Contents

Message
HE. Dr. Martin Ney, German Ambassador to India.................................................................4

Foreword
Ms. Heike Mock, DWIH New Delhi/
DAAD- German Academic Exchange Service.................................................................5

Concept Note
Indo-German Symposium: Future of Work.................................................................6

Programme at a Glance .........................................................................................8

Keynote Sessions
Dr. Didar Singh, Delhi Policy Group ........................................................................10
Dr. Thomas Lange, Acatech- National Academy
of Science and Engineering. Germany ........................................................................12

Session 1
Artificial Intelligence and the
New Working Environment.................................................................................14

Session 2
Redesigning Workspaces.....................................................................................22

Session 3
Working together with Artificial Intelligence......................................................30

Session 4
Impact of New Technologies on People.................................................................38

Session 5
Realigning Work Processes..................................................................................46

Notes.......................................................................................................................54
Work is about to change fundamentally: At a growing number of workplaces, people, machines and products communicate directly with each other via intelligent, digitally networked systems. This enables largely self-organized production - Industry 4.0 – which in turn will have a major impact on individuals and our entire societies. New business models and structures are needed. At the same time, job profiles are changing, requiring different skills and qualifications.

In its current High-Tech Strategy 2025, Germany has defined "innovative working environments" as one of the six future priority tasks for prosperity and quality of life. The aim is to create innovative working environments, that are both healthy and safe, while developing the skills of employees. Fair wages that adequately reward performance are also crucial.

Science and research can make important contributions in this regard. Science at the level of excellence requires international cooperation. Germany and India are strategic partners. Academic exchange and research cooperation between our two countries have grown continuously over decades, reaching unprecedented levels today.

India and Germany maintain joint large-scale research projects in various fields, from physics to computer sciences, from agriculture to biotechnology, from health to humanities and social sciences. Both our governments are currently funding long-term partnerships between Indian and German universities. At present, 17,500 Indian students are enrolled at German universities, a number that has more than doubled over the past four years.

In 2012, Germany has established a German Centre for Research and Innovation (DWIH) in New Delhi. DWIH has already provided many valuable inputs for Indo-German cooperation. This year’s annual conference on "Future of Work" is certainly another highlight. I am delighted that DWIH is devoting special attention to this important topic. I would like to thank the whole DWIH team for all their efforts in organizing this conference and wish all participants a successful and inspiring conference.

H.E. Dr Martin Ney
Ambassador of the Federal Republic of Germany to India
The German Centres for Research and Innovation (DWIH) constitute a network of German research organisations, universities and research-based companies. In five cities around the world, they provide a joint platform for German innovation leaders, showcase the capabilities of the German research and connect German researchers with local cooperation partners.

For decades, scientific collaboration between India and Germany has been very strong. With the opening of the DWIH New Delhi, Germany has taken one more important step towards strengthening ties with its Indian partners. It is currently supported by 16 German organisations that have established their offices in India to encourage and enable academic exchange, scientific cooperation and R&D projects. The DWIH New Delhi acts as an active link between different stakeholders like researchers, policy makers, university and industry representatives from both sides by providing expert advice on partnership opportunities, and through the organisation of conferences, seminars and other networking events.

This year’s flagship event of DWIH New Delhi is the Indo-German Symposium “Future of Work” on the 19th and 20th of March in New Delhi. This symposium brings together scholars and practitioners from India and Germany to exchange their views on one of today’s most trending topics. What will the future of work look like? Will machines replace humans? Will they work hand in hand? What impact will automation and digitalization have on businesses and society? How can companies and governments meet the challenges? Speakers from the academia and the industry from Germany and India will present their work and concepts on the topic and are looking forward to interacting with one another and the participants.

We are confident that this event will not only provide new insights from different perspectives but will also create new networks and add to the growth of academic and scientific relationship between the two countries.

**Heike Mock**  
Director, DWIH New Delhi  
Director, DAAD – German Academic Exchange Service
Driven by technological developments, but also by social, economic and cultural shifts, the world of work is evolving. Gradually moving towards an era where man and machine shall co-work by deploying technologies such as Artificial Intelligence, big data, robotics, IoT at the site of work and otherwise, the challenge of the future will be to extract the best out of this co-working relationship. Human societies have little choice but to brace themselves for the changes to come and find intelligent ways of managing and steering them.

One of the sites of massive change will be the labour market. Less complex and routine tasks are widely expected to be increasingly automated. At the same time, however, tasks which are complex, creative and demand analytical skill will rise in significance. The challenge will be to achieve an inclusive future of work in which everyone finds their place. On the one hand, this calls for massive efforts at up-skilling and re-skilling through innovative forms of training delivery and new kinds of job discovery for all section of the work force. On the other hand, it will be a matter of prime significance to ensure that those excluded from the opportunities will find support and justice.

As the labour markets change, so will the workplaces and working environments of the future. Reorganized structures of working and technological tools such as teleconferencing, remote-working etc. have the potential of empowering individuals and of unleashing creative energies. However, they may also have adverse psychological and social effects. An important challenge of the future will be to find equitable, healthy and safe ways of developing work spaces.

Shifting trends towards increasing dependency on technology and automation will have tangible and intangible effects on business, economy, society and on individuals. In order, to help us understand them, we need to reject facile generalizations, but must look at the complex realities and consider topics from migration via data-privacy and security to social equality.

With an aim to encourage an exchange of views, to deepen our understanding of the issues and to start deliberating on possible responses to the changing world of work, the DWIH symposium “Future of Work” will bring together eminent Indian and German academicians, scientists, researchers, policymakers, representatives of international organisations. The event will be structured around five broad themes.
## Keynote Sessions

**The Future of Work for India**  
Dr. Didar Singh, Delhi Policy Group

**Shaping the Digital Transformation**  
Dr. Thomas Lange, Acatech- National Academy of Science and Engineering, Germany

<table>
<thead>
<tr>
<th>Session</th>
<th>Date/Time</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19 March</td>
<td>14:30 h - 16:00 h</td>
<td><strong>Artificial Intelligence and the New Working Environment</strong></td>
</tr>
<tr>
<td>2</td>
<td>19 March</td>
<td>16:30 h - 18:00 h</td>
<td><strong>Redesigning Workspaces</strong></td>
</tr>
<tr>
<td>3</td>
<td>20 March</td>
<td>10:00 h - 11:30 h</td>
<td><strong>Working Together with Artificial Intelligence</strong></td>
</tr>
<tr>
<td>4</td>
<td>20 March</td>
<td>12:00 h - 13:30 h</td>
<td><strong>Impacts of New Technologies on People</strong></td>
</tr>
<tr>
<td>5</td>
<td>20 March</td>
<td>14:30 h - 16:00 h</td>
<td><strong>Realigning Work Processes</strong></td>
</tr>
<tr>
<td>Time</td>
<td>Event</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00 – 10:30</td>
<td>Registration and Welcome Tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30 – 11:00</td>
<td><strong>Welcome Address</strong>&lt;br&gt;Mrs. Heike Mock, Director, German Centre for Research and Innovation (DWIH New Delhi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Inaugural Address</strong>&lt;br&gt;H.E Dr. Martin Ney, Ambassador of the Federal Republic of Germany to India</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 – 11:30</td>
<td><strong>Teaser of the Symposium Sessions:</strong>&lt;br&gt;An Introduction to Individual Sessions by the Chairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30 – 12:00</td>
<td>Tea Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00 – 13:30</td>
<td><strong>Keynote Sessions</strong>&lt;br&gt;- The Future of Work for India&lt;br&gt;Dr. Didar Singh, Delhi Policy Group&lt;br&gt;- Shaping the Digital Transformation&lt;br&gt;Dr. Thomas Lange, Acatech- National Academy of Science and Engineering, Germany&lt;br&gt;Moderator: Dr. Matthias Kiesselbach, German Research Foundation (DFG) India</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:30 – 14:30</td>
<td>Lunch and Networking Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:30 – 16:00</td>
<td><strong>Session 1: Artificial Intelligence and the New Working Environment</strong>&lt;br&gt;- The Use of Modern I.T. in Working Environments – Opportunities, Challenges, Risks&lt;br&gt;Prof. Dr. Gregor Engels, University of Paderborn&lt;br&gt;- The Future Work Lab&lt;br&gt;Dr. Moritz Hämmerle, Fraunhofer Institute for Industrial Engineering&lt;br&gt;- Production of the Future&lt;br&gt;Mr. Volker Schmid, Festo Didactic SE&lt;br&gt;Chair: Dr. Sabrina Schneider, University of Kassel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:00 – 16:30</td>
<td>Tea Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30 – 18:00</td>
<td><strong>Session 2: Redesigning Workspaces</strong>&lt;br&gt;- Form Follows Disruption, The Interdependency of Space and Future Work&lt;br&gt;Dipl.-Ing Christos Chantzaras, Technical University of Munich&lt;br&gt;- Future Frames: Designing New Dimensions of Work Space Relationships&lt;br&gt;Dr. Gaurav Raheja, Indian Institute of Technology (IIT), Roorkee&lt;br&gt;- Sangeeta Ray, Siemens Ltd.&lt;br&gt;Chair: Prof. Dr.-Ing. Barbara Deml, Karlsruhe Institute of Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:00 Onwards</td>
<td>Reception and Networking Dinner</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Programme: 19.03.2019
Programme: 20.03.2019

DAY 2

09:30 – 10:00 Registration and Welcome Tea

10:00 – 11:30 Session 3: Working Together with Artificial Intelligence

- Are we ready to delegate strategic decisions to Artificial Intelligence? Insights into decision delegation behavior
  Dr. Sabrina Schneider, University of Kassel

- Towards Human-Aware Collaborative Robotic Systems
  Prof. Dr.-Ing. Barbara Deml, Karlsruhe Institute of Technology

- What can brain imaging and Artificial Intelligence reveal about an individual person?
  Prof. Dr. Simon Eickhoff, Forschungszentrum Jülich

Chair: Prof. Dr. Gregor Engels, University of Paderborn

11:30 – 12:00 Tea Break

12:00 – 13:30 Session 4: Impacts of New Technologies on People

- The Fourth Industrial Revolution (IR 4.0): The Indian Perspective
  Prof. Dr. Santosh Mehrotra, Jawaharlal Nehru University

- Opportunities and Challenges for Women due to Digitalization in the Workplace
  Dr. Tanja Carstensen, Ludwig-Maximilians University Munich

- Automation and Digital Transformation of Regional Labor Markets: Challenges and Opportunities
  Dr. Maximilian Goethner, University of Jena

Chair: Prof. Dr. Dev Nathan, Institute for Human Development, New Delhi

13:30 – 14:30 Lunch and Networking Break

14:30 – 16:00 Session 5: Realigning Work Processes

- Enhancing and Restructuring SME Innovation Patterns by Work Organizations of the Future
  Prof. Dr. Carsten Dreher, Freie Universität Berlin

  Prof. Dr. Dev Nathan, Institute for Human Development, New Delhi

- Process Innovation - The Driving Force at EFD Induction
  Hubert Reilard, EFD Induction

Chair: Dr. Thomas Lange, Acatech- National Academy of Science and Engineering, Germany

16:00 Networking Tea & End of the Symposium
Abstract

Employment is probably the single biggest issue across the world. It has become even bigger because of the march of technology. There is a rising fear because jobs are not as easily available on one hand and getting tougher on the other.

That the world is changing at a rapid pace is a well-known fact. However, it is nearly impossible to know exactly how the world will be transformed by megatrends that we are witnessing. What we can do, however, is understand the trends and do our best to be prepared for a future that we cannot take for granted. For developing countries like India, the future of work will be very different from OECD countries. Just as globalization has impacted different parts of the world differently, the future of work will have a varied impact throughout the world. This impact will be contingent upon the level of development, the demography, climate change and technology. While most of the developed world is ageing and faces severe labour shortages, the developing countries are hastily strategizing to make sure their young are gainfully employed thereby contributing to development. There is a need therefore to outline the major challenges for India and recommend some policies for stakeholders such as governments, employers, academic institutions and individuals.
Dr. Didar Singh

Senior Fellow, Delhi Policy Group
Member, ILO Global Commission on The Future of Work

Dr A. Didar Singh, member of the ILOs ‘Global Commission on the Future of Work’, is an author and civil servant who served as Secretary to Government of India from 2009 to 2011 and as Secretary General, FICCI (Federation of Indian Chambers of Commerce and Industry) from 2012 to 2017. Dr. Singh is presently Senior Fellow, Delhi Policy Group and Adviser Bridge India, London. He also functions as Chair of the Diaspora group of KNOMAD, World Bank. He holds a PhD on the Policy and Administration of E-commerce from Panjab University, Chandigarh and is also an alumnus of St. Stephen's College, Delhi, and the University of Birmingham, UK.
Abstract

The digital transformation will result in fundamental changes to work and organisational processes within companies: In the course of the digital transformation, the whole economy is shifting towards a service economy. This service-orientated perspective is rather new for a wide range of industries. Hence, their business models will have to change dramatically. The next few years will be critical for many companies: Will they be able to turn around their business models quickly enough to fully embrace the digital transition? The digitalization must then not stop at the digitalization of the customer interface; companies also have to transform themselves completely. Human resource management plays a key role within that transition. The changes must be shaped in a way that benefits businesses and employees in equal measure.

This talk shall mainly refer to the results of the Human Resources Working Group at acatech, a joint forum for Chief Human Resource Officers (CHROs) of selected German companies and top scientists on the future of work. The focus will be on organizational agility, lifelong learning and the use of AI.
**Dr. Thomas Lange**

Head of Programme Area Economics, Education and Employment at Acatech- National Academy of Science and Engineering, Germany

Acatech provides top-level expertise from science and business for political decision-making processes on a double mandate from the federal and the regional governments in Germany. Dr. Lange has more than eight years of experience with projects on innovation policy and committees of experts. He also lectures on political consulting at the University of Freiburg. Before joining Acatech, he worked as a Junior Economist at IFO Institute for Economic Research in Munich and as a Research Associate at the University of Konstanz. Thomas earned a Master of Science in Economics and a doctorate in Economics from the University of Konstanz.

---

**Moderator**

**Dr. Matthias Kiesselbach**

Director, German Research Foundation (DFG) India and Chairperson, DWIH New Delhi

Matthias Kiesselbach has been the Director of DFG’s India Office in New Delhi since July 2017. Before coming to India to head DFG’s India Office, Mr. Kiesselbach was subject specialist for the discipline of Philosophy within the Humanities and Social Sciences Division of DFG Head Office in Bonn. In this capacity, he collected experience in international funding programs, including the multi-national "Digging Into Data" initiative and the Polish-German bilateral program "Beethoven". Mr. Kiesselbach’s academic background is in philosophy. After a Dr. phil. from the University of Potsdam, he has worked as a postdoctoral researcher in Berlin and Pittsburgh.
ARTIFICIAL INTELLIGENCE AND THE NEW WORKING ENVIRONMENT

19 March | 14:30 h - 16:00 h

SPEAKERS:

PROF. DR. GREGOR ENGELS
University of Paderborn

DR. MORITZ HÄMMERLE
Fraunhofer Institute for Industrial Engineering

MR. VOLKER SCHMID
Festo Didactic SE

CHAIR:

DR. SABRINA SCHNEIDER
University of Kassel
Abstract

The use of modern I.T. in working environments opens up great opportunities for modernization and the associated increase in the efficiency of work processes. This modern IT is characterized by novel types of devices, by their high-speed connections, by the availability of huge sets of data, and lastly by novel AI algorithms which analyse those data. In particular, the availability of data in real-time about processes, devices, and also humans enables novel ways to steer, to control, and to support any kind of work process.

This talk will discuss these new working environments, their opportunities and challenges. It will be illustrated that they have an impact on all involved stakeholders – in all domains, at all levels of an organization, and for each kind of an employee. The talk will also give an overview on recent research activities and results in migrating to those novel working environments. It will be shown that interdisciplinary research is indispensable in order to cover all aspects of the use of modern IT in working environments. A focus will be on the design of digital twins for humans, a digital representation of employees which enable individualized support in working environments while the risk of privacy and security issues is also taken into account.
Prof. Dr. Gregor Engels

Head- Database and Information Systems, University of Paderborn

Prof. Dr. Gregor Engels received his PhD in Computer Science in 1986 from the University of Osnabrück, Germany. Between 1991 and 1997 he held the position of Chair of Software Engineering and Information Systems at the University of Leiden, The Netherlands.

Since 1997, he is Professor of Informatics at Paderborn University, Germany.

He is chairperson of the Software Innovation Lab; the university part of the technology transfer institute Software Innovation Campus Paderborn (SICP). He is chair of two interdisciplinary graduate schools on the topics "Design of flexible working environments- human-centred use of Cyber-Physical Systems in industry 4.0", and "Digital Future", where around 20 PhD students from different disciplines research on the impact of digital transformations on working environments. He is board member of Informatics Europe, a European organization representing informatics departments from universities all over Europe.

Since 1997, he is Professor of Informatics at Paderborn University, Germany.
Abstract

Digitization, Industry 4.0 and Artificial Intelligence are revolutionizing work in future production. Networked machines with intelligent technologies, modern assistance systems and digital work organisation 4.0 are emerging: new technologies raise new questions. What potentials arise from their use? How can processes be designed with them and where is production work developing? The lecture shows future paths and presents them in the context of the Future Work Lab, the largest German innovation laboratory for work, people and technology.
Dr. Moritz Hämmerle is the head of the research department "Cognitive Engineering and Production" at Fraunhofer Institute for Industrial Engineering IAO. Since 2008, he and his teams have been researching and consulting innovative companies on issues relating to digitized production, industry 4.0 and the future of production work. His focus is on production assessment 4.0, I4.0 and lean production, smart flexibilization of working hours in the factory and integration of employees into digital transformation. He is a member of the winning team of the German Industry 4.0 Award 2014 and has, since 2017, been setting up the Future Work Lab in Stuttgart, the largest German innovation laboratory for work, people and technology.
Abstract

In this world of rapid technology disruption, enterprises can no longer rely on sending employees for off-the-shelf training programmes to meet their immediate and longer-term manpower skilling needs, in particular within the context of Industry 4.0 and Smart Manufacturing. This session will therefore provide an outlook of current and future trends of manufacturing of tomorrow. It shall also, however, provide an insight into training programs to qualify personnel professionally. Such programmes often have limited transfer of learning and ROIs at the workplace. Festo, a leading world-wide supplier of automation technology and performance leader in industrial training and education programs has a dedicated arm, Festo Didactic, to spearhead basic and further skills development for manufacturing and process automation. The session will further elaborate on FestoDidactic’s approach on Industry 4.0, how it shapes business models, and the requisite employee profile and portfolio of skills and dispositions for continued business success. FestoDidactic’s philosophy on training and development, anchored on active learning based on actual products and training factories, will be discussed. New evolving ways of developing Industry 4.0 philosophies such as use of gamification, on-the-job coaching, and ongoing challenges encountered will also be shared.
Mr. Volker Schmid

Head, Asia/Pacific, Festo Didactic SE

Mr. Volker Schmid, having a graduate engineering degree in Mechatronics and Automation Engineering from Esslingen University, Germany, with post graduate studies and living experiences in Singapore and Asia during the past twenty years plus, is currently holding the position of the Head of Asia and Pacific for the company of Festo Didactic SE, being the educational arm of Festo. During the past fifteen years, Mr. Schmid has been developing the educational market for Festo Didactic in Asia, Middle East and some parts of Africa, supported by various publications in the fields of curricula design, holistic approaches of training and excellence centres as well as others.

Dr. Sabrina Schneider

Assistant Professor for Technology Management, University of Kassel, Germany

Please refer to pg 33
Session 2
Redesigning Workspaces

19 March | 16:30 h - 18:00 h

Speakers:

Dipl.-Ing Christos Chantzaras
Technical University of Munich

Dr. Gaurav Raheja
Indian Institute of Technology (IIT), Roorkee

Sangeeta Ray
Siemens Ltd.

Chair:

Prof Dr.-Ing. Barbara Deml
Karlsruhe Institute of Technology
Abstract

The design of workspaces has gained in relevance over the past decade. Space, formerly used as tool to organize areas, to structure processes and to ensure hierarchical settings, has shifted towards a medium through which collaboration and innovation is enabled and fostered. The architecture and design of workspaces is becoming a depiction of an organization’s inner structure and its way to work, produce, research and innovate in the future.

Two aspects are of major importance for this development: rising complexities and social interactions. As complexities in markets, products and services grow, they require an interdisciplinary exchange, agile collaboration and co-creation. Simultaneously, the problems companies and their employees are facing are increasingly ill-defined or wicked and demand new approaches. The management attitude has thus shifted from a focus on decision making and choosing among existing alternatives to a design attitude of actively generating new options in creative ways. The implications of the design attitude lead to the development of new spatial settings for work characterized by transparency, flexibility, engagement, exploration and awareness, and a de-hierarchization towards self-organized teams and collaborative networks.

Social interactions, as second aspect, are becoming vital for the productivity and innovation of a company. Despite distance shrinking technologies and advancements in digitization, face-to-face communication is still the most valuable form of interaction for successful teams. Advanced workspaces are adapting to the new requirements of complex challenges and social interactions by fostering self-organization and entrepreneurial spirit, while providing at the same time a sense for community and safe environment, in which curiosity, creativity and innovation sparks.
After the principle of ‘form follows function,’ in the new work settings ‘form follows disruption.’ From one-floor concepts to hybrid mixed-use spaces and entirely empty structures, organizations are literally blueprinting and building their disrupting business models, introducing and integrating through space their new and future working and collaborating modes. In a seamless transition from desk work, meeting, concentration, experimentation, lab and prototyping the achieved flexibility and adaptability of buildings allows for faster interdisciplinary exchange on complex tasks and faster innovation - within a company, between companies, between companies and public institutions. Spaces designed for this growing permeability provide a frame to support new ways of working and can leverage the creative and innovation potential of existing organizations and for upcoming generations.

Dipl.-Ing Christos Chantzaras
Architectural Entrepreneurship & Innovation, Technical University of Munich

Christos Chantzaras has a 10-year-experience as architect and consultant for large scale national and international projects. Since 2007 he held different positions as project manager and project director. He was responsible for office, R&D and production buildings as well as consulting projects within various industries. From 2015 to 2017 he set up an architectural branch in Berlin as interdisciplinary strategy team. End of 2016, he started as lecturer at TUM Department for Architecture to open the profession towards fields ahead of building design. Since March 2017 he is research associate with focus on architectural entrepreneurship and how thinking of architecture can be applied to innovation processes and new ways of working. Related to this, Christos is setting up an Architecture Research Incubator (ARI), developing new educational formats in architecture and mentoring start-ups on the future of work.
Abstract

Amidst an omnipresent future of artificial intelligence, seamless connectivity and virtual realities, this talk aims to explore concerns, challenges and ways to respond to human – machine interfaces in an intensely digital future. It builds on the fact that work and space relationships regulate the new paradigms of human futures more than ever before impacting social health in large ways. This implies asking critical questions on the role of space relationships in supporting work and role of work in human social development? Revisiting spatial design concepts and human relationships in context of work and its new interpretations shall form one of the key highlights of this discussion. It brings a new dimension to speculate future trends through demographic shifts and their associations and implications in spatial planning of workspace designs. The role of form, structure, layouts, materials and other intangibles in any workspace pose a continuous challenge for future adaptabilities of humans that inhabit them. Contemporary shifts in work cultures like work from home, inclusive office spaces, gender equity and new theories guiding the work space futures like the WELL standards, universal design theory, etc. aim to provide an inclusive platform for futuristic design thinking to ensure healthy, efficient, equitable and humanizing workplaces. Towards the end, this talk shall provide multiple future frames to review workplaces.
Dr. Gaurav Raheja is an architect with social thinking outlooks and a well-known expert of accessibility and universal design from India. He is an Associate Professor as well as Co-Cordinator of Design Innovation Center at IIT Roorkee.

Dr. Raheja has been an expert member and has played key advisory roles to the Department of Disabilities in Ministry of Social Justice and Empowerment, Govt. of India. He has been awarded the Mphasis Universal Design Award, 2010 for his professional and research contributions in the field of universal design. He received the Guest Research Fellowship at T U Berlin in 2017, DAAD IIT Faculty Exchange Fellowship 2016 and DAAD Science Tour Fellowship 2016 amongst others.

With a vision of researching urban futures of human inclusion in built and mobility environments, he has set up Laboratory of Inclusive Design at the Department of Architecture & Planning, IIT Roorkee. Dr. Raheja has delivered several invited talks at national and international platforms including DLR, Berlin, WHO, New Delhi, IIM Ahmedabad, TISS Mumbai, Accenture, Bangalore and several others.
Sangeeta Ray

Vice President - Siemens Real Estate - Asset Management Unit India & Bangladesh
Siemens Ltd.

Ms. Sangeeta Ray has been serving as the Head of Real Estate- India and Bangladesh for Siemens Ltd. since 2012. Before this, she was designated as the General Manager for Real Estate Strategy and Planning for South Asia. Though a Chartered Accountant by qualification, her strengths lie primarily in general management, controlling and process orientation. She played an instrumental role in the acquisition of Metrix by Siemens Building Technologies India group during 2007-09 as the executive head for Finance for the company. She has over 27 years of professional experience in diverse management areas, including HR, Finance and Accounts, Audit and Corporate Strategy. She recently (in 2016) also completed her Executive MBA from ISB, Hyderabad which also gave her a chance to complete short programs from FDC in Brazil and at Kellogg & Wharton in the US.

Prof. Dr.-Ing. Barbara Deml

Chair

Director, Institute of Human and Industrial Engineering,
Karlsruhe Institute of Technology

Please refer to pg 35
Working Together with Artificial Intelligence

20 March | 10:00 h - 11:30 h

Speakers:

Dr. Sabrina Schneider
University of Kassel

Prof. Dr.-Ing. Barbara Deml
Karlsruhe Institute of Technology

Prof. Dr. Simon Eickhoff
Forschungszentrum Jülich

Chair:

Prof. Dr. Gregor Engels
University of Paderborn
Abstract

An alternate who is wise, experienced, and capable of making rationally optimal decisions on our behalf is neither a hyperbolical illusion, nor a far-fetched future scenario. Intelligent algorithms have emerged as very powerful potential decision-makers. Owing to their pure rationality and high computational power, they are superior to human decision-makers in many contexts. For many firms, the ability to integrate algorithms into (strategic) decision-making is likely to become a key competitive success factor, if not a requirement for survival. However, there is an aversion to delegate to non-human decision-makers. To most managers, algorithms are non-transparent ‘black boxes’ of unknown mechanisms. This presentation summarizes insights from a series of experimental studies that analyse decision delegation behaviours to algorithms in strategic decision contexts. Furthermore, it discusses the managerial implications and the consequences for Human-AI collaboration.
Prof. Dr. Sabrina Schneider holds a PhD from EBS University for Business and Law, Germany. Her research centres on the strategic implications of digital technologies on business and society. She leads the research group, the Department of Managerial Technology Management, founded in Oct 2016. The research group is part of the Institute of Management and Business Studies (IBWL) of FB 07 (Faculty of Economics and Management) Its main emphasis lies on providing teaching on technology management, business model innovation and management of digitization and to conduct research on the management of disruptive technological developments, in particular digitization.
Abstract

When industrial robots were introduced over fifty years ago, a collaboration between robots and human workers was not possible due to safety reasons. This changed fundamentally with the introduction of lightweight robots, over twenty years ago. It is now possible to operate robots without safety fences within production environments. These collaborative robots (so-called cobots), having the potential of working hand in hand with human colleagues, caused a proper media hype in the last few years.

Despite this, experience shows that the full potential of human-cobot working systems has not been tapped so far, within industrial working environments. This work addresses some of the current drawbacks faced by small and medium-sized enterprises in Germany and discusses relevant approaches from an industrial engineering point of view. Besides, from a human factor engineering point of view, it also addresses how cobots have to be developed further to become real human-aware systems with a high degree of user acceptance. For teaming up with human co-workers, it seems to be of particular relevance that cobots are able to predict relevant user states, such as workload or emotions, and consider these states in an adaptive behaviour. Our research has shown that for predicting user states and intentions, respectively, psycho-physiological user parameters, such as ocular, cardial or electro-dermal data, are meaningful. Summarised results concerning these research activities will also be presented here.
Prof. Dr.-Ing. Barbara Deml

Director, Institute of Human and Industrial Engineering,
Karlsruhe Institute of Technology

Prof. Barbara Deml studied psychology and speech communication at the University of Regensburg, Germany. In her doctoral studies she did research in the field of tele-robotics and telepresence with a major concern on the design of haptic human machine interaction. Her dissertation thesis in doctoral engineering was honoured with a research award by the University of the Armed Forces, Germany. After postdoctoral studies at TU München and Carnegie Mellon University (Pittsburgh, PA) she joined the University of the Armed Forces as Assistant Professor for Cognitive Ergonomics. In 2009 she became a Full Professor at Otto-von-Guericke-Universität Magdeburg and in 2012 she joined Karlsruhe Institute of Technology (KIT). Since this time, Prof. Deml is director of the Institute of Human and Industrial Engineering. Her major research focus is on the design of human-robot-interfaces, user state and intention prediction as well as on the impact of automation on human users.
Abstract

One of the critical challenges that is shared between human resource management, industrial and organizational psychology as well as clinical medicine is the assessment of individual aptitude, competences and personality. A large market ranging from questionnaires and test-systems to assessment centers and human resources counseling services attests to this need. Drawbacks of current approaches towards individual assessment, however, include trade-offs between objectivity and ecological validity and the danger of strategic answers.

Recently, however, artificial intelligence has given rise to a revolution in cognitive neuroscience and differential psychology. For the first time it now becomes possible to train algorithms to predict individual traits or phenotypes in new subjects from neuroimaging data with encouraging accuracy. These developments open the perspective of objectively inferring individual cognitive skills and profiles, personality traits and ultimately long-term professional outcomes from a 10-20-minute passive brain scan. In this presentation the critical distinction between associative tests and predictive modeling will be reviewed in order to highlight the shift in perspective that will drive the future of human assessment. This will be followed by an overview of the concepts, approaches and current results of using artificial intelligence to infer individual phenotypes and traits from neuroimaging data. The presentation shall end with some remarks on precision and confidence as well as with an outlook on how the currently emerging tool may reshape human resource management in the future.
Prof. Dr. Simon Eickhoff
Chair, Institute for Systems Neuroscience, Heinrich-Heine University, Düsseldorf
Director, Institute of Neuroscience and Medicine (INM-7, Brain and Behavior), Forschungszentrum Jülich

Prof. Dr. Simon Eickhoff is a visiting professor at the Chinese Academy of Science Institute of Automation. Working at the interface between neuroanatomy, data-science and brain medicine, he aims to obtain a more detailed characterization of the organization of the human brain and its inter-individual variability in order to better understand its changes in advanced age as well as neurological and psychiatric disorders. This goal is pursued by the development and application of novel analysis tools and approaches for large-scale, multi-modal analysis of brain structure, function and connectivity as well as by machine-learning for single subject prediction of cognitive and socio-affective traits and ultimately precision medicine.

Prof. Dr. Gregor Engels
Head- Database and Information Systems, University of Paderborn

Please refer to pg 17
Session 4
Impacts of New Technologies on People

20 March | 12:00 h - 13:30 h

Speakers:

Prof. Dr. Santosh Mehrotra
Jawaharlal Nehru University

Dr. Tanja Carstensen
Ludwig-Maximilians- University Munich

Dr. Maximillian Goethner
University of Jena

Chair:

Prof. Dr. Dev Nathan
Institute for Human Development
New Delhi
The presentation will examine some recent trends in the use of IR4 technologies in India, and company views in this regard. It will also examine such limited evidence that exists on the grim employment scene in India. However, the focus of the presentation will be on the three main challenges that confront Indian policy-makers that are constraining Indian use of, and innovation in, the IR 4 space. These are: the education/skill level of the Indian workforce; the absence of an industrial policy that underlies the stagnant share of manufacturing in India; and the absence of a well-articulated national innovation system.
Dr. Santosh Mehrotra
Professor of Economics, Centre for Labour, Jawaharlal Nehru University, Delhi

After an MA in Economics from New School for Social Research, New York, and Phd., Cambridge University (1985), Dr. Mehrotra was Associate Professor of Economics, JNU (1988-1991). He spent 15 years with the UN (1991-2006) in research positions, heading UNICEF’s global research programme at the Innocenti Research Centre, Florence, and as chief economist of the global Human Development Report New York. He returned to India to head the Rural Development Division and Development Policy Division of Planning Commission (2006-09), and was lead author of several chapters of the 11th & 12th Five Year Plans of India. He was also the Director General (2009-14) of the National Institute of Labour Economics Research, Planning Commission, in the rank of Secretary to the Government of India.

He consults regularly for the ADB, UNESCO, ILO in Asia region on skills and labour market issues. His work has been translated into Hindi, Spanish, French, Russian, German and Portuguese.

He has three books forthcoming, two of which are translations into Hindi. A new edited volume is called: Planning in the 20th Century and Beyond. India’s Planning Commission, NITI and the Future of Planning (Cambridge University Press). His books also include:

- Policies to Achieve Inclusive Growth in India Cambridge University Press, 2016
- India’s Skills Challenge: OUP, 2014
- India Human Development Report, 2011, Oxford University Press, Team Leader. (Team Leader)

among others.
Abstract

A variety of new digital technologies, including mobile and smart devices, social media, and collaboration platforms, among others, have changed the organization of work times, spaces, tasks and demands. In Germany, the question of gender-relevant consequences of the digitalization of work has meanwhile arrived in media, political and economic discourses.

Despite increased rates of women’s employment and equality efforts, labour is still highly segregated in Germany, with typical male and female professions. Women still encounter the ‘glass ceiling’. The division of labour in paid and unpaid work is also unequal: 47 % of female employees work in part-time jobs, while among males, the percentage is 11 % (Bundesagentur für Arbeit, Statistik/Arbeitsmarktberichterstattung 2018). Correspondingly, women spend more time for child care and housework. Reconciling work and family still remains mainly a ‘women’s problem’. On the other side, during the last decades, we have observed a lot of developments toward equality. ‘Female potential’ is increasingly demanded at work and companies have been developing approaches for diversity management and family-friendliness.

New technologies always offer opportunities for re-negotiations of power and gender relations as well as for a re-shaping of working conditions (Wajcman 2004). Within the German discourse, it is uncontested that digital technologies and the transformations of work will have gendered effects. Two of the most important issues are:

- New forms of working from ‘any place and at any time’ (crowd-working, work from home, mobile working): Are they changing or improving opportunities for reconciling family and work or creating new burdens?
- New forms of digital visibility through use of social media platforms for in-house collaboration, communication and project organization: ‘Social collaboration’ establishes new demands on employees, including self-presentation, sharing, and networking, and could perhaps change previous working cultures of physical co-presence, benefitting women whose physical presence in the office is restricted due to child-care duties.

This presentation shall discuss how far digitalization is improving women’s situations at work and in the labor market, with regard to reconciling child care with their jobs as well as their chances for careers. The argumentation will be based, among others, on the first results of an empirical study in German companies having implemented digital, mobile, and flexible work arrangements (‘Transformations of Gender Relations through Digitalization’, funded by the Hans-Böckler-Foundation). Finally, some insights will be shared into how arrangements between job and care demands (do not) change with digitalization, as well as the degree to which new facilitations and burdens arise.
Dr. Tanja Carstensen
Sociologist and Postdoc Researcher
Department of Sociology, Ludwig-Maximilians-University Munich, Germany

Dr. Carstensen received her doctoral degree in Sociology from the University of Hamburg and worked at University of Hohenheim, Hamburg University of Technology and Leuphana University of Lueneburg. Currently, she is the head of the project 'Transformations of Gender Relations through Digitalization,' funded by the Hans-Böckler-Foundation. Her research interests include: digitalization of work, gender relations in technology, social media at workplaces, digital culture, transformations of agency, and human-technology-interactions.
**Abstract**

How does local employment adapt to the changes imposed by the current digital transformation of the world of work?

Recent technological developments in fields such as artificial intelligence, machine learning and cloud computing (i.e., the "second machine age," Brynjolfsson & McAfee, 2014) present significant challenges to the labor markets of today. New digital technologies create entirely new jobs, transform existing occupations, and previously important jobs are increasingly becoming obsolete. Consequently, formal qualifications do not necessarily appear to be the decisive criterion for a “future-proof” career anymore. Instead, the increasing automation of work processes will likely have task- and skill-biased effects, as new digital technologies will substitute for tasks that can be automatized relatively easy while they will increasingly complement tasks that are currently bottlenecks to digitalization.

The individual employee thus needs to consider her or his skill-set and update respectively. Firms need to adjust their routines and organizational structures to integrate such transformative changes and stay competitive. From a policy perspective, governments may need to establish appropriate measures (e.g., educational programs) to allow participation in a drastically changing labor market and prevent polarization in society. Studies show that even though digitalization represents a serious threat to jobs, the share of high-risk jobs varies substantially between countries (Bonin et al., 2015; Dengler & Matthes, 2015; Sorgner et al., 2017), explained, for instance, by the occupational structure of economies and a country’s level of technological development.

Against this background, this talk will shed light on the recent changes in the world of work, providing evidence for Germany and the European Union. Some of the challenges and opportunities related to digital and automation technologies from the perspective of employers and employees across different industries as well as the general population shall also be discussed.
Dr. Maximilian Goethner

Post-Doctoral Researcher, Department of Microeconomics,
University of Jena

Dr. Maximilian Goethner is a research fellow at the DFG Graduate School "Economics of Innovative Change" (DFG-GRK 1411), funded by the German Research Foundation. He received his PhD in Economics from the University of Jena, Germany in 2012, studying determinants and effects of technology entrepreneurship. His research interests include digital innovation, labor mobility, and economic inequality. His current research focuses on determinants of the fear of automation as well as the diffusion of robot technology as driver of labor mobility.

Prof. Dr. Dev Nathan

Institute for Human Development, New Delhi

Please refer to pg 51
Realigning Work Processes

20 March | 14:30 h - 16:00 h

Speakers:

Prof. Dr. Carsten Dreher
Freie Universität Berlin

Prof. Dr. Dev Nathan
Institute for Human Development, New Delhi

Hubert Reilard
EFD Induction

Chair:

Dr. Thomas Lange
Acattech- National Academy of Science and Engineering, Germany
Abstract

In a study commissioned by the German Federal Ministry of Higher Education and Research BMBF, FreieUniversität Berlin and Fraunhofer ISI, innovation patterns of German small and medium sized enterprises (SME) have been analysed. The analysis was based on literature review of future trends, quantitative analysis regarding the innovation patterns, and additional expert interviews with companies representing the identified patterns. Based on survey data, 12 different SME innovation patterns were identified. Existing and non-existing R & D activities, resources and sources of innovation regarding different goals (whether new products, new services or enhanced processes) were examined in detail. These different SME innovation patterns were confronted with future challenges including new types of work organization combined in the catchword ‘Arbeit 4.0’ (Work 4.0). Many of the non-R & D – based SME innovation patterns show different knowledge appropriation regimes, which are influenced by the way the people work inside the firm or cooperate with other companies. The expert interviews conducted in the firms give insights into the impact of different SME innovation patterns on future work designs.

The main message is, that some of the SMEs are not severely concerned by the new trends of work. Others are highly impacted and have to change their work behaviour dramatically. In addition, new more network-based cooperation patterns require even SMEs to look for international collaboration. That opens up new ways for Indian companies to offer their services to SMEs in Germany enhancing their products, services and processes.
Since 2009, Prof. Dr. Carsten Dreher is at Freie Universität Berlin. He studied Industrial Engineering and Occupational Training at the Technical University of Karlsruhe. He started his career at the European Commission’s Directorate General Research as junior research fellow at the unit Forecasting and Assessment in Science and Technology (FAST). From 1989 to 2006 he worked at the Fraunhofer Institute for System and Innovation Research (ISI) in Karlsruhe analysing industrial innovation behaviour. After finishing his PhD in 1996 at TU Karlsruhe, being visiting scholar at MIT’s Industrial Performance Center, in 2006, he was appointed Joint Professor for Innovation Research and Innovation Management at the University of Flensburg and at the Mads Claussen Institute for Product Innovation of the University of Southern Denmark. His research interests are analysing technology dynamics, routines for innovation processes and mechanisms and impact of public innovation policies.

Abstract

Technological changes, such as automation and digitization, changes in logistic costs and the growing importance of demand-focused value chains are all likely to restructure global value chains (GVCs). Are these changes likely to result in on-shoring or near-shoring of manufacturing? Given that the shift of manufacturing to the Global South has been a major component of industrialization and services growth, it is important to understand the likely impacts of technological changes, pressures to reduce emissions and the growing importance of consumers in various value chains in the likely trajectory of employment in GVCs, particularly in developing Asia, which is the focus of the study.

This presentation will be centred around the ongoing and likely changes in the apparel and shoes value chains. Trends in medium- to high-tech manufacturing, such as auto components; medium- and high-tech services in IT software services and call centres will also be discussed.
Dr. Dev Nathan is an economist and Visiting Research Fellow at the Duke University GVC Centre, USA. Some of his recent publications are (co-editor and author) *Labour in Global Value Chains in Asia and Development with Global Value Chains: Upgrading and Innovation in Asia*. He is one of the editors of the Cambridge University Press series on *Development Trajectories in Global Value Chains*. 
The strength and leading position of small and medium sized industries in Germany is based on continuous technical and business innovations, a pool of qualified and motivated manpower and fast transformation of business- and work processes based on new customer needs and global competition.

This is a good foundation but it is by no means a guarantee for future success. The needed transformation processes, discussed and driven under headlines like Industry 4.0, Internet of things, digital factories and artificial intelligence, has to be quicker and more strategic.

The Bangalore factory of EFD Induction Private Limited can manufacture products and deliver services at more competitive prices, adapted to the needs of the market in India and Asia and that too much faster than products from units elsewhere.

In addition, the unit plays a significant role in EFD Induction’s global corporate strategy:

- provide products and services to group companies to improve quality and reduce cost
- be a “buffer” for market fluctuations elsewhere and supply man-power, products, modules, software and services wherever needed by other group companies.
- Reach the needed level of global flexibility.
- be a part of a global R & D team to make our products more competitive in terms of features and price
- supply software services to our group which are difficult (or too expensive) to get in Germany or Europe

This presentation will highlight a few elements of our work processes to achieve the above targets and take a look at how technological changes will be driven by humans and production improvements will enhance human capabilities to a new level. There seem to be good times ahead since we can produce more using less resources, a driving force during all industrial transformation in the last hundred years.
Hubert Reilard
Managing Director Ret., EFD Induction Pvt Ltd
Past President, Indo-German Chamber of Commerce (IGCC)

Mr. Hubert Reilard served as the Managing Director of EFD Induction Private Limited, Bangalore, India from 1995 to 2017. The company provides heating solutions for a wide range of industrial applications, with manufacturing plants, workshops and service centres across the world, in Europe, in the Americas and in Asia. He was also the President of the Indo-German Chamber of Commerce (IGCC) for the year 2015-2016. As former Managing Director with ALBA Computeranwendungen und Messtechnik GmbH in Munich, Germany, during 1989-1994, he was responsible for projects between the German Space Agency DLR and the Indian Space Research Organisation ISRO. Mr Reilard has also taught Physics at the University of Freiburg, Germany. He is a State certified Engineer for Electronics and Data Processing from the Technical College for Electro-technical and Electronic Engineering in Munich, Germany and holds a specialisation in microcontroller applications.

Chair

Dr. Thomas Lange
Head of Programme Area Economics, Education and Employment at Acatech- National Academy of Science and Engineering, Germany

Please refer to pg 13