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Saudi Arabia

Towards Knowledge-Based Economy*

Dr. Ing. Abdulfattah Obeid
The National Electronics, Communication and photonics centre
King Abdulaziz City for Science and Technology
Riyadh, *Kingdom of Saudi Arabia*
obeid@kacst.edu.sa

I. INTRODUCTION

Saudi Arabia – officially known as the Kingdom of Saudi Arabia – was founded by King Abdul-Aziz bin Saud in 1932. Saudi Arabia is the largest Arab state in Western Asia and the second largest in the Arab world. It has the world's second largest oil reserves which are concentrated largely in the Eastern Province [1]. The country holds a special historic significance since it is the birthplace of Islam and has the holiest places in Islam – Mecca and Medina.

Kingdom of Saudi Arabia in recent years has decided to diversify its economy which is predominantly oil based to a knowledge based economy. Moreover the country has seen rapid growth in young population in recent years which has prompted the government to aggressively expand the infrastructure for higher education including universities, educational and research institutions. The country's spending on education, research and development has increased significantly from 105 billion Saudi Riyal in 2008 to 204 billion (~US$ 54 billion) in 2012 [2].

II. CHIP DESIGN INITIATIVES

Kingdom of Saudi Arabia in recent years has seen a great deal of expansion in integrated circuit design initiatives. King Abdulaziz City for Science and Technology (KACST) which is the country's research lab and its national science agency is at the forefront of these endeavors. The country has developed a National Science, Technology and Innovation Plan (NSTIP) in 2009 which targets to transform the Kingdom's economy from the current oil based economy to a knowledge based one in the next 20 years. The plan envisions the achievement of global leadership in strategic technologies – one of which is Electronics, Communications and Photonics (ECP). KACST's National Center for ECP (NCECP) has been chartered to support and augment various efforts working to fulfill the NSTIP objectives in ECP as one of the selected strategic technologies of this plan.

One of the main NSITP objectives is to diversify the Saudi economy and to transform it to become a knowledge-based one. To elevate the local knowledge base, KACST has launched a number of ambitious initiatives in collaboration with reputable local and global partners to push technology barriers, creating intellectual property (IP) and technological know-how. These efforts are expected to have a positive impact on local research and industry. A number of projects developing Systems on Chip (SoC), Analog/Mixed-signal IC design and Microelectromechanical systems (MEMS) technologies are underway.

KACST has recently launched a Multi-project wafer consolidation service called WaferCatalyst (www.wafercat.com) to accelerate the development of the IC Design in the Kingdom as well as the region. This service accessible globally provides Electronic Design Automation tool purchase coordination, Training,

Capital	Riyadh
Largest city	Riyadh
Language	Arabic
Area Total	2,250,000km^2
Population	26,939,583
Currency	Saudi riyal (SR)
Time zone	(UTC+3)

Consultancy as well as access to Fabrication Facility to entities in the Kingdom and globally.

III. ACADEMIA

Saudi Arabia has seen a tremendous growth in the higher educational sector in the last two decades.

The population growth rate of Saudi Arabia is among the highest in the world reaching 3%. This has resulted in a large percentage (62%) of young population with age less than 24 years. In the fifteen year period from 1993 to 2008 the number of high school graduates increased by 443% [3].

Due to the huge increase in the number of high school graduates a significant increase was necessary in the number and capacity of the higher educational institutions. Many new public and private institutions of higher learning were started. A significant investment of the Saudi government in the higher education sector is expected to increase the capacity of universities in 2014 to 1.7 million students from 636,000 students in 2006 [4].

Emphasis on quality of education and research has already started to yield results with a number of Saudi universities included in top 200 universities in the world consistently in global rakings. Moreover in terms of research publications in scientific and technological journals Saudi Arabia ranks fourth for scientific productivity in the Muslim world [5].

IV. GOVERNMENT PROGRAM

The Saudi government through KACST is playing a key role in the development of the research ecosystem in the country. It is conducting research in large number of strategic areas including water, oil & gas, petrochemicals, nanotechnology, biotechnology, information technology, electronics, communications & photonics, space & aeronautics, energy, environment, advanced materials, mathematics & physics, medical & health, agriculture technology and building & construction.

Apart from conducting its own research and development through KACST and other centers, a number of initiatives to encourage innovation and commercialization of research are already underway. The BADIR program of KACST, which aims at setting up of 80 incubators throughout Saudi Arabia and to create up to 20,000 jobs by 2025 has started resulting in over 100 jobs [5]. The government has also setup 3 Technology Innovation Centers (TIC) in collaboration between KACST and three major universities at the cost of 150 million Saudi Riyals in the fields of Carbon Retain & Sequestration, Radio Frequency & Photonics and Individual Diagnostic medicine.

The ninth five year development plan (2010-2014) of the government allocates significant resources for the improvement of universities and research organizations in the Kingdom with research funds up to US$ 240 million per year have been allocated for grants for science and technology research. During this period, the goal is to create 10 research centers, 15 university innovation centers in association with KACST and 8 technology incubators [4].

KACST also funds innovative research projects for the industry in Saudi Arabia under the Saudi Business Innovation Research (SBIR) program.

Apart from KACST there are other prominent research organizations in the Kingdom working on world class research in various fields like Price Sultan Advanced Technology Research Institute (linked to King Saud University) and King Abdullah University of Science and Technology (KAUST) which has a number of semiconductor research labs operating with strong support from the Saudi Arabian government.

Reference

[1] http://www.globalsmes.org/

[2]http://www.arabnews.com/saudi-arabia/kingdom-tops-world-education-spending

[3]http://www.ond.vlaanderen.be/hogeronderwijs/bologna/forum2010/documents/SAUDI_ARABIA_National_Report.pdf

[4] Saudi Arabia – Rapid growth for universities, 19August2010(http://www.universityworldnews.com/article.php?story=20100819194316389)

[5] SDIR Monthly reports

Dr. Ing. Abdulfattah M. Obeid received the B.S. degree in Electrical Engineering from King Saud University in 1994, M.S. degree in Electrical Engineering from Michigan State University in 1999. In 2006, he received the Ph.D. degree in Electrical and Information Engineering from Technical University of Darmstadt, Germany. He is currently the Deputy Director for Scientific Affairs at the National Electronics, Communications and Photonics Research Centre of King Abdulaziz City for Science and Technology (KACST). His research interests include Integrated Circuit (IC) design and technology, System on a Chip (SoC) design, reconfigurable computing, computer architecture and wireless sensor network. Dr. Obeid has served on the technical program committee of several IEEE Conferences and Workshops. Dr. Obeid is a member of IEEE and ACM.