1st International Conference

of the

Transportation Department

Faculty of Engineering, Alexandria University

Towards better Environment

14 th - 16 th , April 1992

Final Report

Alexandria, Egypt

TRANSPORT AND THE INDUSTRIAL DEVELOPMENT IN NEW CITIES IN EGYPT (A CASE STUDY)

by

Dr. Khaled A. Abbas[1]
Prof. Dr. Abdel Gawad Bahgat[2]

National Institute of Transport
P.O. Box 34 Abbassia, Cairo, Egypt
Tel: Int + 202 2604903

ABSTRACT

The main objective of this study is to gain a general insight into the development process of new cities in Egypt and, in particular, into the role played by transport. To achieve this, a questionnaire survey was designed and sent to the industrial enterprises in two of the new cities in Egypt, namely Tenth of Ramadan and Sadat new cities. The questionnaire responses were analysed using nonparametric statistical tests.

The main purpose of the analysis of data obtained from the questionnaire responses is to understand and infer, in statistical terms, the way in which industrial enterprises in new cities in Egypt perceive the role played by transport in their choice of location, progress and development. The other purpose is to identify and establish, in statistical terms, the relative importance of factors considered necessary to foster the development of industrial enterprises in new cities in Egypt.

The most important conclusions inferred from the questionnaire analysis is that managers of industrial enterprises considered transport accessibility to be one of the significant factors in their choice of location. However, transport in general is not perceived by the industrial enterprises to be a source of problems in their future development and progress.

1. INTRODUCTION

The significance of transport lies not only in the services it renders, but even more in the stimulating influences it exerts on economic activities. Investments in transport are expected to contribute to the development of new cities. In newly developing regions, causal, dynamic, feedback relationships exist between elements of development such as transportation, population, housing and the economy. For new cities, particularly, the provision of transport is foreseen to have a significant influence on attracting industry, resettlement of people and the availability of labour.

Unless new cities attract people in sufficient numbers, they certainly will not survive in a positive, contributory way. The scope for dispersal of population to new cities depends, largely, on the ability to create employment opportunities, and to provide adequate housing.

The industrial sector is usually the prime determinant of the growth of new cities. Attracting new industries will require substantial investment to overcome the economic development constraints of the desert regions where the new cities in Egypt are located. It follows that the provision of locational incentives stimulates the development process in new cities. Transport is considered to be one of the key elements that encourage industry, and hence population, to relocate, settle and use the available land area in the desert.

---

(1) Lecturer at the National Institute of Transport
(2) Director of the National Institute of Transport

2. OBJECTIVES OF CONDUCTING A SURVEY

'If there is a causal relationship between changes in transport supply and industrial development, it should be identifiable by various symptoms in specific geographical zones...one based on how development phenomena are perceived by economic agents' (ECMT, 1975). The need to conduct a survey among the industrial enterprises in new cities in Egypt was perceived. The main purposes of conducting the survey and analysing the questionnaire responses are:

1. to investigate, understand and statistically infer the way in which the managers of industrial enterprises in new cities in Egypt perceive the contribution of transport, amongst other factors, to their choice of location, progress, development and promotion; and
2. to gain a general insight into the development process of new cities in Egypt and, in particular, into the role played by transport.

3. STEPS TAKEN IN CONDUCTING THE SURVEY

Before designing the questionnaire, site visits, interviews, discussions, and an examination of published studies and government reports, were carried out to identify the different factors and problem areas thought to affect the development of industrial enterprises in new cities in Egypt. These factors constitute the core of the questionnaire. These include: lack of demand, shortage of transport facilities, high costs of transport, market competition, shortage of foreign currency, shortage of raw materials at source and others. The following represents the main steps undertaken to conduct the survey.

3.1 Pilot study

The pilot study included visits to two of the new cities in Egypt, namely Tenth of Ramadan and Sadat new cities. During these field visits, a preliminary questionnaire was introduced to some industrial enterprises in both cities. Few interviews with some of the work force were also conducted. A feeling for the services, utilities and general structure of the new cities was achieved. Visits to the new cities' municipalities also took place, where interviews were held and basic data and information about the new cities were collected. The preliminary interviews, with managerial personnel of some of the industrial enterprises in the two new cities, showed that the questionnaire needed to be refined, adjusted and, most importantly, shortened. These interviews also showed the difficulty encountered in arranging and conducting personal interviews, specially if no previous contacts with the managers exist. Further more, it was felt that a lot of the background information required could be attained from the new cities' municipalities and other official government authorities.

3.2 Field study

Based on the previously stated objectives and the insight gained from the pilot study, a final questionnaire was designed for the industrial enterprises in the two new cities. Two questions are presented in Figure 1 as a sample of the questionnaire. The response to these two questions is discussed in detail later in the paper. A decision was made to mail the questionnaire, rather than to conduct the survey as an interview. The questionnaire was mailed with a mail back (i.e. stamped self-addressed) envelope to all of the industrial enterprises that have their mailing addresses available.

4. STATISTICAL ANALYSIS

4.1 Sample representation of population

Table 1 shows the details of the number of questionnaires distributed and the level of response. The response rate to the questionnaire survey is considered acceptable when compared with other similarly conducted studies. Also, it is generally recognised that in developing countries this type of survey is not common, and the willingness of people responding to such exercises is, still, relatively low.

Table 1 : Sample size and response rate in relation to total surveyed population

Survey Details / Sample Representation	Tenth of Ramadan New City	Sadat New City	Tenth of Ramadan & Sadat New Cities
Number of mailed questionnaires	156	40	196
Number of questionnaires returned due to inability to locate addresses	53	5	58
Number of remailed questionnaires to other available alternative addresses	24	0	24
Net number of mailed questionnaires	156-53+24=127	40-5+0=35	162
Number of responses	41	18	59
Ratio of sample size to population	41/156=0.26	18/40=0.45	59/196=0.30
Ratio of sample size to actually mailed questionnaires	41/127=0.32	18/35=0.51	59/162=0.36

(*) Questionnaires were mailed during the month of May, 1989.

(*) A receiving period of approximately six months time was allowed i.e. May to December, 1989.

4.2 Main conclusions from the statistical analysis

All statistical tests were performed using the Statistical Packages For Social Sciences (SPSS-X) software. The following represents a summary of the main conclusions from the statistical tests.

1. The descriptive statistics representing the patterns of responses of the cardinal parameters of the questionnaire and indicating the central tendencies of the responses (mean and standard deviation) reveal that more than a third of the population that work in the industrial enterprises are still resident in the Delta region. While the new cities attract just about a third of the work force to settle in them, Cairo still has around a third of the work force living in it. The rest of the regions have an insignificant percentage of the work force living in them.

2. The results of significance testing of the distribution of responses for the categorical parameters of the questionnaire (binomial test, chi-square test and Kolmogrov-Smirnov test) show that, in most cases, the null hypothesis of uniformly distributed responses may be rejected i.e. it is statistically plausible to reject the assumption that each category of answers would have the same expected frequency of occurrence.

3. The results of significance testing of the distribution of responses for the cardinal parameters of the questionnaire (Kolmogrov-Smirnov test) show that, in most cases, the null hypothesis of normally distributed responses may be rejected i.e. it is statistically plausible to reject the assumption that each category of answers would have an expected frequency of occurrence in accordance with a normal distribution. This means that the results of subsequent (t) test have to be treated with caution, as this test assumes that the tested parameters can be described by the normal distribution.

4. The results of significance testing of the hypothesis of no difference in responses between Tenth of Ramadan and Sadat cities (chi-square test, Wilcoxon-Mann-Whitney test, Kruskal-Wallis test and t-test) indicate that for most of the parameters of the questionnaire there is no significant, statistical difference in the responses between Tenth of Ramadan city and Sadat city.

5. The results of significance testing of the hypothesis of no agreement among respondents (Kendall coefficient of concordance) show that for most questions of the questionnaire, it is statistically plausible to reject the hypothesis of no consensus, regarding the rankings.

6. The main statistical conclusion inferred from all the measures for testing the association/collinearity between questionnaire parameters (phi coefficient, lambda statistic, gamma statistic, Sommer's index and Pearson correlation coefficient), is that there exist no strong collinearities between the responses to parameters that constitute the questions of the questionnaire. Most of the values of the statistical coefficients, for measuring the association between parameters, ranged between 0 and 0.5 which signifies a weak correlation. Thus no bias is expected to have influenced the reported statistical tests or distorted the conclusions and statistical inferences obtained from performing these tests.

5. DIAGRAMMATIC REPRESENTATION AND VERBAL INTERPRETATION

Diagrammatic indication of the responses of the industrial enterprises to two of the questionnaire questions is presented through the use of bar charts. These bar charts demonstrate two different responses, namely:

(a) responses from industrial enterprises in Tenth of Ramadan new city; and
(b) responses from industrial enterprises in Sadat new city.

In viewing the bar charts, with the exception that "no rank" is coded "0", note that rank "1" signifies the highest degree of importance, in relative terms, given to the respective parameter. When there is "no rank" occurrence, there exist two interpretations to explain it. The first is that a respondent did not have enough information and knowledge to rank the particular parameter; the second is that the respondent did not consider the particular parameter to be important enough to be ranked. In this study the second interpretation was considered to be more plausible. This is mainly due to the high number of the no rank occurrences for specific factors and parameters that were originally expected to have a low level of importance from insights gained from the field study.

5.1 Determinants of the choice of location by industrial enterprises

The concept of transportation as being one of the main determinants of the choice of location by industrial enterprises is well established in the literature on economic development. Owners and managers of industrial enterprises, when choosing an area in which to construct and develop their enterprises, trade off and evaluate different site locations according to a set of criteria. Figures 2 and 3 display the importance of reasons for choosing the Tenth of Ramadan or Sadat city as the location for a particular industrial enterprise. It is clear that factors like distance to Cairo and basic accessibility are considered of the most important factors by industrial enterprises, when making their location decision. These two factors are followed, in an inter-changeable manner, by the abundance of land, the price of land and the availability of industrial services. It also seems that the distance to Alexandria, mobility, and the two factors related to industrial enterprises being captive to a particular location, are all not valid enough reasons to be taken into account. Labour availability has an effect, though relatively weak, on the choice of location by the industrial enterprises in new cities. In the space left for the respondents to state other factors of importance in their choice of a new city as the location of their respective industrial enterprises, many stated that the ten years free taxation, offered by the government, represents a very attractive incentive.

5.2 Problems encountered by the industrial enterprises

Figures 4 and 5 show the ranking of the seriousness of problems encountered by the industrial enterprises in the new cities. The main problems are basically concerned with the shortage of foreign currency, the lack of demand, and the difficulties encountered in making raw materials available. The only problem mentioned in relation to the work force is their shortage, not in absolute numbers, but rather in the relative numbers of skilled and trained workers. The transport elements of accessibility and mobility are perceived as insignificant to industrial enterprises. In Egypt, and mainly due to government policy, transport prices have been permitted to deviate from their true economic value, and consequently there may be a divergence from economic efficiency objectives. Transport tariffs and user charges have been maintained at a low level for a number of reasons,

which include the desire to strengthen the competitiveness of exported commodities on the world market, and to hold down the cost of raw materials deemed important for the economy. In the space left for the respondents to state other problems they think are of relevance, the most common statement is that there is a general lack of services in the new cities, like police and fire stations, parks, banks, government, telephone services, clinics, consumer goods, etc. It is quite interesting to note that in spite of the difficulties that the new cities face in accommodating their population, which are mainly industrial workers, the industrial enterprises perceive housing not to be a major factor that might cause any serious problems to, or constrain, the process of industrial development. This means that the industrial enterprises have no incentive to contribute to the housing supply. They view the housing of their employees as the problem of the government, rather than their problem. Although the present housing situation is not perceived to cause any serious difficulties to the existing industrial enterprises, it might create unfavourable conditions in future, both for government as well as for industrial enterprises. It is to be noted that since the time the survey was conducted, a set of government policies aiming at improving the economic environment has been issued. One of the main consequences of these policies is overcoming the problem of scarcity of foreign currency.

6. CONCLUSION

The analysis has shown that approximately two thirds of the work force of the new cities' industrial enterprises still live in either the Delta region or the Great Cairo region. It seems that the population migratory movement to new cities is very unsatisfactory compared to the original plans, or to the actual growth of industry. The alternative for settling in the new cities is for the workers to commute on a daily basis. As a result, daily commuting to new cities seems to be currently at a relatively high level. The problems that can be created by the daily commuting of workers include: exhaustion of workers leading to inefficiency in performance, and loss of time as a result of possible delay encountered in travelling, and increasing risk of traffic accidents.

It seems that a main reason behind such large numbers of the work force not settling in the new cities, is the deficiency in the provision of housing units in the new cities at prices that they can afford, relative to prevailing average income levels of ordinary industrial workers. The solution to this problem is to modify future plans so as to construct more housing units that are of an appropriate type, and to offer these units within a range of prices that is affordable for the employees working or expected to work in the new cities. Alternative types and qualities of housing should be designed to suit the different social characteristics of migrants to the new cities. The price/rent of housing units should also be in line with the living standards of the members of the work force. This set of policies would help to close the gap that exists between the rapid development of industrial enterprises, and the relative stagnation of the housing sector.

Another important issue pertaining to the provision of housing units is related to the system by which an industrial enterprise lets housing units to its work force. If a worker is to leave his/her job, he/she should vacate the unit. This creates a feeling of insecurity and unsettlement among the work force in the new cities. Added to this, is the problem that many housing units have already been bought, yet their owners are not living in them for one reason or another. This in turn increases the idle housing stock of new cities. Hopefully, these problems could be tackled in the future by careful thinking of suitable legislation to avoid the occurrence and repetition of such situations.

The most important conclusions inferred from the questionnaire analysis is that managers of industrial enterprises considered transport accessibility to be one of the significant factors in their choice of location. However, transport in general is not perceived by the industrial enterprises to be a source of problems in their future development and progress. It may be that the managers take for granted the continued existence of a high quality road network.

In new cities, it is almost inevitable that the road infrastructure is one step ahead of other types of development, like industry and housing. Road accessibility is a key factor in attracting industries to locate in the new cities. Any visitor to the new cities could easily

notice the abundance of the road infrastructure and its idleness. Scarce capital resources invested in constructing the road network are lying idle. The opportunity cost of this idle investment is significant as the government is striving for enough resources to carry out the rest of the major developments in the new cities. It is important to avoid too much and too early investment in the road infrastructure. The concept of balanced growth should be pursued. Over-capacity, due to excessive investment producing under-utilised road infrastructure, and under-capacity, due to insufficient investment as with the deficiency in the housing sector, should be avoided.

At present, most of the daily commuting and travelling patterns to or from the new cities are of the work type of trips. The questionnaire analysis revealed that the industrial enterprises in the new cities rely mainly on their own means of transportation for providing the necessary mobility for their work force. There is a number of public buses that connect Tenth of Ramadan new city, both to Cairo and Bilbeis. These are provided by the General Nile Bus Company for East Delta. Another set of public buses are provided under the auspices of the General Nile Company for West Delta and the General Nile Company for Mid Delta for connecting Sadat new city to Cairo and the West Delta governorates. However, it became apparent from interviewing the local operators of these bus companies, that the provision of public transport (buses) is not sufficient to meet the demand for travelling between new cities and these regions. It is recognised that, both in terms of urban and regional mobility, the number and the frequency of buses should be increased, and the periods for working these buses should be extended to cover more hours of the day.

REFERENCES

Abbas, K. A. (1991) The development of a road management system with particular reference to new cities in Egypt: An application of System Dynamics methodology. Ph.D. Thesis. University of Newcastle upon Tyne, U.K.

European Conference of Ministers of Transport (ECMT) (1975) Impact of infrastructural investment on industrial development. Report of the Twenty-Fifth Round Table on Transport Economics. Paris, France.

SPSS Inc. (1988) Statistical packages for the social sciences, SPSS-X user's guide. Third Edition.

Rank the following reasons as considered for choosing Tenth of Ramadan/Sadat new city as a location for the industrial enterprise.

Reasons for the industrial enterprise locational choice	Rank
Only available choice at the time	
Chosen by government agencies	
Short distance to Cairo	
Short distance to Alexandria	
Easy accessibility	
Good mobility	
Availability of labour	
Easy to acquire a whole piece of land	
Cheap price of land	
Availability of industrial services	
Other reasons	

Rank the following elements according to the seriousness of problems, (if any), encountered by the industrial enterprise in dealing with them.

Elements	Rank
Work force	
Main raw materials	
Road infrastructure (accessibility)	
Transportation facilities (mobility)	
Markets' demand	
Foreign currency	
Housing	
Water supply	
Power supply	
Other elements	

Figure 1 : Two questions of the final questionnaire to the industrial enterprises in Tenth of Ramadan / Sadat new cities .

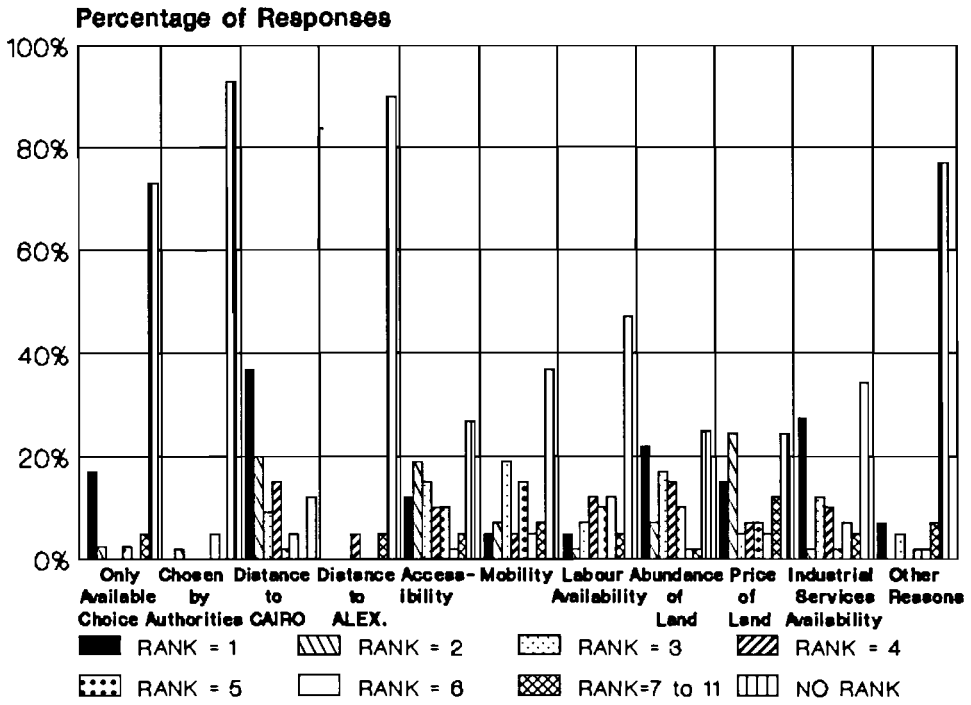

Figure 2 : Reasons for choosing Tenth of Ramadan new city as a location for the industrial enterprises

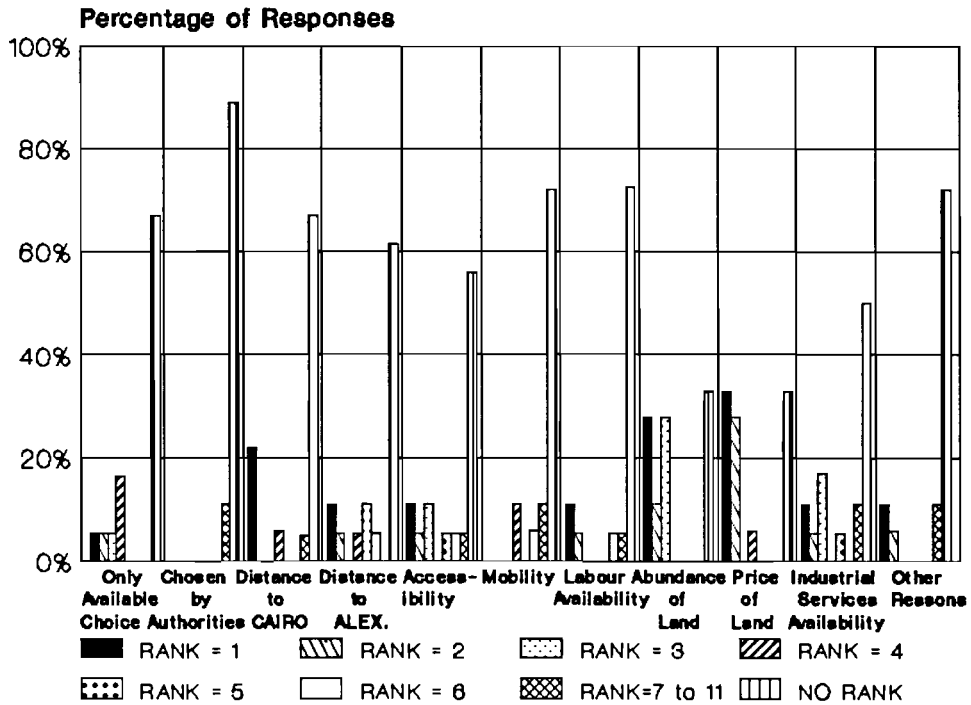

Figure 3 : Reasons for choosing Sadat new city as a location for the industrial enterprises

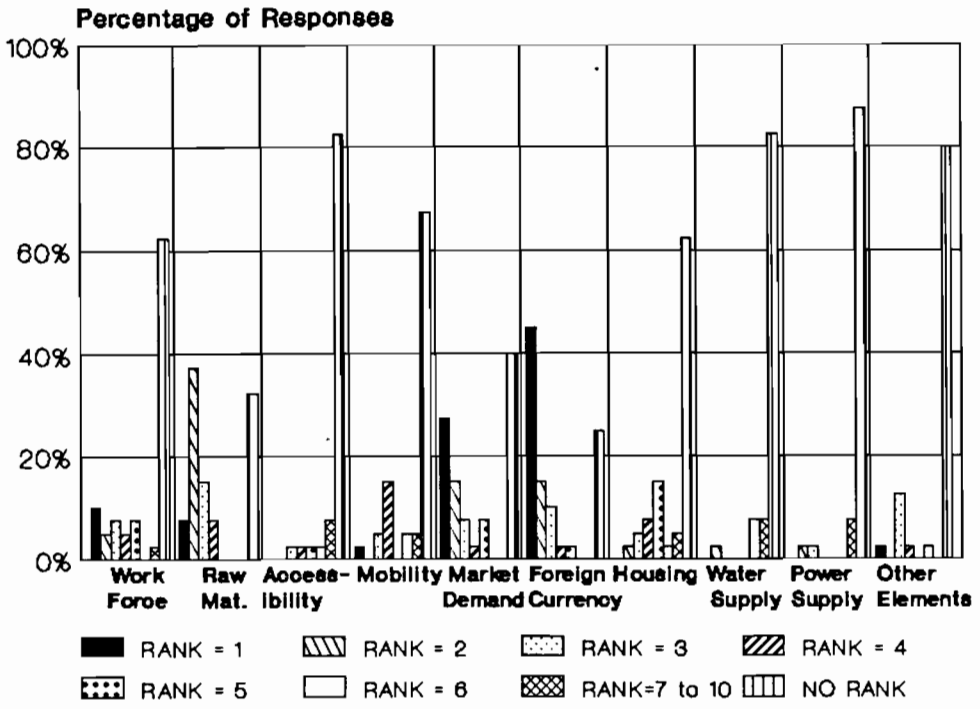

Figure 4 : Seriousness of problems encountered by the industrial enterprises in Tenth of Ramadan new city

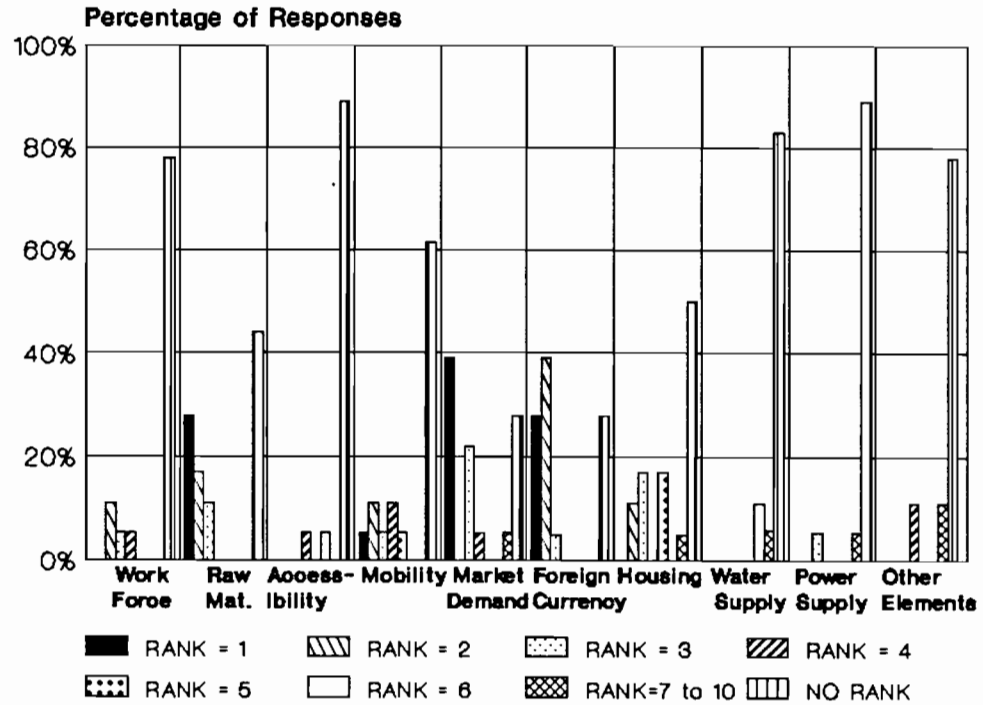

Figure 5 : Seriousness of problems encountered by the industrial enterprises in Sadat new city