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,

Ward de Kleijn
Coordinator Contract Research
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
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.
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.
The research projects are work assignments that will be executed by our participating students. The assignments will have a business-related framework and are carried out at companies that have something to do with the theme of Digital Business Era. With help of these research projects, the International Research Project 2019 will be financed.

Research projects can be carried out between November 2018 and June 2019. The students will work several hours a week on the project (the exact amount of time will be agreed upon later). When the project is too large for one student, it is possible to have more students working on one project. Each student is available for 100 hours per project, and the costs are €3,000.- per student.
The top 5 reasons why your company should do a research assignment for the International Research Project 2019 are as follows:

- 100 Hours of research conducted by master students and supervised by experienced researchers of the department of Industrial Engineering & Innovation Sciences at Eindhoven University of Technology.

- A research project related to the concept of Digital Business Era is a good opportunity to become acquainted with this challenging business topic and the accompanying options for your organization.

- An invitation for a masterclass about several topics related to the theme Digital Business Era.

- An invitation for the seminar where results of the study trip will be presented and excellent recruitment offers (e.g. exhibition stands) will be provided (note: all participating students are selected based on study results and motivation, and belong to the best Industrial Engineering students).

- Excellent company exposure opportunities through social media and TU/e magazine.
Some research examples master students can do:

- **Business network analysis**
The complexity of the network of relationships in which the firm is embedded can be brought to the surface.

- **Benchmark analysis**
Comparison of the application of the intelligent automation concept to other companies.

- **Market research**
Investigation regarding the value of customer needs for your company.

- **Process improvement**
Identification of process improvement opportunities by conducting a scan of the process (e.g. identification of non-value adding activities).

- **Risk management**
Identification of the risks in your business environment.

Of course any other ideas for research projects within Industrial Engineering are welcome as well. Companies that recently have been involved in the IRP include Dow, Maastricht UMC, NS, Vanderlande and Vodafone NL. On the next page, some examples of the past International Research Project and information about the research projects in 2017 are given.
Below some research examples of the previous International Research Project are shown. The theme of the previous year was ‘Intelligent Automation: Innovating Towards a New Industrial Era.’ Company names have not been listed due to privacy concerns.

► One company in the high-tech industry experienced troubles with their sales and operations tool, as employees have to write every month a report. The assignment was to design a tool that automatically checked and processed files. The monthly report can then be generated automatically.

► A chemical company had a need for a consistent sourcing model for plant maintenance stops (‘turnarounds’). Their production plants are divers, as well as their requirements for outsourced services during, after, and in preparation for these stops. The assignment was to define the substantially different maintenance stop types. Secondly, the student developed a purchasing price model per maintenance stop type.

► A transportation company observed the information demand from its customers is increasing rapidly. At this moment the company is automating its information supply, in order to supply information to its clients more accurately and rapidly, like locations of trucks and expected delivery times. The assignment started with a literature study to examine how other transportation companies inform their clients and how this information is useful internally. Furthermore, the company liked to develop a unique selling point in a few years and work more efficiently using their own data.

► A medical institute uses SAP system to store all kinds of parameters, like number of surgeries and average waiting times of clients. However, doctors find it difficult to extract these parameters from the system. The assignment was discuss with different stakeholders and built a dashboard in Excel, which indicates the required parameters and is easy to use for all stakeholders.
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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