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, Data Science and Entrepreneurship, and Manufacturing Systems Engineering are allowed to participate. The participants will conduct the mentioned research projects. 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 2019 will visit Canada and the United States of America. The theme of the International Research Project is Digital Business Era: Stretch your boundaries.
This brochure provides information for companies that are interested in the International Research Project. After a word written by the Rector Magnificus, this brochure provides more information regarding the theme and countries. Then, participation options are elaborated. 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.

In this brochure we aim 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 participant in the International Research Project 2019, and we hope for a pleasant and educational cooperation.

On behalf of the SSTI,

Niek Segers
Coordinator External Relations and Program
International Research Project 2019
“This innovative SSTI study tour is a perfect example of how our students expand their technical, geographical and cultural horizons, and work on concrete solutions in a business environment”
In today’s globalized world, many people believe boundaries no longer matter. All information can be shared to all parts of the world with a simple click, the scientific community has already been a global village for decades, the dollar is a convenient global currency, and people can travel and work between most nations almost entirely without restrictions.

Alas, this picture does not capture the full reality. Countries and multinational entities such as the European Union still have numerous boundaries. Moreover, there is a trend that these are getting stronger every year. The more domestic-focused trade policies of the USA or Hungary’s stand on non-immigration are but two examples of a tendency that globalization has reached its limits and is bouncing back in a more nationalistic approach.

In addition, cultural and lingual barriers have always existed and although somewhat relaxed by modern communication technologies, they still determine to a significant extent separate market behaviors. In both Canada and the USA, the destination of the study trip of the International Research Project (IRP), this is perfectly visible. Canada, of course, is somewhat defined by its bilingualism and the USA is actually far from a culturally homogeneous country. The differences, for example, between liberal California and conservative Texas are huge as are those between the laid back attitude of the American midwest and the very assertive and stressful lifestyle in New York city.

The challenges for business nowadays lie in finding the right combination between advanced global digital technologies and regional, local or even individual consumer markets. Facebook and AirBnB are illustrative of the potential of extremely individualized and customer-oriented intelligent IT systems. Stimulated by advances in Big Data Science and Artificial Intelligence, completely new opportunities have emerged for business to exploit.

These are truly interesting times, and the study association ‘Industria’ has chosen the timely and highly relevant theme ‘Digital Business Era: Stretch your boundaries’. I believe our industrial engineers are more than able to deliver new and important insights regarding this issue. As Rector Magnificus of the TU/e, I fully endorse this International Research Project 2019 and hope that many industries will establish promising projects together with our Industria students.

Prof.dr.ir. F.P.T. (Frank) Baaijens
Rector Magnificus
Eindhoven University of Technology
DESTINATION

VANCOUVER
SEATTLE
PORTLAND
SAN FRANCISCO
This year the International Research Project will head to the west coast of North America. The study tour will start in Vancouver. The second stop will be in Seattle and from there we will travel south to Portland. After visiting Portland we will make a flight to San Francisco which will be our final destination. During the study tour several companies will be visited that have a connection to the theme ‘Digital Business Era’. Also, visits to a number of universities are on the schedule of our study tour.

The goal of the study tour is to explore and observe how the ‘Digital Business Era’ evolves in these destinations. Each city is chosen based on its interesting economy, companies and universities. The diversity in activities during the trips makes this study tour an educative journey that will stretch our boundaries of experience.

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 Digital Business Era. 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 Digital Business Era. 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 Digital Business Era 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 through 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 the Digital Business Era. 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 coworkers.

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 2018, 2017 and 2016 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.

**Dubai, Shanghai & South Korea 2019**

"New Work Future"

**Emirates Skicargo**

"Once we sit down in the conference room, Bert Jorritsma starts to portray his company. After introducing the more general concept of Emirates, Bert directs his (and our) attention to Emirates Skycargo and the available products/services. Furthermore, he introduces us to some of the details/specification with respect to the container slotting in the airplanes and the AS/RS (Automated Storage and Retrieval System) used for storing the cargo containers. After Bert’s presentation, we are invited to take a look at the business process and check the warehouse. Bert explains to us that the lion’s share of the cargo movements takes place during the nighttime. He shows us around the facility, which is divided into three different compartments."

**Samsung**

"The Samsung team welcomed us at the Samsung Innovation Museum. First a presentation was given about the history of Samsung, their products and mission and vision and the campus. Afterwards, we got an overview over Digital City from the roof terrace. On the campus housing, healthcare, restaurants and sports are facilitated for Samsung employees, as well as schools for children of the employees. After the presentation we had the opportunity to talk to employees of different departments. We could ask questions to the expats about their work at Samsung and life in South Korea."

**Texas & Mexico 2017**

"Intelligent 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 robots. It was founded by two engineers from NASA, who now run the company and have many different projects regarding robotics."

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."
Digital Business Era
Stretch your boundaries
The digital Business Era
Information technology has changed the infrastructure and operation of businesses from the time the Internet became widely available to businesses and individuals.

This digital transformation has profoundly changed the way businesses conduct their daily operations; accelerating business activities and processes to fully leverage opportunities in a strategic way. The result is maximized benefits of data assets and technology-focused initiatives. A digital business takes advantage of this in a way to not be disrupted and to thrive in this new era. However, business transformation is complicated, involving a constant fight between strategic vision and operational execution. One cannot succeed without realizing a balance. Digital business is a disruptive transformation that is not possible to achieve without the visionaries among us willing to push the boundaries of what is possible.

“Pioneering enterprises are stretching their boundaries by tapping into a broad array of digital businesses, customers, and even digital things. These forward-thinking companies are eager to drive change and are using this broader digital ecosystem in order to shape entire markets and change the way we work and live.”

-Accenture
During this era, a number of themes is highlighted, that reflect the observed shifts among the digital power agents of tomorrow:

▶ The Internet of Me
The Internet of Me is changing the way people around the world interact through technology, placing the end user at the center of every digital experience. Enterprises are now actively creating connected worlds of their customers’ preferences, habits and context that results in making daily experiences simple, delightful, and personal.

▶ Outcome Economy
Intelligent hardware is the link between the digital enterprise and the physical world. As leading enterprises come face-to-face with the Internet of Things, they are uncovering opportunities to embed hardware and sensors in their digital toolboxes. They are using these highly connected hardware components to give customers what they really want: not more products or services, but more meaningful outcomes.

▶ Platform (R)evolution
Digital platforms are becoming the tools of choice for building next-generation products, services and even entire ecosystems. These platforms are fueling the next wave of breakthrough innovation and disruptive growth. Increasingly,

“Digital business is changing expectations and shifting value within and across industries, transforming competition.”

-Bruno Berthon, Accenture 2018
Platform based companies are capturing more of the digital economy’s opportunities for strong growth and profitability.

**The Intelligent Enterprise**
To this day, increasingly capable software has been used to aid employees in making better and faster decisions. However, with a flow of big data and advances in processing power, data science, and cognitive technology, software intelligence is helping machines to make even more, better informed decisions. Intelligent enterprises are making machines smarter embedding software intelligence into every aspect of its business to drive new levels of operational efficiency.

**Workforce Reimagined**
The push to go digital increases the need for humans and machines to do more in collaboration with each other. Advances in natural interfaces, wearable devices, and smart machines will present new opportunities for companies to empower their workers through technology. Successful businesses will recognize the benefits of human talent and intelligent technology working side by side in collaboration.
The students involved in this project are students of the Master’s program ‘Operations Management and Logistics’, ‘Innovation Management’, ‘Data Science and Entrepreneurship’, 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 students 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.

DATA SCIENCE AND ENTREPRENEURSHIP
The Master’s program Data Science and Entrepreneurship is a joint master by Tilburg University and Eindhoven University of Technology. This program brings data science into effective use in business. Data science aims at deriving actionable insights from large amounts of data, such as theories and methods for data integration, data cleaning, data mining, process mining and business analytics. Entrepreneurial expertise of these students involves the successful development of new business models and entrepreneurial ventures by exploiting new algorithms, models, theories, tools, and project solutions including data entrepreneurship, defining business models, fueling creativity and fostering open innovation.

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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**Prof. dr. T. (Tom) van Woensel**  
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