

NETWORK ANALYSIS: A NEW APPROACH FOR EVALUATION OF INDUSTRIAL OPERATIONAL PLANS (STUDY OF TEXTILE INDUSTRY & CLOTHING OF IRAN)

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Abstract

"Network Analysis" is a new approach which its main focus is on the relations among actors, not individual actors and their attributes in order to discover the gaps, overlaps, isolations, pendants and centralities in networks. As a result, this approach could be useful for "evaluation". "Evaluation" is one of the most important stages of Strategic planning and some failure in operational plans is just due to some inappropriate pre and post evaluations. Preparing operational plans as a guideline for governments is another important stage of strategic planning and management. Hence, pre and post evaluations of these plans lead to prevent changes in strategic plans and increase the time and money saving. In Iran, according to industrial plan development and in order to privatization, some industries such as textile confront some strategic problems. In this regard, we prepared an operational plan for textile industry of Iran including important strategies, problems, plans and activities and the organizations responsible to execute each activity by Hoshin Kanry Model. Then, we used Network Analysis to delineate and analyze this strategic management network in which nodes are considered as organizations and relations are viewed as their collaborations in the same activities. UCINET, Netdraw Softwares, and centrality measures were

used for analyzing and visualizing the plan. The end results showed that Network Analysis is a useful approach to pre and post evaluation of operational plans and helps planners and managers to discover the strengths and weaknesses of strategic plans.

Keywords: Network Analysis, Operational Plan, Strategic Planning, Textile Industry

JEL Classification: D78

1. Introduction

One of the main stages of strategic planning in organizations is policy making and then an operational plan is prepared to make implementation of the policy easier in practice. The phenomenon 'implementation' policies has been a matter of concern and, to some extent, academic study have been done on it.

The implementation problem can be defined in two basic ways (Stoker 1983): The first is on problems of organizational management and the second is a conflict of interest in the process, thus "[m]anagement of potential [interorganizational] conflict would be an essential part of the policy making process . . ." (Stoker 1983, 7). One reason is insufficient attention to the existence of a systemic view in designing relations among organizations (agent) responsible for the policy implementation. In this regard, evaluation of operational plans in terms of power and authority distribution among organizations and the whole captures from these relations is in great importance, but this systemic view is often ignored which causes undesirable outcomes --sometimes changing policy during implementation process (Cline, 2000).

"Network Analysis" as an empirical tool has been one of the major innovations in the social sciences in the last 30 years and is used in different contexts and for different purposes. This article will explore its use in the context of policy evaluation before being implemented in practice. In the last decade, the Policy Network Analysis has become particularly prominent in the analysis of public policies (Brandes et al. 2003; Borzel, 1997; Kenis & Schneider, 1991). In contrast to other policy analysis approaches, this approach has a much more realistic perspective of how policies develop, and considers policies principally as a result of a collaboration of a differentiated set of actors (public and private, local, regional and national, etc.). Also it conceptualizes policy-making as the result of interactions between policy- actors, and assumes that the structure of these interactions explains policy outcomes (Brandes et al. 2003; Brandes et al., 2005).

Almost two decades of research in public policy using the concept of policy network has resulted in considerable output. Moreover, the policy network concept has followed and largely replaced the framework of corporatist interest intermediation (very popular in the 1970s and 1980s in Europe) as a more general analytical framework. The policy network concept has widely been used in the 1990s to analyze policy making within the European Union (Borzel, 1997). Network Analysis has been applied in the analysis of policy making in many different industrial sectors such as nuclear energy (Zijlstra, 1979), chemicals and telecommunication (Schneider, 1992), and policy fields such as environmental (Hassanagis, 2004; Carpenter et al., 2003; Daugbjerg, 1998; Steward & Conway, 1998; Lenschow, 1997; Richardson, 1997) or science policy (Grande & Peschke, 1999). But no attention paid to evaluate policy especially to evaluate before implementation.

This paper evaluates the operational plan of textile industry in Iran which its main strategic focus is based on Hoshin Kanry Model, using Network Analysis approach to answer three following questions:

- 1- Was there a systemic view during operational planning of the textile industry in Iran?
- 2- Whether or not the power and authority distribution among organizations responsible for implementation has done properly.
- 3- Is the network analysis approach a useful tool for policy evaluation or not?

2. Basic concepts of network analysis approach

Network Analysis is a new approach to solve social, managerial, political and ... problems. Three reasons have led to success of Network Analysis as a paradigm and an empirical tool. First, concepts were based on relations rather than attributes. By concentration on their attention to the ties between social entities, rather than to the quantities possessed by them, they force social scientists to think in terms of constraints and options that are inherent in the way social relations are organized. Network Analysis is therefore based on anti-categorical imperative, which rejects all attempts to explain human behavior or social processes solely in terms of categorical attributes of actors, whether individual or collective. Two basic components of Network Analysis are a set of objects (called nodes, positions, or actors) and a set of relations among these objects (called edges, ties, or links) (Knoke, 1990). Network Analysis is not a neutral statistical method, nor is it a theory. It is an empirical tool to describe social structure on the basis of relations between social entities (Kenis & Schneider, 1991). Based on this

toolbox, the principal achievement of Network Analysis has been to transform a merely metaphorical understanding of the embeddedness of actors in networks of social relationships into a more precise and usable tool for social analysis (Raab & Kenis, 2003). Three important concepts used in the analysis are as follows:

- 1- Degree Centrality:
- 2- Betweenness centrality: grouping

Degree centrality is the number of direct connections a node has. Betweenness centrality defined as the sum of the ratios of shortest paths between other actors that an actor sits on. An actor with high betweenness centrality is between many actors in terms of shortest paths (Krebs, 2008; Mueller et al., 2007; Brandes et al. 2003; Freeman et al., 1991).

3. What we did

An operational plan, as its name shows, is a guideline for government's operations and is used to implement the objectives and policies in a legal and functional context. Different methods in the literature are used to prepare an operational plan. (the operational plan of textile industry in the 4th National Development Plan Document of Iran is based on Hoshin Kanry Model. The main purpose of this approach is to systemize the change management of critical processes, so a systemic view is the basis of the work. The final result of applying Hoshin Kanry Model is a list of macro and micro problems and obstacles exist in the textile industry of Iran which are as followings:

Weak mutual relationship between governmental and private entities in macro and technical decision makings, the low level of productivity, inefficiency in policy making and decision making system to improve textile industry, weakness in the process of exporting products, disorders in the system of tariff determination for textile products, nonexistence of a specific criteria for pricing petrochemical products, false view of senior managers to textile industry, the low quality of imported products, inefficiency of workforce law, inappropriate attention to research and development and nonexistence of the strategy of export .

The next stage was to determine the organizations and entities responsible of, or monitoring those problems and obstacles.

In order to answer to the research questions, the network analysis approach is applied to visualize and analyze the relationship of network of organizations which must cooperate together to solve (as a responsible or a monitor) a defined

problem or obstacle. For this purpose, organizations are considered as the rows of a two mood matrix and problems and obstacles as columns. Then single mood matrix of organizations is calculated to determine which organizations cooperate more with each other and which organizations have more centrality and power as well as better position because of more cooperation with other organizations. Then, degree centrality and betweenness measures of each organization are calculated and the cut points are determined.

4. Findings

Figure 1 represents the arrangement of single mood matrix of organization - organization that implies the appropriate congestion of relationship among related organizations. As we see there is no part in the network without connections with other parts and no organization is apart from others. So we can conclude firmly that a systemic and net view has been used during the preparation of this operational plan.

Figure 1: the arrangement of single mood matrix of organization - organization

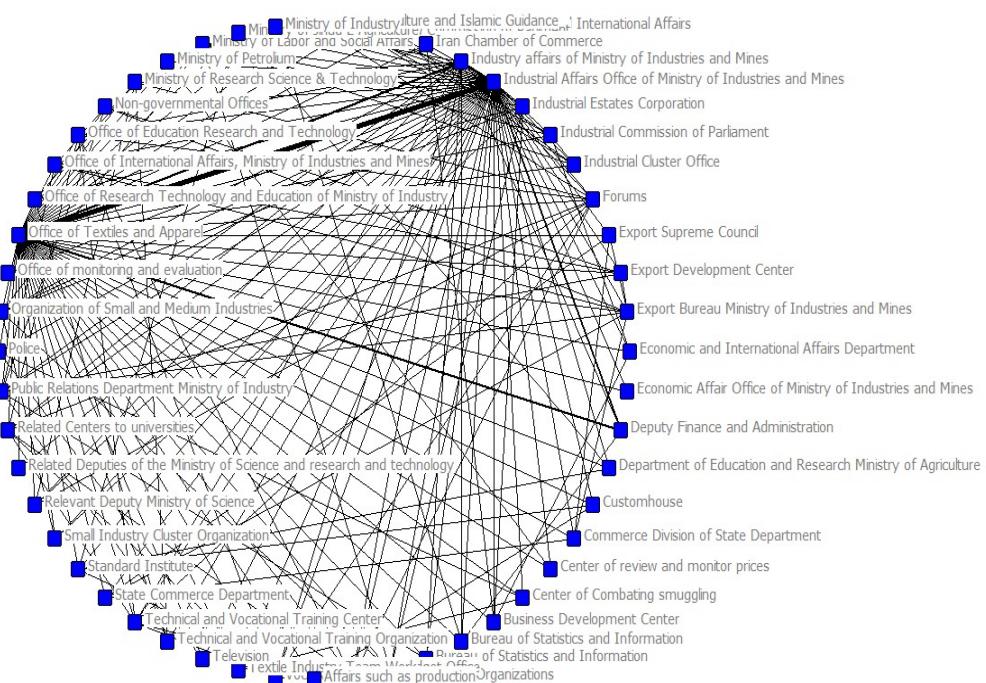


Figure 2 shows that “Industry Affairs of Ministry of Industries and Mines” is the only cut-point of the network. In this regard, if this organization was omitted, the network would be segmented into two separate parts. Also, most of the connections are seen between this organization and the Office of Textiles and Apparels in Ministry of Industry and Mines. “Technology Planning and Development Department” and “Deputy Finance and Administration of Ministry of Industry and Mines” each has several connections with those the above mentioned organization and office. Other organizations are approximately in the same position.

Figure 2: representation of the cut-point (the blue circle) and the strength of connections (the thicker, the stronger)

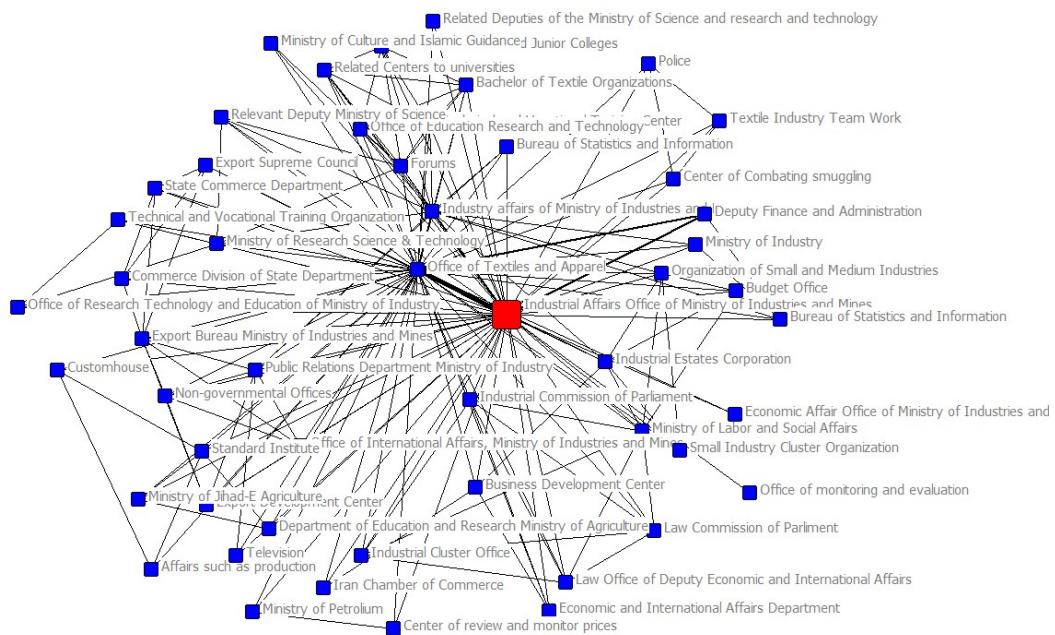
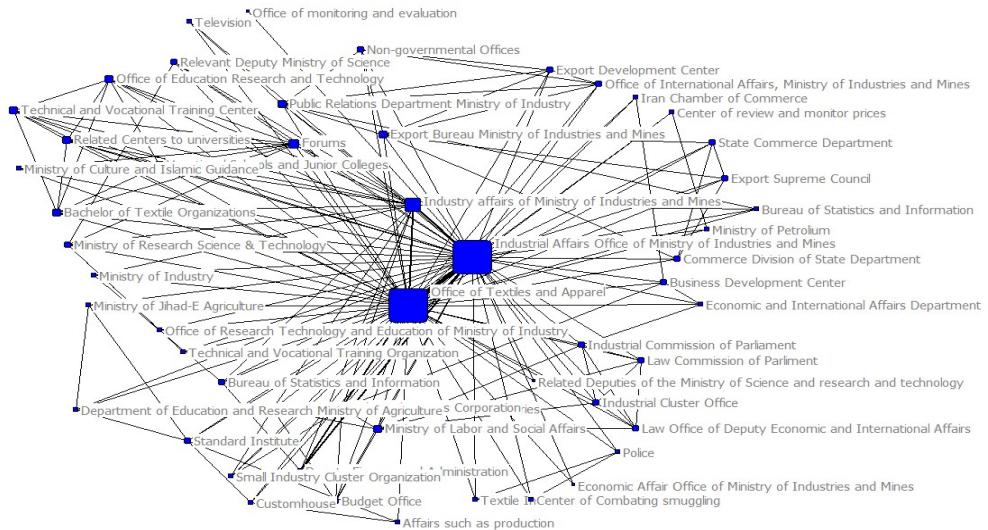


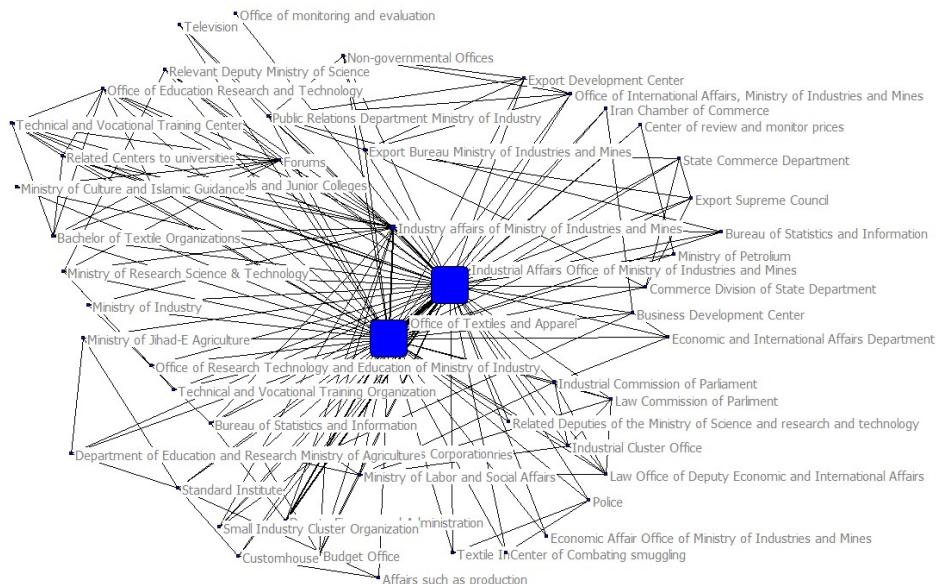
Figure 3 represents degree centrality of the organizations. The most centrality degree belongs to “Industry Affairs” and the “Office of Textiles and Apparels in Ministry of Industry and Mines”. “Technology Planning and Development Department” of the ministry is in the second place and then other organizations are more or less in the same position. In this regard, we can say that power is distributed similarly in terms of degree centrality among all related organizations.

Figure 3: representation of the degree centrality of the organizations (size of the circles is according to degree centralities).



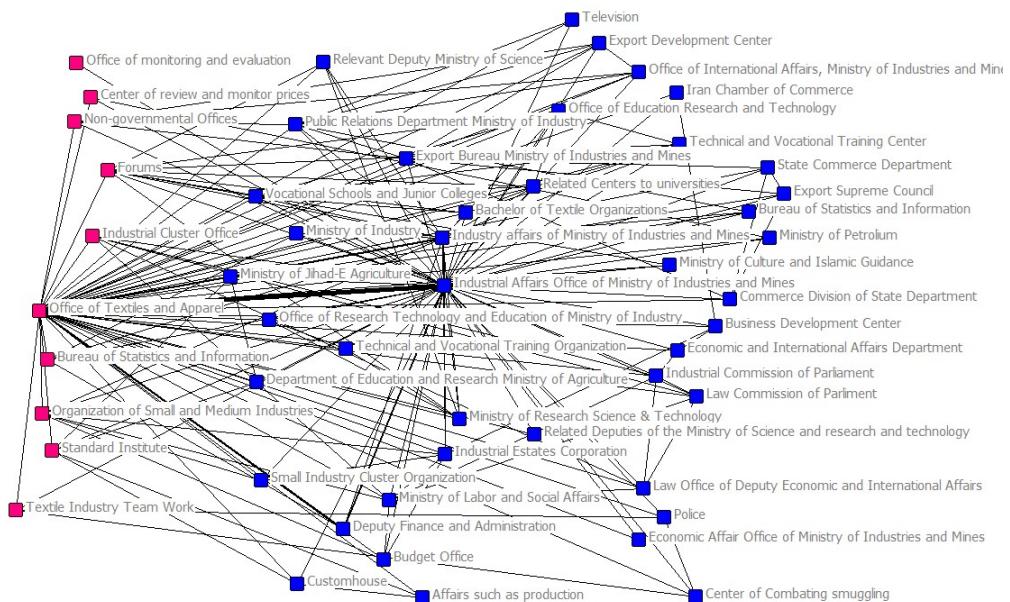
As depicted in figure 4, “Industry Affairs” and “Office of Textiles and Apparels in Ministry of Industry and Mines” have the most betweenness centrality; this means that they are among several organizations and others are in the same position.

Figure 4: Betweenness centrality (size of the circles is according to Betweenness centralities)



In figure 5 the relationships among responsible and monitoring organizations are depicted. This picture shows that organizations and entities which their surfacing is planning and over sighting are put in supervisory positions and it is one of the strong points of this operational plan. (e.g. “the center of review and monitor prices”, “Technology Planning and Development Department of Ministry of Industries and Mines” and the “Bureau of Statistics and Information” of this ministry). We can also see that the two major and central canons of the power in this network- “Industry Affairs” and “Office of Textiles and Apparels in Ministry of Industry and Mines”- are considered in the supervisory position. It shows a good point of the operational plan because most of the weaknesses exist in /// of our country is just the result of insufficient power of supervisory organizations. In fact, insufficiency of power in supervisory organizations which is resulted from inappropriate position and insufficient degree and betweenness centrality of them in policy making networks often cause these organizations not be able to examine or evaluate the process of implementation policies in public policy making activities properly.

Figure 5: representation of the relationships among responsible (in the right side: blue points) and monitoring organizations (in the left side: red points)



Finally grouping order is used to determine which organizations are categorized in the same group in terms of the position of having the same connections with the

same organizations. Based on this analysis some departments of Ministry of Industries and Mines such as Industry Affairs, Office of Textiles and Apparels in Ministry of Industry and Mines, Office of Research Technology and Education of Ministry of Industry, Affairs such as production, Business Development Center, Economic Affairs, and Forums are listed in one group. On the other hand, Oil Ministry , Ministry of Industries and Mines, Islamic Republic Iranian Broadcasting (Television), Export Supreme Council, Commerce Division of State Department, Center of Combating Smuggling, Center Review and Monitoring Prices, Iran Chamber of Commerce, and Industrial Cluster Office are located in other group. In the last group, Department of Education and Research of Ministry of Agriculture, Vocational Schools and Junior Colleges, Ministry of Culture and Islamic Guidance, relevant university centers, Bachelor of Textile Organizations, Technical and Vocational Training Organization, Office of International Affairs in Ministry of Industries and Mines, the relevant deputies of Ministry of Research, Science & Technology, and Ministry of Labour and Social Affairs are formed.

The results of grouping indicate that all organizations in the same group have less or more the same responsibilities which imply a systemic and a net view dominant on the plan. Also, they show that full attention must be paid to put the same organizations to the same positions with the same relationships, the point that always is ignored in most of the policies and operational plans and just some connections without netted connections are represented.

5. Conclusions

This paper evaluated the operational plan of textile industry in Iran which its main strategic focus was based on Hoshin Kanry Model, using Network Analysis approach. The final result shows that while preparing the operational plan of textile industry of Iran, a systemic and netted view was dominated; power is distributed similarly among organizations and all of them are involved adequately to the policy network of organizations responsible or supervisor to remove obstacles and to solve problems and all have sufficient connections with other organizations in the network. Furthermore, organizations with the same organizational responsibilities are in the same positions. Therefore, it can be claimed that the operational plan is applicable in practice but it doesn't mean that there is no need for further evaluations during or after implementation process. On the other hand, the recent research shows the capability of Network Analysis Approach in evaluating policies and operational plans before, during or after implementation.

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