

**"a proposed integrated framework for logistics
management system in the Egyptian engineering
industries sector"**

The researcher

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Abstract.

This study aims at displaying the intellectual framework of the logistics management concept and the activities implied within it and investigating the availability degree of the logistics management requirements within the Egyptian engineering industries sector and also studying the relationship effect of logistics management requirements and its practices on the logistics performance effectiveness ,the researcher has been used the analytical and descriptive approach , as well as, the field study using surveys as a key tool for collecting primary data of research . The researcher has been used complete census method for determining observations from managers of companies under research (the number of observations were 169 observation). The results of the study showed that there are differences between managers of companies according to their perception of logistics management concept and also there are differences between companies according to the availability degree of logistics management requirements and finally there is a significant relationship between logistics performance effectiveness and the availability of logistics requirements in the companies under research.

1-Introduction

Nowadays in the 21st century the world live in radical and rapid changes where the most prominent feature of the surrounding environment of businesses is fluctuation and dynamic change. Therefore, Logistics management process is considered to be one of the modern aspects in management in face of the economical, technological and informational challenges of this age. now the organization attention turned from investigating and analyzing costs into paying much attention to the level of the services offered to consumer which resulted in making marketing and production managers directed to logistics system so to provide the best available service level in a lowest total cost.(Nilsson,2006)

Over the organization level, costs of logistics businesses may reach 30% of the annual sales revenues and approximately 50% - 60% of total operation costs. (vail, 2002)

Logistics Management can be defined as:

A strategic management process for purchasing, movement and storage of material, components and final outputs (and relative information flow) within the organization and its marketing channels in a way supposed to achieve coordination and integration among all departments inside the organization and enlarging current and future profits provided that this will be performed in a sufficient way and an effective cost for fulfilling customers' requirements. (*Christopher, 2010,pp.9*).

Logistics management includes the following activities:

- Material Requirement Planning (MRP).
- Coordination with Production Monitoring System.
- Purchasing.

- Material delivery and performing initial inspection processes to ensure that the received materials match types stipulated in the contract.
- Examination and Quality Control.
- Transportation.
- Inventory control.
- Warehousing.
- Discard static items.
- Physical distribution of final outputs.
- Handling and packaging processes. *(Ibrahim, K.M, 2008)*

2- research problem:

The Researcher's interest in this field is to try to address that: The achievement of effective logistics management can provide Egyptian organizations with a primary source for the competitive advantage which its source could be detected in the following:

- Ability of organization to distinguish itself in the customer eyes "value advantage".
- Reducing costs which in turn enlarges profitability " production cost advantage".

Through the exploratory research conducted by the researcher ^(*) for purpose of identification of research problem, by the help of using interviews with some managers of industrial companies, it was revealed that there are insufficiencies on those companies regarding

^(*) The researcher conducted an exploratory research using interviews to determine research problem .

the concept of logistics management and its application within them, some of the most important insufficiencies are as follows:

Conflict among those who are responsible for logistics activities (procurement, transportation, inventory and distribution departments), lack of coordination among departments responsible for logistics activities, increase of examination, storage and transportation costs, and in addition to the above top management does not give sufficient consideration for making a separate department which organizes activities of logistics management under the title of “Supply and logistics Management Department”.

So, The research problem can be determined in the following main questions :

- 1- Is there a logistics management system in the sector subject of study or not?
- 2- To what degree there is a perception of logistics management concept from managers of companies subject of study?
- 3- How a proposed integrated framework for the logistics management system could be reached inside the Egyptian business environment to enhance logistics performance effectiveness?
- 4- What are the challenges and problems organizations under research face upon applying logistics management?

3-Research importance:

The importance of the research stems from the following points :

- **On the scientific level;** due to the appearance of logistics management concept only recently, it has to be studied on a broader way and to make it subject to an applied study to achieve a coordination and integration

between physical distribution activities and material management activities which help in fulfilling operation requirements and reaching the organization objectives.

- Providing researchers with the possibility of identifying opportunities for applying the logistics management system within the Egyptian companies through identification of differences among what is being actually applied and the scientific basics and origins of this concept in accordance with what the various theoretical frameworks presents.
- This is the first research that investigate the relationship between logistics requirements and logistics performance effectiveness according to the theoretical studies.
- Logistics management is of a great importance since it became responsible for achieving the competitive advantage of the organization through providing the organization needs in the lowest possible cost. This will be executed through following a single system for storage and movement of materials and products within the organization, which helps in reducing efforts and costs and increasing the operation efficiency (i.e. the logistics system).
- **At the applied level:** A proposed framework should be designed including application requirements and information system for the logistics management system as it helps providing information to all departments inside organization and it will also enable the integration of all departments which in turn improve organization efficiency and effectiveness.

4- **Research Objectives:**

- 1- Displaying the intellectual framework of the logistics management concept and the activities implied within it as considered a modern

- trend in business administration field aiming at achieving efficiency and effectiveness for the internal processes inside the organization.
- 2- Recognizing the availability degree of the logistics management requirements within the Egyptian engineering industries.
 - 3- Investigating the relationship between the logistics requirements and logistics management practices within the Egyptian engineering industries and testing their influence on logistics performance effectiveness.
 - 4- Determining the differences among the respondents' opinions about their awareness of logistics management concept.
 - 5- Testing the mediation relationship of logistics management practices between logistics requirements and logistics performance effectiveness.
 - 6- Determining how far a system for the logistics management in the organizations under research is present or not and identifying obstacles in the way of its application.
 - 7- providing a proposed framework for logistics management system contributing to the increase of logistics performance effectiveness within the organizations under research.

5-Research limitations:

This research was done under the following limits:

- 1- The current research concentrated on choosing population research from public sector only of engineering industries.
(placement limitations)

- 2- The current research choose the respondents from managers and heads of the departments only within the organizations under research. (human limitations)
- 3- The primary data of the current research had been collected at the period from march 2016 to june 2016. (time limitations)
- 4- The linear regression does not assume normal distribution for the explanatory variables, so the researcher used alternative method (LAV regression).
- 5- The questionnaire was modified before distribution to targeted logistics professionals and other personnel who have knowledge useful for evaluating logistics system, but the accuracy of their responses cannot be controlled.

6- Research hypotheses:

Starting from research objectives and possibility of achieving it, this research attempts to test the following hypotheses:

- H1:** There are significant differences between listed companies due to their managers' perception of logistics management concept.
- H2:** There are significant differences between listed companies according to the availability degree of logistics management requirements.
- H3:** There is a significant effect of the availability of logistics management requirements and practices on logistics performance effectiveness.
- H4:** Logistics management requirements will be positively related to logistics management practices (LMP).
- H5:** Logistics management practices(LMP) will mediate the relationship between logistics management requirements and logistics performance effectiveness.

7-research population determining:

Research population is represented in the public sector companies for engineering industry inside Arab Republic of Egypt. In this regard, the Researcher has selected the industrial engineering sector due to its great value in comparison to the other industrial sectors.

The Researcher has limited her study in population research to public sectors companies only. These companies can be determined as following:Public sector companies (Holding Company for Engineering Industries) , encompassing the following 11 companies:

El-Nasr for Electrical & Electronic Apparatus (NEEASAE),The tractor and engineering company, El Nasr company for pipes products, METALCO, ELNasr company rubber products (NARUBIN), Spring & transport needs manufacturing company (YAYAT), Transport & engineering company, SIEGWART, El Nasr forging industry company, El nasr company for metals, Egyptian copper works.

The response rates are shown in table no. (5) by the number of distributed questionnaires and complete \ true questionnaires in addition to the response rate for each company .

| Company name | Distributed questionnaires | Complete \ true questionnaires | Response rate |
|--|-----------------------------------|---------------------------------------|----------------------|
| NEEASAE | 24 | 17 | 75% |
| The tractor and engineering company | 20 | 16 | 80% |
| El Nasr company for pipes products | 20 | 20 | 100% |
| METALCO | 25 | 20 | 80% |
| EL Nasr company rubber products (NARUBIN) | 18 | 15 | 83% |
| Spring & transport needs manufacturing company (YAYAT) | 20 | 18 | 90% |
| Transport & engineering | 20 | 20 | 100% |

| company | | | |
|----------------------------|-----|-----|------|
| SIEGWART | 15 | 15 | 100% |
| El Nasr forging industry | 20 | 18 | 90% |
| EL Nasr company for metals | 12 | 10 | 83% |
| Egyptian copper works | - | - | 0% |
| Total | 194 | 169 | 87% |

Table no.(5) ,Source: Prepared by the researcher.

The last table show that the response rate ranges from 75% to 100% and the average response for all companies is about 87% and the researcher excluded the company of Egyptian cooper works because they refused to cooperate with the researcher due to special circumstances in that company.

8-Defining research variables and measures used:

- **Dependent variable:** is the logistics performance effectiveness (represented as decreasing operating costs).

Operating costs can be defined as the costs associated with inventory, storage , transportation, distribution, and supplying processes. (pasecki , 2001) .

We got these data from the financial statements of the listed companies under research through time series for four years.(from 2011:2014).

- **Independent variables** : represented as logistics management requirements such as :

- Human resource requirements (HRR) .

- Organizational requirements (OR) .

- Informational requirements (IR) .

- **The mediator variables** : logistics management practices (LMP) :

Represented by the practices of logistics activities .

The research depends on the following measurements when preparing questionnaire :

- Dimension of organizational requirements depends on (Maul,et al., 2001) , (Henry, Eleanor,2011), (Lin, c.et Ho,Y.,2011).
- Dimension of human resource requirements and the perception of logistics management concept depend on : (Erik, 2002), (Ghorbani ,2006), (Christopher.etal.,2000),(Eleanora Bottani,2006), (Ralston,2013) ,(Lin c.and Ho,Y.,2011),(zacharia,z.g,2004)
- Dimension of informational requirements and the practices of logistics management activities depend on :

(ketikidies et al.,2007),(Lin .c.et Ho,Y.,2011).this is due to their inclusion of a lot of measures and they have the recent subsystems used in logistics management and also include problems and challenges that face companies when applying logistics management.

All these measures have conducted the psychometric tests and have been sure of their validity and reliability of them where cronbach's alpha value is ranged from (0.7:0.9) and it is a satisfied value .

The researcher conducted some modifications to some phrases of questionnaire and added another until the questionnaire became more fit and expresses logistics management concept and recognizes the importance of its application and practicing its activities.

9-The tools and methods used in that research :

-The research depends on a lot of integrated methods for collecting data in the field study and this is via exploratory research , interviews and questionnaires prepared especially for the purpose of the research in the

light of literature review and developing some questions to fit research objectives.

- The researcher designed the questionnaire to cover dimensions that represent the proposed framework of logistics management system and includes four major parts:

First : questions that measure organizational ,human resource requirements and logistics management practices and the extent to which managers realize logistics management concept.

Second : the recent systems used in companies according to informational requirements .

Third : benefits from recent systems and challenges face companies when practicing logistics management.

Fourth : data about companies.

So ,the final form of the questionnaire will be as follows:

First section: comprises from 59 questions and the alternative responses of it using likert scale pentathlon are represented as follows:

| | | | | |
|----------------------|---------------|---------|----------------------|-----------------------------|
| Not available at all | not available | Neutral | Available moderately | Available with ahigh degree |
| 1 | 2 | 3 | 4 | 5 |

Second section: comprises from 11 questions and alternative reponses for its phrases are measured as follows:

| | | | | |
|------------------|--------------------|------------------|-----------------|-----------------------|
| Need improvement | Start implementing | Future implement | not appropriate | Unkown to the company |
| 1 | 2 | 3 | 4 | 5 |

Third section: comprises from 16 questions and the alternative responses for it using likert scale are as follows:

| | | | | |
|----------------------|-----------|-------------------|-------|------------------|
| Absolutely not agree | Not agree | Agree to somewhat | Agree | Completely agree |
| 1 | 2 | 3 | 4 | 5 |

Fourth section: comprises from 11 questions represent private data about companies and 6 from it are opened questions and 5 are closed questions with a dummy variables (their answers are by yes or no).

10-The most important literature review:

| | | | |
|---|---------------------------------|---|---|
| 1 | Nyaberi,J.N& Mwangangi,P.(2014) | This research aims to show that the importance of logistics management in any of the organization cannot be underrated and it should be the core business of the business to formulate and design order processing logistics practices to enhance performance . | The study concludes that order process logistics management practices contributes to increase in profits , sales volume, service delivery, production levels, quality of products and decrease in costs. inventory control logistics assists the performance limited through costs of maintenance of stock reduces, quality of the product remain intact and cost of breakages reduces. This in turn leads to customer good will and a high volume of sales, reducing costs and improvement in overall performance of all business. |
|---|---------------------------------|---|---|

| | | | |
|---|----------------------|--|---|
| 2 | Erkan, B.(2014) | <p>This research aims to introduce the importance of logistics performance to global economic activity as their costs are estimated to be between 9-20% of the GDP and introduce also the logistics components and processes.</p> | <p>This research concluded that when countries increase their investment on logistics research and give more importance to their logistics, economic development will be anticipated. Indeed , in the face of the increase in logistics performance of a country, economic growth, employment level and productivity will increase ,poverty will decrease. Due to the logistics activities, country's comparative advantage will increase , since efficient logistics will reduce costs of transport and decrease the cost of production.</p> |
| 3 | Ralston et al.(2013) | <p>The purpose of this manuscript is to assess the impact of logistics salience on logistics capabilities and performance. Specifically, the impact of logistics salience on logistics innovativeness and logistics service differentiation is measured along with logistics innovativeness and logistics service differentiation effect on logistics performance.</p> | <p>The results suggest that logistics salience positively impacts both logistics innovativeness and logistics service differentiation. Logistics innovativeness and logistics service differentiation both positively influence logistics performance. These findings give credence to the resource based view of the firm which states that resources lead to capabilities which leads to performance.</p> |
| 4 | langing liu.(2011) | <p>The primary objective of that research is to present a new management system of material supplies based on the modern</p> | <p>The analysis results of this research showed that the proposed management system could impel the development of the supply strategy</p> |

| | | | |
|---|---|---|---|
| | | <p>logistics supply chain theory and by using this modern logistics supply chain theory, it can help the logistics cost reduction and improve the enterprise's core competitiveness.</p> | <p>and provide theory and technology support to the advanced material supply management for enterprises.</p> <p>The proposed method can reduce the logistics cost and benefit the enterprise management.</p> |
| 5 | <p><i>Ramakrish nan Ramanthan,</i> (2010)</p> | <p>This research aims at using data derived from customer classifications online to discover how the relationship between logistics performance and customer loyalty is affected by risk upon purchasing product specifications and sites efficiency.</p> | <p>Research has summarized “risk” in two essential points: price and product vagueness.</p> <p>Efficiency means the ability of the internet sites to achieve good percentages in respect to operational factors (such as customer satisfaction on product specifications, refunds and rates). It means also to achieve good estimates in respect of customer loyalty.</p> <p>Research concluded that efficiency, not risk, has more impact on the relationship between logistics performance and customer loyalty</p> |
| 6 | <p>Yu_Jen Wu and Jiang_Ling Hou. (2009)</p> | <p>The major aim in the logistics field as a third party is to improve performance of logistics activities so to enhance operational efficiency and corporate efficiency.</p> <p>In addition, it should also improve employees’ performance to optimize these activities.</p> <p>Accordingly, the major objective</p> | <p>a model of logistics information has been created on the internet to help managers in collecting and saving scientific data, determining tasks of poor performance and also determining experienced employees within organization.</p> <p>In addition, an actual case has been used to test the application of this</p> |

| | | | |
|---|---|---|--|
| | | of this research is to set up a model for evaluation of employees' performance which includes three major aspects: determination of direct performance, determination of indirect performance and analysis of performance aspects. | proposed model. At the end, this research displays an integrated model that aims at calculating the employee's performance accurately and consequently would lower work burden endured by logistics decision makers |
| 7 | <i>Joseph Sarkis.(2008)</i> | This research aims at conducting some researches and applications in the electronic commerce field and the third party (logistics management) on a broad scale in both theory and applications. | This research has reached the conclusion that there is an increasing importance for utilizing information technologies and making available of logistic services so that the supply chain should become such a vital element in operation in the 21 st century, especially from the viewpoint of the default corporations and the possibility of creating a supply chains on the Internet. |
| 8 | <i>P.H. Ketikids, S.C.L. Koth and Others(2008)</i> | This research aims at achieving the future trend of using information systems in favor of logistics services and logistics supply chain management (LSCM). This research has been applied in south and east of Europe and it was concerned with three main elements: * Determining the necessary development for using logistics information systems in companies. | Results indicate that corporations in Albania, Bulgaria, Greek, Republic of Macedonia and Romania and Black Mountain face similar challenges for development when use logistics information system. It appeared that all of them extremely focus on demand chains and have weakness points in the supply chains. Also, main results of research point out that companies and government in south east Europe don not show |

| | | | |
|--|--|---|---|
| | | <p>*Measuring the actual level of satisfaction concerning the existing policy of logistics information systems.</p> <p>* Revealing the actual need for projects in south and east of Europe in respect of the effective usage of information systems.</p> | <p>their willingness to play an important role in the global supply chains. This is because there are obstacles preventing the rapid development of logistics information systems.</p> |
|--|--|---|---|

Prepared by the researcher according to literature review.

Commenting on the previous studies:

1- Similarities between current research and the previous researches are shown in the importance of analyzing and explaining of the theoretical framework of logistics strategy, identifying its principles and method of developing it into strategies as represented in the researches of (Meade L. and Sarkis,J. ,1998; Langing L.,2011;Ketikids,P.H et al.,2008; Marcela).

They also have similar aspects in that there is a dire need for using logistics information systems in Egyptian organizations so to achieve integration and coordination among departments inside the organization as found out in the research of (Stephen M.rutner ,2002) which concluded that the successful companies in implementing logistics integration systems are the most likely to obtain success regarding expansion and application of electronic commerce.

2- The Researcher observed the lack of Arabic and egyptian researches and references which address subject of study due to lack of consideration directed to such subject inside the Egyptian organizations

for some reasons because most of researches in that field were interested in the role of logistics in ports only.

- 3- However, how important the results obtained by the previous researches in this field are, these results may not match with the reality of practical application inside the Egyptian environment which reflects the importance of addressing logistics management concept to be applied to the Egyptian businesses.

Research gap:

Differences between the current research and the previous researches can be summarized as the following :

- 1- Current research is considered the first one in Egypt that interested in the role of logistics for business organizations as most of Egyptian researches were interested in the role of logistics in ports only.
- 2- By investigating the theoretical and practical researches in that field, there were pitfalls found according to studying the effect of independent variables on the dependent variable of that research, however there are some studies indicated to the existence of these relationships ,but also no study proved it practically(studies such as: YU,J.(2009); Erkan,B.(2014); Nyaberi, J.N& Mwangangi,P.(2014))
- 3- According to my knowledge, this is the first research that investigate the relationships between logistics management requirements(as independent variables), logistics management practices (as a mediator variable) and logistics performance effectiveness(as a dependent variable).
- 4- Current research differs from previous researches in the fact that it identifies the requirements of applying logistics management and

application stages. It also aims at reaching a design of a framework for logistics management system since no research used this concept in the Egyptian environment which motivated the researcher to conduct such research.

11- Analyzing data and testing hypotheses:

Testing hypotheses

This section aims to empirically test the research hypotheses as the following :

H1: there are significant differences between listed companies under research due to their manager's perception of logistics management concept .

To make a successful applying of logistics management , managers should have an integrated awareness of that concept from the following points:

- The extent to which there are high efficient managers ,personnel that are responsible for executing logistics management activities.
- The extent to which there is a private department for managing and executing the new ideas of logistics management.
- The extent to which there is a continuous search for methods of decreasing operating and order costs.
- The extent to which the key activities of logistics management are applied (such as: procurement , receipt of materials ,distribution, inspection of materials and quality control and handling materials on time).
- The extent to which the top management is interested in providing material requirement planning.
- The role of top management in providing a sufficient training to use recent technological systems.

-The extent to which top management contributes to achieve integration between all departments .

-The extent to which top management seeks to build long-term relationships with suppliers .

- The extent to which workers adapt to any change happens inside the organization .

The table no. (12) presents the analysis of manager's attitudes means and variances due to their perception of logistics management concept:

| Phrase | Mean | Direction | Overall average | variance |
|--|-------------|------------------------------|------------------------|-----------------|
| 1-senior managers keen to select and appoint a high efficient personnel responsible for logistics activities. | 4.67 | Available with a high degree | 3.73 | 10.8% |
| 2-The extent to which senior managers are oriented toward low cost while maintaining high quality. | 4.57 | Available with a high degree | 3.73 | 14% |
| 3-Your company combine the activities of purchasing ,storage ,distribution and quality control in a separate department called logistics management department. | 1.20 | Not available at all | 3.73 | 3.5% |
| 4-Workers in your company adapt to any change happens inside it. | 4.14 | Available moderately | 3.73 | 19% |
| 5-Senior managers are interested in directing workers toward change and | 4.35 | Available with a high degree | 3.73 | 15.7% |

| | | | | |
|--|------|------------------------------|------|-------|
| training them to solve problem. | | | | |
| 6-Senior managers put in top priorities improving their relationships with suppliers. | 4.41 | Available with a high degree | 3.73 | 21.4% |
| 7-Senior managers put in top priorities the participation of all departments in decision making. | 4.24 | Available with a high degree | 3.73 | 22% |
| 8-The quality system include documented purchasing system. | 4.64 | Available with a high degree | 3.73 | 13.8% |
| 9-Senior managers put in their priorities achieving coordination and integration among all departments in organization. | 4.49 | Available with a high degree | 3.73 | 17.3% |
| 10-There is a system in place to adequately control the handling, storage and packaging of products. | 4.17 | Available moderately | 3.73 | 23% |
| 11-Senior managers permit employees' participation in putting plans and programs for their jobs. | 4.01 | Available moderately | 3.73 | 27% |
| 12-Workers are empowered to take decisions on their jobs. | 4.02 | Available moderately | 3.73 | 10.5% |

Table no.(12) ,Prepared by the researcher depending on data analysis using spss program

- The results for research population managers were positive due to their perception of logistics management concept : they recorded overall average of

3.73 degree of response rates (means that this dimension is available with a moderate degree according to questionnaire methodology*)

This means that managers are aware of the concept of logistics management system that based on achieving integration between all activities of the organization and is able to solve most of problems they face during the process of providing material requirements.

However , they managers are aware of logistics management concept , they don't have a separate department called logistics management as presented in response rates of phrase number 3 .

The value of overall variance is 16.5% and it represent a little variations between response rates attitudes ; means that there is orientation toward the perception of logistics management concept on the level of all respondents (managers).

In details , the response rates of most respondents (managers) ensure the following points :

- most of respondents are aware of the importance of logistics management concept that is a commitment from top management and a big responsibility on them where they should keen to select and appoint a high efficient personnel for material activities under a separate department called logistics management , but this is not available at all on the listed companies although they do these activities distributed on other departments , but they should combine and coordinate these activities under

* determining the availability area rang = $\frac{\text{high response} - \text{low response}}{\text{high response}} = 0.8$ so that mean will be as follows : (1- 1.79) = not available at all , (1.80- 2.59) = un Available , (2.60- 3.39) = neutral , (3.40 – 4.19) = available moderately , (4.20 – 5) = available with a high degree

a separate department ; so this means that they suffer from the rigors of governmental routine .

- Most of respondents are aware of the importance of directing employees toward change and training them to eliminate obstacles they face with a mean of (4.35) and a variance of (15.7 %) and this means that training employees to adapt to any change happens inside the company is very important and this will improve their skills and this will be reflected on work efficiency .

- Most of senior managers are aware of the process of orientation toward low cost while maintaining high quality when purchasing raw materials with a mean of (4.57) and a variance of (14%) and should also put in their priorities improving relationships with suppliers with a mean of (4.41) and a variance of (21%) .

- Most of respondents are aware of the importance of employee's participation in putting plans and programs for their jobs with a mean of (4.01) and a variance of (21%) , this means that it is available with a moderate degree ; this is due to the problems the companies face of un development for many reasons such as : centralization of decisions , un empowerment of heads of department to take decisions without reference to the executive manager and adherence to the hierarchy of authority inside the organizations .

- Most of senior managers and respondents are aware of the importance of coordinating and integrating all logistics activities and the responses of phrase (9) ensure that with a mean (4.49) and a variance of (17.3%), so the researcher saw that the awareness of managers of logistics management

concept is very important and necessary for the success of applying that concept .

This is consistent with the study of (Ralston et peter , 2013)results as they viewed that the lack of awareness and coordination among members in the logistics system results in an increase in operating costs of production , transportation and inventory .

By using ANOVA test to determine the extent to which there are significant differences between companies toward perceiving logistics management concept .

We use the means of responses to each company , and show that homogeneity assumption for ANOVA test is unavailable (as the P value of homogeneity test = $0.000 < 0.05$; means that there is no homogeneity between listed companies under research according to their perception of logistics management concept) . so , the researcher used non- parametric test as alternative to ANOVA test called kruskal wallis test and the table no.(13) will present its results :

| Variable | Chi ² | Significance | differences |
|---|------------------|--------------|-------------|
| The awareness of logistics management concept | 137.042 | 0.000 | significant |

Table no.(13), Prepared by the researcher by analyzing data on spss.

We noticed the following from the table :

- P value $0.000 < 0.05$ = means that there are statistical significant differences between listed companies according to their perception of logistics management concept and the following table no.(14) will present the degree of perception for each company .

| Company | Mean | Result |
|---|------|------------------------|
| 1- Neasa company | 4.11 | more than overall mean |
| 2- The tractor and engineering company | 3.71 | Less than overall mean |
| 3- El Nasr for pipes product | 4.12 | more than overall mean |
| 4- The Egyptian company for metal products (Metalco) | 3.81 | more than overall mean |
| 5- El Nasr company for rubber products (NARUBIN) | 3.47 | Less than overall mean |
| 6- Spring & transport needs manufacturing company (YAYAT) | 3.97 | more than overall mean |
| 7- Transport and engineering company | 3.41 | Less than overall mean |
| 8- The Egyptian company for pipes and cement (SIEGWART) | 3.50 | Less than overall mean |
| 9- El Nasr forging industry company | 4.00 | more than overall mean |
| 10- El Nasr company for metals | 2.76 | Less than overall mean |
| Overall mean | 3.73 | ----- |

Table no.(14), Prepared by the researcher.

The previous table presented the extent to which the respondent's perception for each company with overall mean of 3.73 and ranged between 2.76 and 4.12 and the result should that five companies have a mean more than overall mean and the others have a mean less than overall mean (this means there are some differences between respondents of each company according to their perception of logistics management concept as an integrated concept.

Accordingly , we accept the alternative hypothesis that say there are significant differences between companies managers according to their perception of logistics management concept .

Hypothesis 2 :

H2:There are significant differences between listed companies according to the availability degree of the logistics management requirements .

The researcher tests this hypothesis by using kruskal wallis test due to unavailability of homogeneity assumption of ANOVA test on the data and the table no.(15) show the results of the test :

| Variables(Requirements) | Chi- square value | Significance (P- value) | Results |
|---------------------------------------|--------------------------|----------------------------------|----------------|
| 1- organizational requirements | 97.92 | 0.01> 0.000 | Significant |
| 2- informational requirements | 143.35 | 0.01> 0.000 | Significant |
| 3- human resource requirements | 142.52 | 0.01> 0.000 | Significant |

Table no.(15) ,Prepared by the researcher depending on statistical analysis using spss , appendix no . (8)

The previous results show that there are significant differences between listed companies according to the availability degree of logistics management requirements (organizational , informational , human resource requirements) where chi square for the requirements was 97.92 , 143.35 , 142.52 respectively 0.50 we accept the null hypothesis and reject the alternative one .

The researcher interpret the variations between the three requirements is duo to the variations of logistics management practices (the executive side of logistics management) among all companies and the next table will represent it as follows :

| Companies | Means of logistics practices | Result |
|--|-------------------------------------|----------------------------------|
| 1- Neeasa company | 4.47 | Available more than overall mean |
| 2- The tractor and engineering company | 4.21 | Available less than overall mean |
| 3- El Nasr for pipes product | 4.76 | Available more than overall mean |
| 4- The Egyptian company for metal products (Metalco) | 4.74 | Available more than overall mean |
| 5- El Nasr company for rubber products (NARUBIN) | 4.20 | Available less than overall mean |
| 6- Spring & transport needs manufacturing company (YAYAT) | 4.59 | Available more than overall mean |
| 7- Transport and engineering company | 4.27 | Available less than overall mean |
| 8- The Egyptian company for pipes and cement (SIEGWART) | 4.42 | Available more than overall mean |

| | | |
|--|------|----------------------------------|
| 9- El Nasr forging industry company | 4.23 | Available less than overall mean |
| 10- El Nasr company for metals | 3.76 | Available less than overall mean |
| Overall average | 4.40 | ----- |

Table no.(16),Prepared by the researcher depending on statistical analysis using spss , appendix no . (8)

The previous table showed the variations (difference) among companies according to their practices of logistics management activities and the researcher noticed that companies NEEASA , EL NASR for pipes , METALCO , YAYAT , SIEGWART have recorded means more than the overall average with values of 4.47 , 4.76 , 4.74 , 4.59 , 4.42 respectively while the companies of the tractor and engineering , NARUBIN, transport and engineering , EL NASR forging industry , EL NASR for metals have recorded means less than the overall average with values of 4.21 , 4.20 , 4.27 , 4.23 , 3.67 respectively . the previous results refers to that there are variations and differences among companies in practicing logistics management activities duo to the strong positive relationship between logistics requirements and logistics practices by pseudo $R^2 = 49.3\%$ (by analyzing H_4) means that logistics requirements interpret 49% of logistics practices , so the variations of practices refers to variations on the availability of logistics requirements .

H3: There is a significant relationship between logistics performance effectiveness and the availability of logistics management requirements and its practices in the Egyptian engineering listed companies.

To test the following hypotheses, we should verify that the data have met the assumptions underlying OLS regression because without verifying that the data have met the assumptions of OLS regression, my results may be misleading.

First: Checking for Normality of the residuals

It shows that we cannot accept the assumption of the normality of the residuals.

So, we could test this hypothesis by using LAV regression depending on data from questionnaire phrases of (1-13), (14-43), (46-59) in the first section and from (1-8) in the third section as independent variables and also taking the natural logarithm of operating costs average from a four-years' time series as a dependent variable.

Accordingly, the following model is designed to test H_3 and can be defined by the following equation:

$$Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i$$

Where z : is the natural logarithm of operating costs average.

β_0 : is the constant, β_1 : is the coefficient of x_1 , β_2 : is the coefficient of x_2 , β_3 : is the coefficient of x_3 , β_4 : is the coefficient of x_4 .

X_1 : is the organizational requirements (OR).

X_2 : is the informational requirements (IR).

X_3 : is the human resource requirements (HRR).

X_4 : is the logistics management practices (LMP).

ε_i : is the percentage of accepted error.

The following table no.(17) illustrates the LAV regression results:

| Variables | Coefficients | VIF |
|---------------------------|-------------------|------|
| OR(x ₁) | 0.055(0.05) | 1.93 |
| IRR(x ₂) | 2.243(2.29) ** | 1.86 |
| HRR(x ₃) | 7.582(5.93) ** | 1.68 |
| LMP(x ₄) | -10.752(-4.63) ** | 3.59 |
| -constant | 19.615(3.64) ** | |
| Pseudo R ² (%) | 22.5% | |
| N | 169 | |

Notes: the values in parentheses are t-values, ** denotes 5% level of significance.

The results show that the coefficient of OR as organizational requirements within Egyptian firms, is not significantly associated with logistics performance effectiveness (represented as decreasing operating costs), but on the other hand the IR, HRR and LMP are significantly associated with logistics performance effectiveness at 0.05 level of significance.

It means that informational, human resource requirements and logistics practices have the higher effect more than organizational requirements on operating costs, Pseudo R² = 22.5% means that the independent variables interpret 22.5% of operating costs and this percentage is considered scientifically accepted in the studies conducted by (Ralston,2013; Mohnan,2013).

Hypothesis 4 :

Logistics management requirements (OR, IR, HRR) will be positively related to logistics management practices (LMP) .

we resorted to the LAV regression as a good alternative to OLS regression due to the violation of normality .

| Variables | coefficients | VIF |
|-----------------------------|--------------------|------|
| OR (X ₁) | 0.3252 (17.28)** | 1.93 |
| IRR(X ₂) | 0.2255 (16.48)** | 1.86 |
| HRR (X ₃) | 0.2898 (17.42)** | 1.68 |
| Constant | 0.8958 (8.62)** | |
| Pseudo R ² (%) | 49.3 % | |
| N | 169 | |

The results show that the coefficient of OR , IR , HRR are significantly associated with logistics management practices at 0.05 level of significance.

It means that organizational , informational , human resource requirements have a strong positive relationship with logistics management practices , pseudo R² = 49.3% means that OR , IR, HRR interpret 49.3% of logistics management practices and this is considered a high percentage of interpretation .

Hypothesis 5 . logistics management practices (LMP) will mediate the relationship between logistics management requirements and logistics performance effectiveness .

To test the hypothesized relationships in our path – analytic framework , we employed Stata statistical program to examine paths between constructs , and estimated the path coefficient to show direct and indirect relationship among variables.

The expected results of path analysis also provided support for both of the third and fourth hypotheses. It is widely known that path analysis is the best approach to fit a causal model – involves mediation- as follows:

(1) fitting the model without the mediator first to investigate the direct relationship between logistics management requirements and logistics effectiveness.

The figure no.(14) will show the direct relationship

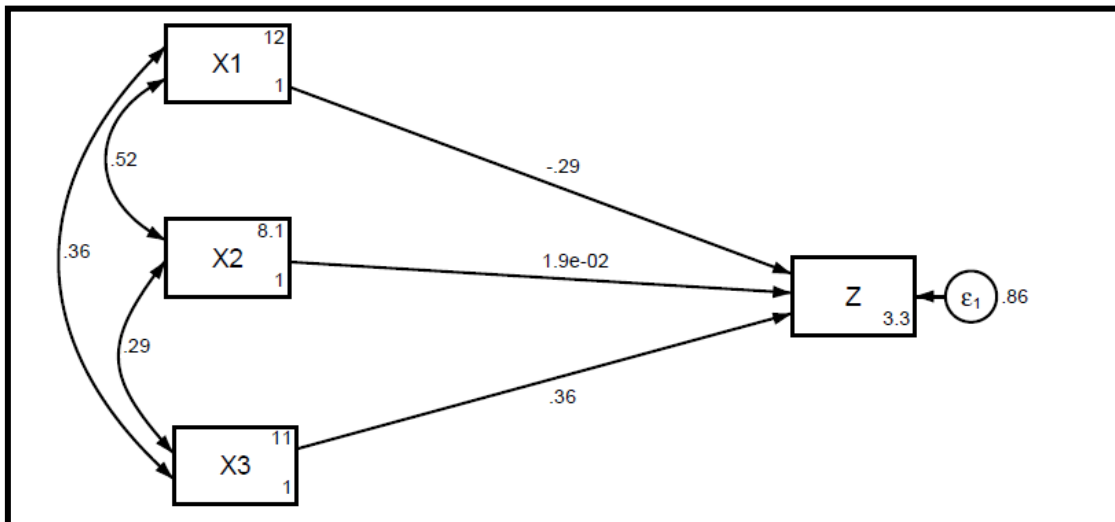


Figure no.(14),prepared by Stata statistical program

Direct effects without the mediator :

As noted , there is a significant relationship between Z and X₂ , X₃ and there is no significant relationship between Z and X₁ .

We see that both informational and human resource requirement have significant effects on logistics management effectiveness, but organizational requirements don't have significant effect. We meet our first goal of having statistically significant .

(2) fitting the model that includes the mediation term to identify the indirect relationship between logistics management requirements and logistics effectiveness as showed in figure no.(15) :

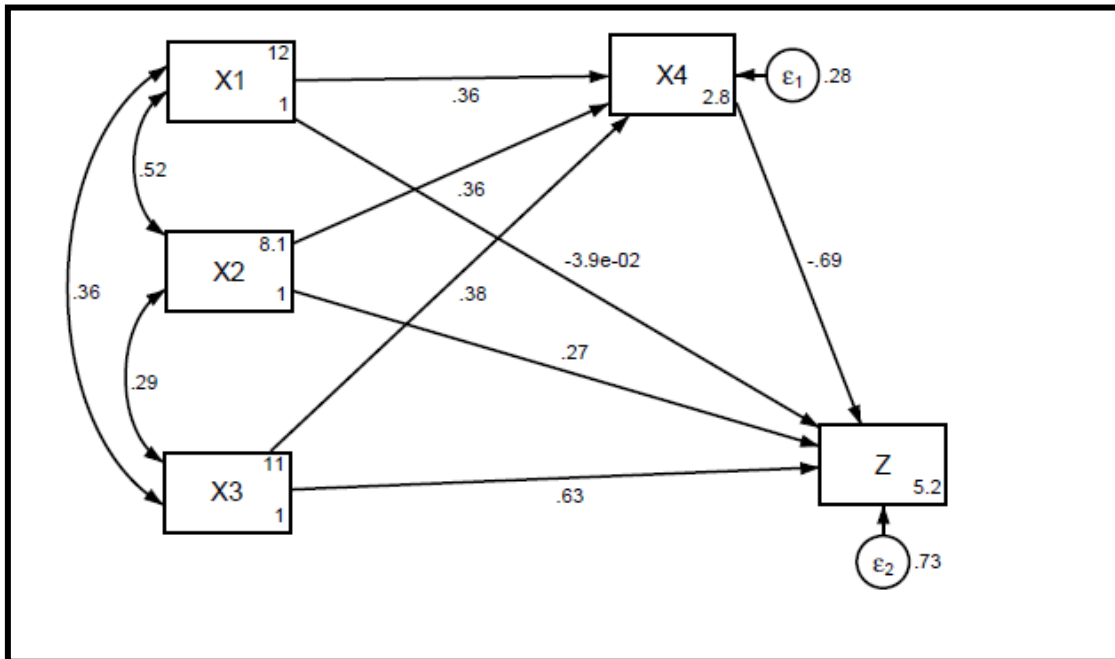


Figure no.(15)

We should investigate the direct , indirect by calculating the product of path coefficients and the total effect that is simply the sum of direct and indirect effect and we summarize these results in the table no . (19)

| Relationship | Direct effect | Indirect effect | Total effect | Type of mediation |
|---------------------------|----------------------|------------------------|---------------------|--------------------------|
| X₁ on z | -0.335 ^{ns} | -2.151 [*] | -2.486 [*] | Full |
| X₂ on z | 1.724 [*] | -1.603 [*] | 0.121 ^{ns} | partial |
| X₃ on z | 5.306 [*] | -2.210 [*] | 3.069 [*] | partial |

Table no.(19) ,Prepared by the researcher depending on Stata results.

(* significant at 5% , ns no significant)

We saw from the table the indirect effect of X_4 on X_1 is -2.151 and this is significant , indirect effect of X_4 on X_2 is -1.603 and this is significant , indirect effect of X_4 on X_3 is -2.210 and this is significant .

With these results , we can go back to our question of whether logistics practices in companies mediates the effect of logistics requirements and logistics effectiveness . using the rules for whether mediation is partial , full or in significant , we will first look at the effects of requirements on logistics effectiveness without controlling for logistics practices X_1 has no significant direct effect on logistics effectiveness

(-0.335^{ns}) , but there is a highly significant indirect relationship (-2.151*) , so it is full mediation , X_2 has significant direct effect (1.724*) and a significant indirect relationship (-1.603*) , so it is partial mediation , X_3 has a significant direct relationship (5.306*) and a small significant indirect relationship (-2.210*) , so it is partial mediation thus , we conclude that there is full and partial mediation where by part or full of the direct effect of logistics requirements on logistics practices .

Goodness of fit measures :

We should estimate the goodness of fit statistics for that model . In our study , we will depend on CD and SRMR for measuring goodness of fit .(kline,2011)

Concerning CD , (is a coefficient of determination) a perfect fit corresponds to a CD of 1. CD is like R^2 for the whole model CD for the model here is 0.79 show that the model is fit.

Concerning to SRMR(means the standardized root mean squared residual). A perfect fit corresponds to an SRMR of 0.**and here SRMR is 0.** This means it has a very good fit.

12- research results;

| No. | Hypotheses | Result |
|-----|--|---|
| 1 | There are significant differences between listed companies due to their managers' perception of logistics management concept. | We accept that hypothesis. |
| 2 | There are significant differences between listed companies according to the availability degree of the logistics management requirements . | We accept that hypothesis. |
| 3 | There is a significant effect of the availability of logistics management requirements and practices on logistics performance effectiveness. | We accept that hypothesis partially. |
| 4 | Logistics management requirements will be positively related to logistics management practices (LMP) | We accept that hypothesis. |
| 5 | Logistics management practices(LMP) will mediate the relationship between logistics management requirements and logistics performance effectiveness. | We support that hypothesis and accept it. |

Prepared by the researcher

13-research recommendations:

- **We can improve the performance of logistics activities by using the following recommendations :**
 - Training employees on modern techniques about the performance of purchasing, storage, IT technology and distribution activities and the orientation toward electronic purchasing and benefit from its advantages.
 - Setting database for suppliers that enable employees in purchasing department to collect sufficient information about all suppliers and material prices.

- Provision of proper storage environment that fit stored materials and providing devices necessary to keep materials and maintain accurate lists about raw materials .
- Supporting quality management department with information system that contains storage and transportation directions and assurance procedures to control quality of materials and selecting the appropriate inspection method of materials.
- Senior managers should redesign organizational chart for engineering industries sector companies where they collect subsystems formed logistics management system in one department called logistics management department and included material requirement planning, purchasing, storage, quality control, raw material inspection, handling materials, packaging, distribution and improving relationships with suppliers and customers so that they can achieve coordination and integration among all departments in each organization.
- Supporting logistics management department with transportation information system to develop its activities and providing information necessary about the nature of materials transmitted and its quantities, places transmitted to it and training employees on periodic maintenance and selecting recent , developed transportation methods.
- Supporting information system with network computing to relate logistics activities with all organizational activities that enable coordination and integration among all departments in each organization.
- I recommend the holding company for engineering industries to create information controlling agency to control companies and its main

missions that are: revising goals, policies, strategies and evaluating performance, continuous improvements, material requirement planning, purchasing ,storage and finally controlling quality and distribution.

From the field study and exploratory study the researcher made, the researcher resulted that there are a lot of problems and obstacles that meet companies when practicing logistics management in the public sector under research, so the researcher proposes some recommendations to improve the process of practicing logistics activities and creating managerial environment as the following:

1- Resistance to change problem from employees :

From statistical results, this problem has a mean of (1),so it need more support from top management , so that the researcher recommend of training employees and workers in organization to know recent approaches, systems and techniques via training courses and sessions and trying to spread the culture of accepting the change and recognizing the surrounding environment to enable workers to fit to environmental changes whether internal or external.

2- Lack of resources and financial possibilities:

From statistical results, this problem has a mean of (2),so it need some support and the researcher recommends of providing all physical and financial possibilities from computer devices , tools and machines for developing and creating recent systems such as: MRP, ERP, WMS to improve organizational performance.

3- The lack of experts and human skills:

From statistical results, this problem has overall mean of (3), so the researcher recommend to train employees on technical skills to use

computer and recent information systems via training courses to develop human resources and enhance their efficiency and also they should update evaluation and compensation systems to motivate employees and direct them toward the best.

4- The lack of sufficient support from suppliers problem:

From statistical results, this problem has overall mean of (3), so the researcher recommends the necessity of improving relationships with suppliers and setting effective system of communications with them and also developing programs for evaluating suppliers to determine who is the best for purchasing from them with long-term contracts.

From the field study especially interviews, it is viewed that there are some pitfalls in practicing logistics management activities as a mediator variable ,so the researcher recommends the following:

- The organization's managers should evaluate suppliers regardless of their reputation in market and should evaluate their commitment of receipt time, the required specifications and quality of materials and also they should support purchasing system with financial resources to use recent programs and trying to practice electronic purchasing.
- Organization's managers should train employees at purchasing , storage and quality control departments to improve their knowledge skills about organization's policies, economic and accounting information that aid them to work efficiently where the researcher noticed from interviews that there is a knowledge weakness of employees especially the company of EL-Nasr for metals & transport and engineering company.

- Searching for strengths and support them and searching for weaknesses that lead to work suspension then searching about solutions fit the quality, cost and timing so that they can provide materials just-in-time.
- Managers should develop handling machines, materials movement inside stores and fitting storage conditions with the nature of raw materials.
- They should inspect all raw materials when receipt them to match with purchasing order requirements and to assure from quality of them.
- They should support inventory system with efficient information system so that they can use the best systems of inventory control to make rigid decisions about calculating safety stock and economic ordering quantities(EOQ).
- They should develop and update documents, tools used in quality control procedures continually starting from supplying of materials to distributing and transporting finished product to the end customer.
- They should provide a unified system to transport raw materials from suppliers and also transporting finished products to distribution centers whether by contracting with a third party or purchasing vehicles or cars for transportation owed by the company(selecting on the basis of economic study).
- Senior managers should improve and enhance relationships with employees, customers and suppliers to achieve coordination and integration among all departments via using SRM and CRM approaches.

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