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KUWAIT UNIVERSITY RESEARCH PARK: A KEY DRIVER FOR STI IN KUWAIT AND THE REGION

PLENARY SESSION 3

Cooperating with knowledge creators: Models of collaboration with universities and R&D

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Kuwait University Research Park: a Key Driver for STI in Kuwait and the Region

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ABSTRACT

We have developed the main concept of Kuwait University Research Park (KURP); aimed at bringing research at Kuwait to life. KURP is envisioned to be a key driver of innovation, economic, and societal development in the State of Kuwait. The fundamental Framework of KURP revolves around two major Oases: Innovation & Discovery Oasis (IDO) aimed at developing applied scientific research, primarily focused on multidisciplinary research; and Collaboration & Commercialization Oasis (CCO) aimed at providing a venue for collaboration with local and international institutions, and benefiting from research outcomes for economic and societal development. Working towards the physical realization of KURP, current efforts are essentially aimed at identifying core elements for transforming park into a vibrant scientific entity, through KU's research strengths, intellectual caliber, internal and external partnerships, and sustained flow of capital. In this paper a systematic methodology was adopted whereby the main challenge is identified through a process of reverse engineering, followed by finding the root causes, and strategies for mitigation. A key finding is that the way forward for a sustainable intellectual research capacity building should be borne through the laborious process of strengthening the local capabilities rather than the seemingly appealing outsourcing strategy.

Introduction

At Kuwait University (KU), increased efforts are being directed at enhancing institutional research infrastructure, facilities and capabilities. Researchers, at all thirteen faculties of KU, actively participate in funded and unfunded research

activities, resulting in the development of several areas of research strengths. The Office of Vice President for Research grants and manages around 500 research projects annually (OVPR, 2013a), through the Research Sector (RS).

Over the past few years, the RS is endeavoring to improve and elevate the quality of scientific research at KU through measures that involve restructuring of the grant support system, investing in General Facility projects, and instituting incentive rewards for distinguished research accomplishments of faculty members (OVPR, 2011/12). These measures have resulted in expediting infrastructural development, facilitating research implementation, and enhancing institutional research capabilities essential for the sustenance of high quality research; apart from providing an encouraging environment for faculties to pursue multidisciplinary research in basic and applied sciences, and humanities.

Together with enriching the research facilities, RS current focus is on external research collaborations (see Figure 1), and a good number of ongoing projects are being funded by external sources, through collaborative linkages and in partnership with KU. The principal aim of external funding is engaging KU researchers in applied research activities, and enhancing their potential and expertise by involving them in research and development projects of strategic significance and value to local industries and the society.

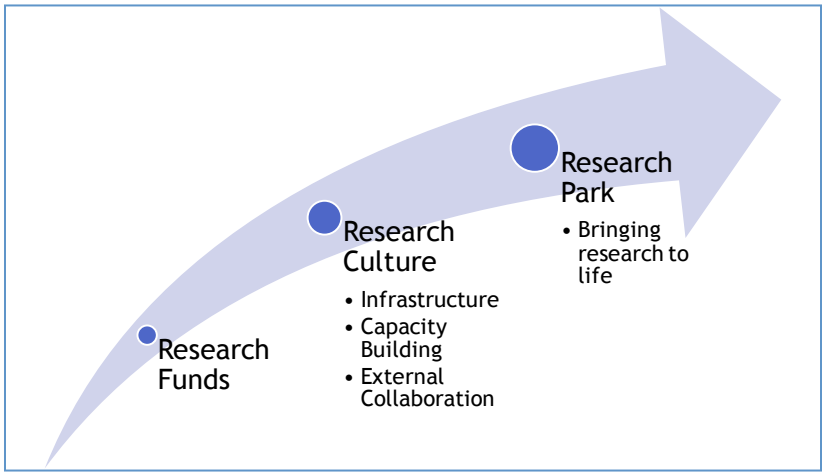

Figure 1: Progress of research activity at KU.

Presently, RS major thrust is towards “bringing research to life” (Figure 1), through exploring venues for investing research outcomes and IPs. External

alliances are simultaneously being enhanced in a bid to incorporate global outlook and dimensions in KU research and development. In this context, a concept development study has been conducted for establishing *Kuwait University Research Park* (KURP) in the new campus, at Sabah Al-Salem University City (OVPR, 2013b). KU has already moved beyond the concept and key findings of the empirical study, taking strategic steps towards launching the Virtual KURP last September 2013.

Despite continuous efforts to enhance research productivity at KU, recent analysis showed a slight decline in number of published papers, while maintaining steady increase in quality of publications in terms of number of citations. Furthermore, given the boost in science, technology and innovation (STI) initiatives and activities in the region, it is seriously believed that it would be difficult to keep the research stature of KU, which was in the front end within regional institutions since the early eighties of the last century. Such early signals necessitate serious efforts to study the challenges, identify root causes and deploy a strategic plan that would go beyond solving the problem, to achieve major improvements.

The main aim of the current study is to identify the root causes of the decline in the research outcomes at KU, and to verify a hypothesis that the concept developed for the future KU Research Park (KURP) would contribute in mitigating the problem.

Methodology

A systematic methodology is followed to identify the root causes and testing the hypothesis that establishing a university research park would contribute in uplifting the research outcomes at KU. The proposed methodology is presented in Figure 2. It starts with identifying the main challenge to realizing the aims (i.e. desired outcomes) of university research parks in Kuwait and the region. Selected analysis tools are then applied to diagnose the challenge in order to identify root causes. Finally, we test the hypothesis that the proposed conception of the KURP does indeed provide the solution elements to mitigate the challenge.

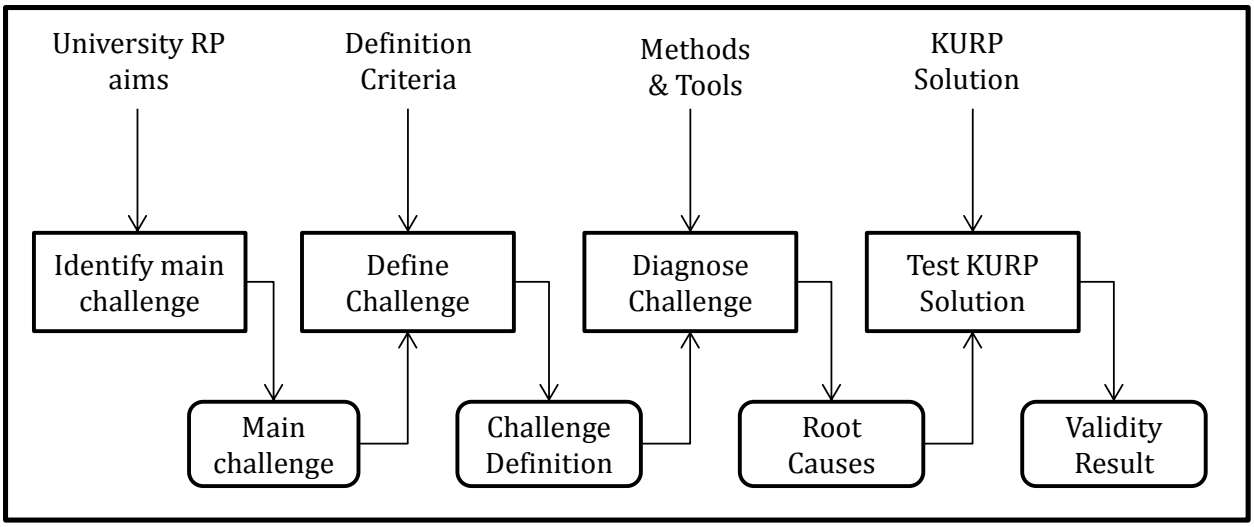

Figure 2: Proposed methodology to validate the conception of KURP.

As shown in Figure 2, the main steps of the proposed methodology are as follows:

1. *Identify the main challenge*. In this step reverse engineering concept is applied. Starting from the final outcomes and aims, and considering the research culture of Kuwait and the region, the main challenge is identified.
2. *Define the challenge*. In this step the main challenge is defined through studying and analyzing the current status of research in Kuwait and the region.
3. *Diagnose the challenge*. Using information on research parks in general and GCC in particular, a cause-and-effect diagram is developed to identify cause categories and related causes leading to the challenge. The output of this step is the root-causes of the challenge.
4. *Test the KURP Solution*. In this step, the validity of the proposed KURP concept is tested as a solution that addresses the root causes.

Identifying the Main Challenge

Examining the literature on university research parks (AURP, 2013), their final desired outcomes are twofold:

1. Development and expansion of national economy.
2. Creation of value-added job opportunities.

These impacts are generally realized through the following three major *effects* of university research parks:

1. Assisting existing companies to grow.
2. Creating new knowledge-based innovative businesses.
3. Commercializing intellectual properties.

These effects can be addressed by the following university research park *outputs*:

1. Strong research.
2. Commercialized research outcomes.

Some metrics for the above outcomes have been identified in the KURP concept development study (OVPR, 2013b) as shown in Table 1.

Typical challenges facing research parks to produce the desired outputs are:

1. Developing sustainable intellectual research capacity.
2. Targeting the right research areas that address both national priorities and university strengths.
3. Securing financial funds.
4. Overcoming governing bureaucratic regulations especially in the public sector.

Figure 3 depicts the relationship among the various types of outcomes as they relate to the university research park system and the main challenges that need to be addressed in order to achieve success. The figure is based on the Organization for Economic Co-Operation and Development (OECD) model of organizations' outcomes (OECD, 2009). It is important to note that the effects and impacts of university research parks are highly affected by external environment factors; e.g. drivers of market competitiveness such as primary education, efficiency of goods market, efficiency of labor market, financial market development, business sophistication, innovation, market size, and technological readiness (WEF, 2013/14).

Table 1: Definitions of KURP's Key Performance Indicators (KPIs)

Objectives		Key Performance Indicators	
1	Promote national economic development	1.1	Spinoff Rate
		1.2	Retained Earnings
		1.3	Core Activities Contribution
2	Create new and value-adding jobs	2.1	National Job Generation Rate
		2.2	Rate of Hired Students
3	Motivate multidisciplinary technology-based innovations	3.1	Talent Development Rate
		3.2	Intellectual Patents Rate
		3.3	Average Patent Filing Time
		3.4	Tenants Occupants Rate
4	Produce impactful research	4.1	Rank of Kuwait University
		4.2	Research Anchors Rate
5	Establish a strong base of researchers in targeted innovation focus areas	5.1	Rate of Researchers in Targeted Research Areas
6	Develop entrepreneurial culture among researchers and students at KU	6.1	Incubations & Businesses
		6.2	Rate of Patent Commercialization
		6.3	Development Intensity

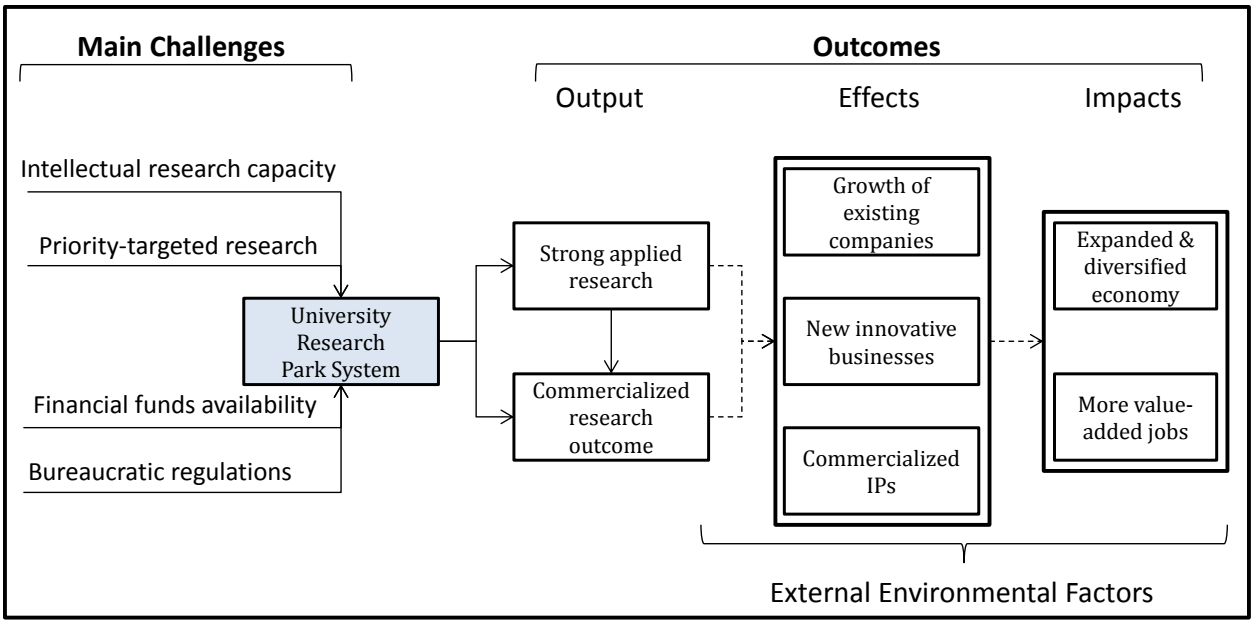

Figure 3: University research park outcomes and challenges.

Considering Kuwait and the region, the first challenge is the one that stands out as most difficult to address. We believe that the remaining challenges may be naturally addressed through a sound operational university research park. For KURP, innovation focus areas have been identified to address national priorities and university's strengths as shall be explained later. As for securing financial funds, Kuwait and the region are blessed with abundant financial resources. However, a mark of a successful university research park would generate enough income to sustain its own operation. The fourth challenge could be addressed by establishing a non-for-profit entity to handle necessary commercial transactions; this has been facilitated with recent laws adapted by legislations in Kuwait.

The remainder of this paper will focus on the challenge of building a sustainable intellectual research capacity, as we believe that it is the most formidable challenge for university research parks in our region. This will be followed by addressing the other challenges through the conception of the KURP.

Defining the Challenge

Research outcomes and productivity of faculty researchers at KU, generated from funded and unfunded research, are continuously monitored to identify

research strengths, and assess the impact and outcomes of various research programs. Research productivity trends, in terms of number and quality of publications, are effectively used to materialize the transformation from the conventional model of faculty level research to the model of interdisciplinary, innovative and entrepreneurial culture (see Figure 1). This objective is realizable over the coming few years, considering the faculties increased predilection to quality consciousness, which is bound to gain further momentum on quality front in faculty research, and in the process, raising international scientific standing and stature of Kuwait.

Publications trend of Kuwait is compared with those of Saudi Arabia, Qatar and UAE in Figure 4. At institutional level, Figure 5 compares research outcomes of KU with KAUST, MASDAR and Qatar University. Although the trends indicate clearly that scientific research at KU has been at the frontend since early eighties, they also show stagnation and slight decline over the last decade. Such symptom has been considered by the RS as a serious alarming sign, and hence calls for immediate corrective actions. A reassuring sign is that despite the decline in research outcomes, the RS efforts during the past few years have resulted in maintaining continuous ascend in research quality (see Figure 6), in terms of number of citations.

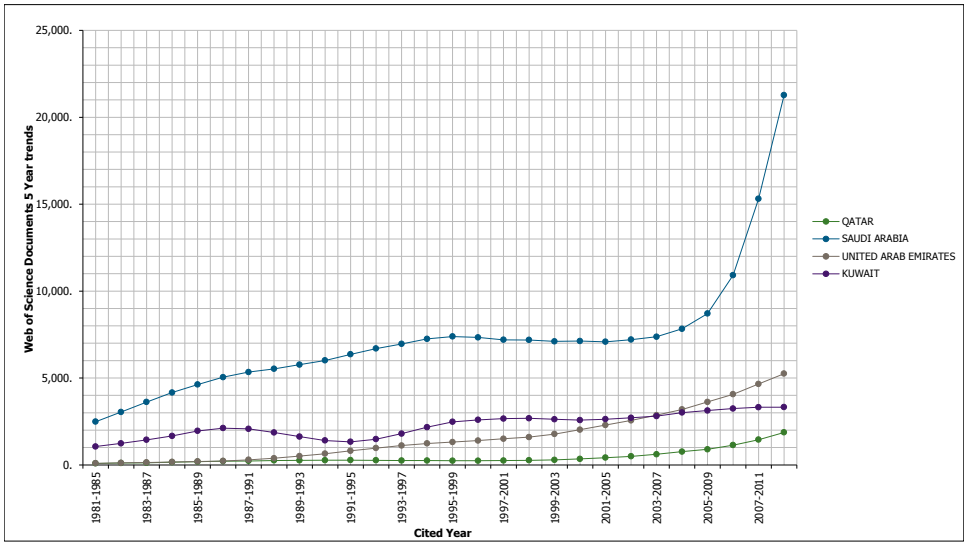

Figure 4: Comparison of publication trends of Kuwait, Saudi Arabia, Qatar and UAE (source: Incites, Thomson Reuters).

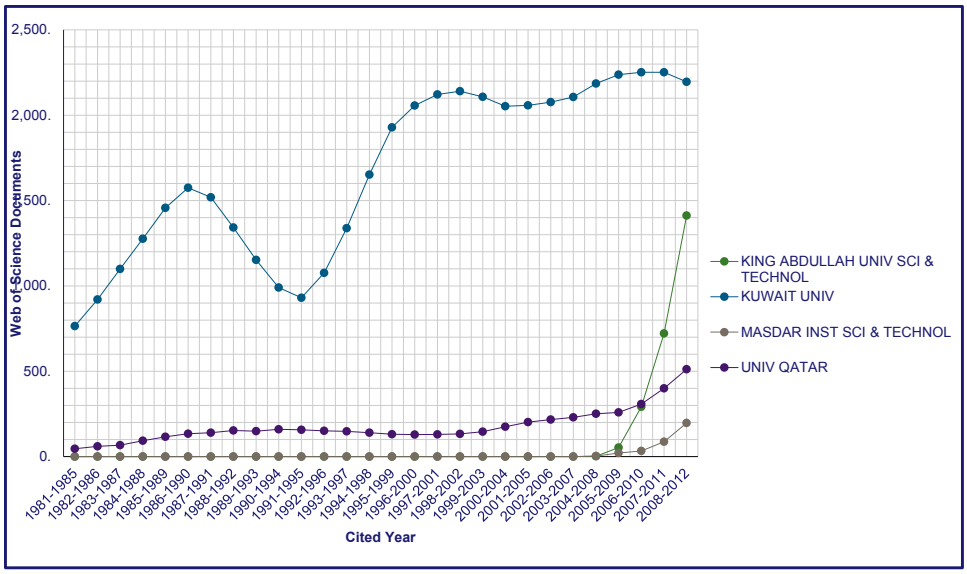

Figure 5: Comparison of publication trends of KU, KAUST, MASDAR and Qatar University (source: Incites, Thomson Reuters).

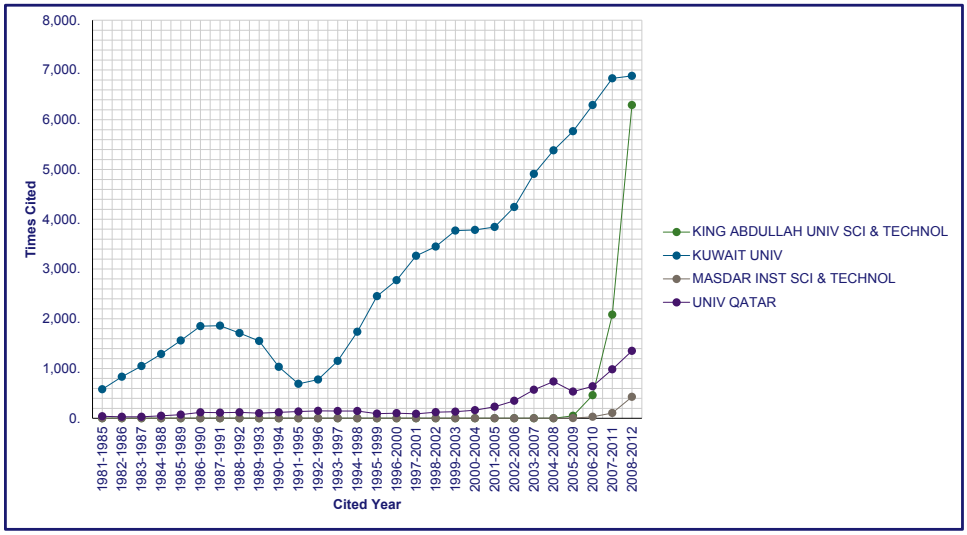

Figure 6: Comparison of citations of KU, KAUST, MASDAR and Qatar University (source: Incites, Thomson Reuters).

Hence, the Challenge may be stated as follows:

> *Kuwait University has reached its capacity limit in terms of research productivity; this potentially impacts its future research rank in the region. The mission is to develop sustainable solution(s) that would expand its research capacity.*

Diagnosing the Challenge

The causes for low non-sustainable intellectual research capacity in Kuwait are identified through a process that involves review of the literature on university research parks in general, and examination of the experiences of regional university research parks. After examining the causes, we classified them into four categories and depicted the results graphically on a cause-and-effect diagram as shown in Figure 7.

Many public universities in the region, despite their public claim otherwise, place much higher emphasis on teaching at the expense of research and community service. This is evident by the practice of calculating faculty loads exclusively based on teaching hours. So, faculty members, regardless of their research productivity and aptitude, are required to teach the same minimum number of courses. Also, universities in the region award graduate scholarships (master and doctorate) abroad. This coupled with the lack of encouragement of international students to study in local universities lead to weakening of their graduate programs.

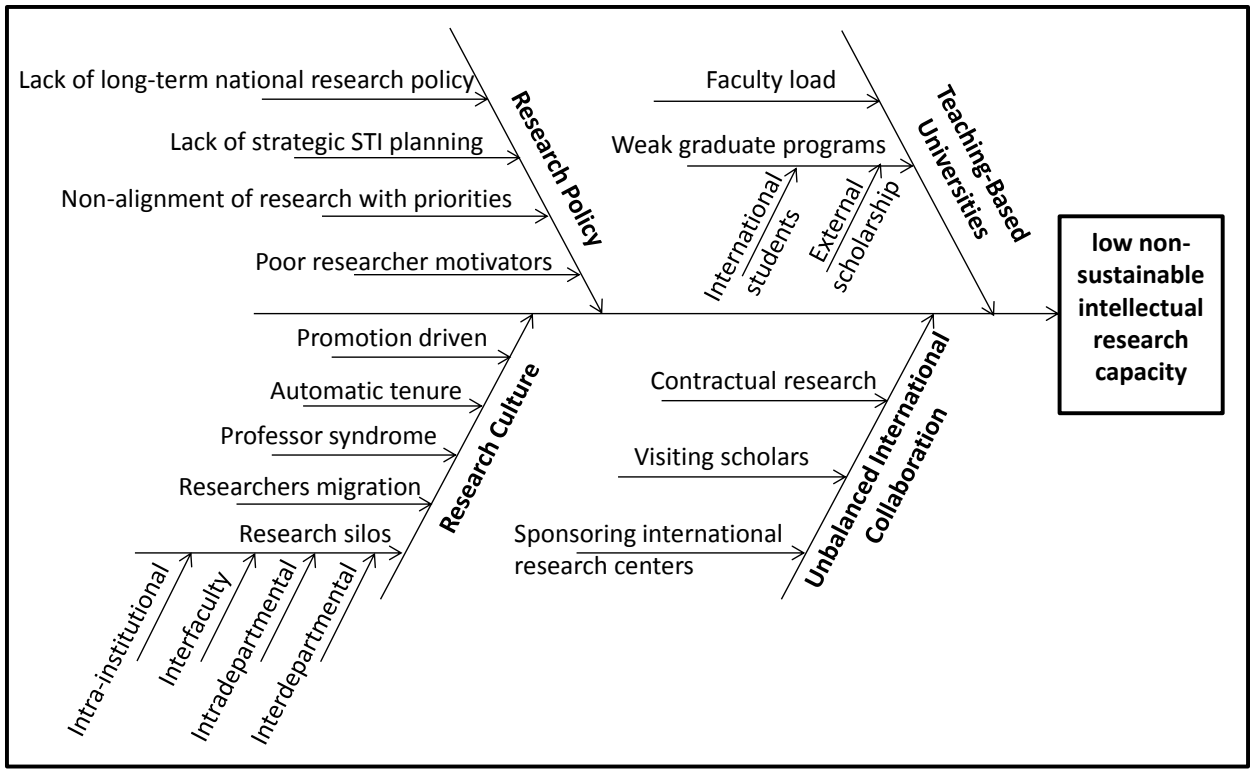

Figure 7: Causes for low non-sustainable intellectual research capacity.

Research collaboration efforts between regional universities and international reputable universities and research institutes may be characterized as unbalanced, usually in favor of the international party. In the contractual model, the local side usually bears the financial burden; whereas, the international one the intellectual. Moreover, the contractual experience shows that it does not lead to the transfer and sustenance of research capacity. Similarly, the two other models, i.e. visiting scholars and sponsorship by international research centers (Figure 7), focus on the high financial capacity of regional universities to achieve short-term and short-lasting research benefits.

Examining the research productivity and quality trends, it is evident that a number of regional institutions have realized sharp increase in their performance over a relatively short period. This was largely attributable to a strategy of importing individual and institutions intellectual capabilities; thank to the financial abundance that makes this possible. Bowman and Darmody (2008) reported; "... the increasing oil revenues in many nations in the Middle East are funding large-scale research and development investments that far surpass

those being built in the United States". Nevertheless, though it is possible to expedite infrastructural and technology developments, it is highly questionable that this is possible in the realm of building sustainable research. World experience has shown that STI can only sustain through building intellectual national capacity.

Several characteristics of the present research culture in the Gulf universities inhibit sustainable intellectual research capacity building. Notable examples include the academic promotion being the primary driver of research for many faculty members; the tenure status that is immediately granted to young national faculty members before they demonstrate any research capability or promise; the professor syndrome where faculty members, especially national ones, exhibit sharp decline in research productivity once they attain the rank of professorship; the migration of non-national researchers that tends to be prevalent due to the financial advantage being the primary competitive source among competing regional universities; and the interdepartmental, intradepartmental, interfaculty and inter-institutional research silos (Figure 7). Such a phenomenon requires serious investigation to find out its specific causes.

Finally, a formidable well-based long-term research policy is generally lacking in the region. For example, in Kuwait, a national overarching research policy is non-existent despite the many attempts to adopt one through both the legislative and executive branches. Another important missing is a strategic STI plan that delivers much needed research-capable young enrolls to the universities. Non-alignment of research with national priorities is yet another policy-related weakness. The last important cause of a policy nature is the absence of motivators for researchers. Here it is important to emphasize that financial reward is more of a dis-satisfier than a motivator. Researchers are typically motivated by a work environment that is conductive to research, where they have easy access to research funds, facilities and equipment. Equally important motivators, are job security and family welfare; especially for non-national researchers.

As a result of analyzing the cause-and-effect diagram shown in Figure 7, it can be argued that the research policy is the root cause for low non-sustaining

intellectual research capacity. It is believed that it has direct effect on the other three cause categories. Only through a long-term policy that provides for institutionalizing, rather than outsourcing, intellectual research capacity would be possible to achieve research sustainability. This is a premise of the KURP that shall be examined in the following section.

Testing the KURP Solution

The main concept of establishing KURP is outlined in a study (OVPR, 2013b), conducted by a team of researchers at KU, and sponsored by Kuwait Foundation for the Advancement of Sciences (KFAS). The vision, mission and strategic objectives of KURP are:

- ***Vision***: KURP's Vision is *to become a key driver of innovation, economic, and societal development in the State of Kuwait.*
- ***Mission:*** KURP's mission is *to nurture applied and multidisciplinary research, commercialize research outcomes, incubate and establish new businesses, and collaborate with relevant research, governmental and non-governmental institutions.*
- ***Strategic Objectives***:
  (a) *Participate effectively in diversifying and growing national economy, and creating new and value-added job opportunities;*
  (b) *Create a transformational change in research performance, resulting in uplifting the stature and ranking of KU worldwide; and*
  (c) *Develop national capabilities in advanced technology and entrepreneurship, to ensure the development and prosperity of the Kuwaiti society.*

As shown in Figure 8, the fundamental framework of KURP consists of two major Oases:

1. ***Innovation & Discovery Oasis (IDO)***: Aims to developing applied scientific research, with a focus on large-scale multidisciplinary research. The IDO is mixed-use, meaning that it fosters and encourages the collaboration of both KU and industrial researchers in the realm of multidisciplinary and translational research.

2. ***Collaboration & Commercialization Oasis (CCO)***: Aims to providing a venue for collaboration with local and international institutions, and benefiting from research outcomes for economical and societal development.

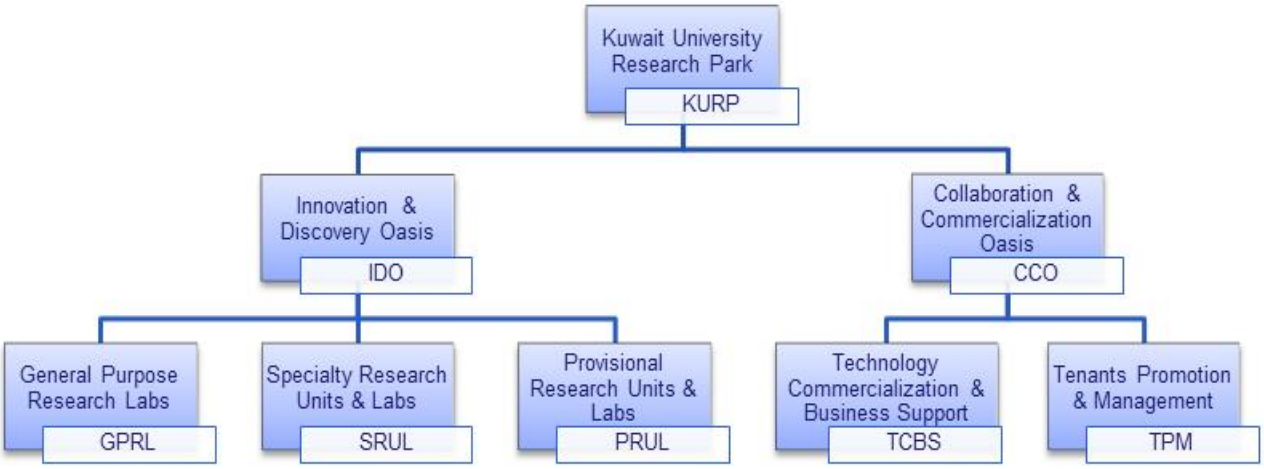

Figure 8: Major components of the IDO and CCO.

Key functions of KURP are defined as: nurturing research and innovation; corporate relations and engagement; technology commercialization; incubation and spinoffs; entrepreneurship and capacity building; and public relations and marketing. A key component in the KURP framework is non-for-Profit Organization, envisioned to be established for managing the commercial activities of the CCO for effective and efficient marketing of research and innovation outputs of the oasis, establish business incubators for new innovation and technology companies, as well as enter into agreements and alliances with leading companies and institutions, known for empirical research, development and innovation.

Four innovation focus areas (IFAs) were essentially identified based on elaborate analysis of KU's areas of research strength and national priorities. These IFAs include: services and computing systems; health services, diagnostics, drugs and therapeutics; alternative and renewable Energy and environment; and advanced Materials.

A phased implementation strategy has been adopted and started on Sept. 2013, which revolves around "Virtual Research Park," (VRP) involving explicit steps towards gradual operation of the research park, until achieving complete operational functionality. Operational activities of the (VRP) are categorized in four phases: Initialization, Startup, Transition and Physical Realization.

The strength of the proposed KURP conception is in being a *capacity-oriented university research park* that relies on grass-root capabilities as a base for building intellectual research capacity. This is evidenced in the following KURP key design aspects (OVPR, 2013b):

1. Supporting faculties through leveraging the research park facilities to extent KU researchers' capabilities and potentials, and creating a sense of ownership among KU faculties.
2. Strengthening KU graduate programs through creating attractive environment for postgraduate students; not only from KU but also from national, regional, and international academic and research institutions.
3. Involving undergraduate and graduate students in scientific research through internship programs at KURP.
4. Introducing a policy that balances research and teaching. This may entail providing partial or full time release for faculty members to do research at the Park.
5. Encouraging inbreeding; and promoting post-doc scholarships after doctorate degree.
6. Adopting strict technology transfer policy that ensures balanced partnerships with international academic and research institutions.

Conclusion

In this paper we have outlined the current research provisions at Kuwait University. Through examining research performance of Kuwait University in terms of number and quality of publications, and comparing it with regional institutions, it was possible to identify the main challenge KU and other regional universities will face in the coming years. Adopting a systematic methodology, the challenge was defined and diagnosed for root causes. Considering various design aspects of the KURP conception developed by RS, it has been concluded that only through a *capacity-oriented university research park* would it possible

to develop a sustainable research in Kuwait. In a nutshell, relying on national grass-root capabilities is the most assuring, yet relatively slow, way to develop sustainable intellectual research capacity.

Acknowledgement

This work was supported by Kuwait Foundation for Advancement of Sciences (KFAS), project number 2012-150-802.

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