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EVALUATING THE APPLICATION OF ERA-BASED CELLULAR PLANNING FOR THE DEVELOPMENT OF IRANIAN STEEL INDUSTRY IN A CASE STUDY OF MOBARAKEH ISFAHAN STEEL COMPANY

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Resumen: El presente estudio busca examinar y evaluar la posibilidad de emplear la gestión estratégica con el enfoque de celulares basados en Era para la industria siderúrgica iraní en general y para la empresa Mobarakeh Isfahan Steel en particular. Así, al examinar los activos disponibles y la situación actual y también las fortalezas y debilidades del complejo, utilizando el conocimiento y la experiencia de profesionales calificados, se diseñaron y explicaron un conjunto de escenarios aconsejables para el desarrollo de Mobarakeh Isfahan Steel Company considerando la Las hipótesis que presiden sobre las tres era de la acción, el futuro deseable, y el futuro ideal, que seguirá. La presente investigación es cualitativa y la técnica utilizada en ella es el análisis temático y los resultados de las 21 entrevistas con los profesionales de este campo eventualmente llevan a la conclusión de 31 temas fundamentales y 10 temas principales. También para cada época 4 escenarios y en total 12 escenarios recomendables fueron diseñados para las épocas de la acción, futuro deseable, futuro ideal y cada escenario se le dio un nombre simbólico. Los 12 escenarios son por orden: acero integral, acero creativo, acero coherente y realista en la era de la acción, acero de apoyo, acero interactivo, acero localizador y acero verde en la era del futuro deseable y acero iraní, acero cualitativo, acero y acero. Estable en la era del futuro ideal.

Palabras claves: Planeación celular basada en la era, planificación de escenarios, Mobarakeh Isfahan Steel Company

Abstract: The present study seeks to examine and evaluate the possibility of employing strategic management with the approach of Era-based cellular for the Iranian steel industry in general and for the Mobarakeh Isfahan Steel Company in particular. Thus, by examining the available assets and the present situation and also the strength and weaknesses of the complex, using the knowledge and expertise of skilled professionals, a set of advisable scenarios were designed and explained for the development of the Mobarakeh Isfahan Steel Company considering the hypothesizes presiding over the three era of action, desirable future, and ideal future, which will follow. The present research is qualitative and the technique used in it is thematic analysis and the results of the 21 interviews with the professionals of this field eventually lead to the conclusion of 31 pivotal themes and 10 principal themes. Also for each era 4 scenarios and in total 12 advisable scenarios were designed for the eras of action, desirable future, and ideal future and each scenario was given a symbolic name. The 12 scenarios are by order: comprehensive steel, creative steel, coherent and realistic steel at the era of action, supportive steel, interactive steel, locator steel and green steel at the era of desirable future and Iranian steel, qualitative steel, utilizing steel and stable steel at the era of ideal future.

Key Words: Era-based cellular planning, scenario planning, Mobarakeh Isfahan Steel Company

1. INTRODUCTION

Steel is one of the most functional and essential material in the world and plays a major role in every aspect of our lives. From the infrastructure to the very delicate pieces of the precise tools, they are all made of steel. Steel is firm, multi-function, and forever recyclable. [1] Steel industry is considered one of the significant industries in the world economy, which due to its many linking before and after spheres with other sections of industry and economy is of great importance as a pioneering and key industry insofar as the degree of its production and consumption indicates the progress of countries and the motivation of other economic sectors. [2]

The country's steel industry is known to be one of the main locomotives driving the industrial growth which responds to various domestic and, to some extent, international needs. Today numerous strategic industries including defense industries, car manufacturing, accommodation, home appliances, etc. are directly, and many other industries indirectly, depending on iron and steel industry. Thus the development of this industry can power the other industries and liberate the country from importation. Of course, during recent decades, the growth of steel production and steel products has, due to variable reasons, declined in developed countries and new economies in Asia are carrying the weight of the world's steel production, however, world's great economies are still investing in infrastructures and improving the production technology.

2. STATING THE ISSUE AND THE NECESSITY FOR RESEARCH

As the biggest industrial complex of Iran and producing various kinds of steel products, the Mobarakeh Isfahan Steel Company plays a major role in the field of steel industry of Iran, a fact that had a significant role in choosing this complex as the subject of the present study. On the one hand, today different items are involved in making decisions and designing strategic plans by the managers. China as the biggest steel and steel products producer that roughly produces half the world's supply of steel, new economies such as India, South Korea, Turkey, Brazil,

and Taiwan, the decline in the world price of steel and the dumping of imported low-quality steel products in the country, the circumstances for facing post-sanctions era, and new variables, are some of the international challenges in this field. On the other hand, the lack of water and water resources crisis, inflation recession of the country's economy, the alert state for the destruction of the environment and natural resources of the country, water and air pollution, worn out and useless infrastructure for development, instability and insecurity in management and subjective short-term decision making, are of other challenges inside the country. Thus the need for a dynamic and flexible plan to deal with all the complication that can be improved and reviewed at all times according to the present circumstances is greatly felt. Therefore the tendency for dynamic planning based on scenario increases.

Considering the country's development plan in the field of steel industry and specially Mobarakeh Isfahan Steel Company, and by taking into account that generally Iran's steel industry is on the way of rapid progress due to the increasing growth in the demand for steel in new economies of the world, at least in quantity, it seems that, having in mind the domestic and international challenges mentioned, the necessity for a dynamic planning is felt more than ever. Era-based strategic planning is recommended since it exhibits the required flexibility to face the different and various complications and circumstances the lay ahead.

3. THEORETICAL FRAMEWORK OF THE RESEARCH

3.1. Strategic management

Strategic management is the set of decisions managing decisions and actions that determines the long-term function of an organization [3]. Strategic management can be defined as: the art and science of designing, implementing, and evaluating the multiple task decisions that enable the organization to achieve its long-term goals [4].

3.2. Strategic Planning

A plan consists of the stating and expressing the measures or steps required to completely execute a single design. [5] Planning means to define qualitative and quantitative goals of the organization, creating a general strategy to achieve these goals and finally designing a comprehensive hierarchy of plans to integrate and coordinate activities. Thus planning is related to goals (what must be done) and also to the means (how to achieve the goal). [6] Planning can be done in order to achieve one of these six goals: changing the environment, determining the way, reducing the effects of the changes, improving efficiency and effectiveness, decreasing the wastes, designing standards to facilitate control. [7]

Strategic planning is a powerful managing tool that is designed to help small companies adapt themselves in a competitive manner with the predicted changes of the environment. Specially, the process of strategic planning provides a perspective and analysis of the company and its related environment, explains the status quo of the company and identifies the key factors affecting its success. [8]

Strategic planning help organizations in the turbulent environment to determine the future path and exploiting key opportunities and reducing environmental threats, predicting and making the necessary changes, investing on the strength and dealing with the weaknesses of the organization, determining a rational and defensible basis for decision-making, creating strategic thinking and designing effective strategies, the ability to effectively respond to the environmental quick changes, setting clear goals for the employers and increasing their motivation and satisfaction and improving organizational performance. [9]

3.3. Future Studies and Foresight

Foresight is the process of systematic attempt to look to the long-term future of science, technology, environment, economy and society with the goal of identifying general newfound technologies and strengthening the fields of strategic research which probably have the most economic and social benefit. In fact, foresight means preparing for the future and means utilizing the present resources in the best possible way and for the values. [10]

Regarding the definition of future studies Mac Hall provides one of the best definitions; he considers

future studies a major that covers all forms of dealing with the future and consists of the extrapolation of the process until the utopia. [11] The key assumptions of future studies are: 1. Time is continuous, linear, unidirectional and irreversible. 2. What will be in the future has not been necessarily present in the past or present. 3. Future studying the knowledge of the world is necessary for the life of human beings. 4. In order to make our path in the world, whether individually or collectively, the most useful knowledge is knowledge of future. 5. Since future is not foreseeable there is no true knowing about the future. 6. Future is not pre-determined completely. 7. The results that happen in the future depend, to some extent, on the individual and collective behavior of the humans. 8. There is mutual dependency between the parts of the universe and the approach used in future studies is holistic approach. 9. Some futures are better than the others [12].

Different futures can be divided into 4 categories: possible futures, plausible futures, probable futures, and preferable futures or desirable futures; Possible futures include possible situations that may come true in the future, even if we are not aware how these futures are realized. Plausible futures are those situations that can come true in the future. In other words, those futures that are possible with the present knowledge the humans have. In contrast to possible futures which includes futures that contradict the principles and present knowledge of the human beings, plausible futures conform to these principles. Probable futures refers to those futures that will probably come true. For instance, the continuation of the present trends are among the futures that will probably happen. Different happening-probability can be considered for this kind of futures, since some of these futures are more probable than the others. Futures that are the continuation of past and present situations, are generally considered as probable futures for the short term, however, the more our future-thinking horizons are extended their realization probability is reduced. Preferable or desirable futures are in contrast with the other futures – that is possible futures, plausible futures and probable futures – since in the previous three categories, the futures were the cognitive knowledge kind, but preferable futures are the provocative kind not the cognitive. These futures are born out of value-based judgments and thus are more subjective rather than objective. This is yet another difference that distinguishes these futures from other kinds. [13]

3.4. Principles and Concepts of Scenario Planning

Scenarios are the “stories of the possible futures”. The word “scenario” is taken from the world of film and theatre and consequently we emphasize on the narrative and presentation features of this word, even after it’s been transferred to the world of business or other organizations. Scenario planning is designed to help us perceive the present and the future as a continually evolving story [14]. Dictionaries define scenario as the general plan of the natural state of the incidents or the general plan of the natural state of the expected incidents [15]. However in more technical terms it can be said that scenario is a descriptive story of justified alternates that look to a specific part of the future. [16].

The financial crisis of 2008 in Greece showed very well that how much management in today’s world is affected by the events that occur in public environment. Uncertainty is an inseparable characteristic of the modern world. The situation is much more complex and fluctuating in comparison to 30 years ago. We are facing many problems for planning. The affective factors change rapidly and their effectiveness is increased each day.

In such circumstances, the traditional planning tools such as Porter’s five forces or the market share growth matrix are less and less able to respond the needs of the senior managers and strategic planners. These were developed in the 70s and the 80s where there was less complexity and fluctuation.

Since the 90s, the traditional strategic planning approaches along with their fundamental presumptions were widely criticized by the researchers and practitioners. These critiques specially aimed at the very base and foundation of the traditional strategic planning thinking, which believes that plans must be developed for a clear and single direction in the future. Many of the analysts believe that the concepts and frameworks of the traditional strategic planning cannot fulfil the needs related to the process of planning in the dynamic and complex business environment of today whose fluctuations are increasing by day.

During the future years the world will experience increasing turbulence. This means imposing more uncertainty in the strategic planning process of the companies. More fluctuation, complexity and doubt.

The tools which the managers use for strategic planning and predicting have changed significantly over the recent decades. But still they cannot fulfil the needs of the managers and companies in today’s radically changing environment. The scenario-based strategic planning approach can be a solution to the challenges of today’s business world. [17]

3.5. Principles and Concepts of Era-based Cellular Planning

Era-based cellular planning systems, with the goal of overcoming the impasses of planning and development, are very flexible against future emergency incidents and, due to their cellular construct, provide the possibility to review current and future plans according to the developments in knowledge and technology and even manage the unwanted and unfavorable outcomes of previous plans. The cellular construct of these plans provides such conditions that the future plans will not be affected by past plans as far as possible; in other words, future plans depend less on past actions.

Every plan cell signifies a scenario or plan from a specific era. These cells must be planned as a set of subsystems based on hard and stiff links and soft and flexible links. Era-based cellular planning is designed with the goal of constantly optimizing decisions and policies and the skeletal nature of the outcomes for every decision, specially affected by the systemic links nature, is placed between cells.

The plan packages might consist of plans for one era or several eras. Those plan packages whose plans are designed in one era are called horizontal plan packages; while packages containing consecutive or alternate eras are called vertical plan packages.

The cellular construct of these plans creates circumstances that allows future plans to be less affected by past plans as far as possible, in other words, future plans depend less on past actions. For

instance, if our long-term plan focuses on a 20-year outlook, it can be divided into 5-year plans, 1-year plans and numerous several-months plans, one-month plans and even shorter periods, in a way that each of these micro-plans form a cell in the era-based cellular planning system.

Obviously if the plans are designed as coherent and united packages, the planning and execution system will be extremely vulnerable; since in this case the planners will be forced to restore their set of plans in the face of any environmental change and suspend many of its operating parts and eliminate many of its executed parts.

In this network infinite plans in infinite eras are designed, as listed below symbolically from A to Z. As in can be seen in figure (1), every number on the left signifies an era and every number on the right signifies a plan from a family; for instance cell D14 signifies the fourth plan from the family of first plans in the era D. [18]

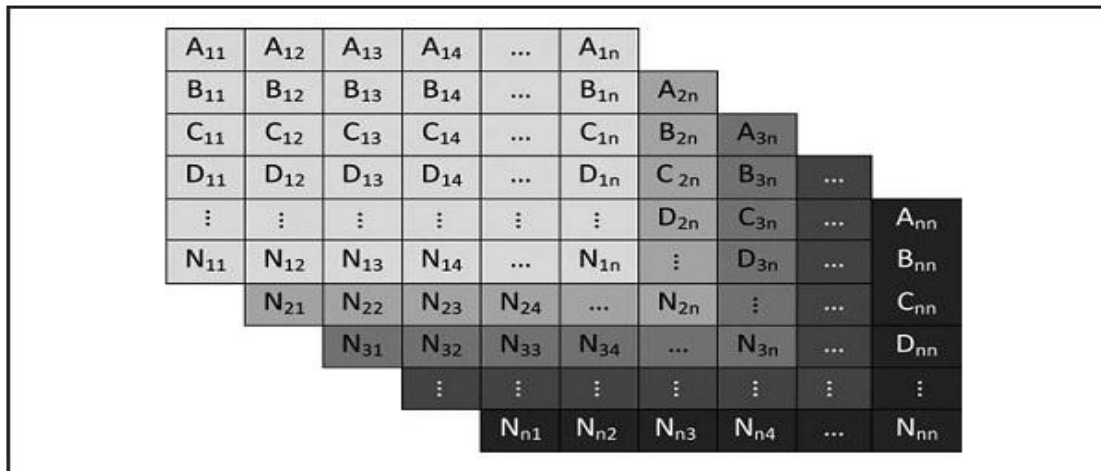


Fig 1. Era-Based Cellular Planning Systems` Network

4. RESEARCH METHOD

This study seeks the possibility of employing era-based cellular planning for the development of Mobarakeh Isfahan Steel Company and providing suggestion sets regarding the intended challenges and problems. Thus, in terms of research goal, this study can be considered applied research.

Also due to the research approach being qualitative, analyzing the data was done using thematic analysis technique which is widely used in qualitative research.

5. RESEARCH POPULATION AND SAMPLE

The population for this research consist of a main group and a general group: 1. All the managers and engineers and experts of companies, organizations and subsets of the Mobarakeh Isfahan Steel Company 2. Lecturers and professionals and expert students in the field of strategic planning, era-based cellular method, scenario planning, and future studies

Regarding he sample, in this study, non-random sampling method was used and the technique used for this method is the chain or snowball sampling. Therefore sampling with this technique continues until

saturation. Normally sources introduce 15±10 as saturation [20]. The present study reached the intended saturation regarding collected data after 21 interviews.

6. COLLECTING AND ANALYZING DATA

For collecting data library research, field research, and referring to high level documents were used and the main tool for collecting data was interviewing and giving questionnaires to the professionals.

Considering this study takes a qualitative approach, to analyze data thematic analysis technique was used and considering the goal of the study which is applied and using scenario planning in steel industry that has not been studied before, thus the research is exploratory and feasibility study. Feasibility studies help with the framework of the design and enriching the different and suggested scenarios. Also for applying era-based cellular planning, it is necessary to assess the possibility of its establishment, which the present study achieves by surveying and interviewing the professionals.

Questions were designed for both professionals in strategic management and the professionals in steel

industry. And in every section, before the expert interview, individual characteristics such as education and field of study, age, area of professional activity and professional background were asked of the interviewee. With their permission, the interviewees' voice was recorded during the interview for close examination and deriving propositions, and also notes were taken of the important points. After finishing, all the interviews were transcribed and their propositions and concepts were extracted. Thematic analysis was used to analyze data.

First the key points, otherwise known as the propositions related to each interview, were extracted. Every proposition has its exclusive code. Preliminary codes of this stage are turned to secondary codes due to them being too many and confusing, in order to transform them into categorized concepts and facilitate the forming of the themes. In other words, the preliminary codes that have similar and mutual meaning are collected and merged in one category and those concepts or meanings that are in one field make

up the themes. Finally, different scenarios are designed according to the received themes. Based on the era-based cellular planning, the foundation of our research is based on 12 scenarios in three consecutive eras; era of action, era of achievable future, and era of ideal future. In fact, in this study and according to this model, substantial strategies for the development of Iran's steel industry in different fields are examined. With this method we will have great efficiency in costs and the risk of encountering crisis in the future. That is, the development of our steel industry will not stop and under any circumstances will proceed based on the scenario and current cells. In era-based cellular method every opinion and suggestion from the professionals of different areas will be used for strategic planning and no opinion or suggestion will be ignored. For instance, it is possible that some development suggestions are not feasible at the time, but they will be saved in the cells so that they can exhibit their function at the right time. Figure (2) indicates a sample model that was used for scenario planning in the present study.

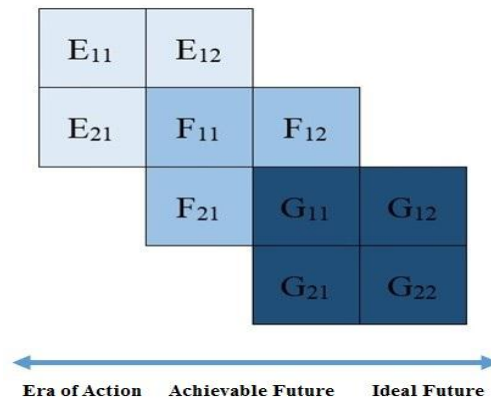


Fig 2. Plannig Cellules in three consecutive eras; Action, Achievable Future and Ideal Future

7. CONCLUSION

In this study, the data was collected and then coded as propositions and concluded as concepts from 5 interviews with strategic planning lecturers, students and professional who have carried out research in or are familiar with era-based cellular planning, and also 16 individuals from among senior and junior managers, engineers, technicians, and planners and economists active in the subset of Iran's steel industry and specially Mobarakeh Isfahan Steel Company and

its related sectors, in total, 21 experts in this area. Finally and by analyzing the data from encoding the interviews, 31 pivotal themes were identified that are placed in 5 categories. 10 themes related to the main insufficiencies of developing the steel industry, 6 themes as the factors effecting the development of steel industry, 5 themes of the necessities of employing era-based cellular planning in steel industry, 5 themes related to the obstacles and challenges in the way of implementing era-based cellular planning in the steel industry, and finally 5

themes were placed under the area of the necessities and pre-requisites of implementing era-based cellular planning. Overall, these 31 pivotal themes are classified in 10 main themes which are: specialization and meritocracy, creating an innovative and creative environment for localization, systematic and long-term thinking, creating free and competitive environment, developing the infrastructures and locating steel units, data and operational coherence of all the subset organizations of Iran's steel, responsible utilization and preserving the environment, developing and improving production technology and utilizing human resources, Iran's steel in international market and green and stable steel. Also, the 12 advisable scenarios were designed considering the themes resulting from the study in the three eras of action, preferable future, and ideal future, and for every scenario a symbolic name was chosen.

The scenarios for era of action are: comprehensive steel (creating industrial information bank and coherent business data websites for Iran's steel industry and forming a reference for researchers and experts, investors and strategists active in the steel industry of the country), creative steel (creating workgroups and creative elevators alongside the organizations and industrial units of the country, specially Mobarakeh Isfahan Steel Company, and establishing creative thinking outside the bureaucratic and up-to-down pyramid hierarchies), coherent steel (creating a reference managing organization on the top of the Iran's steel industry pyramid and establishing information and management coherence in interaction with other organizations and related entities) and realistic steel (expanding the realistic environment regarding the management decisions and planning for the country's steel industry, and specifically for Mobarakeh Isfahan Steel in the production technology, energy, natural resources and environment section).

The scenarios for era of preferable future are: purposeful steel (purposeful support, government help and encouragement to support the private sector and prevent the irregular importation of low-quality steel products), interactive steel (planning and designing strategies for eliminating the international limitations, especially for industrial economy, in the post-sanction era and establishing constructive interaction and cooperation with the world), locating steel (proper transferring and locating of the country's steel units to beach areas and correction and balanced development of infrastructures and rail-transportation, road

transportation and see transportation tariffs with the growth of steel industry), and green steel (correction and development of pollutant and industrial wastewater control methods, and investing in environment protection and energy use).

The scenarios for era of ideal future are: Iranian steel (localizing all the processes and the elements of the value chain of the country's steel and utilizing the capacity of domestic professionals), qualitative steel (developing the production of quality steel products using advanced technology and able to compete with international products, and setting high added value for the country's steel industry), stable steel (investing in the area of green and renewable energy and aligning with global green and stable trends), and utilizing steel (maximizing the utilization in proportion to the intended technology, active workforce and energy consumption).

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