

Welcome

In This Presentation, We
Will Shed Light On The
Institutional Fund For
Research & Innovation At
KSU



About The Institutional Funding Program

The Ministry of Education, represented by the Research and Development Agency, has launched the Institutional Funding Programme for Research and Development with the aim of developing a roadmap for research, development and innovation at Saudi University, which will help the University to define its research and development priorities in a manner consistent with the University's potential and research strategies. KSU, represented by the Vice Rectorate for Graduate Studies and Scientific Research, has developed an implementation plan to ensure that the objectives of the institutional funding programme are achieved in line with the aspirations of the Ministry of Education and the University's strategic objectives aimed at strengthening the University's role in achieving national strategies for the Kingdom's Vision 2030 and at developing the University's global competitiveness among its research priorities.

vision & Mission

Produce creative research to serve society and contribute to transforming the Saudi economy toward a sustainable future through a conducive research atmosphere, optimal use of resources, technologies and effective international collaborations

What KSU Aims From The Program

First,

Strengthen and enlarge KSU research by focusing on advanced technologies of strategic importance to KSA economic and industrial sectors, such as; energy, water, oil, petrochemicals, mining, advanced materials, health, tourism, archaeology, education, communication and IT, agriculture, transportation, environment, space and aeronautics, defense and security, nuclear science and applied physics

What KSU Aims From The Program

secondly,

As a comprehensive university, KSU aims to be the focal point in shaping KSA's innovation capabilities stated in the SAUDI VISION2030. Focusing resources on specific areas of research and scholarship where KSA has critical needs. Aiming at declining the dependence on natural resources and building the Saudi knowledge economy

What KSU Aims From The Program

thirdly,

In supporting societal issues and solving community challenges, KSU research aims to enhance health and social services to the entire Saudi community. KSU houses a multi-disciplinary medical city with the finest technology and state-of-the-art facilities best suited for clinical trials. KSU research and development will continue to complement the existing wide-range and extensive healthcare, social services, research-based consulting and professional services.

The Research Priorities

1. Clean and sustainable energy systems
2. Human wellbeing
3. Digital innovations
4. Food, water and environment
5. Petrochemical
6. STEM education



Clean and sustainable energy systems

IMPACT ON KSA ECO SYSTEM

KSA is committed to maximizing value captured from the energy sector; the kingdom advocates 'circular carbon economy' model to achieve sustainability goals. KSA plans to develop its own carbon trading mechanism as part of a move to develop a circular carbon economy (CCE).

IMPACT ON R&D TRENDS

Through innovation and collaboration, KSA is looking to achieve standards set under the United Nations' Sustainable Development Goals and is looking to develop a system where carbon emissions are reduced, reused, recycled and removed to be used in other economically-viable ventures to boost the economy.



Clean and sustainable energy systems

ACTIVITY 1: FIRMLY ESTABLISH LEADERSHIP IN ENERGY STORAGE SYSTEMS

Energy storage is a crucial technology to enable the global transformation towards low-carbon, resilient power systems, and is a key to tackling the intermittency issues of renewable energy. Our research on energy storage will directly service the, enhancing grid operations and safety.

ACTIVITY 2: ADVANCE ENERGY EFFICIENCY TRENDS THROUGH DIGITIZATION.

Global energy intensity has major implications for consumers, businesses, governments and the environment. Energy efficiency will boost economic growth and avoid greenhouse gas emissions, more research focus is needed on how digitalization is transforming energy efficiency and increasing its value.

ACTIVITY 3: PROMOTE SUSTAINABILITY RESEARCH IN TURNING WASTE INTO ENERGY.

As more governments and private operators recognize the need for alternative waste management, creative solutions are needed to become the norm around the world, combining the future of waste and the future of energy.



Clean and sustainable energy systems

ACTIVITY 4: ADVANCING CREATIVE RESEARCH IN SOLAR ENERGY

DESCRIPTION: Solar power is in a constant state of innovation in 2019, with new advances in solar panel technology announced constantly. More future research is needed in solar efficiency, solar energy storage, wearable solar tech, and solar design tech.

ACTIVITY 5: STIMULATE RESEARCH IN ADVANCING PEACEFUL NUCLEAR ENERGY

DESCRIPTION: Coal is responsible for 38% of the world's power, such stagnation led environmental groups to conclude that we need more nuclear energy. The new, safer nuclear reactors might help stop climate change. From sodium-cooled fission to advanced fusion, research will revive trust in nuclear energy.

ACTIVITY 6: NANO STRUCTURES CATALYST

DESCRIPTION: In this proposed activity, a new supported catalyst for different chemical reactions will be investigated. For example, ethane dehydrogenation by carbon dioxide will be synthesized and investigated. Nano-structured monometallic and bimetallic oxides will be loaded on the prepared mesoporous Titania to achieve high dispersion and more stability of active species.



PETROCHEMICAL

IMPACT ON KSA ECO SYSTEM

Saudi Arabia economy relies on its petroleum and petrochemical industries and is actively seeking to make the most of petroleum and natural gas products to produce petrochemicals of economic value. Examples of the most important areas include: the manufacture of new catalysts in the manufacture of polymers, the production of polymeric membranes to extract minerals from water, applications of petrochemical products in paints

IMPACT ON R&D TRENDS

King Saud University was distinguished by its relationship with SABIC, which resulted in the establishment of the SABIC Polymer Center, and this alliance helped in providing many solutions for the petrochemical industries in the Kingdom. We hope our strategy will support this field and it will benefit from the accumulated experiences of the university researchers in transferring modern technologies in petrochemical industries and relevant fields.



PETROCHEMICAL

ACTIVITY 1: DEVELOPMENT OF POLYMERIC NANOCOMPOSITES (PNCS) MATERIALS TO PURIFY WATER AND GET RID OF POLLUTANTS AND RADIOACTIVE MATERIALS.

The development of polymeric nanoparticles (PNCs) to be used in water purification, material separation and extraction of specific elements or compounds due to their ability to improve and increase the effectiveness of surface area, stability and other characteristics that can be modified and improved. This will be reflected in its cost and effectiveness, and will prove its ability to remove pollutants or extract elements and compounds with high speed and selectivity.



PETROCHEMICAL

ACTIVITY 2: DEVELOPMENT OF SMART POLYMERS

Polymers are often used as fixed structural parts, but there are recent developments that have led to entry into advanced (smart) polymers that may have special functions that appear in response to external conditions. Focusing on thermoplastics and their development and packaging materials that respond to the surrounding conditions, especially what concerns food and its packaging, if the materials applied in the manufacture of the electromagnetic shield, automobile components, electronics manufacturing and applications of ATEX (Atmosphères Explosibles) to reduce the risk of an explosion will be taken care of in this program.



PETROCHEMICAL

ACTIVITY 3: MANUFACTURE OF VALUABLE PLASTIC MATERIALS FOR THE ENVIRONMENT AND INDUSTRIAL APPLICATIONS

Development of petrochemical materials origin to produce compounds that serve the environment, such as polymers used in agriculture, water conservation, and plastic sheeting used in greenhouses controlled by infrared entry, and the production of epoxy materials to work with the paint to improve its properties and other applications that maximize the use of petrochemicals to contribute to the economic growth and welfare of human beings.



FOOD, WATER AND ENVIRONMENT

IMPACT ON KSA ECO SYSTEM

The strategy meets local economic, societal, industrial and developmental needs through enhancing research productivity in the Water-food-energy sectors as a national interest specified in the SAUDI VISION 2030. Some of the related KSA programs are: National Industrial Development; Logistics Program & Energy sector development Achieving environmental sustainability; efficient use of soil resources for food security; Ensure sustainable use of water resources, waste water; and rehabilitating economic cities.

IMPACT ON R&D TRENDS

Improved water, energy, and food security on a global level can be achieved through integrated management and governance across sectors and scales. Supporting the transition to a Green Economy, aiming at resource use efficiency and greater policy coherence. As part of the international research ecosystem, KSU will Increase the number of international cooperation and the added value of transferring technology to the R&D in this field.



FOOD, WATER AND ENVIRONMENT

ACTIVITY1: FOSTER ADVANCE NEW TRENDS IN WATER DESALINATION

Recent advances in desalination technology have reduced costs and improved performance and reliability. The advance research includes: membrane and membrane pretreatment systems, energy recovery devices, materials of construction, hybrid process configurations, and increased unit capacities

ACTIVITY 2: TACKLING RESOURCES AND ENVIRONMENTAL THREATS FACING BIG CITIES OF THE FUTURE

Our aims at resolving major issues and problems confronting big cities include those involving fiscal difficulties, crowding, housing, traffic, pollution, public education, and crime.

ACTIVITY 3: PROMOTE RESEARCH, TECHNOLOGY AND INNOVATION IN AUTOMATED SYSTEMS FOR EFFICIENT WATER QUALITY AND DISTRIBUTION

Providing sufficient water of appropriate quality and quantity has been one of the most important issues in human history. Research will ensure water distribution system challenges are overcome and supply water sources to users reliably in a more sustainable and timely manner as a strategic goal.



FOOD, WATER AND ENVIRONMENT

ACTIVITY 4: FOOD AND WATER SECURITY

Research projects in this priority area represent a continuing depends on national and un-conventional resources to meet water and food security demands. As more governments and private operators recognize the need for alternative water management, creative solutions are needed to become the norm around the world, combining the future of waste water reuse, and the future of food security.

ACTIVITY 5: VALUE ADDED CARBON FROM NEW EMERGING WASTE

The easiest and sustainable utilization of new emerging waste is by converting it into carbon via pyrolysis process under an inert atmosphere. Unlike recycling, the pyrolysis process can be considered as green technology even though it generates gaseous products that can reuse for the energy requirement of the pyrolysis plant. Since the pyrolysis is conducted in the absence of oxygen, it produces lesser gaseous pollutants compared to incineration.

ACTIVITY 6: TURNING WASTE INTO VALUE

The Solid waste comprising of all waste from Ag. Municipal and construction waste will be collected from farms and commercial sources. The collected solid waste will be converted to a good source of basic material and more efficient. The efficiency of solid waste will be evaluated to other uses to help save the environment and maximize the benefit of the economy.



HUMAN WELBEING

IMPACT ON KSA ECO SYSTEM

This critical research priority is aligned to KSA Health Care Development Program detailed in the SAUDI VISION 2030. Aiming to improve healthcare service, promote a healthy lifestyle, and strengthen prevention against health threats.

IMPACT ON R&D TRENDS

As part of the international community it's our obligation to respond to top global research concerns. Our strategy will accommodate international Sustainable Development research areas such as; Climate & Environmental Changes, Human Health, Cardiovascular and Metabolic Diseases, Neurosciences, Agriculture, Mobility and Cultural Encounters, and Decreasing the use of Natural Resources by moving beyond discovery to translation and stirring from routine collaboration to co-creation and implementation.



HUMAN WELBEING

ACTIVITY 1: BUILD KSU EXPERTISE IN EMERGING INFECTIOUS DISEASES DIAGNOSING THE FACTORS CONTRIBUTING TO DISEASE EMERGENCE

Emerging Infectious Disease (EID) incidence has increased in the past 20 years and could increase in the near future. Emerging infections account for at least 12% of all human pathogens. Our research aims to reduce the threat posed by EID through prediction, pandemic detection, and vaccine development.

ACTIVITY 2: PRODUCE CREATIVE RESEARCH TO DEEPER UNDERSTAND CHRONIC DISEASES

Globally, more than 70 % of deaths are due to chronic diseases. Chronic diseases directly affect overall health care budgets, employee productivity, and economies. Research efforts to understand, treat, and prevent chronic diseases will help to reduce the global burden of these conditions.



HUMAN WELBEING

ACTIVITY3: INCREASING SUPPORT TO CONFRONTING MENTAL HEALTH CHALLENGES

Confronting mental health challenges, is still lagging behind, mental challenges account for 47% of disability in life. Addressing mental ailments account for only 10% of the health budget of developed nations. Basic and clinical research on mental illnesses aims at paving the way for prevention, recovery, and cure.

ACTIVITY 4: ADVANCE RESEARCH, TECHNOLOGY AND INNOVATION FOR CLEANER AIR-ENVIRONMENT, LESS POLLUTION AND LOWER HEALTH RISKS

Health impacts of air pollution by governments urged action around the globe. Sectors like energy, transportation and fossil fuel must work in keeping cutting out carbon and other toxic pollutants from their factories. More research, technology and innovation is needed in these traditionally carbon intensive sectors



Digital innovations

MPACT ON KSA ECO SYSTEM

The digital world has grown to become crucial to the functioning of society. Across the globe, the pace of digital transformation is accelerating. This research priority will focus on four major local and worldwide essential R&D areas: Aligned to KSA economic, societal and industrial priorities, The Digital Transformation Strategy will guide KSA on its journey to 2025. It will deliver benefits and meet the expectations of the Saudi economy & society as specified in SAUDI VISION 2030. KSA aims to improve livability in Saudi cities, achieving environmental sustainability, improve the quality of services, and improve the urban landscape. KSA also developed Digital Saudi 2030, comprehensive knowledge and business platform for digital transformation.

IMPACT ON R&D TRENDS

This priority area is well aligned to broader, international R&D trends. The Socio-economic impact of the digital revolution has been large worldwide. The digital revolution radically changed the way individuals and companies interact. Software services and manufacturing and rapidly dropping technology costs made possible innovations in all aspects of the industry and everyday life.



Digital innovations

ACTIVITY 1: ADVANCING THE IMPACT OF DIGITAL REVOLUTION IN DELIVERING EFFICIENT HIGH QUALITY HEALTH CARE

Healthcare industry has been slow to join the global digital revolution. New tools and technologies are needed to make waves across the healthcare system and hold great promise to transform the delivery of health services in the near future.

ACTIVITY 2: EMBRACING THE USE OF DIGITAL TECHNIQUES FOR CROWD MANAGEMENT

Airports, shopping malls, sports stadiums, amusement parks crowds tend to create safety challenges. Without successful crowd control management, the result ranges from unpleasant to dangerous. Research includes techniques such as: wayfinding optimization, queue management, temporary closures, rapid deployment, and customer flow management.



Digital innovations

ACTIVITY 3: INCREASE THE USE OF TECHNOLOGY IN NEW URBANIZATION TO SUPPORT INDUSTRIALIZATION

More than 70% of the world's population will live in cities in 2030. Technology innovation plays an important role in the process of urbanization. Creative research, technology and innovation will create friendlier environment with more efficient energy use.

ACTIVITY 4: APPLY UNDERSTANDING OF ROBOTICS INFLUENCE IN THE FOURTH INDUSTRIAL REVOLUTION

More research and innovation is required for the future design, manufacture, and use of robots for personal and commercial use. While we're yet to see robot assistants in every home, technological advances have made robots increasingly complex and sophisticated. They are used in fields as wide-ranging as manufacturing, health and safety, and human assistance.



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STEM EDUCATION

ACTIVITY 1: STEM Education in Saudi Arabia

The research activities will start with the development of a relevant framework of STEM education to our context; then more research work can be devoted to develop the applications of this framework to produce research- based lessons, materials, activities etc. also, research can lead to assess the consequences of this framework and applications in students learning and their future and the impact on our economy.

ACTIVITY 2: Large-Scale Studies in Science and Mathematics Education

The research activities focus on utilizing the rich data in TIMSS and PISA to provide more understanding of our education related to science and mathematics education and to compare us with other countries and support our practice of evidence – based policy in our education in Saudi Arabia.



STEM EDUCATION

IMPACT ON KSA ECO SYSTEM

Saudi Arabia is seeking to develop general and basic skills of all students to enable them, to face modern life requirements, in addition to specialized skills for each profession that covers all professional fields for young generation. This is asserted in Vision 2030 and the National Transformational Plan with the main aim of preparing a workforce ready to solve real-world problems through hands-on learning activities and creative design. Education is contributing in transition of the economy from dependence on one source of income to economy depending on mind-sets with high skills, creative, and productive human energies. Behind the STEM focus is an economic imperative based on ensuring our current and future workforce are prepared for a STEM-based economy in the future via Strengthen relationships between educational institutions, industry, community organizations.

IMPACT ON R&D TRENDS

Research—Interdisciplinary faculty teams have also collaborated on a number of STEM-related DBER projects and have created new opportunities to engage students in authentic research experiences in STEM.



Thanks for your time