INNOVATION ENTERPRISE MECHANISMS IN DEEP TECHNOLOGY BUSINESSES

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The aim of this research is to critically investigate innovation enterprise mechanisms and success determinants for deep technology organizations in the Kingdom of Saudi Arabia. It proposes and validates a framework for innovation enhancement practices in the Kingdom. An empirical study was initially designed using Wallach’s 3-Dimensional model and Organizational Culture Index (OCI) for survey questionnaires in order to identify the Kingdom’s cultural profile (e.g. bureaucratic, innovative or supportive). A framework was validated from the case companies comprising deep technology and government-based companies in the Kingdom. Although the results were promising and paving the way for innovation, most of the companies were facing enormous challenges. When compared with current practices, it was revealed that innovation practices were ranked as very low among deep technology companies. The most significant challenges identified from this study were: lack of leadership, shortages of skills, managerial capacity and capability, lack of appropriate KPIs (Key Performance Indicators) and readiness of organization in the Kingdom.

Keywords: Technology organization, Framework, Wallach’s 3-Dimensional Model, KPIs, Leadership, Innovation-based culture.

1 INTRODUCTION

Innovation has long been considered an engine of economic growth regardless the size of the company and economy. In light of globalization and the rapid changes in the business sectors around the world, the term innovation became an integral part of all organizations. Organizations have to respond to the need of innovation as it is an important indicator of performance. Innovation within organizations is known as a sustainable competitive advantage, as it allows organizations to adopt new changes, sustain business growth and avoid any inappropriate environments (Khayati and Selim 2019, Perkins 2016). Innovation is often connected to organizational progress through creating and developing new ideas that help to achieve positive results in terms of business growth and value-adding activities. Haak-Saheem and Brewster (2017) argued that innovation payback period is long, which discourages small and medium sized businesses to adopt innovation activities at their workplace.

Existing data sheds a lot of light on innovation within large industries, with little attention paid to small and medium sized businesses in the developing countries. Because of this, the innovation process among small businesses in developing countries is not properly addressed. More than 80 percent of a country’s economic development is directly or indirectly associated with small businesses (Nafchi and Mohelska 2020). Furthermore, small businesses are considered a cornerstone for a country’s social and economic development. Small firms can represent a shift from a traditional economy to a modern one through simply employing skills,
technology and raw materials, promoting indigenous entrepreneurship, technology innovation and bringing gradual socio-economic change. For example, IKEA is considered a world leader in business innovation and constantly looks to improve its products and services propositions. The introduction of an innovative “Shop & Go” feature in the IKEA app provided their customers with more flexibility than before while shopping and secured high growth for their ecommerce, which increased revenue from 7% to 31% in the last three years (Stackpole 2021). Innovation in companies is thus very key to a country’s future development and progress.

2 JUSTIFICATION OF RESEARCH

Saudi Arabia is a country where there is a push to introduce innovation in most aspects of life. The Saudi government has injected a 72 billion Saudi Riyal (UK £14.94 billion, US$ 19.20 billion) stimulus package as a part of Vision 2030 in order to boost the country’s private sector (Ashri 2019). The funds allocated to different programs include a government venture capital (VC) fund, government fees reimbursement, indirect financing to SMEs (Small and Medium Sized Enterprises), and others. Moreover, as a part of Saudi’s “Vision 2030”, the government also created a Public Investment Fund (PIF) with a capital of 4 billion Saudi Riyals (UK £830 million, US $1.07 billion), which encourages private sector companies to participate through investments in VC. Alshuwaikhat and Mohammed (2017) stated that Saudi Arabia has taken initiatives for funding SMEs for the development of the entrepreneurship ecosystem. For these initiatives, a cooperation agreement was signed between the Ministry of Labor and Social Development and the Ministry of Communications and IT (Information Technology) to allocate 1 billion Saudi Riyals (UK £208 million, US $267 million) in order to support the technology sector, including start-up companies (Saudi Vision 2030 2017). However, there is a clear lack of initiatives toward innovation and supporting businesses to become innovative (Khayati and Selim 2019). In addition, knowledge of deep technology and innovation practices in upstream and downstream production is poor. It is thus clear that the Kingdom of Saudi Arabia is lacking in developing effective strategies toward the development and support of deep technology companies. This is a major obstacle to economic development and requires immediate attention within the Vision 2030 agenda. Although the Saudi Government is starting to focus on innovation and entrepreneurship to overcome the challenges faced by diversification strategies, there is still a need to recognize the deep technology sector as an important catalyst of economic development.

This paper provides additional insight into the nature of innovation within deep technology companies in Saudi Arabia to gain better knowledge and understanding of innovative activities and how they can help in achieving Saudi’s Vision 2030. This research specifically studies the context of small and medium sized businesses, which help to generate more jobs, promote economic growth and development, and alleviate poverty.

3 METHODOLOGY

A mixed methodology was conducted; survey questionnaire as quantitative and semi-structured interview as qualitative methods were used. A mixed methodology is a triangulation design which helps to gather different and complementary data on the same topic to understand and explore research problem (Creswell and Creswell 2009).

3.1 Survey Questionnaires

Survey questionnaires are useful data collection methods which help to collect a participant’s opinion, perception and view about certain elements of the topic (Bryman and Bell 2007). Multi-
stage surveys were used to understand the varying degrees of detail. An initial survey questionnaire was designed based on Wallach’s Organizational Cultural Index (OCI) to measure dimensions of organizational cultures (e.g. bureaucratic, innovative and supportive cultures). Wallach’s OCI consists of eight items, and has ratings based on a four-point scale. The main reason to use this scale was to measure the organizational culture and level of employee’s inspiration and interaction which lead to high levels of workforce engagement, productivity and performance. A total of 80 surveys were sent to different deep technology companies in Saudi Arabia. However, 77 completed surveys were returned and included in the statistical data analysis, which was then analyzed to produce standard deviations, medium and means, frequencies, cross-tabulations, graphs and bar charts, with regression analyses conducted to understand the significance between the different variables. An advanced data analysis tool (SPSS: Statistical Package for Social Sciences) was used to generate data in the form of a descriptive analysis.

3.2 Semi-Structured Interviews
Semi-structured interviews are an effective qualitative data collection method, with open-ended questions favored in this research in order to provide a more in-depth understanding of the topic and generate reliable outcomes (Creswell and Creswell 2009). Nine semi-structured interviews were conducted across different deep technology companies in Saudi Arabia, spanning both government and private sectors, covering executive managers, senior managers, and middle managers in order to understand their views and perception of their companies’ innovation and how their companies work towards achieving high performance, productivity and growth. Braun and Clarke’s (2006) six-step thematic framework was used for thematic data analysis.

4 RESULTS AND DISCUSSION
Based on the key findings from both survey and interviews, it was established that the current culture among deep technology companies in Saudi Arabia is not innovative or supportive but bureaucratic. This confirms previous findings in the literature, which identified this bureaucratic culture within organizations as the most significant challenge and barrier to the development of an innovation-based culture (Sarhan et al. 2019). During the surveys stage, most of the drivers for adoption were validated, which included organizational efficiency, managerial capacity and capability, leadership, skills availability, innovation-based culture, investment and development of technology infrastructure. Other drivers were also reported during both interviews and surveys, including collaboration with universities in R&D, retention of skills, reducing operational cost (e.g. adopting sustainability approaches), training and development interventions and resource availabilities. However, there are challenges and barriers which also need to be considered in the Kingdom of Saudi Arabia to facilitate adoption of innovation among deep technology companies as well. These were found to include shortages of skills, regulatory changes which impact on businesses and the labor market, lack of attracting and retaining talent strategies, and lack of communication issues. Performance variables were also validated from both surveys and interviews as participants identified the key variables, such as high performance, high growth, competitive edge, business portfolio and high-performance work practices. Few new performance variables were also identified for the adoption of innovation among deep technology companies such as cost leadership, high turnover, and customer satisfaction. In terms of KPIs (Key Performance Indicators) among deep technology companies and government organizations, there was little evidence that innovative-related KPIs are being practiced or used among them. However, certain KPIs were considered by interviewees within
their companies, including return on innovation investment (ROI²), net promoter score (NPS), customer online engagement level, innovation rate and innovation portfolio.

Figure 1 illustrates the main variables which were identified during interviews with the case companies. The greater emphasis was on the feasibility of implementing the framework such as the main components required to form the framework, the need to set roles and responsibilities for each member, team and department. Furthermore, the framework adoption or implementation requires different phases which need to be considered as well. Following the adoption and implementation process of the innovation framework within deep technology companies in Saudi Arabia, the companies are required to continue with the development phase. This is encompassed in the five main elements which include decide, prepare, execute, improve and maintain. In this first phase, leadership and other senior management decide the high impact of the innovation within the actual processes map of the company (Hickman and Akdere 2017) Rafiki (2020) argued that the four key areas which required a relationship to the innovation management and alignment within the improvement areas include, strategic design, development, people management, and continuous improvement. During interviews with senior managers of the case companies, preparation/ company readiness was identified is essential, along with the actual capacity, both being controlled variables to ensure any new process is adopted effectively. Managers also discussed the need to monitor their implementation process of innovation as well as the innovation management itself. Alwakid et al. (2020) stated that within the sphere of innovation life-cycle, continuous improvement and maintenance of the system are essential.

Post-implementation phase, there should be continuous monitoring of both internal and external environments, which may impact the implementation process (Castela et al. 2018) such as in the case of the Covid-19 pandemic and its effect on employees’ well-being and financial status. In such a case, the companies need to understand and regularly evaluate the external and internal environmental factors, while formulating and articulating diagnosis stages. For companies to achieve high standards and business innovation, they need to apply existing solutions efficiently, explore more opportunities and collaborate with keys stakeholders, including employees for searching radical and agile processes of innovation to pursue competitive advantages. In this final framework, which was adapted after the second stage of surveys, deep technology companies need to align technological incremental innovation with their strategy (i.e. labor skills, costs, customer satisfaction, and business performance). During the first stage, managers in deep technology companies in Saudi Arabia need to identify processes which require changes within the actual process map. Once, these have identified, the second most important stage of implementation of innovation is to set roles and responsibilities which will integrate innovation with other functions. With development of multidisciplinary teams, there is a need to consider a detailed plan design and infrastructure which combines efforts to identify benefits, shortcomings and needs of all stakeholders involved (Lahr and Mina 2016).
The innovation process can be successfully implemented within a company by developing core processes, competitive intelligence, new market ventures and organizational changes, accompanied by a strong and effective leadership approach. Furthermore, available management techniques and tools need to be analyzed in order to support the activities defined for the processes. Managers from case companies would also need to discuss the need to monitor processes of the implementation. In this stage, companies need to identify KPIs which assist in monitoring the progress and also facilitate in controlling the process as well. As highlighted in the framework, the innovation life cycle is a continuously improving process which influences companies. Through this, companies will achieve positive effects and perceived quality and acceptability. This framework will also assist government departments or government-based organizations as well in using innovation processes or developing innovation-based culture. It will also encourage the government to provide more incentives and investment in supporting companies to achieve innovation strategies. Universities in Saudi Arabia can also provide support in this regard and establish training, which further helps students with future ambitions of becoming innovative or creative in their career profession.

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References