Company Brochure

International Research Project 2023

INTRODUCTION

The foundation Stichting Study Tour Industria (SSTI) annually organizes the International Research Project (IRP).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 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, and Data Science and Entrepreneurship 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.

This brochure provides information for companies that are interested in the International Research Project, The participation options are elaborated and the capabilities of the students involved are described. 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 2023, and we hope for a pleasant and educational cooperation.

On behalf of the SSTI,

Annika Spijker
Coordinator External Relations
International Research Project 2023

A WORD BY RECTOR MAGNIFICUS

"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"

Powerful decisions are important. But don't underestimate the power of doubt. Philosopher René Descartes developed a theory about it: the methodical doubt. He argued that in order to acquire established, unquestionable knowledge, you must first question everything. This way you can start reasoning from scratch and build a new idea or theory from scratch.

It's easy to think of what we know, but more difficult to recognize what we don't.

Doubt offers the opportunity to explore new paths. Doubt about existing theories and ideas are at the root of all scientific discoveries. And doubt provides the innovation and ideas needed to tackle the challenges in this rapidly changing society.

Our students are trained to look critically at existing systems and ideas, are not afraid to doubt and to choose new paths. That is why I believe that our students can play an important role in these times, in these complex societies.

In our curriculum, we provide our future engineers with in-depth knowledge and expertise in a specific discipline, combined with necessary skills to transform their knowledge into successful innovations. We call it the T-shaped engineer. At TU/e, our data scientists and our dedicated data and business masters are among the best in the world. Our graduates are well known and sought after by future employers.

That's why, this year again I fully endorse this International Research Project of the Study Association for Industrial Engineers, Industria. Their Challenge Based approach is perfectly aligned with our own approach, and will greatly benefit participating and sponsoring industries.

I wish all the participants good fortune and many new insights in their study tour through South Korea and Singapore.

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

THEME

The Power of Decisions

Seizing opportunities in a fast-changing environment

The Power of Decisions

Every day, thousands of decisions are made in the business environment. Making the right decisions at the right time can be crucial for a business to survive. Proper decision-making is needed to regulate the performance of the business, including for example objectives, goals, strategies, policies, and organizational designs. Making correct decisions reduce complexities, uncertainties, and diversities of organizational environments.

However, making the right decisions at the right time is not that easy. The current business environment is constantly changing. Modern organizations are therefore expected to be able to anticipate the future, quickly establish cause-and-effect relationships, and propose new ways of doing things. Making decisions which cope with the fast changing environment is more important than ever. This wil lead to competitive advantages and more business efficiency.

To support decision-making challenges, new technologies are emerging and increasing the power of decisional outcomes. While most decisions used to be driven by gut, experience, and intuition, the shift to a data-driven world is bringing decisions-making to a new dimension. We are shaping a world where decisions are more and more driven by data and analytics, or are even completely algorithmic driven. These intelligent technologies matching the requirements of modern management have gained great importance. When talking about decision-making, Artificial Intelligence (AI) is of significant importance. It makes the process clearer and faster, supporting both small decisions and complex problems. However, even with such a powerful tool as AI, decision-making comes with its challenges. Intelligent technologies emerging in the fast-changing environment ask for the optimal cooperation between managers, data applications, customers and their needs, and the competitive landscape to achieve powerful decisions.

To summarize the wide applications of the power of decisions and its challenges in current business practices, it can be classified into the following 4 components:

- Innovative Decision-Making
- Decision-Making in the Human-Machine Interface
- Future-Proofing Supply Chains
- Customer Oriented Decision-Making

THEME

The different components of the power of decisions entail the following:

Innovative Decision-Making

To stay ahead of competition, it is important for businesses to be innovative. Innovation is not only integrated in organizational level, also the underlying cognitive processes where valuable decision-making plays a big role. For example, decisions in innovation determine where creative ideas are sourced, how options are weighed, and who engages in the process. However, decisions in innovation are often limited by insufficient information and complex factors, which results in inefficient decision-making reducing an organizations resources and their chances on bigger bets.

"The future of your business depends on your ability to make the right decisions today"

Decision-Making in the Human-Machine interface

Human-machine interfaces are now ubiquitous in everyday life. Many decisions are not solely made by humans but are made with the assistance of machines. Recent advances in computational power, the increase in the availability of data, and new machine learning techniques allow humans to use AI-based solutions to an even bigger extent in decision-making. The development in computational power forces organizations to think about the human-machine interface. When should decisions be automated and when should humans make the decisions? To what extent should machines collaborate with humans in decision-making?

Future-Proofing Supply Chains

Supply chains have always been vulnerable to disruptions. For example, in 2021 the Suez Canal, one of the most important transport canals of the world, was blocked for six days, resulting in enormous backlogs and enormous money losses. Furthermore, shortages negatively influence supply chains and the companies involved. Shortages can be of any kind such as freight capacity, where companies struggle to get trucks to transport their goods. To make supply chains future proof and adapt to new changes, companies may want to mitigate these risks. By implementing new innovative ideas and communicating more outwards with supply chain partners, it is possible to mitigate current risks and increase resilience for the future.

Customer Oriented Decision-Making

Customers and their satisfaction are very important to companies, especially in competitive markets. In current practice, business decisions are often driven by customers. Therefore, understanding the needs and interests of customers is vital for successful decision-making. A business approach that could help managers' decisions to have better outcomes is applying the concept of customer orientation. This approach puts the needs of customers over the needs of the business, in which the business thrives by consistently improving customer focus. When making decisions, for example when selecting ideas for new product development, customer needs are set as top priority. Companies using this approach turned out to be more profitable by increased sales.

However, due to increasing technologies enabling greater personalization, customer needs and expectations increase exponentially. Consequently, it is a complex task to make proper business decisions while being customer oriented. Big data and data analytics have become important to gain crucial customer insights, knowing their experience, preferences, and behavior.

DESTINATION

SEOUL - DAEJEON - BUSAN - SINGAPORE

INTERNATIONAL RESEARCH PROJECT 2023

This year the International Research Project will head to South-Korea and Singapore. The journey will commence in the capital of South–Korea, Seoul. Thereafter, the trip will head to the beautifull city Deajeon. After visiting Deajeon we will take a beautiful trip to our next stop, Busan. Lastly, after visiting South - Korea,we will be flying to our final destination: Singapore.

During this study tour we will visit several companies that have a connection to the theme 'Power of decisions'. Furthermore, to get a more diverse impression of the local culture, we also intend to visit a number of universities and consulates.

The goal of the study tour is to observe and explore how the 'Power of decisions' evolves in these destinations. Each city is chosen based on its fascinating culture and interesting economy, companies and universities. The diverse nature of its activities (economy and culture) is what makes this study tour an enjoyable and educative journey.

Once this knowledge has been obtained we can use it to complement the research findings of the project we conducted in the Netherlands.

Company visits

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 'Power of decisions': 'Seizing opportunities in a fast changing environment'. We are looking for companies that have affinity and experience with this theme and are interesting to visit from an industrial engineering perspective. For our participants, it is extremely exciting to interact with many different companies, ranging from big multinationals to smaller (high-tech) companies and from headquarters to manufacturing plants. We are eager to gain and share knowledge by visiting companies that have developed expertise within fast changing environments.

What are the possibilities for a visit?

During a visit, we would be glad to hear the story of your company and your connection with our theme: 'Power of decisions': 'Seizing opportunities in a fast changing environment'. Each of our participating students will have conducted a 100-hour research project in the Netherlands based on this theme. If your company were to be interested in this, we would like to present our academic prowess and research findings aligning with your company. We would also love to learn about your company by having a guided tour around the premises of the corporate HQ and/or manufacturing locations. In addition, we are looking for in-depth discussions or case studies to solve related to the theme and Industrial Engineering as a whole. For example, solving/discussing a case about your company or a brainstorming session about a current problem could lead to interesting results or discussions. Other informal activities (e.g., a networking drink) are also possible if you are looking to get to know the master students better.

What can the International Research Project do for your company?

Facilitating a visit can bring thought-provoking opportunities for sharing knowledge and promoting your company. There are two main reasons why participating in the International Research Project is appealing for your company. Firstly, the International Research Project brings a group of excellent Dutch top students to your company. All participants are in the last phase of their studies and will be searching for a company to graduate from or to start working at after graduating. After we have returned from our trip, all stories about our research projects and company visits are shared with all participating companies and students in our closing activity. These stories from our trip will be shared via several (social media)channels (e.g.,LinkedIn,Instagram, etc.), so you will get a lot of exposure to other students. Secondly, the visits can bring up interesting discussions with master students from three specialization directions within Industrial Engineering. Presentations and cases will share the knowledge we gained in the Netherlands (during a masterclass and research projects) about Power of decisions. We can exchange ideas and might have a different view on certain problems, which could lead to interesting discussions. For these reasons, hosting a visit can be a good opportunity to present yourself to other companies and potential future co-workers.

Planning

A visit can be planned for one morning, one afternoon, or a complete day. The duration depends on the possible content of the visit, the planning of the tour, and the preferences 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 informal conversations and create opportunities for us to explore the local culture. Provisional planning for the days in each city exists, but this depends on the number of companies we will eventually plan to visit in each region or city. We will contact you by email, phone or video conference to arrange all the details of the visit, We will plan every detail of our tour before we travel overseas. In all cases, do not hesitate to contact us.

EXAMPLE VISITS

Some examples of company visits from the International Research Projects 2022, 2019, and 2018 are presented. There are no examples of the International Research Project of 2020 and 2021, as these editions were cancelled due to COVID-19. 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.

Seattle, San Francisco, Los Angeles & San Diego 2022
"Real-time economy - Today's reality digital connectivity"

PACCAR Parts

"PACCAR Parts is situated in Seattle and is a global leader in the distribution, sales and marketing of aftermarket parts for heavy and medium-duty trucks, trailers, buses, and engines. At PACCAR we got a short presentation from the director of human resources, who was Dutch. After that we got shown around the warehouse and the IT Center. In the IT Center we got shown around the innovation lab, where we discovered the amount of technology involved at PACCAR. Lastly, we got shown around the heart of the company, the plant Factory. At the plant factory specialised trucks are made that can range from costing 200.000 to 1 million dollars."

NASA

"The National Aeronautics and Space Administration, or better known as NASA, is an independent agency of the US federal government responsible for the civil space program. Our visit to NASA started out with an inspiring presentation with goals and inspiration of NASA. After this, we were shown around the premises. This meant going to the mission control room, the famous room that is televised during important missions. Furthermore, we visited the Jet Propulsion Laboratory, where we saw engineers working on an actual jet propulsions engine."

Port of LA

"One of the more educational boot rides of our trip to America involved a tour through the massive port of Los Angeles. During the boat tour we were educated on how these giant ports manage the insane amount of cargo coming in. Furthermore, we learnt more about the role of industrial engineers at the port."

Vancouver, Seattle, Portland & San Francisco 2019
"Digital Business Era - Stretch your boundaries"

Starbucks

"One of the first companies that we visited in Seattle was Starbucks. The day started with a 2-hour long tour through the roasting factory. During this tour we saw with our own eyes how Starbucks roasts their coffee beans. After the tour we got a presentation about Starbucks and the possibility to discuss some topics."

Amazon
"We were given a presentation about the logistic processes within Amazon. These processes are needed to deliver the high amount of ordered packages to the customer on time. Thereafter, we got a tour through the impressive 'Spheres', which is part of the Amazon headquarter."

Philips Ultrasound
"The day at Philips Ultrasound started with a tour through the factory where they showed how they implemented the LEAN processes. Afterwards, we got a demonstration of the Ultrasound systems. After this demonstration, they gave us a very interesting lecture about the maintenance and service logistics within the company.

Dubai, Shanghai & South Korea 2018
"New Work Future"

Emirates Skicargo
"Once we sat 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/specifications concerning 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, its products, mission, vision, and the campus. Afterward, we got an overview of the 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."

CAPABILITIES

The students involved in this project are students of the Master's program 'Operations Management and Logistics', 'Innovation Management', or 'Data Science and Entrepreneurship'. 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.

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.

BOARD OF RECOMMENDATION

The IRPhas been supported by the following people:

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

Prof. dr. ir. P.W.P.J. (Paul) Grefen
Research Director School of Industrial Engineering
Eindhoven University of Technology

Prof. dr. A.G. (Ton) de Kok
Innovation Director European Supply Chain Forum (ESCF)
Eindhoven University of Technology

Prof. dr. T. (Tom) van Woensel
Program Chair of the Bachelor Industrial Engineering
Eindhoven University of Technology

P. (Paul) van Nunen
Director of Brainport Eindhoven
Brainport Development

E. (Erik) van Wunnik
Director Product Development
DSV Solutions Nederland BV

ORGANIZATION

The following executive committee is responsible for the organization of the IRP2022:

Wesley de Vries
Chairman
chairman.irp@industria.tue.nl

Tjielke Nabuurs
Financial Manager
financial.irp@industria.tue.nl

Myrna Bierman
Coordinator Contract Research
contracting.irp@industria.tue.nl

Annika Spijker
Coordinator External Relations & Program
external.irp@industria.tue.nl

Femke Krap
Coordinator Culture, Accomodation & Transportation
c.a.t.irp@industria.tue.nl

CONTACT INFORMATION

Eindhoven University of Technology
P.O. box 513, Atlas 2.238
5600 MB Eindhoven

Annika Spijker
Phone: +31(0)6 - 38507124
E-mail: external.irp@industria.tue.nl
Website: industria.tue.nl/irp

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International Research Project

SSTI
Stichting StudyTour Industria