The foundation Stichting Study Tour Industria (SSTI) annually organizes the International Research Project. The International Research Project consists of two parts: the research projects and the study tour. The research projects will be conducted prior to the study tour and are based on a predetermined theme. After finishing these projects, the study tour takes place. The study tour is organized around the same predetermined theme. During the tour, companies and universities in the country of destination will be visited.

The International Research project is an initiative of students of the department of Industrial Engineering & Innovation Sciences at Eindhoven University of Technology. Students of the Master programs ‘Operations Management and Logistics’, ‘Innovation Management’, ‘Business Information Systems’, and ‘Manufacturing Systems Engineering’ are allowed to participate. The participants will conduct the research projects mentioned above. For the participants, the International Research Project is a great opportunity to apply their academic knowledge within an international business setting. Furthermore, IRP provides students the opportunity to gain in-depth knowledge about a subject of research that suits their interests and education.

The International Research Project 2018 will visit Dubai, Shanghai and South Korea. The theme of the International Research Project is “New Work Future: A Technology Driven Revolution.”

This brochure provides information for companies that are interested in the International Research Project. After this introduction this brochure provides more information regarding our destination and ideas about company visits in Dubai, Shanghai and South Korea. Thereafter, our theme is explained. Finally, the capabilities of the students involved are described and our Board of Recommendation is presented. Contact details are listed at the end of this brochure.

This brochure aims to provide a clear overview of the set up and scope of the International Research Project. Together with all the students involved, we are looking forward to welcome your company as a part of the International Research Project 2018.

On behalf of the SSTI,

Renate Maresch
Coordinator External Relations & Program
International Research Project 2018
This year the International Research Project will head to the Middle East, China and South Korea. The study tour will start in Dubai. The second stop will be Shanghai and from there we go to South Korea by boat. In South Korea, we will hire a few vans to make a road trip. During the study tour several company visits that have a connection to the theme ‘New Work Future’ will take place. Also several universities will be visited, and a visit to the Dutch embassy in Seoul has been scheduled.

Currently, the trip is planned from 7-28 July 2018 (but this might shift with 1-2 days) and we will visit Dubai, Shanghai, Seoul, Ulsan and then Busan.

The goal of the study tour is to explore and observe how the ‘New Work Future’ evolves in these countries. Each country is chosen based on their interesting economy and culture. The cultural and economy diversity between the countries makes the trip an educative journey through different parts of the world.

Once this knowledge has been obtained, we can use it to complement the research findings of the project we conducted in the Netherlands.
What companies are we looking for?
By visiting companies and academic institutions during our trip, we want to gain and share knowledge about our theme New Work Future. We are looking for companies that have affinity and experience with this theme and are interesting from an industrial engineering perspective. For our participants it is very interesting to see many different companies, ranging from big multinationals to smaller (high-tech) companies and from headquarters to manufacturing plants. We can learn a lot from the knowledge and experience from visiting many different companies.

What are the possibilities for a visit?
During a visit we would be glad to hear the story of your company and your relation with our theme New Work Future. Of course we would like to present our background and research findings as experienced in the Netherlands as well. Another nice way to learn about the company is by doing a guided tour. Especially impressive headquarters and manufacturing locations are interesting to see from the inside. Besides that, we are looking for in-depth discussions related to the new work future and industrial engineering. For example a case about your company would be very interesting to solve and discuss or a brainstorm session about a current problem (inside your company). Besides that, there are also other possibilities, even more informal ones (e.g. a drink afterwards) if you’re looking to get to know the students even better.

What does it bring your company?
There are two main reasons why your company should participate in our International Research Project. Facilitating a visit can bring interesting opportunities for sharing knowledge and promoting your company. First of all, the International Research Project brings a group of high educated Dutch students to your company. All participants are in their last phase of their studies and will be searching for a company to graduate at or to start working after graduating. After we have returned from our trip, all stories about companies and visits are shared to all participating companies and students in our closing activity or magazine. These stories from our trip will be shared trough many different ways, so you’ll get a lot of exposure to other students. Second, the visits can bring up interesting discussions with master students from four directions in industrial engineering. Presentations and cases will share the knowledge we gained in the Netherlands (during a masterclass and research projects) about New Work Future. We can exchange ideas and might have a different view on certain problems, which might be interesting and lead to discussion. For these reasons, hosting a visit can be a good opportunity to present yourself to other companies and possible future co-workers.

Planning
A visit can be planned for one morning, one afternoon or a complete day. This will depend on the possible content of the visit, the planning of the tour and the wishes of both parties. We are also interested in sharing lunch or even dinner as an extension of the company visit. This will make room for some less formal conversations and create opportunities for us to explore the local culture. A provisional planning for the days in each city exists, but this depends on the amount of companies we will eventually plan to visit in each region or city. To plan the place and time of the visit, you will have a lot of contact with our board or one of our participants via email, phone or videoconference. We will plan every detail of our tour before we will travel overseas. In all cases, don’t hesitate to contact us.
Some examples of company visits from the International Research Projects 2017, 2016, 2015, and 2014 are presented. These descriptions come from the magazines that were made after the study tour and can be seen as an example content of a company visit.

Texas & Mexico 2017
“Illuminating Automation”

National Instruments
“We had several presentations about different products National Instruments produces and services it provides. Regarding Intelligent Automation it was noted that for example a strong internet connection is needed to succeed. Therefore, National Instruments is developing 5G, which they’re currently testing near Austin.”

Dow Chemical and Houston Mechatronics
“After a pleasant flight, the trip started with 3 days in Houston. Here, we visited many different aspects about the corporate culture in Texas. On one side we saw Dow Chemical, who has a main focus on the oil and gas industry and is a bit conservative regarding technology. We really felt the expression “bigger is better” during our tour through the gigantic area around Freeport where they’re still building new factories. On the other hand, we saw Houston Mechatronics: a smaller company which is completely focused on robotics. It was founded by two engineers from NASA, who now run the company and have many different projects regarding robotics.”

Japan & Singapore 2016
“Outcome Economy”

Canon
“We were given a tour through their showroom where Canon got the chance to present their history and the various products they have developed over the years. After this interesting tour it was time to go to the presentation room. The design team of Canon prepared two presentations, how Canon applies customer thinking in their product development process and what customer data they use when the Canon products are designed. Also, our chairman gave a nice presentation about our theme the Outcome Economy for the Design department of Canon. After some very interesting presentations about the design team and the user interface design team, it was time to try all kinds of cameras ourselves.”

Fujitsu
“After a nice trip through Tokyo we were welcomed by Fujitsu and received a very interesting lecture about the different innovative projects Fujitsu is currently working on. After we got the chance to ask some question, the projector board magically opened and we got a chance to play with the various products Fujitsu has developed over the years. And that was not all! After everyone was finished playing we were taken to the board room were we got a presentation about the different strategies for innovative products that Fujitsu works with while enjoying the view of the city.”

USA & Canada 2015
“Innovating towards zero”

Google and PepsiCo
“The last two company visits (PepsiCo and Google) were enormously successful. Both companies challenged us with some cases. PepsiCo’s assignment was to improve a production process and at Google we had to come up with new innovative ideas surrounding innovating toward zero and mobile development. A clear winner at Google was ‘Google Connect’. These companies were a perfect ending of the company visits.”

USA west coast 2014
“Service-dominant world”

Nike
“Already the fifth day of our trip which is dedicated to Nike. The company visit at Nike consists of presentations, a case, and a factory tour.”

Boeing
“We started with a tour around the factory, which is the largest building under one roof in the world and the size of 40 soccer fields. After the tour, two presentations were given. First Andrew, the manager of marketing Europe, gave us a more general presentation about Boeing. After that, the services manager, gave us more information about the work his department’s delivering.”
New Work Future
A Technology Driven Revolution

Technological change has reshaped the workplace continually over the past two centuries since the Industrial Revolution, but the speed with which automation technologies are developing today, and the scale at which they could disrupt the world of work, are largely without precedent.

The fourth industrial revolution is mainly driven by the upcoming robotization and automation of machines. Technology becomes more intelligent and drives companies towards new ways to deal with employment. It may seem as if humans are simply being replaced by machines, but the only thing that changes is the role of humans in the production process. Where machines take over some roles and jobs from humans, new jobs, knowledge and skills emerge that have to be filled in in order to make this new cyber-physical system work. Humans will be more focused on the programming, calibrating and maintenance of automated processes.

McKinsey, 2017
The changing work environment has its influence on many levels, which will be illustrated as follows.

- **Digitalisation vs human expertise**
  There is the ongoing discussion about whether it is more likely to automate processes, or to keep investing in human resources. Elements such as expertise, experience, costs and the nature of work play a huge part here.

- **Labour flexibility**
  Another part of the new work future, is the growing trend of flexibility in many industries. Due to the expanding digital world, employees are no longer stuck to their desk at the office, but they are able to work from home. This trend is caused by the evolution of the internet, growing digitalisation and the ability of companies to innovate. The expectation is that this trend won’t stagnate, due to the improvement of for example virtual reality.

- **Labour polarisation**
  As an effect, there is a growing polarisation on the labour market. Growing income differences, fear of unemployment and underemployment and different market opportunities between high- and low skilled jobs. New jobs are being born while others disappear. For example, there is a growing need for programmers and craftsmen, while jobs like accountant can be taken over by machines more and more. The way companies deal with that is an interesting thing to investigate.

- **Feminization & Migration**
  Besides the effects illustrated above, which are mainly technology and digitalisation, there is another more cultural side path of the new work future. Slowly, but significantly, more women make their way to the top of business. Due to differences in the way men and women think and act, this ‘female shift’ causes significant influence on the cultural aspects within companies. This is an important and interesting trend. Besides the feminization, the participation of migrated people in the labour market also has its influence on the way businesses work and cultural aspects within a company.

- **Dark analytics**
  Big data enables us more and more to quantify theories and complex developments. This can be used to measure human performance as well. For example, cameras can nowadays monitor perfectly how employees work, which can be quantified in order to measure the effectiveness of employees.

- **Behavioural operations management**
  There are more aspects than the ones illustrated above that has its influence on the future of work. First, there is the influence of human behaviour on operations management. The way people work influences the optimization processes in many industries. The cause of this is related to Human Performance, the results are related to optimization processes. The research that is done here shows a good collaboration between those research directions.
The students involved in this project are students of the Master’s program ‘Operations Management and Logistics’, ‘Innovation Management’, ‘Business Information Systems’, or ‘Manufacturing Systems Engineering’. All students have knowledge in Industrial Engineering, but also capabilities specific to their Master’s program. These capabilities will be discussed on the next page.

The majority of the selected students completed their Bachelor of Industrial Engineering at Eindhoven University of Technology. Topics the students covered during their Bachelor’s program include accounting, goods flow management, human performance management, stock control, organization science and information systems. The students of Industrial Engineering are focused on making improvements in companies and are ready to apply the methods and tools they have learned during their courses. The study program at Eindhoven University of Technology regularly involves group assignments. These group assignments enable students to train their analytical skills, their social skills and their presentation and cooperation skills.

**OPERATIONS MANAGEMENT AND LOGISTICS**

Operations Management & Logistics is a multidisciplinary field that covers such disciplines as supply chain management, manufacturing systems, information systems, business process management, human performance management, health care engineering, transportation, reliability engineering, maintenance, and operational finance. The program trains student in quantitative analyses. In all courses, the theory is related to existing research and students are shown how to apply theory in practice. For example, an alternative design of a control concept for a supply chain or a workflow process in an insurance company are investigated. They also learn how efficiency improvement or cost reduction can be obtained by advanced concepts.

**INNOVATION MANAGEMENT**

Innovation Management studies the management of innovation processes and develops theories, tools and techniques to make businesses more innovative. Key aspects of this discipline are knowledge management, strategic alliances, entrepreneurship, new product development, supplier partnerships, marketing management, quality management and technology management. Students learn how to use the knowledge that they gain in carrying out research into innovation management and in industrial applications. They also learn how to analyze the current innovative performance of a company, explain it in terms of quality, cost and time, and improve this performance by re-engineering innovation processes.

**BUSINESS INFORMATION SYSTEMS**

Modern organizations such as banks, insurance companies, ministries, hospitals, travel companies and webstores are critically dependent on their information system: when it falters, all the other processes come to a standstill. This creates a demand for experts who are able to face the challenges of both computer science and industrial engineering. The Business Information Systems Master program unites the competencies of the computer scientist and the industrial engineer. Through a balanced selection of computer science and industrial engineering courses, this program gives students a solid foundation to be able to design and realize secure and reliable information systems. Students can specialize in one of the four streams: business process management, healthcare, ICT services and logistics.

**MANUFACTURING SYSTEMS ENGINEERING**

Because of digitization and automation, the manufacturing industry is now rapidly changing. The whole chain of products, machines, factories, warehouses and customers, or the Internet of Things, is able to share and exchange information. To fully exploit this network of information for more effective and efficient production, the Manufacturing Systems Engineering Master program provides students with knowledge of the whole chain: from the technology inside the machine up to the level of supply chains. The program offers this combination of technological knowledge of high-tech production systems and knowledge of production processes and supply chains, and shows how to apply this knowledge effectively at both system and network level.
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