Day 1: Wednesday, 30 March, 2016

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Bilal U. Haq, Smithsonian Institution, Washington D.C

Productivity growth-technology-entrepreneurship nexus: Implications for Pakistan
Irfan ul Haque, South Centre, Geneva

Session 2: *Pakistan's productivity performance*

An Assessment of Pakistan's Productivity Performance 1980-2015
Rashid Amjad, Anam Yusuf & Namra Awais, Lahore School of Economics

Costs, Capabilities and Cash: The Problem of Technology and Sustainable Economic Growth in Pakistan
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Diversification and sophistication of Pakistan's exports: the need for structural transformation
Uzma Afzal & Maha Khan, Lahore School of Economics

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Waqar Ahmed Wadho & Azam Chaudhry, Lahore School of Economics

Structural Change and Economic Growth: The Experience of the East Asian Economies
Rajah Rasiah, University of Malaya, Malaysia

Innovations in Austrian SMEs: Attitudes-Motives-Impact-Implementation-Cooperations
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Correlates of entrepreneurship in Pakistan: the regional dimension
Mahnoor Asif & Anum Ellahi, Lahore School of Economics

Session 4: *Productivity differences and the technological catch-up process*

Same Jeans Same Stitch? A Comparison of Denim Production across Three Factories in Punjab, Pakistan
Theresa Chaudhry & Mahvish Faran, Lahore School of Economics

Measuring Technology Differences across Football Manufacturers in Sialkot
Tariq Raza & Azam Chaudhry, Lahore School of Economics

Technology Adoption in the Sialkot Sport Gloves Manufacturing Sector
Saba Fazal Firdousi & Azam Chaudhry, Lahore School of Economics

What this research tells us about the catch-up process? Policy implications
Azam Chaudhry, Lahore School of Economics

Scientific Research Imperative for Entrepreneurship and Sustainable Development

Dr. Bilal U. Haq
Smithsonian Institution

Indigenous scientific research is crucial for long-term economic growth and simple transference of technology or buying of expertise has its ultimate developmental limitations. Examples from the hydrocarbon industry clearly illustrate this paradox.

Oil-rich developing countries can afford to import expertise with ease, but rarely develop the new technologies needed for the next methodological breakthrough or paradigm shift. Lack of a culture of open scientific enquiry often underlies this failing. For resource-deficient countries this is compounded by dearth of infrastructure and an often-cited reason is unaffordability. Yet, scientific research does not always require large investments of funds, software development is an apt example. Deficit of scientific research in Pakistan may stem from many of these issues, as well as other encumberments. Innovation and entrepreneurship requires a special mix of encouragements and incentives from the government and industry. In my presentation I will outline some of these issues based on my own experience of over 25 years of research leadership and funding in the US and Europe and my involvement with transference of knowledge to both developing and developed countries. I will also review the reasons for my own scientific career choice and the sense of discovery and fulfillment, as well as the perks, associated with the scientific option.

About the presenter:

Dr. Bilal U. Haq, formerly at the US National Science Foundation as the director for Marine Geosciences, is currently a research professor at the Smithsonian Institution in Washington and at Sorbonne University in Paris. He is marine geoscientist of worldwide recognition who has been honored by several professional awards in geophysics and marine sciences in the US and Europe. He was elected a member of European Academy of Sciences, and just recently also to the Royal Danish Academy of Sciences, for his seminal works on sea-level change and its impacts on maritime nations. Dr. Haq has broad experience in the academia, the industry and the government, and has also held assignments with the White House and the World Bank in Washington DC. He has taught or undertaken research at many universities around the world, including MIT, Oxford, Cambridge, Paris and at Tongji University in China.

In Geosciences Dr. Haq's publications are amongst the most cited and influential. He has been a researcher with very diverse interests, with major contributions to marine geology, paleo-oceanography, paleo-climatology, global and seismic stratigraphy

Productivity growth-technology-entrepreneurship nexus: Implications for Pakistan

Dr. Irfan ul Haque
South Centre, Geneva

Labour productivity growth has receive scant attention in Pakistan even though it provides the foundation for rising living standards and a country's ability to compete in the world market. Productivity rises when producers invest and introduce new technologies as reflected in more efficient production methods and improved quality and range of products. Competition among producers entails a constant search for areas of improvement, tapping new technologies and finding innovative ways of producing and delivering the output to consumers. This is entrepreneurship. The first part of the paper discusses productivity growth and its drivers. The second part explains the critical importance of technological progress and innovation in economic growth and the catch-up process. Entrepreneurship and how it might be stimulated in Pakistan is next discussed. The paper concludes with a few ideas on how science and technology could be promoted in Pakistan.

About the presenter:

Dr. Irfan ul Haque – a macro-economist with special interest in trade, finance and development – is Special Advisor at the South Centre. Over the past several years, he has helped the Lahore School in organising the Annual Conferences, including this one. Dr. Haque served as a member of a Group of Eminent Persons, set up by UNCTAD, to examine the issue of commodities and financing, whose report was submitted in 2003 to the UN General Assembly.

He holds a Ph.D. in economics from the University of Cambridge. He started his career at UNCTAD, and later worked in various capacities in the World Bank from 1970 to 1995. After leaving the Bank, Dr. Haque joined the South Centre in 1998. He has served as a consultant to UNCTAD, UN, ILO, UNDP, and G-24. He is author of a number of publications, covering issues of international finance and trade, and macroeconomics as well as science and technology.

An Assessment of Pakistan's Productivity Performance 1980-2015

Dr. Rashid Amjad
Graduate Institute of Development Economics
(Paper co-authored with Anam Yusaf and Namra Awais)

The paper reviews Pakistan's productivity performance over the last thirty five years (1980-2015) and identifies factors which can help explain the declining trend in labour productivity especially in recent years. The paper examines, using standard techniques, the contribution to labour productivity of physical capital, human capital and TFP (total factor productivity) for the overall economy as well as for the three major sectors agriculture, industry and services. Separately the paper also examines using the Job Creation and Growth Decomposition (JOGG) tool the sectoral contributions to job generation in this period. Drawing on the results of these two exercises the paper explores how the labour market may have impacted upon labour productivity and labour absorption in the economy, given the trade-off between the two, with the sharp increase in the supply of labour over this period. In conclusion the paper identifies key factors responsible for Pakistan's disappointing labour productivity performance as well as its inability to create more and better jobs for its fast growing labour force and the dire necessity to revive higher and sustained economic growth in the economy if this performance is to improve.

About the presenter:

Dr. Rashid Amjad is Professor of Economics and Director, Graduate Institute of Development Studies, Lahore School of Economics. He was Vice-Chancellor of the Pakistan Institute of Development Economics (PIDE) for a term of five years 2007-2012. He served for two and a half years (2008-10) as Chief Economist at the Pakistan Planning Commission and as Member, Planning Commission. Dr. Amjad graduated from Government College, Lahore and went on to do his Tripos in Economics (BA Hons. & M.A.) as well as Ph.D. from the University of Cambridge. His PhD thesis on "Private Industrial Investment in Pakistan 1960-70" was published by the Cambridge University Press, U.K. in its prestigious South Asian Studies Series.

Dr. Amjad taught at the Punjab University, Lahore for seven years between 1969 and 1980, when he left to join the ILO. In the ILO, he held a number of positions including as Director, South East Asia and the Pacific as well as led its Employment Strategy Department. He was a member of the Panel of Economists set-up to frame Pakistan's Fifth Year Plan and contributed chapters to Pakistan's Sixth and Seventh Five Year Plan. As Chief Economist he coordinated the preparation of the Draft Tenth Five Year Plan (2010-15).

Costs, Capabilities and Cash: The Problem of Technology and Sustainable Economic Growth in Pakistan

Dr. Matthew McCartney
University of Oxford

Growth in Pakistan has been surprisingly sustainable. GDP growth of 5% p.a. since independence and no recession since (at least) 1960 according to World Bank data represents a creditable performance when compared to all but the most successful developing countries. Pakistan has significantly transformed the structure of its economy during these same decades; in 1950 99% of its exports were agricultural goods and by the 1990s exports were largely manufactured goods. This very success indicates a growing constraint on sustaining growth into the future or a the concern that Pakistan may be headed for a Middle Income Trap. Although there does exist scope for continued growth based on further structural changes - in particular the large number of people still employed in agriculture or else the women not currently engaged in the labour force - for growth to be sustained a more intensive or productivity oriented growth will be necessary. This paper first outlines the importance of productivity growth for sustaining GDP growth in Pakistan, then examines the historical and comparative productivity performance of Pakistan, and explores a number of case studies of successful technological change particularly in South Asia and finally attempts to draw some lessons for contemporary Pakistan.

About the presenter:

Dr. Matthew McCartney is the Director of South Asian Studies; Associate Professor in the Political Economy and Human Development of India. He has studied for a BA in Economics at King's College, Cambridge (1993-1996) followed by an MPhil in Economics at Keble College, Oxford (1996-1998). After spending two years (1998-2000) in Zambia working in the Ministry of Finance under an ODI Fellowship he returned to academia doing a PhD under Mushtaq Khan at SOAS, London. He remained at SOAS for eleven years, graduating from PhD student to a Lecturer in the Economic Development of South Asia. He then returned to Oxford in September 2011 to take over from Barbara Harriss-White as Director of the South Asia Programme.

Dr. McCartney describes himself as a political-economy macro-economist. His research interests include the role of the state and late industrialization; He developed an original framework for analyzing the state and applied it to books on India (2009) and Pakistan (2011) and brought a lot of this together in something much broader, looking at the distinction between the proximate (investment, population, productivity) and deeper determinants (institutions, culture, geography, history and openness) of economic growth in the context of the world economy over the last five hundred years - Economic Growth and Development: A Comparative Introduction was published by Palgrave MacMillan in 2015.

Diversification and sophistication of Pakistan's exports: The need for structural transformation

Uzma Afzal
Lahore School of Economics
(Paper co-authored with Maha Khan)

The composition of the export basket of a country is an indicator of its industrial structure. The diversity of a country is expressed by the number of products it exports with a comparative advantage. According to the literature there is substantial evidence of diversification in exports leading to enhanced total exports and subsequent increases in GDP growth rates (Samen, 2010). Diversification coupled with structural transformation involves a movement of the export products along the sophistication chain. Therefore, shifting from primary to manufactured exports and further, from labor intensive to more resource intensive production. In this paper, we analyze Pakistan's export performance through: the location in the product space, technological sophistication of exported products and economic complexity of the productive structure. By comparing Pakistan's export performance with India, we find that while Pakistan's exports are more diversified, its total exports show a downward trend as opposed to a rising trend for India. This refutes the traditional argument of diversification leading to greater exports and economic development. Instead, we find that in addition to diversification, the nature of exports is of huge significance. Pakistan's exports are concentrated in the periphery of the product space with no production in the tightly packed industrial core where structural transformation is more promising (Hausmann and Klinger, 2010). The paper will conclude by making policy recommendations for enhancing the productive structure of exports by promoting movement into the industrial core of the product space and producing a more technologically sophisticated product mix.

About the presenter:

Uzma Afzal is an Assistant Professor and research fellow at the Center for Research in Economics and Business (CREB) at the Lahore School of Economics. Uzma's research interests lie in the areas of firms and enterprise development, intra-household decisions, and human capital investments. She is currently working with researchers from the Stanford, Oxford, Politecnico di Milano and the Lahore School of Economics on a field experiment on using ROSCAs as a model for enterprise microsavings in Pakistan with a focus on liquidity and risk preferences at the household level. Uzma has an MPhil in Economics from the Lahore School of Economics and a BSc (Hons.) in Economics from the Lahore University of Management and Sciences (LUMS).

Maha Khan is a Research and Teaching Fellow at the Center for Research in Economics and Business, Lahore School of Economics. She teaches undergraduate and co-teaches graduate level courses in Economics. She received her MPhil degree in Economics and a BSc (Honors) Double Majors in Economics and Finance from the Lahore School of Economics. She has co-authored a paper that was presented at the Lahore School Annual Conference 2015 titled: "Pakistan: A Case of Premature Deindustrialization" and has been published in the Lahore Journal of Economics, special edition.

Innovation in the Textiles Sector of Pakistan: A Firm Level Analysis of Technological and Non-technological innovation, Sources of Knowledge Spillovers, Constraints, and Economic Returns

Dr. Waqar Ahmed Wadho
Lahore School of Economics
(Paper co-authored with Dr. Azam Chaudhry)

In recent years, information technology has led to extraordinary increase in access to information and new markets for firms in many developing countries. This coupled with increased globalization is constantly changing the landscape of innovation and firm's competitiveness. It has also resulted in greater international competition and in new organizational forms for the effective management of global supply chain. As a result, knowledge has taken a central place as the main driver of innovation and economic growth. In such knowledge-based economy, it has become increasingly important to better understand critical aspects of the innovation process, such as innovation activities beyond the R&D, the interaction among different actors in the market and the relevant knowledge flows. Using sample of 614 textiles manufacturers, this study explores the dynamics of firm's innovation activities by analyzing the innovation behavior, the extent and types of innovation, the resources devoted to innovation, sources of knowledge spillovers, factors hampering technological innovation, and the returns to innovation for three years 2013-2015. Our results showed that 56 percent of firms introduced technological or non-technological innovations. 38 percent firms introduced new products, however, these innovations were generally incremental in nature as vast majority of innovations were only new to firm. There were six enterprises who introduced products that were first in the World and all the six are from Sialkot. 30 enterprises introduced new product on their market. Innovation rate increases with firm size; large firms have innovation rate of 83 percent, followed by medium sized firms (68 percent) and small sized firms (39 percent). Technological innovative firms spent on average 10 percent of their turnover in 2015 on innovation expenditure. Acquiring newer vintages of capital with a purpose to introduce new/improved product and processes was the dominant innovation activity. Acquisition of machinery and equipment was the main innovation activity with 56 percent of innovation expenditures devoted to it. 31 percent innovation expenditure was on R&D (25 percent on in-house and 6 percent on external R&D). Overall, firms considered market sources as the most important source of knowledge spillover. However, large firms consider foreign market sources (clients and suppliers), whereas small firms consider local market sources as the important source of information and cooperation. Firms appear to be more focused on innovations that promote growth. Product outcomes dominate the objectives with 63 percent technological innovators reporting improving quality of goods as most important objective. Lack of availability of funds within the enterprise was the single most important cost factor hampering innovation, followed by high costs of innovation. The economic importance of innovation seems very high as measured by the percentage of share due to innovative products. Our results showed that 67 percent of the turnover of product innovative firms in 2015 resulted from product innovations that were either new to market or new to firm.

About the presenter:

Dr. Waqar Wadho is an Assistant Professor of economics and Senior Research Fellow at the Center for Research in Economics & Business (CREB), Lahore School of Economics. He has Masters and PhD in Economics from Aix-Marseille School of Economics France. Dr. Wadho teaches Theories of Economic Growth for PhD, Advanced Macroeconomics for M.Phil, Macroeconomics and Resource economics for undergraduate programs, and supervises graduate thesis in Economics. He is HEC approved supervisor and is member of the HEC Curriculum Revision Committee on Economics 2012-13. Dr. Wadho is also member of the HEC sub-committee on Economics of Committee for Development of Social Sciences and Humanities in Pakistan" (CDSSHP). His research interests include Endogenous Growth Theory, Corruption and Rent-seeking, and Economics of Innovation.

Structural Change and Economic Growth: The Experience of the East Asian Economies

Rajah Rasiah
University of Malaya

The East Asian economies have attracted attention from policy makers following their successful efforts to quicken economic development. Rapid growth in these countries has been achieved through structural change from low to high value added activities. In all of them the share of manufacturing rose as the economies grew rapidly. With the exception of China and Vietnam where the share of manufacturing in GDP is still growing, it has gradually fallen in the others. However, while deindustrialization in Japan, Singapore, South Korea and Taiwan began to occur only after these economies had become developed, deindustrialization in Indonesia, Malaysia, Philippines and Thailand have taken place while they are still developing. This paper attempts to analyze these different experiences against host country policy interventions with a view towards elucidating lessons for other latecomer economies, such as Pakistan.

About the presenter:

Dr. Rajah Rasiah is Professor of International Development at the Faculty of Economics and Administration, University of Malaya. He obtained his doctorate in Economics from Cambridge University in 1992, and was a Rajawali fellow at Harvard University in 2014. He was the first holder of the Khazanah Nasional Chair of Regulatory Studies, and was Dean of the Faculty of Economics and Administration, University of Malaya in 2009-2010 and 2013-2014. He is a member of the GLOBELICS scientific board, and an advisory member of the Industrial Development Research Centre, Zhejiang University, professorial fellow at UNU-MERIT, senior research fellow of the Technology Management and Development Centre at Oxford University. He is the recipient of the 2015 Celso Furtado prize from the World Academy of Sciences for his seminal contributions in the field of social sciences (development economics).

Innovations in Austrian SMEs: Attitudes-Motives-Impact-Implementation-Cooperations

Dr. Hanns Pichler
Vienna University of Economics and Business

The study, based on a comprehensive sample focusing – for the first time – on the SME sector specifically, tries to depict entrepreneurial and business potentials as to prevailing innovation-oriented attitudes and related activities, differentiated by relevant size, classes (EU definition) and major sectors.

The term "innovation" thereby follows the commonly accepted and widely used Oslo/OECD definition which – with a kind of Schumpeterian touch – has proved itself more readily being applicable also to smaller and entrepreneurially driven entities.

Results on the whole clearly demonstrate that SMEs, in reflecting the specifically small scale Austrian business structure, with over 99% of non- primary business establishments being of small and medium size, represent the mainstay of innovative forces and potentials in the country; thus, visibly outperforming the minority of larger enterprises (which quite often maintain their R&D units at respective headquarters abroad anyway).

About the presenter:

Dr. Hanns Pichler graduated from Vienna University of Economics and Business with a Master's in 1958 and Doctorate in 1960 and a M.Sc. Economics/Econometrics in 1963 from University of Illinois, USA. He was a senior Economist/Resident Representative at the World Bank Group from 1965 to 1974) with far ranging responsibilities in Latin America, the Caribbean, Eastern Africa, and especially South & South-East Asia. He has been Head of Department & Institute of Economics from 1975-2004 and Emeritus since 2004.

Dr. Pichler has earlier served as Senior Schumpeter Fellow, Center for European Studies, Harvard University, as President/Chairman and memberships of various scientific as well as professional societies and institutions and as Consultant World Bank Group and UNIDO amongst other.

Correlates of entrepreneurship in Pakistan: the regional dimension

Mahnoor Asif
Lahore School of Economics
(Paper co-authored with Anum Ellahi)

The purpose of the study is to analyze entrepreneurial ability in Pakistan through a cross sectional comparison across the provinces and districts by using Global Entrepreneurship Monitor (GEM) data for three years, 2010-2012. The aim is to explore individual and country level factors that impact nascent entrepreneurs and potential entrepreneurs and to see how regional income levels and the degree of development impact entrepreneurship (both opportunity and necessity) and eventually how they contribute to innovation and economic growth in Pakistan. In our study, we firstly investigate the effect of Total Early Stage Entrepreneurial Activity (TEEA) on Entrepreneurial Framework Conditions (EFCs) at a regional level and secondly we evaluate the impact of education, age, gender and entrepreneurial ability on measures comprising of potential entrepreneurs, nascent entrepreneurs and baby business owners to examine the entrepreneurial startup process.

About the presenter:

Mahnoor Asif is a Teaching Fellow at the Lahore School of Economics. She has acquired an Mphil degree in Economics and a Bsc (Honors) Double Majors in Economics and Finance from the Lahore School of Economics. Her Mphil thesis that she completed under Dr. Azam Chaudhry was on Political Networks where she estimated how network centrality impacts parties' political choices and electoral politics in Pakistan. She presented this paper (co-authored with Dr. Azam Chaudhry) at the Centre for the Study of African Economies Conference, 2016. Her areas of interest are Networks, Political Economy and Macro Economics.

Anum Ellahi is a Teaching and Research Fellow at The Lahore School of Economics. She has a Masters of Philosophy (MPhil) in economics and Bachelors (Bsc- Honors) Double Majors on Economics and Finance from Lahore School of Economics in 2014 and 2012 respectively. Her MPhil Thesis was a theoretical paper on Corruption, Hierarchal Tax Administrative System and its repercussion on economic growth, completed under the supervision of Dr. Waqar Ahmed Wadho. Her areas of interest are corruption, macro-economic growth and development along with technology and innovation.

Same Jeans Same Stitch? A Comparison of Denim Production across Three Factories in Punjab, Pakistan

Dr. Theresa Thompson Chaudhry
Lahore School of Economics
(Paper co-authored with Mahvish Faran)

In this paper, we look at denim production in three different factories in Punjab, Pakistan. We map the manufacturing process for a standard denim jean produced for an international retailer. We requested three factories of different scales and proximities to the technological frontier to stitch, finish, and wash an identical pair of jeans. These firms included a large-scale exporter with established links to a major multinational brand, a medium-sized exporter with links to regional European labels, and a small producer selling primarily to the domestic market.

About the presenter:

Dr. Theresa Chaudhry is Associate Professor of Economics and a fellow of the Centre for Research in Economics and Business (CREB) at the Lahore School of Economics. She received a BS in Foreign Service from Georgetown University in 1996, and a PhD in Economics from the University of Maryland, College Park in 2005. Prior to teaching at the Lahore School, Dr. Chaudhry worked at the World Bank in Washington, D.C. on issues of public finance and public sector governance. She teaches microeconomics for the BSc Economics, MPhil Economics, and PhD Economics programs, and has supervised both BSc and MPhil theses. She also serves as an editor of the Lahore Journal of Economics, a bi-annual scholarly journal cited in the JEL.

Measuring Technology Differences across Football Manufacturers in Sialkot

Tariq Raza
Lahore School of Economics
(Paper co-authored with Dr. Azam Chaudhry)

A fascinating example of the fluctuating fortunes of Pakistani exports is that of the footballs produced by a cluster of manufacturers in Sialkot. A sector which was dominated by Pakistani firms is now under heavy threat from cheaper balls produced in East Asia (particularly China). Looking at the sector, it is striking to see that the technology used by the majority of the firms has not progressed over the last 30 years and this raises the question of whether Pakistan is falling significantly behind the technology frontier. Using data from a sample of firms we map the football production process and focus on different cutting technologies to compare the productivities across firms and measure the benefits of technology upgradation across different sized firm. Our results show that technology upgradation comes at a cost but is worthwhile for firms that need to produce a high volume of balls. But the falling demand for Pakistani balls may not justify technology upgradation for most of small and medium sized firms in the sector (which make up the vast majority of firms in the cluster).

About the presenter:

Tariq Raza has a BSc degree with a double majors in Economics and Finance from the Lahore School of Economics. He then went on to acquire his Masters in Economics (finance) from the University of Edinburgh. He started his career by working at renowned consultancy firms where he assisted the team in project analysis, contract negotiations, client-interfacing and process development for startup ventures. Later he joined the Lahore School of Economics as a Research Associate on an International Growth Centre (IGC) funded project which looked at organizational barriers in the adoption of technology. He is currently employed as a Project Coordinator at Center for Economic Research in Pakistan, (CERP) and is also conducting research at the Lahore School of Economics on innovation, technology and firm behavior.

Technology Adoption in the Sialkot Sport Gloves Manufacturing Sector

Saba Fazal Firdousi
Lahore School of Economics
(Paper co-authored with Dr. Azam Chaudhry)

The last two decades have witnessed a remarkable spread of technology in all spheres of economic activity. The change has been so rapid that firms are finding it difficult to keep pace with ever-changing market situations. The issue of technology adoption and technology mapping is particularly relevant for export-oriented manufacturers who face tough competition in international markets and must maintain a competitive edge by adopting latest product and process technologies to meet the requirements of upscale global markets. It is generally believed that Pakistani firms have lagged behind their competitors in international markets in terms of technological advancement and consequently Pakistan's exports continue to remain concentrated in low value-added and low quality product segments. This study is an attempt to explore the determinants of technology adoption in Sialkot gloves industry of Pakistan. In this paper, we will map the gloves' production process and calculate differences in productivity across firms with respect to level of technology adoption and firm size. We will then see if the use of different types of technologies across firms in each stage of the production process can explain productivity differences across firms. We will calculate the total factor productivity, total revenue productivity and labor productivity. The productivity calculations will help to make a cross comparison between small, medium and large enterprises on the basis of technical change, firm size and export destinations. Moreover, in order to estimate the correlates of technology adoption, we estimated an ordered Logit model of technology adoption. The result shows positive and significant impact of retained earnings and firm profitability on technology adoption. Furthermore, technology adoption also positively impacts firm level productivity.

About the presenter:

Saba Fazal Firdousi has recently completed her Post Graduate majoring in Economics from Lahore School. Now, she is working as Junior Teaching Fellow and industrial researcher at Technology Management Center, Lahore School. Her main area of focus is on designing cost structure models, feasibility studies, process and technology mapping for small and medium enterprises in Pakistan.

What this research tells us about the catch-up process? Policy implications

Dr. Azam Chaudhry
Lahore School of Economics

About the presenter:

Dr. Azam Chaudhry is Professor of Economics at the Lahore School and the Dean of the Economics Faculty. He has a B.Sc. (Hons.) in Economics from London School of Economics where he specialized in Monetary Economics, Econometrics and Corporate Finance and a M.A. and Ph.D in Economics from Brown University, USA. He joined the Lahore School of Economics in 2005 and before that he worked for the World Bank. His areas of interests are International Trade, Macro Economics and Economic Growth. His current research projects are: Spillovers in technology adoption: evidence from a randomized experiment in Pakistan and Effects of external migration on school enrollments, accumulated schooling and dropouts in Punjab.

He teaches Econometrics and Macroeconomics at the Lahore School and his research interests include Innovation and Technological Change, Institutional Economics, Economic Growth and Development, Political Economy and Empirical Macroeconomics and Microeconomics.

Day 2: Thursday, 31 March, 2016

Session 5: *Entrepreneurship, Innovation and Finance*

Entrepreneurship and Innovation in the Technology Sector: Constraints to Growth
Naved Hamid & Faizan Khalid, Lahore School of Economics

Promotion of innovation and S&T: The role of finance
Saeed Ahmed & Mahmood ul Hassan Khan, State Bank of Pakistan, Karachi

Access to Finance and Agency: What constrains business creation?
Farah Said, Lahore School of Economics

Revisiting Pakistan's Premature Deindustrialization Thesis
Nazia Nazeer & Rajah Rasiah, University of Malaya, Malaysia

Session 6: *S&T upgrading and innovation: Industry Experience*

Public Policy Innovation and Economic Growth: An Economic and Technology Perspective on Pakistan's Telecom Industry
Musleh Ud-Din, Pakistan Institute of Development Economics, Islamabad
Inayat U Mangla, Lahore School of Economics
Muhammad Jamil, Independent Researcher

Innovation in Information Technology (IT) Industry
Aezaz Hussain, Systems Ltd, Lahore

Status of Innovation and Technology in Pakistan Tractor Industry
S. M. Irfan Aqueel, Millat Tractors Ltd, Lahore

Innovation and Technological Upgradation in Lahore: Results from the LCCI Business Confidence Survey 2016
Azam Chaudhry & Mahvish Faran, Lahore School of Economics

Session 7: *The role of Pakistan's public policy institutions in the promotion of technological innovation*

Competitiveness through Foreign Technology
Sikandar Rahim, Former World Bank, Washington D.C

Which Public Policies can Promote Technology Management, Productivity and Innovation in Pakistan
Shaukat Hameed, COMSTECH, Islamabad

Role of Public Policy Institutions in R&D and Innovation
Fazal Abbas Maken, Ministry of Science & Technology, Islamabad

Entrepreneurship and Innovation in the Technology Sector: Constraints to Growth

Dr. Naved Hamid
Lahore School of Economics
(Paper co-authored with Faizan Khalid)

The digital economy has grown rapidly since the 1990s and according to a recent McKinsey report, the value of world trade in digital services was greater than that in goods for 2015. Today digital companies such as Google (Alphabet), Facebook and Amazon are among the 25 largest US companies by market capitalisation while Tata Consultancy Services (TCS) and Infosys are among the top 5 in India. India has benefited greatly from the growth of the digital economy and is a leading exporter with IT (& ITES) exports of over $100 billion in 2015. Recently India has seen rapid growth of digital businesses catering to the domestic economy, in areas such as ecommerce, transportation, advertising and consumer services, with many companies valued at over $1 billion. These businesses have only taken off with the availability of fast mobile internet following the launch of 3G/LTE services in 2009.

In Pakistan, well-established IT companies such as Systems Ltd and NetSol exist, but growth in start-ups of digital businesses catering to the domestic market is a recent phenomenon which has accelerated dramatically since the launch of 3G/LTE services in mid 2014. In this paper, we take a look at digital companies and start-ups in Pakistan in terms of the entrepreneurial environment, growth of the sector and the constraints for start-ups. The purpose of the paper is two-fold: First, with the rapid expansion of the digital economy in Pakistan, these companies could be a major source of investment and growth in the country over the next decade, and so it is important to identify the constraints to growth of this sector. It is hoped that by highlighting the potential of and constraints to the growth of the digital economy, we can influence policymakers and other stakeholders to take measures to mitigate these constraints. Second, as the process from start-up to an established company in the technology sector takes place at an accelerated pace, we can observe critical factors that either hinder or promote entrepreneurship in the Pakistani environment. This could provide useful guidance for developing policies to promote entrepreneurship in the traditional sectors of the economy.

About the presenter:

Dr. Naved Hamid is Director Centre for Research in Economics and Business (CREB) and Professor at the Lahore School of Economics. He has served on various working groups and advisory panels of the Government and boards of not-for-profit organizations. He has previously worked at the Asian Development Bank, Manila, Lahore University of Management Sciences (LUMS) and the Punjab University. He has a PhD in Economics from Stanford University, USA, and BA (Hons) from Cambridge University, UK. His publications include: Chapter 6 on Export Lessons from the Past and the Way Forward (with Hamna Ahmed and Mahreen Mahmud) in Pakistan Moving the Economy Forward, edited by Rashid Amjad & Shahid Javed Burki, Delhi: Cambridge University Press, 2015; Chapter 2 on Migrant Remittances to South Asia: Determinants and Effect on Growth (with Mahreen Mahmud). In Adjusting to Global Economic Volatility. The Case of South Asia, edited by R. M. K Mujeri & M. Wahiduddin, New Delhi: Academic Foundation, 2014.

Faizan Khalid graduated with masters in Management from The University of Nottingham, UK. Over the last four years, he has established a vertically integrated group of companies overseeing a shoe manufacturing facility, a retail network, an online apparel store and bespoke clothing store in Lahore. He has also been a faculty member in the Entrepreneurship, Marketing & Management department at Lahore School of Economics. His work as an academic involves researching the innovation & technology startup sector in Pakistan, which is perfectly aligned with his personal and academic interests.

Promotion of innovation and S&T: The role of finance

Dr. Saeed Ahmed
State Bank of Pakistan
(Paper presented by Mahmood ul Hassan Khan)

Promotion of innovation and S&T enables economies to achieve sustainable economic growth. In addition, firms engaged in medium- to high-tech production tend to gain more from innovation and are, on average, more productive compared to enterprises which are limited to low-tech systems. Innovation is, in turn, inextricably linked to the availability and nature of financing. Empirical studies in developing countries reveal that bank financing and FDI play a vital role in this regard. This paper provides an overview of: (a) the role of financing in facilitating S&T and innovation; (b) State Bank of Pakistan's policy initiatives to make financing available, both in general, and also to specifically facilitate S&T and innovation in the country; and (c) the role of innovations in expanding access to finance in Pakistan.

About the presenter:

Mahmood ul Hasan Khan is currently serving as Senior Economist, Economic Policy Review Department, State Bank of Pakistan. He is responsible for managing SBP's Annual and Quarterly Reports on the state of Pakistan's Economy. He has been a regular contributor to other SBP flagship publications including Financial Stability Review, Financial Sector Assessment reports, SBP research Bulletin, and Working Papers. He has authored/co-authored more than 10 articles, which appeared in local and international journals.

Mahmood ul Hasan Khan received his M.A in Development Economics degree from Williams College, USA; M. Phil Economics from Quaid-e-Azam University, Islamabad, and M.A. Economics from the University of Punjab.

Access to Finance and Agency: What constrains business creation?

Farah Said
Lahore School of Economics
(Paper co-authored with Azam Chaudhry, Giovanna d'Adda & Mahreen Mahmud)

This study evaluates at a microfinance product for new business start-ups run by women in Pakistan. The main research aim of this study was to measure whether applicants of a large microfinance institution set up a business when they are provided with microenterprise loans. Apart from access to finance as a constraint on micro-enterprise, we also used in-field experiments to measure constraints in the form of self-control (risk preferences) and pressures from within the household.

One year after the loans were provided to randomly selected applicants, we find a significant impact of the microfinance product on the likelihood of setting up a business. However, this does not translate into any improvement in household asset holdings as well or women's independence in making ordinary household decisions over the same year.

Incentivized experiments reveal that women in both groups are not very different from each other when it comes to exerting control over finances or in their risk preferences. We do find some evidence that men and women perceive the social norms against women making financial decisions independently very differently –in particular, women perceive social norms to be less favorable towards independent decision making by women than men do. We find interesting heterogeneity in results by occupation of the woman. Our results imply that, in addition to access to finance and training, the dynamics in the household that the woman belongs to is also an important covariate in the decision to run an enterprise.

About the presenter:

Farah Said obtained her MSc. in Financial Economics from the University of Oxford. She is currently enrolled in the PhD Economics programmme at the Lahore School of Economics. She is also a Research Fellow and Assistant Professor at the Lahore School of Economics. At present, she is working on a study with researchers at Stanford, Oxford and the Lahore School of Economics to compare the effectiveness of micro-savings and micro-loans as means for households to manage risk and liquidity. She is also working on a study to evaluate the socio-economic and welfare impacts of micro-loans to female micro-entrepreneurs using lab-in-field experiments. Previously, her research was focused on determining whether household decision-making changes as a result of experiencing rare events, such as natural disasters.

Revisiting Pakistan's Premature Deindustrialization Thesis

Nazia Nazeer
University of Malaya
(Paper co-authored with Dr. Rajah Rasiah)

As leading commentators have argued, Pakistan has undergone premature deindustrialization since particularly 2004. The sector's contribution to GDP has not only been marginal it has neither faced substantial technological upgrading from within industries nor a shift from low value added industries to high value added industries. This paper revisits this debate to: one, analyze the economic impact of overdependence on the clothing and textile sector on economic development in Pakistan; and two, to explore the potential for engendering structural change from these industries to higher value added manufacturing industries in Pakistan.

About the presenter:

Nazia Nazeer is a PhD Candidate at University of Malaya, Malaysia. She has a professional degree in Management from University of Karachi. Her research interests include Environmental Economics, Renewable and Non -Renewable Energy Consumption, Low Emission Sustainable Communities and Technological Innovation.

Public Policy Innovation and Economic Growth: An Economic and Technology Perspective on Pakistan's Telecom Industry

Dr. Inayat U Mangla
Lahore School of Economics
(Paper co-authored with Musleh Ud-Din & Muhammad Jamil)

At a time of rapid technological advancements in every field, Pakistan must develop a comprehensive strategy for harnessing science and technology to promote economic growth on a sustained basis. In recent decades, successful economies have moved away from factor accumulation models of economic growth to productivity led growth that is underpinned by technological advancements and innovations. To this end, we provide a synthesis of literature review for developed and developing economies on numerous visions that have been advanced about the role of Schumpeter's (1949) entrepreneurship in a capitalist society. Following Solow's (1956) seminal work, the endogenous growth theory emphasizes knowledge as a key driver of economic growth besides traditional factors. Using the endogenous growth theory as a framework of analysis, the paper will provide a macroeconomic perspective on the importance of technology and innovation for sustainable economic growth.

We argue that public policy must be geared to generate robust growth by encouraging investment in research and development (R&D) and human capital. The paper will conceptualize the role of technology in the process of economic growth and identify policy areas that can be instrumental in promoting technological modernization and innovations. The discussion on policy will focus on the role of domestic commerce, services sector, trade policy and macroeconomic policy in promoting technological modernization and innovations.

The paper will briefly survey some illustrations from Pakistan's telecommunication industry. Despite some pitfalls, this is perhaps one of the only two areas in which public policy in Pakistan has made some meaningful progress that demonstrates some degree of organisational and technological modernization and innovation. We try to evaluate telecom industry from a policy perspective. Telecom observers have long been pointing out that telecom regulation and taxes are too high in Pakistan compared to countries with similar level of development. In the latest quarterly report of State Bank of Pakistan (SBP) on the state of economy, it suggests that "there is large untapped potential in the broadband segment", and urges the government to take measures to improve mobile and broadband usage. Furthermore, the report suggests that "heavy taxation on mobile services in Pakistan does not bode well for economic growth in the country". We would provide some anecdotal evidence showing if and how high telecom taxes and other sectoral issues are leading to lost economic output and consumer surplus.

About the presenter:

Dr. Inayat Mangla has taught, developed new curriculum, and conducted research on North American economies, Singapore, Japan, China, Malaysia, Indonesia, India, Pakistan emerging economies and U.A.E. to name a few. He has published more than 50 scholarly papers in international journals, more than 100 articles in conference proceedings, written five monographs, and he has conducted several research studies for the World Bank, CIDA (Canada), Planning Commission (Government of Pakistan), PIDE, and Q.A. University, Islamabad etc. His area of research includes Global Financial Markets, Banking, and Microfinance.

Dr. Mangla is currently visiting faculty at the Lahore School of Economics. Previously, he has served as a director of the Graduate Programs at the Haworth College of Business, Western Michigan University in the late 1990s. Dr. Mangla also serves as an Associate Editor of the Journal of Financial Issues, member of Editorial Board of the Lahore Journal of Economics and Pakistan Development Review.

Innovation in Information Technology (IT) Industry

Aezaz Hussain
Systems Ltd

In the mid-nineties a group of Nobel Laurates working for IBM Research Lab were asked to foretell the use of computers in the 21st century. Their thoughtful response was that this question would be best answered by a science fiction writer rather than the scientist working on improving the technology. Innovation in the use of Information technology is driven more by the discovering new ways of using it rather than by the developments in the technology itself. Had someone with foresight foretold the current capability of smart phones 20 years ago, the computer scientist would have said that of course it is very possible as the technology does already exist. No doubt the technology has continued to become faster, more miniaturized, and dramatically cheaper, but the key elements which allow this dramatic improvement in usage have existed for over 2-3 decades.

In Pakistan this industry has a chequered past but has in the past decade reached a mature stage of availability to users. Starting from a complete ban on import of computing equipment from the early sixties to draconically regulated communication industry, Pakistan has in the last decade moved to an enabling and encouraging environment for the IT industry. This has led to its widespread use and impact on all spheres of economic activity. With the world's 8th largest mobile phone user's base, and market driven communication costs, Pakistan has created a hugely incentivized environment for innovation in application of IT. This has been recognized by investors and has started drawing FDI and corporate investments.

In addition to traditional enterprise computing aided by a dramatically improved communication network, mobile computing is potentially the most disruptive force for changing governance and economic activity in Pakistan. Key impact is being seen and will continue to grow in: Financial Inclusion, Government Services, Medical Services, Farmers extension services and Industrial Productivity. So far the government policies have been supportive of this industry but the move towards taxing it in this early stage will become a deterrent to innovation. Key constraints in the enabling environment which need to be addressed include access to venture capital and entrepreneurial mentoring and support.

About the presenter:

Aezaz Hussain is currently Chairman Systems Limited. Mr. Hussain founded Systems Limited in 1977 as the first software house and IT services company in Pakistan and led it to-date. In this capacity has been involved in evolving IT strategies for major organizations in the government, public and private sectors and overseeing software development projects. Within the organization, he has been responsible for the internal restructuring needed to respond to the shift in the company's strategy. This has included the acquisition of Visionet Systems, Inc., in New Jersey, USA. His main role has been in the development of enterprise strategy.

Prior to starting Systems Limited, he worked with IBM World Trade Corporation as Systems Engineer. Subsequently, he was with the National Fertilizer Corporation as Head of the Planning and Systems Department. He was a member of Pakistan's Information Technology Commission, which advised the President of Pakistan on IT related matters and national policies. He was founding member and founding president of Pakistan Software Houses Association (P@SHA). He has been a member of a number of Committees and Advisory bodies set up by the government on information technology strategies and on the development of public sector/government information systems.

Status of Innovation and Technology in Pakistan Tractor Industry

S. M. Irfan Aqueel
Millat Tractors Ltd

Tractors and farm machinery usage in Pakistan started in the early 1960's by importing completely built-up tractors and machines. After initial experiments, it was felt that these machines were either too expensive for our farmers or not suitable for our requirements - small farm size and complicated irrigation system. The local entrepreneurs saw a gap between the available hardware and the farmers need hence the initiation of a gradual process of local development with the help of foreign partners. This shift was well planned in the light of Govt. of Pakistan indigenization policies and under the technology transfer agreements between the local industry and their foreign partners.

The industry, especially Millat Tractors Ltd. (MTL) established their own R & D facilities in the 1980's, equipped with qualified team of engineers and necessary infrastructure to facilitate the local production and adoption of new technologies. Total quality management and quality circles practices are well in place which is helping the Company foster an innovative culture. Today, the local tractor industry has indigenization level above 90% and offering an extended range of tractors and farm equipment to its customers. MTL's technical up-gradation process has been highly instrumental in the Company achieving a market share of over 60% in the local market and eventually gaining access to the global market through the AGCO network.

Both vendors and foreign buyers have strong impact on innovation process in terms of technology exposure and development of products as per market needs. The local industry first got exposure to better specs of products and components supplied by international vendors and then developed and modified locally as per customers' needs. Likewise, the foreign buyers' demands have forced the industry to improve its products and efficiencies for global competition. It is expected that MTL's new export venture with AGCO will accelerate its product innovation and development process and in the years to come local tractor and farm machinery industry is expected to follow its footprints.

About the presenter:

S. M. Irfan Aqueel, a professional chemical engineer started his career with ICI Pakistan Ltd as a management trainee in 1981. He then worked his way up the corporate ladder gaining operations exposure to ICI's various businesses in Pakistan including Soda Ash, Polyester Fibers, Specialty Chemicals, Agrochemicals & Seeds, Paints as well as design, erection and commissioning of medium to large BMR Projects. In February 2005 he joined Millat Equipment Ltd. (MEL) as Chief Executive Officer. Taking over at the project stage he not only attained commercial production in record time but also achieved profitability in the 1st year of operations. The company has doubled its sales and profits every year by continuously meeting the OEM requirements of gears and shafts. He played a pivotal role in establishing MEL as a brand name for quality gears and transmission components in Pakistan and abroad. He was appointed as the Chief Executive Officer of Millat Tractors Limited on 1st January 2012.

Innovation and Technological Upgradation in Lahore: Results from the LCCI Business Confidence Survey 2016

Dr. Azam Chaudhry
Lahore School of Economics
(Paper co-authored with Mahvish Faran)

In March 2015, the Lahore School of Economics and the Lahore Chamber of Commerce & Industry (LCCI) conducted a unique business confidence survey of firms in order to determine industry specific trends as well as the perceptions of general macroeconomic trends. In 2016 the Lahore School and the LCCI conducted its second Business Confidence survey in which it asked a variety of firms about the same issues as well as posed questions about their level of innovation and technological upgradation. In this paper, we focus on the results from the innovation and technology related questions in the 2016 survey: First, we performed an aggregate level analysis across firms to see if they innovated and upgraded their technology. Then we took a more focused approach to see the impact of innovation on exports and domestic sales as well as seeing if firms that reported higher exports innovated more. Finally, we looked at each of the sectors (manufacturing, services, retail) and analyzed the levels of innovation and technological innovation in each of these sectors.

About the presenter:

Mahvish Faran is currently a research fellow at the Lahore School of Economics. She is also managing the technology management centre that was set up at the Lahore School of Economics in May 2015. She has completed her MSc in Economics from the University of Warwick. Her research interests are Industrial Organization and Labour Economics.

Competitiveness through Foreign Technology

Sikandar Rahim
Former World Bank

Pakistan's lack of industrial progress over decades should be cause for concern about the future. The goods the economy produces competitively are the typical goods that yield so little income that they are only exported by economies that have low wage labour. They are much the same manufactures now as during the 1960s and have been kept competitive by keeping wages down through repeated devaluation. Income per head will rise slowly, at best, if the economy does not learn how to produce goods that yield more income, and that means acquiring the up to date technical knowledge needed to be competitive from the foreign producers who produce such goods. But that is knowledge obtained through R&D and is not provided freely, least of all to would-be competitors. Pakistani firms can try to do their own R&D, but, even with public sector collaboration, they cannot catch up with the established foreign firms, which continue to do their R&D and have more money, experienced staff and facilities.

The two possibilities are to attract foreign direct investment and for Pakistani firms to insert themselves into the production processes of foreign firms. Experience shows that the first, though it has worked well in several countries, can be ruled out for the present; there has been no FDI in Pakistan for making exportable manufactures. But economies like South Korea and China acquired the technical knowledge they needed through subcontracting and joint ventures with American, European and Japanese firms and moved on from there. There is no realistic alternative and task ahead is to determine what has to be done to realize it.

About the presenter:

Sikander Rahim studied mathematics at Cambridge University, graduating with a BA in 1961, after which he studied economics there. He worked at the PIDE, the Economic Affairs Division and the Planning Commission before joining the World Bank staff as a country economist in 1978. He retired from the World Bank in 1997 and has since then been frequently associated with the Lahore School and has occasionally taught here.

Which Public Policies can Promote Technology Management, Productivity and Innovation in Pakistan

Shaukat Hameed
COMSTECH

How do we manage technology in Pakistan? While numerous public announcements are made about moving towards a knowledge economy, the reality is that our competitiveness is falling, organisational changes are slow, our workforce skill levels are inadequate and there is a stalling in productivity and innovation. In fact, Pakistan faces a serious risk of de-industrialisation, unless the dynamics and disruptive nature of managing modern technology are understood, and are embedded as a key pillar of public policy which can lead to enhancing innovation and productivity.

About the presenter:

Dr. Shaukat Hameed holds a D.Phil degree from the University of Oxford and is a Fellow of the Pakistan Academy of Sciences. Dr Hameed is currently the Coordinator General at COMSTECH (OIC Ministerial Standing Committee on Scientific and Technological Cooperation) Islamabad. Previously, he has served as Member, Planning and Commission, Government of Pakistan (2005 – 09); Chief Scientist / DG, Pakistan Atomic Energy Commission; as a Visiting Scientist, CERN, Geneva and Rector, GIKI, Pakistan. Dr. Hameed has over over three decades of experience in R & D, academia, technical management, production, and policy planning with 28 research publications and numerous conference papers.

His work in policy and strategy formulation included preparing the Science and Technology Programme Document in 2015 for the 57 OIC Countries for the period 2016-25 and the Implementation Strategy (timelines, costs, & necessary structural reforms) for the National Industrial Policy, 2011, for Ministry of Industries, Pakistan. He was also member of the President's Steering Committee, 2002, which resulted in the establishment of Higher Education Commission of Pakistan and Director/Principal Author of the Vision 2030 Project, (2007), a foresight exercise which attempts to examine where Pakistan might be in 2030.

Role of Public Policy Institutions in R&D and Innovation

Fazal Abbas Maken
Ministry of Science & Technology

Ministry of Science & Technology (MoST), the national focal point and enabling arm of Government of Pakistan for planning, coordinating and directing efforts in the field of Science and Technology, is mandated through its organizations to uplift the existing national economic scenario through introduction of Scientific approach, new innovative ideas and technology transfer to the industry in the country. MoST through Science, Technology and Innovation Policy-2012 and National Quality Policy strives to promote Technology Innovation and quality production in the country. Four of its organizations i.e NUST, PCSIR, NIE and CIIT have established Technology Business Incubation Centers in their premises, where the newly developed businesses are assisted and transferred technologies developed are transferred.

The focus of R&D organizations have been shifted from In-house R&D to demand driven R&D culture. The policies of Government in general and MoST in particular are aimed to promote entrepreneurship in the country. For this purpose along with ST&I Policy and NQP, different line ministries have evolved their policies to create a business friendly environment in the country to support the new entrants in the market.

About the presenter:

Mr. Fazal Abbas Maken completed his Graduation from Government College, Lahore with Economics and Statistics as his major subjects. Mr. Maken joined the Pakistan Administrative Service in 1983. Mr. Maken served as Secretary, Irrigation and Power Development, Government of NWFP (now Khyber Pukhtunkhwa) from 2000 to 2002. He successfully steered the Malakand-III Hydel Power Project and initiated the procurement process for its construction. He also worked with WAPDA for preparation and approval of PC-1 for GomalZam Dam Project.

From 2011 2014, Mr. Maken worked in the Ministry of Commerce as an Additional Secretary. The job involved negotiations with bilateral and multilateral trading partners and formulation of Pakistan's stance regarding various WTO agreements. Mr. Maken also led the ministry's team, which formulated the Strategic Trade Policy Framework 2012 - 2015. As Additional Secretary, Ministry of Interior, he handled issues pertaining to immigration policy and registration of citizens for smooth and effective implementation of the National Action Plan to counter terrorism. Mr. Maken assumed the charge of Secretary, Ministry of Science & Technology (MoST) on 9th July 2015. With his diverse expertise in policymaking and trade promotion, He is pursuing to create linkages amongst R&D institutions, academia and the industry.

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