

## Strategic Technology Foresight in Organizations through Quality Management and Business Excellence Concepts: A Case Study

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**Abstract:** We are living in an era of accelerated change and uncertainties where disruption in all aspects of our modern lives is the norm. In such context, foresight supported by quality management systems and organizational excellence frameworks comes into prominence as strategic toolset to face these social and economic challenges in organizations and societies and ensure sustainability. Foresight has been widely used by organizations as a strategy to support leadership and decision makers in situations that involve big uncertainties towards the future. The present paper is a conceptual study in the sense it discusses the relationship between organization's foresight capability and quality management and organization excellence approaches. Essentially, we will attempt to answer the fundamental research question: "To what extent quality management and organizational excellence approaches and models lead to enabling and building future foresight capability of modern organizations?" For that purpose, a survey questionnaire was developed based on literature review, and administered online to leadership of Saudi organizations national wide. Statistical analysis performed. The analysis showed that quality management and organization excellence frameworks implementation in Saudi organizations would be an enabler for successful foresight implementation. This led to pronounce that in order to achieve their strategic objectives in line with the national vision 2030, Saudi organizations should implement quality management systems such as ISO 9001:2015 and the national quality award (KAQA). It is believed that the paper opens a discussion between quality professionals and foresight experts on the potential link between quality management principals and foresight capability in modern organizations operating in an accelerated change environment and disruption.

**Keywords:** Strategic Foresight, Quality Management, Organizational Excellence, Industry 4.0.

**Abbreviations:** VRPs-Vision Realization Programs, MBNQA-Malcolm Baldrige National Quality Award, EFQM-European Foundation for Quality Management.

### 1. Introduction

We are living in an era of accelerated change, where disruptive technologies and immersing uncertainties are affecting personal lives, business environment, and national and international policies. In these situations, foresight research and methods implementation at the organizational and national levels come into prominence to foresight future scenarios and anticipate targeted horizons. Foresight has been defined as a "systematic, future-oriented, analytical and interactive process that partly contributes to shared visions concerning long-term developments within science, technology, business and society and partly facilitates the alignment of relevant stakeholder groupings around desirable developments through relevant strategies, decisions and actions" [1].

Foresight activities support decision making in situations and areas that involve long lead times, such as long-term labor market planning, education and training for future skills development and anticipation. At the strategic level, foresight projects have been traditionally used as a policy tool for priority setting in identifying key strategies to be implemented, key areas of national priorities to be achieved and how to Make investments in an efficient and effective manner towards the achievements of organizational or national goals. A substantial increase of interest in foresight studies around the world has been registered during the last three decades. The biggest number of studies came from countries like Japan, United States, United Kingdom, Finland, Denmark, France, Germany and Russia, which have large and longer foresight programs national wide. Limited foresight studies were reported from developed countries like Brazil, Columbia and Iran. Only, very limited studies were published in Arab countries like the MENA region, mainly in the Kingdom of Saudi Arabia and the UAE [2-12]. Saudi organizations in both public and private sectors are operating within a national momentum driven by the 2030 Saudi vision. The strategic goals set to achieve the vision are three folds: (a) Diversification of the economic sectors and efficient localization of industries (such as military, mining, renewable energy, and logistics services), (b) Vibrant Society (through cultural transformations) and (c) Building an ambitious nation. To achieve these strategic goals, the government launched 13 Vision Realization Programs (VRPs) together with national strategies for industry and quality. The realization of the vision requires economic and social transformations associated with the fourth industrial revolution (Industry 4.0) technological drivers. In this national context, it is of particular importance to foresight the skills, competencies and the jobs landscape required by the kingdom to achieve its strategic goals. The present study falls within a national research project, with the aim to assess and measure the readiness level of Saudi organizations to adopt and practice foresight methods in their strategies to achieve the strategic goals set in the National Vision 2030. Within this paper, we will discuss the relationship between foresight capability and quality management and organization excellence models. Essentially, it attempts to answer the fundamental research question: "To what extent quality management and organizational excellence approaches and models lead to enabling and building future foresight capability of modern organizations?" It is expected that the result of the project would support Saudi leaders and decision-makers for priority-settings and identifying key strategies and investments in human capital development through education, training, research and innovation in areas related to future scenarios driven by the Saudi Vision 2030 and requirements of Industry 4.0 revolution.

#### 1.1. Quality Management and Organizational Excellence Systems as Enablers to Foresight

For the last decades, quality management systems and organizational excellence models such as the Malcolm Baldrige National Quality Award (MBNQA) and the European Foundation for Quality Management (EFQM) have been used by organizations worldwide to achieve and sustain excellent performance through a systematic and holistic approach to managing the various aspects of the organization. Excellence can be used proactively as a modern management method for building the future and sustaining governments and organization performance. Through a set of fundamental principles and guiding criteria, excellence helps organizations and governments to preserve the interest of the society, and to build a happy future for communities and providing them with the conditions to thrive, prosper and enjoy high quality of life standards [13]. The new organizational excellence approach stimulates governments to build their plans and goals continuously without stopping at the point of achievement or satisfaction of successful implementation to ensure the economic, social and environmental long-term sustainability. Government entities should

implement excellence models to develop their future anticipation capabilities through using future foresight tools to identify continues future trends and global directions. This helps the government entity be able to predict, analyze and respond to the global and future changes to create its future readiness through continuous redefinition of existing business models supported by new and advanced technology driven by digital disruption of Industry 4.0. Excellence has been used to help organizations realize ambitious visions and strategic objectives. Vision Realization through foresight projects is an essential criterion that excellence models address [13].

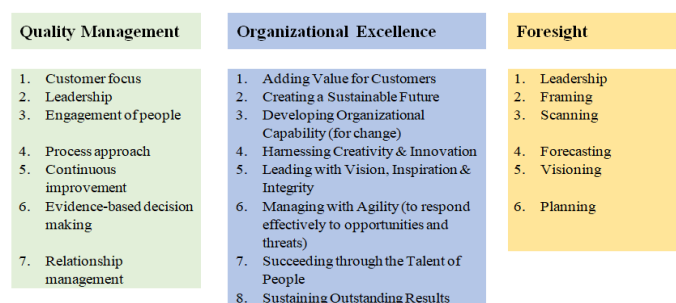
Readiness and preparedness for the future can be considered as a powerful predictor for becoming an outperformer in the business, for attaining superior profitability and for gaining superior excellence [5].

Foresight has been used as a powerful tool to help organizations Operate more effectively in today's environment of rapid, highly complex, often unpredictable changes in technology, social and economics. Organizations readiness to foresight can be measured using foresight maturity models such as the Grim's Foresight Maturity Model [14]. This model which has been widely used in the open literature is a set of best practices that ensure that the organization develops a robust, useful, and comprehensive approach to take charge of the change and anticipate desirable future scenarios. The model divides foresight activities into six fundamental disciplines as shown in Table 1 where each discipline can be assessed within five levels of maturity (ad-hoc, aware, capable, mature, world class).

**Table 1.**  
Fundamental components of the foresight maturity model [14].

Fundamental concept	Measure in the foresight activity or project
Leadership	Clear ownership and active leadership to implement and institutionalize foresight capability
Framing	Establishing the boundaries and scope of the endeavor
Scanning	Collection of appropriate and relevant information in a format and timeframe that support useful retrieval
Forecasting	Description of long-term outcomes that contrast with the present to enable better decision-making
Visioning	Creation of a preferred future that imaginatively captures values and ideals
Planning	Ensuring that the plans, people, skills, and processes support the organizational vision

Saudi organizations either in public or in private implement quality management systems (ISO 9001:2015) and organizational excellence model (King Abdul-Aziz Quality Award - KAQA) to achieve performance excellence in line with their strategic goals and objectives. This is mainly driven by the momentum of the 2030 Saudi vision and the government's official approval of the national strategy for quality early 2019. In the present study, we were interested to investigate whether the implementation of such quality systems and organizational excellence model would give an indication of the organization's readiness and capability to adopt foresight for future opportunities and targeted horizons as prescribed by the vision 2030. For that purpose, the researchers used Figure 1 to make a mapping between the fundamental concepts of quality management adopted by QMS, ISO 9001:2015, the organizational excellence concepts and the foresight concepts as defined by Grim Maturity Model.



**Figure 1.**  
Mapping between Quality Management, Organizational Excellence and the Foresight Capability Principals [14].

## 2. Research Methodology

The present work was initially dedicated to measure the readiness level of Saudi organizations towards the implementation of foresight as a strategy to achieve the goals of the national Saudi vision 2030. The perceptions of both management and operational employees towards this issue were measured through a survey administered online to Saudi organizations. The main objective of the study was to report on the views and experiences of leadership management and staff members regarding foresight implementation as means to achieve the objectives of the 2030 Saudi vision. The survey consisted of several parts:

- Part 1-Demographic characteristics (respondents' characteristics: position in the organization, educational level, age, gender, professional experience) and (organization characteristics: organization's size, business sector, regional location in the kingdom, adoption of foresight manager, quality manager at the organization, ISO certification status of the organization, national quality award participation, and the development of a strategic plan in line with the 2030 vision).
- Part 2 -Saudi Organizations readiness to implement foresight.
- Part 3-Degree of knowledge and implementation of foresight methods.
- Part 4-Barriers to foresight implementation in Saudi organizations.
- Part 5-Additional information and personal comments from respondents.

The survey questionnaire was distributed to major Saudi organizations from government and the private sectors during March 2020 online, through the network of students and graduates of the Master program in quality engineering and management, who were from leadership of Saudi organizations from different regions of the kingdom. Of about 300 questionnaires sent, 221 questionnaires were received, which means a response rate of 73.67 %. More details about the research survey instrument and the research methodology can be found in Al-Homaid [10].

In this paper, we will discuss only the results related to the research question related to foresight capability and quality management and organizational excellence models implementation.

## 3. Results and Discussion

### 3.1. Analysis of the Validity of the Results

In exploratory survey investigations, validity and internal is measured by calculating Cronbach's alpha coefficient. A value of Cronbach's alpha greater than 0.7 indicates homogeneity and consistency of the survey element and validity of its results. In the present study, the Cronbach coefficients of the survey elements are shown in Table 2, where it can be seen that high values were obtained, indicating the reliability of the survey and the validity of the results.

**Table 2.**  
Cronbach's Alpha values for the survey elements.

Part	Survey elements	# of questions	# of responses	Cronbach's alpha
2	Readiness to implement foresight	11	221	0.92
3.1	Foresight methods knowledge	19	221	0.95
3.1	Foresight methods implementation	19	93	0.97
4	Barriers to foresight implementation	10	221	0.88

### 3.2. Participants Characteristics

**Table 3** summarizes the respondents profile characteristics. A careful examination of this Table shows that respondents to the questionnaire are about 47.51% from top management (9.05% CEOs, 16.29% Middle management and 22.17% managers) and 14.93% from academic sector. It can be seen that a percentage of 62.44 of respondents were from leadership and academic. 67.6% are PhD and MSc holders with 41.6% are more than 40 years old and with extensive professional experience, since 79.2% of the respondents have more than 5 years' experience in the organization. These statistics give a confidence about the study since the respondents turn out to be closely related to the decision making process, with relevant professional experience in the business sector. These factors are important in foresight projects which usually require some knowledge and expertise in the business filed [1, 2, 5].

Figures 2 and 3 show the characteristics of the sampled organizations. The organizations were ranked as either large organizations (43.89%) or small and medium organizations (56.11%). The government organizations represent 54.75% of the participant and the private represent 18.55%. The business activities were distributed between educations and training with 26.24%, Military with 9.95%, industrial sector with 7.69%, services with 7.2%, and healthcare with 10.86%. The study was carried out national wide, where all the 13 administrative regions participated. The big majority of participants (88.69%) came from the main cities of the kingdom (Riyadh, Makkah, Madinah, Dammam, Qassim and Hail) where most of businesses and government departments operate.

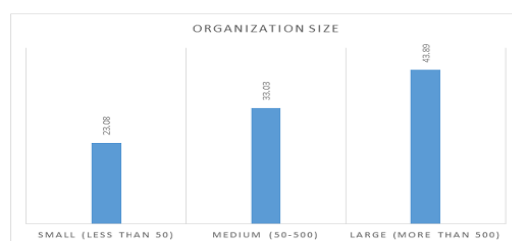
**Table 3.**  
Demographic characteristics of the survey respondents.

Respondents characteristics	Frequency	% age frequency
Position		
Top management (CEO, or business owner)	20	9.05
Middle management (HR, quality manager, etc.)	36	16.29
Executive management (Supervisors)	49	22.17
Academician or researcher	33	14.93
Employee	28	12.67
Other	55	24.89
Education		
PhD	42	19
MSc	62	28.05
BSc	99	44.8
Diploma	14	6.33
High school	4	1.81
Age		
21-30 years	36	16.29
31-40 years	82	37.1
41-50 years	66	29.86
Over 50 years	37	16.4
Gender		
Male	160	72.4
Female	61	27.6
Professional experience		
Less than 1 year	8	3.62
From 1 to 5 years	38	17.19
From 6 to 10 years	34	15.38
From 11 to 20 years	61	27.6
More than 20 years	80	36.2

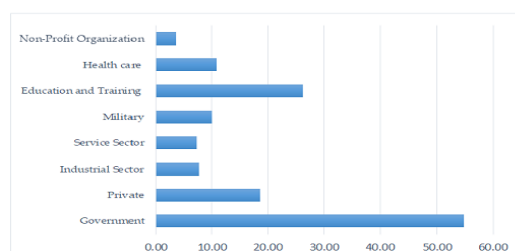
### 3.3. Foresight, Quality Management and Organizational Excellence Principals Relationship

As mentioned earlier, Saudi organizations either public or private implement quality management systems (ISO 9001:2015) and the national organizational excellence model (King Abdul-Aziz Quality Award - KAQA) to achieve performance excellence in line with the strategic goals of the national 2030 vision. It has to be mentioned here that a strong momentum towards quality management has been created within the frame work of the vision and the subsequent government's official approval of the National Strategy For Quality (NQS) early 2019. In this paper, we are mainly interested to investigate whether the implementation of such quality systems and organizational excellence model would correlate with the organization's readiness to adopt foresight for future opportunities and targeted horizons.

**Figure 4**, which summarizes the results that measure these aspects, show that while 84.16% of the organizations have a quality manager, 53.85% of them have undergone the process of ISO certification to their management systems (QMS, EMS, etc.), and only 20.36% of them implemented the national quality award criteria in their businesses. A relatively high percentage of 78.28 of the surveyed organizations have a strategic plan in line with the 2030 Saudi vision [15]. These statistics give an indication of the level of readiness towards the adoption and implementation of quality management systems and organizational excellence models, which constitute an organizational enablers and catalysts for foresight implementation, from the author's point of view. The percentages of organizations that had established a position of foresight in their organizational chart was 37.10% and those who performed foresight projects previously were 24.89%. These percentages would give a clear indication of a relatively high level of readiness of Saudi organizations towards adopting foresight as a strategy to achieve their goals. This is believed to be associated with the high level of implementation of quality management and organizational excellence approaches.



**Figure 2.**  
Respondents' distribution by organization size.



**Figure 3.**  
Respondents' by organization business sector.

In order to determine if there is an association between the organizations' characteristics (size, business activity, and King Abdul-Aziz Quality Award implementation) and the existence of foresight department in the organization Tabulated statistics and Chi-Square tests were used. The statistics in **Table 4** show that organizations, which have already established a foresight department, are equally distributed with the size of the organization. No indication that a specific organization type (size) has invested more in foresight though the national momentum driven by the Saudi 2030 vision. From the survey data, the Pearson chi-square statistic is 0.267 (with a p-value of 0.992) and the likelihood chi-square statistic is 0.267 (which also gives a p-value of  $0.992 > 0.05$ ). So, with an alpha significance level of 0.05, we can conclude that there is no significant association between the two variables (Organization Size, Foresight department). Similarly, no significant association between Organization business activity and foresight department, was found with the Pearson chi-square statistic is 22.655 (with a p-value of 0.066) and the likelihood chi-square statistic is 23.136 (which also gives a p-value of  $0.058 > 0.05$ ).

From Table 4 the statistics show the organizations, which have already established a foresight department with the implementation of the national excellence model (King Abdul-Aziz quality award, KAQA). The Chi-square test performed for the association between the two variables, with a Pearson chi-square statistic of 46.655 (with a p-value of 0.000) and the likelihood chi-square statistic 47.362 (which also gives a p-value of  $0.000 < 0.05$ ). So, with an alpha significance level of 0.05, we can conclude that there is a significant association between the two variables (the implementation of the KAQA model and foresight activity in the organization). This would lead us to conclude that quality management and organization excellence frameworks implementation in Saudi organizations would be an enabler for successful foresight implementation. This would lead us to pronounce that in order to achieve their strategic objectives in line with the national vision 2030, Saudi organizations to implement quality management systems such as ISO 9001:2015 and the national quality award (KAQA) [16-19].



**Figure 4.**  
Measures of quality management, organizational excellence and foresight capability in Saudi organizations.

#### 4. Conclusions

Through measurement of the readiness level of Saudi organizations to adopt foresight activity as a strategic tool to anticipate future changes dictated by the 2030 national vision and Industry 4.0 drivers, this paper discusses the relationship between foresight and quality management and organizational excellence approaches. The paper shows that the role of quality management and business excellence is pivotal to the building of Saudi organizations' competitive advantage based on foresight as one of its core competences. The statistical analysis of the surveyed organizations shows that the degree of Saudi organizations readiness to adopt foresight in their strategies is rather high and it is at an international standard. The analysis shows clearly that quality management and organization excellence frameworks implementation in Saudi organizations would be an enabler for successful foresight implementation. This would lead us to pronounce that in order to achieve their strategic objectives in line with the national vision 2030, Saudi organizations to implement quality management systems such as ISO 9001:2015 and the national quality award (KAQA). It is the authors' believes that further discussion between experts would be required to explore the important relationship between quality management, organizational excellence, and foresight approaches for a better future world.

**Table 4.**  
Tabulated statistics: Organization characteristics vs foresight activity.

Organization size		Foresight department			
		Yes	No	Not sure	All
Large organization	Count	36	31	29	96
	Fr (%)	35.62	32.58	27.8	43
Medium organization	Count	27	26	20	73
	Fr (%)	27.09	24.77	21.14	33

Small organization	Count	19	18	15	52
	Fr (%)	19.29	17.65	15.06	24
All organizations	Count	82	75	64	221
	Fr (%)	37.1	33.93	28.96	
KAQA implementation	Foresight department				
		Yes	No	Not sure	All
Yes	Count	22	12	11	45
	Fr (%)	16.7	15.27	13.03	
No	Count	25	49	10	84
	Fr (%)	31.17	28.51	24.33	
Not sure	Count	35	14	43	92
	Fr (%)	34.14	31.22	26.64	
ALL	Count	82	75	64	221
	Fr (%)	37.1	33.93	28.96	

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