المصري فيما يتعلق بمتطلبات التنفيذ والفوائد المتوقعة من التنفيذ.

## Research Gap:

Egyptian Pharmaceutical companies facing a lot of challenges and problems which need continuously adopting new and improved production systems like Optimized Production Technology (OPT) as it consider one of the most interesting production and inventory control systems so companies have to apply such production systems in order to achieve smooth production.

Only few researches reported how the (OPT) principles can be applied (*Jacobs R.F., and Aschcroft*). According to previously mentioned reasons, there is a need to empirically explore Optimized Production Technology (OPT) Requirements of Implementation and Expected benefits from implementation in Egyptian Pharmaceutical sector.

### **Research Questions:**

To reconcile the above mentioned gaps, the researcher developed This Questions:

1. What are the main Requirements of implementing Optimized Production Technology (OPT) System in the Egyptian Pharmaceutical sector?
2. What are the Expected Benefits from implementing Optimized Production Technology (OPT) System in the Egyptian Pharmaceutical sector?

### **Research Objectives:**

To answer the previous mentioned questions, the research objectives are:

- Identify the main Requirements of implementing Optimized Production Technology (OPT) System in the Egyptian Pharmaceutical sector.
- Investigate the Expected Benefits from implementing Optimized Production Technology (OPT) System in the Egyptian Pharmaceutical sector.

### **Research Hypotheses:**

**H1:** There are no significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle – First Line Levels) regarding the Requirements of implementing Optimized Production Technology (OPT) System.

**H1.1:** There are no significant differences among employees in Egyptian Pharmaceutical Sector at the Three

Organizational levels (TOP – Middle – First Line Levels) regarding the Human Resources Requirements.

**H1.2:** There are no significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle – First Line Levels) regarding the Organizational Requirements.

**H1.3:** There are no significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle – First Line Levels) regarding the Technical Requirements.

**H2:** There are no significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle – First Line Levels) regarding the Expected Benefits from implementing Optimized Production Technology (OPT) System.

**H2.1:** There are no significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle – First Line Levels) regarding the Expected Benefits on the production Level from implementing Optimized Production Technology (OPT) System.

**H2.2:** There are no significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle – First Line Levels) regarding the Expected Benefits on the Technical Level from implementing Optimized Production Technology (OPT) System.

## Previous studies:

Studies that discussed OPT include:

### 1- Theory of Constraints: A Literature Review.

<b>Author:</b>	<i>(Zeynep Tuğçe Şimşita, Noyan Sebla Günayb, Özalp Vayvayc, a a.c Marmara University,Istanbul, 34722, Turkey b Okan University-Istanbul, 34959, Turkey (2014)).</i>
<b>The aim of the study:</b>	<p>This study discusses that Theory of constraints has a wide range of implementation scale. This theory can be applied in production, logistics, supply chain, distribution, project management, research and development, sales and marketing and so on. There is a common point which is defined in almost every study, constraint. The main aim of every company is increasing the profit. According to this point of view, constraints are main obstacles in achieving companies' aims.</p> <p>In other words, everything which exists on the road of having more profit is considered as a constraint. So, if companies can handle constraints in their system and manage these constraints, they would have a continuous improvement management system thus they could achieve higher profits. This simple logic leads to many questions and for this reason alone pushes researchers to investigate every aspect of TOC.</p> <p>In this study, to better understand the evolution of TOC, <i>Watson et al.</i>'s five era structure is used.</p>

	<p>Although these five eras based on the names of <i>Goldratt's</i> books, it is most useful to see the basic principles of TOC and analyze the development process. The applicable Era for this research,</p> <p><b><i>The Optimized Production Technology Era- (1979-1984)</i></b></p> <p>In 1979 when <i>Goldratt</i> introduced its solution called "Optimized Production Technology (OPT)" in order to increase the output of a firm which could not satisfy the demand because of resource constraints which it face , it drew too much attention and spread in the USA and immediately it is starting to be used in companies with utmost urgency.</p> <p>On the other hand, the logic could not decode clearly for that reason academicians did not pay enough attention for that approach and continued to use traditional approaches.</p>
<b>Results of the study:</b>	<p>The goal of any organization is to make more money now and in the future as <i>Goldratt</i> say. In order to achieve that and make money, throughput of an operating system should be increased while its inventory and operating expenses are being reduced.</p> <p>Therefore the performance of any system is limited by the rate of throughput at the system's constraint; identifying the system's constraint as the weakest link of the chain and eliminating it consider the main idea behind Optimized Production Technology (OPT) system.</p>

	<p>As can be seen it actually focuses on continuous system improvement by dealing with constraints, this system can be implemented to almost every sector and almost every size of companies. Since it has been first put forward by Eliyahu Goldratt in the early 1980s, TOC and OPT systems has found acceptance as a management philosophy and has drawn wide attention from practitioners and academic researchers.</p>
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## 2- Constraint Management System – Optimized Production Technology (OPT).

<b>Author:</b>	<i>(Iveta KUBASÁKOVÁ, Katarína IVÁNKOVÁ (2010))</i>
<b>The aim of the study:</b>	<p>This research emphasis that OPT system is designed for production shop scheduling. It is very sensitive to any changes in the data, including for example new orders, missing information, etc. A failure at a bottleneck cannot intervene because the entire planning process is meaningless. For this reason it is necessary that increased capacity be available at bottlenecks.</p> <p>In order to <b>eliminate bottlenecks</b> capacity must be expanded at the given bottleneck, e.g. via overtime work.</p>
<b>Results of the study:</b>	<p>The central idea of OPT system is the concept of bottlenecks in terms of the entire system (connected to production systems). OPT defines bottlenecks as the part of the production system that has the lowest production potential. The production potential of a production system is</p>

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	<p>composed of all production factors (labor, equipment, technology, organization, materials, financing and management) and their dynamics (with regards to individual production process operations).</p> <p>Complete harmony between the partial potentials of the individual factors is nearly impossible to achieve. The production system bottleneck is the factor with the lowest production potential.</p>
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### 3- “Application of Optimized Production Technology in a capacity constrained flow shop: A Case study in a battery factory”

<b>Author:</b>	<i>(Pisal Yenradee, D.Eng (1994))</i>
<b>The aim of the study:</b>	<p>This study introduced Optimized Production Technology (OPT) as one of the most interesting production and inventory control systems. OPT was originally sold as a software package and later became an entire productions control philosophy based on bottleneck management and finite-capacity scheduling.</p> <p>It is now better known as Theory of Constraints (TOC). The OPT proprietary software is so expensive and complicated that its users are limited to only large firms in developed countries.</p>
<b>Results of the study:</b>	<p>The OPT policy is a good trade-off between throughput and inventory. So, by using OPT a high throughput can be achieved by having only limited amount of inventory.</p>



#### 4- Management Science, Theory of Constraints/ Optimized Production Technology and Local Optimization.

<b>Author:</b>	( <i>Rohit Verma 1997</i> )
<b>The aim of the study:</b>	The OPT game developed by Creative Outputs was used as the experimental instrument. This computer game was originally developed to explain the main ideas behind TOC using the nine OPT rules. This OPT game was chosen because the game was designed to resemble the day-to-day operations of a typical manufacturing plant and because the nine OPT rules are supposed to operationalize the TOC concepts. This game is an appropriate instrument because it forces the decision-maker to make trade-offs similar to actual production planning.
<b>Results of the study:</b>	The OPT game illustrates some of the main activities of a typical manufacturing plant and the problems that may arise when attempting to manage it profitably. The player is the operations manager of a production facility. He/she has to make three different types of decisions: types and quantities of raw materials to purchase; product mix; and scheduling of two machines that are required to complete the work.

## 5- Applying The Principles Of Optimized Production Technology In a Small Manufacturing Company.

<b>Author:</b>	<i>(S.H. Ashcroft) Department of operational Research and Operations management, School of management, University of Lancaster, Lancaster (Great Britain 1989)</i>
<b>The aim of the study:</b>	<p>This research emphasizes OPT Application as an alternative planning and scheduling approach which made efficient use of manufacturing resources and which could provide reduced (or more consistent ) production lead times, The company had investigated and were unimpressed by various expensive large scale MRP systems. JIT was inappropriate because of the variable demand and wide product range.</p> <p>A viable and promising alternative seemed to be offered by the ideas underlying methods of (OPT). The application of (OPT) philosophy was carried out by identifying the major bottlenecks, introducing the OPT ideas to management and workforce, designing and implementing a new system.</p>
<b>Results of the study:</b>	<p>A simple way of establishing the bottlenecks was required. The order book volatility meant that this would be an ongoing process using a desktop PC. This analysis was carried out in stages, firstly at the company and departmental level and then for particular machines, processes and worker skills; this allowed workforce flexibility to be taken into</p>

	account. The assumption was that if the available man-hours in a department were roughly in balance with the order book workload, then labor flexibility and machine availability would make it unlikely that any individual machine or process would form a major bottleneck in that department.
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### **Statistical analysis:**

Descriptive statistics (Means and Standard Deviation) are calculated for each item to summarize respondent's answers and to rank items of each dimension according to degree of agreement.

#### **Requirements of implementing (OPT)**

##### ***Human Resources Requirements***

Table (1) shows the means and standard deviation of items of "Human Resources Requirements"

Table (1): Means and Standard Deviation of items of Human Resources Requirements.

<b>Human Resources Requirements</b>	Mean	Std. Deviation
Skilled labours.	4.63	.592
Flexible work force.	4.55	.567
Assign an appropriate number of workers to the job during each day of work.	4.46	.711
Recruit Qualified/certified individuals from outside the company.	4.23	.942
Educate Workers with the ideas underlying the new style of operation.	4.30	.906

From the above table, it is clear that the majority of the sample respondents agree (either totally or fairly) to all items of the

“Human Resources Requirements” and this is reflected by the high values of the means (greater than 3).

The most important items are:

- Skilled labors.
- Flexible work force.
- Assign an appropriate number of workers to the job during each day of work.

Results in the above table show that employees in pharmaceutical companies agrees on the Human resources Requirements especially the need to have a skilled labours in order to have the ability to adapt Optimized Production Technology (OPT) system as this system need very qualified and skilled labours in order to implement it efficiently and successfully ( *S.H. Ashcroft(1989)*).

Also there is another Human resource requirement which is Flexible work force which refers to a group of employees that understand how to perform a variety of different jobs and functions within a company. Many companies desire a more flexible workforce to avoid having the loss of any particular staff member damage its prospects for success, and so they might implement an extensive cross training program for employees ( *S.H. Ashcroft(1989)*).

Another important human resource requirement is Assigning an appropriate number of workers to the job during each day of work this requirement ensure the necessity of selecting right workers in order to achieve the new system objectives ( *Goldratt (1970), Johnson*).

### ***Organizational Requirements***

Table (2) shows the means and standard deviation of items of “Organizational Requirements”

Table (2): Means and Standard Deviation of items of Organizational Requirements.

<b>Organizational Requirements</b>	Mean	Std. Deviation
Start and end time determined activity.	4.27	.916
A scheduling heuristics which generate workable and efficient schedules have to been set.	4.23	.970
Hire the right resource (employees, materials, or technology) at the right place.	4.33	.768

From the above table, it is clear that the majority of the sample respondents agree (either totally or fairly) to all items of the “Organizational Requirements” and this is reflected by the high values of the means (greater than 3).

The most important items are:

- Hire the right resource (employees, materials, or technology) at the right place.
- Start and end time determined activity.
- A scheduling heuristics which generate workable and efficient schedules have to been set.

From the above table the researcher concluded that there is a need for organizational requirements, the most important requirement is Hire the right resource (employees, materials, or technology) at the right place as the key to successfully developing such a program like OPT is to follow a proven

recruiting process for the position which needed to fill (*Peter G.(2007), harjinder(2007)*).

Other important organizational requirement is start and end time determined activity, it consider very important requirement as it make an employee have more loyalty for the company and make him know what his duties and rights (*Goldratt (1970), Johnson*).

A scheduling heuristics which generate workable and efficient schedules have to been set it make the work more organized and effective (*Jacobs (1986)*)

### ***Technical Requirements***

Table (3) shows the means and standard deviation of items of “Technical Requirements”

Table (3): Means and Standard Deviation of items of Technical Requirements.

<b>Technical Requirements</b>	Mean	Std. Deviation
Manufacturers need an equally strong company wide commitment to continuous improvement.	4.40	.688
Cash to cover OPT Implementation cost.	4.45	.679
Identify and evaluate the system’s constraint.	4.43	.695

From the above table, it is clear that the majority of the sample respondents agree (either totally or fairly) to all items of the “Technical Requirements” and this is reflected by the high values of the means (greater than 3).

The most important items are:

- Cash to cover OPT Implementation cost.
- Identify and evaluate the system’s constraint.

- Manufacturers need an equally strong companywide commitment to continuous improvement.

From the above table the researcher concluded that the most important item of Technical requirements is Cash to cover OPT Implementation cost as any new production system need enough cash in order to install it successfully and achieve it's previously determined objectives (*Aggarwal (1985)*). The next important technical requirement is Identifying and avaluate the system's constraints the importance of this requirement back to having a clear impression for the system's constraints and identifying it in a way that help in determining strengthes and weaknesses points of the system (*Goldratt and Cox, (1992)*).

### **Benefits from implementing OPT**

#### ***Benefits on the production Level***

Table (4) shows the means and standard deviation of items of Benefits on the production Level

Table (4): Means and Standard Deviation of items of Benefits on the production Level

<b>Benefits on the production Level</b>	Mean	<i>Std. Deviation</i>
Increase output of the firm.	4.70	.489
Eliminated bottleneck capacity.	4.42	.808
More control over the production process.	4.54	.592
Better use of facilities (only when directly contribute to throughput)	4.40	.722
Balance the flow of work through the bottlenecks.	4.39	.784
Better Handling and managing of any constraints in the system.	4.41	,723
Achieve smooth, continuous flow of work in process.	4.24	.944

From the above table, it is clear that the majority of the sample respondents agrees (either totally or fairly) to all items of the “Benefits on the Production Level” and this is reflected by the high values of the means (greater than 3).

The most important items are:

- Increase output of the firm.
- More control over the production process.
- Eliminated bottlenecks capacity.

From the above table it's clear that there are an agrees from the majority of sample respondents on the Expected benefits from implementing Optimized Production Technology (OPT) system which result on the production level. The most important benefit is Increase output of the firm . it considers the most important benefit any company wants from applying any new production system as it will improve all operations performance also it will make the company achieve its goals (*Zeynep Tuğçe Şimşita(2014)*).

Another most important expected benefit from implementing OPT on the production level, More control over the production process. Production control is the activity of monitoring and controlling a large physical facility. It is a "set of actions and decision taken during production to regulate output and obtain reasonable assurance that the specification will be met." (*Goldratt(1970), (fox)*)

A very important benefit on the production level is Eliminating bottleneck capacity (*Goldratt(1990)*) a bottleneck is one process in a chain of processes, such that its limited capacity



reduces the capacity of the whole chain. The result of having a bottleneck are stalls in production, supply overstock, pressure from customers and low employee morale (*Chron.com.2015*) so there is a need for giving a concern for Eliminating bottleneck capacity.

Table (5) shows the means and standard deviation of items of Benefits on the Technical Level.

Table (5): Means and Standard Deviation of items of Benefits on the Technical Level

Benefits on the Technical Level	Mean	Std. Deviation
Improved worker skills.	4.28	.853
Efficient use of manufacturing resources.	4.52	.678
Reduced operating costs.	4.49	.667
Low Inventory by restricting it to certain strategic locations.	4.48	.678

From the above table, it is clear that the majority of the sample respondents agree (either totally or fairly) to all items of the “Benefits on the Technical Level” and this is reflected by the high values of the means (greater than 3).

The most important items are:

- Efficient use of manufacturing resources.
- Reduced operating costs.
- Low Inventory by restricting it to certain strategic locations.

From the above table the researcher concluded that there are agrees from the majority of respondents on the expected benefits from implementing Optimized production Technology (OPT) system especially on the technical level. The most important benefit is efficient use of manufacturing resources. This benefit considers very important benefit from implementing OPT as it makes the company use its resources the efficient use and benefit from available resources it have (*S.H. Ashcroft(1989)*).

Another important benefit on the technical level is Reducing operating costs. This benefit has a large benefit to the company as it saves money and effort for the company also it help the company to achieve its goals without spending on extra expenses (*Zeynep Tuğçe Şimşita(2014)*).

A very important benefit from implementing OPT on the technical level is Low Inventory by restricting it to certain strategic locations. OPT encourages the business to avoid high inventory by planning to use the facilities only when they will directly contribute towards throughput in the form of immediate sales.

Inventory plays a strategic role in OPT by being placed in particular quantities at specific locations in the production process with the object to protecting bottlenecks from enforced idled due to lack of material and so guaranteeing throughput.(*S.H. Ashcroft(1989)*)

### **Testing Hypothesis:**

To test the first hypothesis, Analysis of Variance (ANOVA) and the F-Test are used.

The results of the analysis are shown in Table (6)

Table (6): The results of F-Test for the First Hypothesis

Variable	Top Level		Middle Level		First Line Level		F-Test (Using SPSS)		Chi-square difference test  (Using AMOS)	
	M	S.D.	M	S.D.	M	S.D.	F	Sig.	$\chi^2$	Sig.
Human Resources Requirements	4.546	0.495	4.582	0.451	4.269	0.562	22.215	0.000	41.377	0.000
Organizational Requirements	4.208	0.934	4.368	0.663	4.227	0.756	2.251	0.106	4.930	0.085
Technical Requirements	4.548	0.689	4.467	0.567	4.347	0.620	4.151	0.016	7.557	0.023

From the above Table, it could be concluded that :

- There are Significant difference among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle – First Line Levels) regarding the Human Resources Requirements.

As the result of F-Test (Sig. 0.000 < 0.05 ) indicates that there are statistically significant differences among employees at the Three Organizational levels in favor of employees at the middle level.

*Accordingly, H1.1 will be Rejected.*

- There are no Significant differences among employees in Egyptian Pharmaceutical Sector at the Three

Organizational levels (TOP – Middle – First Line Levels) regarding the Organizational Requirements.

As the result of F-Test (Sig. 0.106 > 0.05 ) indicates that there is no statistically significant difference among employees at the Three Organizational levels.

Accordingly, H1.2 will be Accepted.

- There are significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle– First Line Levels) regarding the Technical Requirements.

As the result of F-Test (Sig. 0.016 < 0.05 ) indicates that there is statistically significant difference among employees at the Three Organizational levels.

Accordingly, H1.3 will be Rejected.

From testing this hypothesis it can be concluded that respondents from different levels from the three levels in each Pharmaceutical company have different requirements for implementing Optimized Production Technology (OPT) system and this returns to differences among each company and another in skilled labours they have( *S.H. Ashcroft(1989)*) or culture of workers also available resources each company hire (*Peter G.(2007), harjinder(2007)* )or cash required to introduce a new production system like (OPT) (*Aggarwal (1985)*).

Also from results of statistical analysis the significant differences among three levels regarding the Human resources

requirements are in favor of Middle level and this can be explained as Middle managers spend their time determining specific tactics for reaching organizational objectives set by top management such as Human resources, But Technical requirements different between Top managers in each company according to different circumstances in which each company operate.

After testing the first hypothesis and Based on the previous results, the previous comparisons were based on the results of the F-test using SPSS. When the analysis was done using Chi-square difference test (using AMOS), the same results were achieved, as indicated in the above table.

The first main hypothesis is Rejected.

To test the second hypothesis, Analysis of Variance (ANOVA) and the F-Test are used.

The results of the analysis are shown in Table (7)

Table (7): The results of F-Test

Variable	Top Level		Middle Level		First Line Level		F-Test (Using SPSS)		Chi-square difference test (Using AMOS)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	F	Sig.	$\chi^2$	Sig.
Benefits on the Production Level	4.696	0.220	4.433	0.420	4.351	0.474	22.549	0.000	80.875	0.000
Benefits on the Technical Level	4.667	0.409	4.471	0.576	4.331	0.540	13.626	0.000	34.273	0.000

From the above Table, it could be concluded that:

- There are Significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP – Middle – First Line Levels) regarding the Expected Benefits on the production Level  
As the result of F-Test (Sig. 0.000 < 0.05 ) indicates that there is statistically significant difference among employees at the Three Organizational levels.

*Accordingly, H2.1 will be Rejected.*

- There are Significant differences among employees in Egyptian Pharmaceutical Sector at the Three Organizational levels (TOP– Middle – First Line Levels) regarding the Expected Benefits on the Technical Level  
As the result of F-Test (Sig. 0.000 < 0.05 ) indicates that there is statistically significant difference among employees at the Three Organizational levels.

*Accordingly, H2.2 will be Rejected.*

From testing this hypothesis it can be concluded that respondents from different levels from the three levels in each Pharmaceutical company have different visions and expectations from Expected benefits from implementing OPT system as it will have different impact on each level in their

control on the production process (*Goldratt(1970)*, (*fox*)) or in the flow of work through the bottlenecks (*S.H. Ashcroft(1989)*), as a result it can be concluded that there are significant difference regarding the benefits on the production level.

Also there are significant differences between among three levels in the pharmaceutical companies regarding the benefits on the Technical level and these may be due to changes in different skills each level has to acquire (*Jacobs (1986)*) and Efficient use of manufacturing resources (*S.H. Ashcroft(1989)*) as each company have different resources and different amount of inventory (*S.H. Ashcroft(1989)*).

After testing the second hypothesis and Based on the previous results, the previous comparisons were based on the results of the F-test using SPSS. When the analysis was done using Chi-square difference test (using AMOS), the same results were achieved, as indicated in the above table.

The Second main Hypothesis is Rejected.

## Questionnaire:

**Table (8): Questionnaire on the Requirements of implementing Optimized Production Technology (OPT) in Egyptian pharmaceutical sector.**

Please tick (√) in front of the phrase that expresses your opinion regarding the following expressions:

Here are some of the requirements for applying optimized production technology system. How important are these requirements to implement optimized production technology system in the company to which you belong?

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<b>Requirements of implementing (OPT)</b>	Very Important	Imp.	neutral	Not Important	Not Important at all
<b>A-Human Resources Requirements.</b>					
1. Skilled labors.					
2. Flexible work force.					
3. Assign an appropriate number of workers to the job during each day of work.					
4. Recruit Qualified/certified individuals from outside the company.					
5. Educate Workers with the ideas underlying the new style of operation.					
<b>B- Organizational Requirements.</b>					
6. Start and end time determined activity.					
7. A scheduling heuristics which generate workable and efficient schedules have to be set.					
8. Hire the right resource (employees, materials, or technology) at the right place.					
<b>C-Technical Requirements.</b>					



9. Manufacturers need an equally strong companywide commitment to continuous improvement.					
10. Cash to cover OPT Implementation cost.					
11. Identify and evaluate the system's constraint.					

**Table (9): Questionnaire on expected Benefits from implementing OPT.**

<b>Benefits from implementing OPT</b>	Totally Agree	Agree	Neutral	Disagree	Totally Disagree
<b>A- Benefits on the production Level.</b>					
1. Increase output of the firm.					
2. Eliminated bottlenecks capacity.					
3. More control over the production process.					
4. Better use of facilities (only when directly contribute to throughput)					
5. Balance the flow of work through the bottlenecks.					
6. Better Handling and managing of any constraints in the system.					
7. Achieve smooth,					

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continuous flow of work in process.					
<b>B- Benefits of the Technical Level.</b>					
8. Improved worker skills.					
9. Efficient use of manufacturing resources.					
10. Reduced operating costs.					
11. Low Inventory by restricting it to certain strategic locations.					

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