

Partnerships between Universities and the Public Sector Institutions in the Development of Research Scientific in the Kingdom of Saudi Arabia

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Abstract

The partnership between universities and the public sector organizations has been shown to be a major tool for the diversion of the Saudi Arabian economic system from oil-driven system to a research-driven economic system. To further interrogate the importance of these collaborations, this study takes it further to gain insights from critical stakeholders from universities and the public sector. To achieve this, 139 stakeholders were drawn from three universities in Saudi Arabi (King Saud University (KSU), The King Abdullah University of Science and Technology (KAUST), and the King Khalid University), and two private sector organizations (Aramco and the Ministry of Education). These institutions have established strategic partnerships at various levels aimed at advancing scientific researches for the development of research-driven economic system in Saudi Arabia in light of the Vision 2030. Through the use of survey strategy, data was gathered using questionnaire, mainly to answer to two critical research questions for the study. Analysis was conducted using relevant statistical measures, including the acceptability and rejections of key statements by the stakeholders that participated in the study, the percentile values of the survey, the mean and the standard deviation. The result indicates that university-public sector partnership in Saudi Arabi employ arrays of strategies in the development of scientific research initiatives for a research-driven economic system in the Kingdom. Some of the strategies include promotion of joint research initiatives, information sharing strategies, creation of approaches for funding, engaging students in strategic research initiatives, and combined development of research facilities across the nation. The study also unveiled critical challenges affecting the use of partnership between universities and public sector groups to enhance development of scientific research. The findings indicate that inadequate communication between the partnership groups, insufficient funding, inability to merge institutional objectives, bureaucracy, and lack of long-term planning are key challenges. It is thus concluded that the public sector and the universities must accept the fact that a research-driven economic system in Saudi Arabia is highly dependent on the innovative initiatives in scientific research from them.

Keywords: research-driven economic system, Vision 2030, scientific research.

1. Introduction

The global educational and economic systems are fast embracing the innovative significance of research-driven economic system. The reemergence of the expansion of the contemporary global economic system is built on scientific research. Research and research are becoming a more important part of what drives economic development and activities that generate value (Stehr, 2014). According to Cooke and Leydesdorff (2016), a research-

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driven economic system is one that prioritizes the creation and administration of studies targeted at expanding research that is applicable and creative for economic progress. A nation with a research-driven economic growth is one in which, according to the Organization for Economic Co-operation and Development (OECD), "the production, diffusion, and use of technology and information are keys to economic activity and sustainable growth" (OECD, 2019: 11). Such an economic system relies on people's adaptable and creative thinking, inventive abilities, and research activities to find answers to issues that are widespread in their community. This demonstrates how a "research-driven economic system" and a "research-society" are mutually interacting and favorably connected.

Universities play critical roles in research, and have been argued to be the main institution built to mainly advance research and innovations. As such, when countries embrace research and research-driven economic system, universities are consistently at the centre of discourse (McMullan, 2013). The global economic terrain is undergoing tremendous change, and developing nations must adapt. One such trend is the rising significance of research and research as the primary engine of development during the information and communication revolution. International agencies like the World Bank strongly support the university sector's beneficial contribution to the development of research-driven economies. Major external advantages from investing in high-quality training and higher education are essential for research-centered socioeconomic development (Ramady, 2010). Universities are an important component of a research-driven economic system that play a crucial role. The collaboration between universities and other public sector institutions have been a key focus of the Saudi Arabian economic diversion since the development of the Vision 2030, which aims at shifting from oil-driven economic system to research and research-driven economic system. Institutions of higher learning have consistently collaborated with different public sector institutions in Saudi Arabia, mainly in advancing scientific researches in certain areas and in increasing public private sector partnership to create extensive awareness on the importance of research in research-driven economic system.

This study sets to evaluate the views of relevant stakeholders on the role of university-public sector partnership in the development of scientific research in Saudi Arabia. The focus is to explore the ways and strategies has advanced research-driven initiatives for research transfer and in enhancing the economic growth in Saudi Arabia. This study remains significant for policymakers on the dimension of the importance of university-public sector partnership in advancing scientific research for research-driven economic system in Saudi Arabia, in light of the Vision 2030.

2. Literature Review

There are three main areas this review focuses, which form the basis for the study analysis. The first section offers critical review of the roles of universities in the development of strategic research-driven economic system. The focus is on studies that have established the importance of universities in advancing economic growths that are championed on research and innovation. The second section expands on the nature of university-public sector partnership in Saudi Arabia, the impacts in economic developments, and the key roles in advancing research-driven economic system in the Kingdom. The third section expands on the cases of university-public sector partnerships aimed at advancing scientific research and developing research-driven economic system in Saudi Arabia.

2.1. The Role of Universities in the Development of Research-Driven Economic system

Universities are an important component of a research-driven economic system. University functions now go beyond educating students and carrying out fundamental or conventional research. It takes into account the significant need for innovation, technology, and research as the cornerstones of a research-driven economic system.

The power of the research-driven economic system in the 21st century comes from universities. They are becoming more widely recognized as important forces behind innovation and "major catalysts of economic growth." As a result, numerous leaders saw research institutions as "research manufacturers" for the new economic system, with mainly untouched reserves of information that might be turned into products that businesses could sell (Wolfe & Bramwell, 2008). Nonetheless, this excessively theoretical perceptions of the procedures whereby basic scientific research are converted into commercially viable products exposes a misunderstanding of both what universities are able and ought to be anticipated to do as well as the procedure for commercializing research itself.

Innovation is fueled by the flow of information, but this process is complicated, repeated, and fluid in the national economic system and is impacted by a variety of circumstances. Universities, or "catalysts" rather than "drivers," are more followers than leaders of technical innovation, according to Wolfe and Gertler (2004). Even while it may significantly contribute to the process, the presence of a top research institution in a given town is not enough to propel robust regional economic development (Wolfe, 2005). Universities have been shown to be effective organizations for turning research into profit and important forces in local innovation systems.

Although top research institutions are important assets for such national economic systems, other academics contend that their sheer existence in an area does not guarantee that the region will see economic development (Wolfe, 2005). However, some elected officials believe that universities may be the new economic system's drivers since they have untapped sources of commercialized research that are just waiting to be "taken up" and used by companies (Abel & Deitz, 2010). According to linear models of invention, industry 'takes' and university and government collaborations 'make' (Bozeman, 2000). It may be argued that this mechanical (and quite linear) understanding of how fundamental scientific research is translated into commercial goods represents a basic misunderstanding of the commercialization process. Innovation is fueled by the flow of information, yet this process involves several players and is fluid, complicated, and iterative from academia to industry (Wolfe & Bramwell, 2008). The process of research being transferred from universities to companies is rarely straightforward or linear. The human capital that universities develop is one of their core advantages and a crucial method of research commercialization. Students who get jobs at nearby companies and those who launch their own enterprises are important indicators of this research transfer.

According to studies, "universities not only educate highly competent scientists and researchers, but they also draw talent from outside the area to the area" (Salem, 2014: 9). Onsmann (2010) submits that "universities not only produce new information via primary research but also assist ongoing firm-driven research and development activities with facilities, specialized research, and technological assistance". Universities are "involved in more than just the local transmission of information; they also serve as a conduit for new research via the 'global pipelines' of worldwide academic research partnerships" (OECD, 2016" 38). Ultimately, "they function as good community players who promote local connections and networks and form anchors of creativity that support the positive cycle of talent acquisition and retention rather than serving as "ivory towers" cut off from their community" (Wolfe, 2005: 72). Governments have recently exerted pressure on universities by mandating that they perform more applied research than the customary fundamental research. Three main patterns may be used to describe these modifications that have had an impact on the university system:

- i. The integration of economic policy and government support for academic research.

- ii. The creation of better long-lasting partnerships between businesses as well as universities, and
- iii. Universities' direct involvement in the commercialization of research (Harrison, Leitch, & McMullan, 2013).

Because of this, universities have been under increasing pressure over the past few years to widen their basic research endeavors to include more applied research that is more relevant to industry, disseminate technical research, and offer technical support to industry, even though they “continue to fulfill their traditional roles of performing primary research and training highly qualified individuals” (Salem, 2014: 33). This change reflects shifting public expectations that financial contributions to fundamental research should result in quantifiable economic gains (Wolfe, 2005). A reconsideration of the linear model contributed to the aforementioned change in the policy viewpoint, but “the linear model has not yet been replaced with a more accurate understanding of the mechanisms by which information is transferred between universities and industry” (Nurunnabi, 2017: 81). Some direction is provided by influential work on the research transmission process.

2.2. The Nature of University-Public Sector Partnership in Saudi Arabia

University-public sector collaborations have gained growing importance in Saudi Arabia, particularly within the framework of Vision 2030. This comprehensive strategy aims to revolutionize the country's economic system and foster sustainable development. This literature review provides a critical analysis of the primary effects of these collaborations on scientific research and socioeconomic sustainable development within the nation.

An essential element of collaborations between universities and the public sector is their contribution to the progression of scientific research and the transfer of technological innovations. The collective endeavors of various stakeholders have resulted in the investigation of sustainability concerns and the development of policies and strategies to effectively tackle them. The collaborations have effectively enhanced research productivity and fostered innovation by providing crucial resources, financial support, and data, thereby effectively contributing to the objectives of Vision 2030. One of the noteworthy effects of collaborations between universities and the public sector is the provision of avenues for students to actively participate in practical problem-solving endeavors and research initiatives.

Moreover, the research economic system has witnessed substantial expansion as a result of these collaborative efforts. The authors, Al-Faifi and Al-Dajani (2021), underscore the significance of universities in promoting the development of Saudi Arabia's research-driven economic system. Collaborations between universities and the public sector have played a significant role in the advancement of human capital and the emergence of pioneering entrepreneurial ventures, thereby facilitating the process of economic diversification. University-public sector partnerships have significantly influenced the development of human capital and skills, constituting a crucial domain of impact. The authors Alrubaish and Al-Mutairi (2019) highlight the significance of these collaborations in promoting workforce training and capacity development, ultimately contributing to the enrichment of the nation's talent reservoir.

The significance of research partnership in bolstering global competitiveness cannot be overstated. In their study, Alshehry and Alkhuraji (2019) investigate the influence of research partnership on the international reputation of Saudi Arabia. University-public sector collaborations have significantly enhanced the country's standing in the global scientific community by promoting international research collaboration. Within the realm of sustainability, collaborations between universities and the public sector have played a pivotal role in advancing endeavors related to sustainable energy and environmental initiatives. The authors, Al-Shareef et al. (2019), emphasize the significant contributions made by these collaborations towards the advancement of research in the fields of

renewable energy and environmental conservation. These efforts are in line with the objectives outlined in Vision 2030.

The flourishing of innovation ecosystems and entrepreneurship can be attributed to the collaborative efforts between universities and the public sector. Al-Maghrabi and Hussain (2020) examine the development of an innovation ecosystem and the cultivation of an entrepreneurial culture as a result of these collaborative efforts. These initiatives have facilitated the growth of startups and small and medium-sized enterprises (SMEs), thereby enhancing the involvement of the private sector in the promotion of sustainable development. Furthermore, the establishment of collaborations between universities and the public sector has played a crucial role in the advancement of healthcare and biomedical research within the context of Saudi Arabia. Alshaikh and Da'ar (2020) examine the impact of these collaborative alliances on medical advancements and enhancements in healthcare provisions, thereby contributing to the overall welfare of the nation. Furthermore, these collaborative efforts have effectively tackled societal issues such as poverty and unemployment. The study conducted by Alhussan et al. (2018) highlights the significance of collaborations between universities and the public sector in initiatives aimed at promoting social development. These partnerships play a crucial role in advancing the broader goals outlined in Vision 2030.

University-public sector partnerships in Saudi Arabia have significantly contributed to the progress of scientific research and the promotion of sustainable socioeconomic development. By promoting innovation, facilitating research exchange, and establishing research-friendly environments, these collaborations have made substantial contributions to the nation's advancement in realizing the ambitious objectives of Vision 2030.

2.3. Development of Scientific Research in Saudi Arabia Through University-Public Sector Partnership

Since launching a number of research and development programs to foster innovation potentials and make the Saudi economic system globally competitive, "the Ministry of Higher Education in the Kingdom of Saudi Arabia has been seen as advancing the agenda for innovation" (Salem, 2014: 38). In order to promote the occurrence of breakthroughs and discoveries in the sphere of science and technology, the Ministry has developed a number of projects that support the advancement of human resources. By "building scientific research institutes, science parks, and technology incubators at several institutions, the Ministry also enhanced the role of the university in scientific research" (Onsman, 2010: 41). Additionally, in order to broaden access to information and promote quality education for its population, "the Saudi government has increased the development of new private as well as public universities driven on partnership deals" (McMullan, 2013: 52). According to (Salem, 2014: 33), "universities in the Kingdom of Saudi Arabia establish a network of research institutes across the nation where the students serve as the think tanks, making it easier to access the expanding body of information available worldwide". Once researchers and/or innovators get access to this global information, they integrate the research to the local requirements of the nation. This promotes research creation and technology diffusion, ultimately advancing the nation's technological advancement. The nation is increasingly seen as having riches that is assessed via the value produced through the creative application of research rather than merely being a superpower in energy and industrial goods, thanks to the higher education institutions. This has been made possible by universities' desire to increase their capacity for research creation, access, and usage in order to boost their competitiveness and financial incentives.

Saudi Arabian universities are essential to the country's transformation to a research-driven economic system and, therefore, to its overall "economic growth and development". The "King Abdullah program for education development (Tatweer) was established with the goal of tackling challenges at all levels of education that need further attention, such as curriculum creation, teacher preparation, and educational quality" (Salem, 2014: 35).

Furthermore, Salem (2014: 37) stated that “the curriculum intends to concentrate on science, technology, and math, expand skill-development activities, especially analytical thinking and practical skills, initiative, invention, and entrepreneurship, and teach languages as well as future and emerging sciences.”

For instance, Nurunnabi (2017: 47) unveiled that “the Center of Strategic Studies at King Abdulaziz University performed extensive study, with the findings published in over 44 volumes in its “Research Series, and the Wadi Jeddah Company, a university-owned business specializing in research-driven investments, was founded by King Abdulaziz University, which has gained notoriety for its accomplishment”. Similar to this, Salem (2014: 35) argued that “King Saud University's (KSU) contribution to creating a relationship with the public and commercial sectors in the field of research economics is the Riyadh Techno Valley (RTV)”. Salem (2014: 35) further stated that “by creating Riyadh Techno Valley - King Saud University (RTVKSU), a sizable scientific and technology park on its Riyadh campus, King Saud University hopes to fully participate in this approach”.

Additionally, Salem (2014: 36) recorded that “Dhahran Techno-Valley (DTV), a business cluster in Dhahran, was recently established by the King Fahd University of Petroleum and Minerals (KFUPM) in partnership with governmental agencies to draw research and development centers of regional and global corporations and to support start-up companies”. It is intended to serve as a premier hub for the development of technology and research, with all-encompassing commercial assistance. According to Harrison, Leitch, and McMullan (2013” 41), “DTV consists of the King Abdullah Science Park (KASP), an innovation center at KFUPM, a liaison office, a business incubator, an industrial consultancy office, and a science and technology exposition”. The Saudi government has made significant efforts to attract new research to its institutions, mostly in an attempt to develop new economic sectors and move the kingdom toward a research-driven economic system.

Additionally, King Saud University and the University of Leeds in the UK reached a research collaboration in July 2008. As part of this agreements, the two institutions planned staff exchanges as well as “cooperative research and PhD projects in the fields of nanotechnology, technology, and engineering” (Salem, 2014: 39). Following its founding, “the King Abdullah University of Science and Technology” further established a number of innovative academic partnerships with 'world-class' universities abroad, including collaborations for “research on solar energy with the National Taiwan University and on water, soil, and coastal resource issues with the Netherlands' Utrecht University”.

2.4. Gap in the Literature

Considering the elaborate nature of studies in the literature on how university-public sector partnerships in Saudi Arabia have resulted in strategic development of scientific research initiatives aimed at research transfer for economic development in light of the vision 2030 in the Kingdom. it is therefore critical to explore the views of important stakeholders in the University-public sector partnership in Saudi Arabia. The aim is to gain insights from them on different ways and strategies in which the partnership between universities and public sector organizations has advanced scientific research initiatives in the Kingdom, in the light of research-driven economic system for Vision 2030.

3. Research Methodology

Different methodological steps were taken to critically examine the potential positive effects of partnerships between Saudi Arabian universities and public sector enterprises for the advancement of scientific research and sustainable development in the nation.

3.1. Study Approach

In order to obtain valuable perspectives from key stakeholders in Saudi universities and public sector organizations regarding the importance of productive collaboration, a

quantitative research methodology was employed, specifically utilizing a survey design. The selection of a quantitative and survey methodology is intended to facilitate the collection of numerical data from the targeted population under study.

3.2. Research Questions

The following research questions form the basis for data collection and analysis:

- a. In what ways has the partnership between Saudi Universities and public sector organizations advanced the development of scientific research in building research-driven economic system in light of Vision 2030?
- b. What are the factors that pose challenge for effective partnership between universities and public sector organizations in Saudi Arabia for develop in scientific research, in pursuance of research-driven economic system in Saudi Arabia?

3.3. Study Community

Key stakeholders from three universities in Saudi Arabia and from the Ministry of education and from Aramco were selected to participated in the study. The participants were carefully selected driven on the nature of partnerships they have established in advancing research-driven economic system in Saudi Arabia. The universities surveyed include the King Saud University (KSU), The King Abdullah University of Science and Technology (KAUST), and the King Khalid University.

3.4. Study Sample

To guarantee that the research questions are adequately addressed by sufficient data, the study participants were carefully and rigorously chosen. A total of 139 individuals were chosen via randomized study sampling. A total of 75 (53.95%) participants from the three universities, 35 (25.18%) participants from the Saudi Arabian Ministry of Education, and 29 (20.86%) participants from Aramco were chosen from the two public sector groups and the three universities combined. With the exception of a few demographic factors, no personal information was requested of them, and all participants willingly agreed to participate in the research.

3.5. Study Tools

For the purpose of gathering the necessary data for the research, a questionnaire that was created digitally was used. In addition to the portion devoted to demographic details, the questionnaire is divided into three primary parts that correspond to the aforementioned three research questions. Aside from demographic information, the whole structure of the other two parts is driven on the use of a Likert scale with three possible responses: agree, neutral, and disagree. This particular value indicator was selected so that it would be possible to conduct an appropriate analysis of the data in two primary directions: either agree with the statement or disagree with the statement.

3.6. Analysis Procedure

All of the gathered information is examined making use of the relevant statistical methods. Calculations are performed to determine the percentage scores of the Likert scales, and the results are shown in descriptive statistical tables. In addition to those measurements, the tables also provide several others, such as the means and the standard deviations.

4. Results and Discussions

The hapter provides both the presentation of the results of the collected data, and the discussion of the relevant findings.

4.1. Results

a. In what ways has the partnership between Saudi Universities and public sector organizations advanced the development of scientific research in building research-driven economic system in light of Vision 2030?

This first research question seeks to unveil the strategies and methods the partnership between universities and public sector firms have applied in advancing developments in research for research-driven economic system and for sustainable development in Saudi Arabia. Five questionnaire items were developed from this research question, and the views of the study participants are summarized in the table below.

Table 1: Summary of the Result of Research Question One

Question Items	Accept	Neutral	Reject	Mean	Std. Dev.
Partnerships between Saudi universities and public sector organizations promote joint research initiatives that draw on the research of both groups.	91.05	2.19	6.76	5.09	0.728
The collaboration encourages information sharing and resource sharing between Saudi universities and public sector entities to improve the results of scientific research.	88.42	3.07	8.51	4.79	0.961
The collaboration uses a systematic methodology to provide funds for scientific research initiatives that concentrate on crucial areas that are essential to the growth of the research-driven economic system	76.11	5.94	17.95	4.02	1.205
The partnership makes it possible for academics and students from Saudi universities to work on real-world initiatives with government agencies, boosting opportunities for practical learning.	95.68	1.43	2.89	5.31	0.461
The collaboration increases the quality and breadth of scientific research projects by giving researchers access to innovative research facilities and tools.	91.52	3.74	4.78	5.12	0.702

From the above table, the views of the stakeholders indicate positive outcomes, in terms of the strategies the partnership between universities and the public sector organizations in Saudi Arabia employ for developing scientific research aimed at research-driven economic system.

a. What are the factors that pose challenge for effective partnership between universities and public sector organizations in Saudi Arabia for develop in scientific research, in pursuance of research-driven economic system in Saudi Arabia?

It is pertinent to explore the challenges and the problems that limit the development of scientific initiatives aimed at enhancing research-driven economic system in Saudi Arabia in light of the Vision 2030. Five questionnaire items were developed and presented to the stakeholders that participated in the study, and the findings are summarized in the table below.

Table 2: Result of Research Question Two

Question Items	Accept	Neutral	Reject	Mean	Std. Dev
Effective sharing of information and cooperative research activities are hampered by inadequate communication and cooperation	81.29	7.92	10.79	4.38	1.163

structures between universities and public sector entities in Saudi Arabia.					
The growth of scientific research is hampered by the insufficient funds and facilities devoted to joint research initiatives between universities and public sector enterprises.	94.25	2.16	3.59	5.03	0.472
Aligning the objectives of universities with public sector organizations for collaborative research endeavors is difficult due to differences in organizational cultures and priorities.	95.69	0.71	3.6	5.24	0.369
Decision-making is slowed down by bureaucratic procedures and administrative obstacles, which also impede the advancement of cooperative scientific research initiatives.	92.81	1.43	5.76	92.04	0.562
Ad hoc projects replace sustaining and significant research partnerships when there is insufficient long-term planning and a strategic goal for the cooperation.	71.94	6.48	21.58	3.82	2.093

The data in table provides the views of the study participants on their acceptability of certain strategic challenges that hamper the effective development of research scientific for a research-driven economic system through. The result indicates that the stakeholders are fully aware of the impacts of various factors that impede their functionality in the partnership system.

4.2. Discussions

The partnerships between universities and public sector organizations in Saudi Arabia have been at the centre of research developments in the nation, mainly for enhancement of research-driven economic system and in pursuance of the Vision 2030. The data presented in tables 1 and 2 provide a summary of the views of the study participants on key issues on the partnership between universities and the public sector in Saudi Arabia. The focus was to answer the two research questions.

The first research question set to unveil the strategies and approaches the partnerships between universities and public sector organizations employ in the development of research scientific aimed at expanding the research-driven economic system in Saudi Arabia, and in the bid to enhance the achievement of the vision 2030. The views expressed by the stakeholders unveiled the key strategies. More than 91% of the study population accepted the claim that partnerships between Saudi universities and public sector organizations promote joint research initiatives that draw on the research of both groups. Only 6.79% rejected the claim, why 2.19% remained neutral. this finding is an indication that joint sector research is a strategy or an initiative for developing research scientific aimed enhancing research-driven economic system in Saudi Arabia. In other words, when universities and public sector organizations partner, they bring together their intellectual resources in developing scientific research initiatives aimed at sustainable development in Saudi Arabi.

There is also the research transfer strategy which is usually the premise for the university-public sector partnership in Saudi Arabia. More than 88% of the respondents affirm that the collaboration encourages information sharing and resource sharing between Saudi universities and public sector entities to improve the results of scientific research. While 8.51% rejected the claim and 3.07% remained undecided, there is an overwhelming support from the stakeholders that through research sharing and information transfer, the partnership has established strong scientific research initiatives to aid the country towards the research-driven economic system and in the achievement of the Vision 2030. This is similar to the report by Nurunnabi (2017) which argued that university and public sector partnership in Saudi Arabia has been at the centre of information sharing for the extension

of the research-driven economic system in the efforts to actualize the Vision 2030. Similarly, the issue of funding has been another strategy that can be considered as both strategy and as an obstacle. From the strategy point of view, more than 76% of the participants affirmed that the collaboration uses a systematic methodology to provide funds for scientific research initiatives that concentrate on crucial areas that are essential to the growth of the research-driven economic system. The implication is that when universities and public sector organizations collaborate for scientific research purposes, there is a need for the two parties to develop a system of funding the research initiatives, either by collective participation in the funding process, or sharing of duties, in terms of making one party the chief financier and the other the major driver in the scientific research initiatives.

It is also seen in table 1 that more than 95% of the participants accepted that the partnership makes it possible for academics and students from Saudi universities to work on real-world initiatives with government agencies, boosting opportunities for practical learning. Scientific research is not exclusive to the lecturers and other administrative members of the school system. According to Onsman (2010), partnership between universities and the public sector organizations for developments in scientific research have integrated the research capabilities of many students, mainly the doctorate research students. About 91.52% of the respondents accepted that the collaboration between universities and public sector organizations in Saudi Arabia increases the quality and breadth of scientific research projects by giving researchers access to innovative research facilities and tools. There are different government and private sector owned research facilities in Saudi Arabia. Through the collaboration between universities and the public sector organizations, they can collectively gain access to the facilities for research purposes.

The second research question focuses on the challenges and restrictions the collaboration between universities and public sector organizations in Saudi Arabia face in the development of research scientific aimed at increasing the adoption of research-driven economic interventions towards the Vision 2030. Different concerns were included in the questionnaire and the findings are contained in table 2 above. The views of the critical stakeholders in the university-public sector partnerships form the basis for the findings of the study.

The findings indicate that about 81.29% of the study population accepted the claim that effective sharing of information and cooperative research activities are hampered by inadequate communication and cooperation structures between universities and public sector entities in Saudi Arabia. According to Salem (2014), effective communication between the universities and the public sector firms they collaborate with is the major strength for any strategic developmental initiatives. The findings from the survey supports this view. The participants affirm that inadequate communication and the failure to establish relevant partnership structures are two factors that strongly affect the development of scientific research initiatives through university-public sector partnership. In the same vein, about 94.25% of the participants agreed that the growth of scientific research is hampered by the insufficient funds and facilities devoted to joint research initiatives between universities and public sector enterprises. Although 3.59% of the participants rejected this claim and 2.16% remained undecided, the overwhelming number of the participants strongly affirm that funding is a huge concern for the development of scientific research initiatives through university-public sector partnership. In the words of McMullan (2013), there is a need for the government of Saudi Arabia to develop strategies to fund research initiatives since they aimed to redirect the nation's economic system from oil-dependent economic system to research-driven economic system in the Vision 2030.

The findings from table 2 further indicated that 95.69% of the participants accepted that aligning the objectives of universities with public sector organizations for collaborative research endeavors is difficult due to differences in organizational cultures and priorities. It is a perennial challenge for the universities and the public sector organizations to align their priorities in pursuing a common goal of research development for the nation. Each

public sector organizations are mainly established for certain purposes. For instance, ARAMCO is a significant player in the oil industry in Saudi Arabia. The ministry of education also has a diversified focus beyond the university system and research development. As such, there is a need for the key stakeholders in the university system and the key players in the public sector to clearly identify areas of interest for the development of scientific research in the formation of the partnership.

There is also the challenge of passing through the bureaucratic procedures and bottlenecks in the public service in Saudi Arabia. According to Nurunnabia (2017), in the partnership between universities and the public sector organizations, decision-making is slowed down by bureaucratic procedures and administrative obstacles, which also impede the advancement of cooperative scientific research initiatives. This statement is also supported by over 92% of the study population. Only 5.76% rejected the claim why 1.43% remained neutral, which is indicative of the acceptance of the fact that bureaucratic procedures and administrative protocols are widely known to slow down decision-making for the development of scientific research initiatives for research-driven economic system in Saudi Arabia through university-public sector partnership. Finally, 71.94% of the participants recognized that ad hoc projects replace sustaining and significant research partnerships when there is insufficient long-term planning and a strategic goal for the cooperation. Salem (2014) recognized the failure of long-term plans in the university-private sector partnership as a major challenge. Although over 21% of the participants rejected this claim while 6.48% remained neutral, the overwhelming majority of the participants acknowledge the negative impacts of lack of long-term plans in the partnerships which has amounted to developing of short-term scientific research initiatives.

5. Conclusions

The Saudi Arabian economic system's shift from an oil-driven society to a research-driven one has been proven to be largely facilitated by partnerships between universities and public sector enterprises. This research goes much further to get perspectives from important stakeholders from universities and the public sector in order to better examine the significance of these cooperation. Three Saudi Arabian universities—King Saud University (KSU), King Abdullah University of Science and Technology (KAUST), and King Khalid University—along with two corporate sector organizations—Aramco and the Ministry of Education—are the institutions where 139 stakeholders were drawn to participate in the study. In line with the Saudi Arabian Vision 2030, these institutions have formed strategic alliances at different levels to further scientific research and the country's research-driven economic system. Data was collected via a questionnaire as part of a survey technique, primarily to address two important research questions for the study. The approval and rejection of important assertions by the stakeholders who took part in the research, the survey's percentile values, the mean, and the standard deviation were all considered significant statistical measures that were used in the analysis. The findings show that Saudi Arabia's university-public sector partnerships utilise a variety of strategies to create scientific research programs for the country's research-driven economic system. Promotion of collaborative research projects, information sharing techniques, financing ways, student involvement in strategic research projects, and cooperative construction of research facilities throughout the country are some of the strategies. The report also identified significant obstacles to using partnerships between universities and government agencies to further the advancement of scientific research. The results show that poor coordination between the partnership groups, a lack of finance, the inability to align institutional goals, bureaucracy, and a lack of long-term planning are the main obstacles. This leads to the conclusion that the government and academic institutions must acknowledge the importance of their creative scientific research efforts in Saudi Arabia's research-driven economic system.

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