D3.1 ANALYSIS OF THE MARKET

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BoostEuroTeQ

Strengthening institutional transformations for responsible engineering education in Europe

How can technical universities help to create a workforce that **meets the challenges of complex global problems that cut across technology and society?** How can we support the **professional development of future engineers?** How can we **effectively upscale co-creation teaching practices?**

These are some of the questions we aim to address in **Boost**EuroTeQ – a scientific research project funded by EU Horizon 2020. As a complementary project of the Erasmus+ funded EuroTeQ Engineering University our goal is to encourage institutional change towards **responsible research and innovation. The multidisciplinary project brings together engineering education, philosophy, ethics, and science and technology studies.**

Over the course of three years (2021-2024)
we will work on two main dimensions

Enabling individuals

Supporting the lifelong learning journey of European professionals by conceptualising new professional profiles

- Analyse the developmental needs of the engineers of the future
- Develop a strategy for the upskilling of professional engineers at universities
- Create tailor-made training programms in close collaboration with institutional and industry partners
- Conceptualise training for Learning Professionals with the aim to qualify them as specialists in the scientific upskilling of engineers

Societal transformation

Augmenting the transformative potential of universities in society by investigating co-creation practices and developing context-sensitive strategies for their reflexive institutionalization

- Create a EuroTeQ Co-Creation Manifesto on institutional strategies that will enhance the evolution of responsibility practices at technical universities
- Support the development of learning networks to increase co-creation practices in each community
- Conduct stakeholder engagement events on responsibilisation instruments at EuroTeQ partner universities
- Investigate the benefits and challenges as well as identify potential indicators for successful co-creation teaching at universities
- Develop a roadmap for the upscaling of co-creation teaching practices

EXECUTIVE SUMMARY

This report is made to analyse and clarify the initial situation of Lifelong Learning (LLL) for engineers, as a deliverable 3.1 in the EuroTeQ Boost project. The approach is divided into three parts:

- First, interviews have been conducted with representatives of the LLL departments at each of the EuroTeQ universities.
- Secondly, a questionnaire was filled in by the same LLL departments, profiling their main private competitor and the value proposition of this competitor.
- Finally, based on the conclusions from the collected data, a SWOT analysis has been conducted to conclude on the strengths, weaknesses, opportunities, and threats of LLL in the EuroTeQ universities.

To describe the departments and their structure in the six EuroTeQ partner universities one should keep in mind that the nature, vision, and organization of LLL in each university is very different. One main difference in the degree of centralization of LLL at the universities, ranging from completely decentralized, with every department in the university managing their own LLL offerings, to completely centralized with one single-point of entry for all LLL at the university.

CONTENT

1. FOCUS OF WORK PACKAGE 3

Work package 3 centres on the upskilling of professional engineers. This includes delivering an **overview of the current situation in the market**, an analysis of the needs of engineers for continuous education and the development of new tailor-made formats for the upskilling of engineering professionals.

The objectives of WP3 have been defined as follows:
- Develop a strategy for the upskilling of professional engineers in Europe.
- Implement involved institutions as constant companions in the Lifelong Learning (LLL) journey of engineers in Europe.
- Increase general level of qualification of European engineers.

The task of D3.1 is to conduct and coordinate an (technology supported) analysis of the market and clarification of the initial situation of professional development programs for (European) engineers.

Technology supported analysis

The initial idea to conduct a technology supported analysis using Google analytics, was discarded as it posed challenges to do a meaningful analysis across languages (many LLL courses are only offered in the local language). Furthermore, to do an analysis yielding comparable results, it would be necessary to focus the search on specific course topics. However, as it is the objective of deliverable 3.2 to conduct a needs analysis, and thereby identify the specific course topics of interest, we concluded that the idea of using technology in supporting the analysis, would not in fact add value to the collection of knowledge at the current stage.

2. APPROACH

The approach for this deliverable was to first gain an understanding of the current situation of LLL at the EuroTeQ universities. Therefore, we chose to pursue an action plan in three steps:

Step 1

As a first step, interviews were conducted to clarify the initial situation for LLL structures at the six partner universities, how new courses were developed and marketed, and the strategy for the future of LLL. Interviews were conducted in the time period from 1st of November – 16th of December 2021 and were supplemented with publicly available information from university websites etc.

Names and titles of interviewees:
CTU: Vladimir Janicev (on behalf of Dana Dubnova, Head of Dept. for Education and Students Affairs)
DTU: Karina Rothoff Brix, former Managing Director of DTU Learn for Life (DTU LFL)
TalTech: Hanno Tomberg, Head of Lifelong Learning Department Open University
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The key aspects in the interviews hereinafter:

- Structure of LLL department in each EuroTeQ university
- The future for LLL in the EuroTeQ universities
- Demand for LLL courses and how new courses are developed
- Marketing strategy – how do the universities market their courses?
- Competitive situation in the market
- Strengths and weaknesses of the EuroTeQ university as a LLL course supplier

Step 2

In the second step of this deliverable, the differences between continuous education courses at the EuroTeQ universities and their private competitors are investigated. For this purpose, each university has collected data and produced a profile of their main private competitor for continuous education courses for engineers (excluding EMBA[1] programs).

The questions asked in this profile are the following:

- Which private course supplier in the market most closely resembles a competitor to your university's LLL courses? And why?
- Types of courses and course topics offered by this competitor
- Target group of courses
- Price of course and course formats: duration, physical/virtual, theoretical vs. applied
- Branding and marketing
- Geographic reach
- Strengths and weaknesses of the competitor in relation to the university
- Other similarities/dissimilarities
- Looking at the dissimilarities between the university and the private competitor, what would be the main reasons for a professional learner to choose the private suppliers over the university?

Delimitation

EMBA programs: When looking into competitors for the universities' LLL course portfolio, the decision to delimit from looking at EMBA programs and the competitors for these was taken. This decision was made as EMBA programs only make up one single, very distinguished and highly prestigious element of continuous education offerings, and as such doesn't compare to anything except other MBA programs. Furthermore, not all university partners involved in the project offer an EMBA program.

Pricing: The pricing of universities and private suppliers' LLL programs is a complex affair involving state subsidies, support through special funds for LLL and further. Because of the high complexity of the pricing structures, we have deliberately chosen not to attempt a direct comparison of program prices between universities and the competing private course suppliers.

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[1] Executive Master of Business Administration

Step 3

Based on the learnings about the universities' own LLL offerings (in step 1) and the offerings of their main competitors (step 2), a conclusion on the strengths, weaknesses, opportunities, and threats (SWOT) of the university as a supplier of LLL courses will be conducted. The SWOT analysis is originated by Albert S. Humphrey in the 1960s and is a straight-forward model that assesses what an organization can and cannot do as well as its potential opportunities and threats. It helps to identify an organization's strengths, weaknesses, opportunities, and threats. It guides to build on what is done well, address what is lacking, seize new openings, and minimize risks. It is applied to assess the organization's position before deciding on any new strategy. The SWOT analysis will be used to conclude on the current situation for EuroTeQ including all six universities as suppliers of continuous or lifelong learning for engineers.

Structure of the report

The structure of the report will be as follows: For each paragraph, we will first present the main findings from the data. At the bottom of the paragraph, a table will be inserted with the extracted data from each university from which we have concluded the findings. The questionnaires on the main private competitor of each university can be found in appendixes.

3. STRUCTURE OF LIFELONG LEARNING WITHIN THE EUROTEQ UNIVERSITIES

To clarify the current situation of Lifelong Learning (LLL) departments and their structure in the six EuroTeQ partner universities, an overview, and a comparison of the state of centralization for each university is constructed.

It should be kept in mind that the **nature, vision, and organization** of LLL in each university is very different, which is in turn reflected in the structure of the LLL activities. One main difference in the manner of which the universities arrange their LLL, is the matter of **centralization vs. decentralization** i.e., does the university have one department/institute, or centre administering all LLL courses or are the courses and their administration and marketing handled decentralized by the faculty or department within which the subject knowledge of the course belong.

The decision on centralization vs. decentralization for the universities' LLL offerings is decided and supported by the university's management and accordingly implemented in the faculties and departments. From the six interviews, we have attempted to summarize the effects of the centralized vs. decentralized approach to LLL (as voiced by the interviewees). The main points from the interviews are summed up below:

Possible gains of the centralized approach:

Development of programs

- A common strategy, coordination, and administration will lead to the consolidation of expertise on continuous education, enlargement of scope and a more efficient use of resources
- Shared standards for scientific program development and quality management
- Aligned procedures for offering courses
- Development of continuous education courses across departments or even courses that are outside the scope of the university departments

Sales and marketing

- A centralized LLL unit with a dedicated marketing department can ensure an increased focus on market orientation for LLL courses
- Establishing aligned procedures for marketing, sales, and execution to obtain a better and more uniform customer experience
- The possibility for focusing on establishing the university's brand as a supplier of continuous education
- The expertise within marketing and digital marketing can be better utilized and optimized

Administration

- One single-point of registration e.g., through a centralized webshop
- An aligned and optimized flow for handling all administrative tasks related to the customer journey will free up administrative resources

UNIVERSITY	CENTRALIZED/DECENTRALIZED STRUCTURE OF LLL
CTU	**Decentralized** LLL is not centralized at CTU. All institutes have separate offers within their subject knowledge. There is no one central point of entry to LLL. There are no plans to centralize LLL, but CTU is however planning to streamline the LLL procedures on all faculties more than they are today. Right now, everybody's solving everything ad hoc.
DTU	**Partly centralized but on a path to become completely centralized** DTU is working towards a one-point entry to LLL courses. Previously, all activities were distributed amongst the different institutes. The plan is to onboard all institutes to DTU Learn for Life, offering their LLL courses through a webshop, and handling all marketing and administration tasks in relation to the courses, via LLL's administrative support departments. LLL also develops its own executive education courses.
TALTECH	**Centralized** In TalTech LLL activities are accessed through the "Open university department" - a central body that connects all departments in coordinating the LLL activities. The Open University department develops its own courses and offers LLL courses delivered by the different departments.

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TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY	**Decentralized. A separate centralized unit will be implemented in September 2022.** At TU/e LLL is decentralized, with every department or institute having their own approach. There is no one single point of entry for LLL. The university is planning a centralization by implementing a separate LLL unit September 2022.
Technical University of Munich TUM	**Centralized** The TUM Institute for LLL Learning acts as a shared platform for all further education activities at TUM and therefore works in close collaboration with the different schools, departments, chairs, and centres at TUM. All administration, marketing, and sales activities for LLL are centralized at the institute.
ÉCOLE POLYTECHNIQUE	**Centralized as a private company** At L'X LLL is centralized in a private company owned by the university. All programs aimed at lifelong learners are accessed through the LLL centre. This includes the MBA, diploma programs and certificate courses.
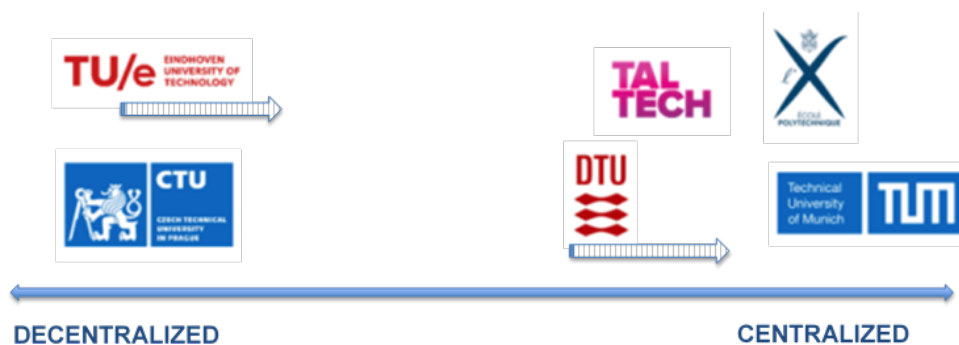
Figure 1: The figure above shows the placement of each university on a continuum from completely decentralized to completely centralized

4. THE FUTURE OF LIFELONG LEARNING IN THE EUROTEQ UNIVERSITIES

For most of the EuroTeQ universities, the offering of LLL courses as part of their value proposition, is still in its early stages in terms of maturity. Thus, most partners are currently on a journey towards developing LLL offerings which is the best match for the future. Inquiring about the strategies for LLL going forward, the main trends are as follows.

Flexibility/micro-credentials

There is a general market tendency of **professionals looking for faster and more tailors made upskilling courses** that meets their exact needs without being very time consuming in nature. This tendency points towards a **need for shorter, more focused, more flexible courses or even micro-credentials**, which allows participants to compose their own continuous education consisting of short (stackable) modules, which exactly meets their needs and allows them to learn at their own pace. And even self-study courses are asked for. This insight links to the EuroTeq WP 2.7, which specifies on the development of Micro-credentials in a formal way.

Virtual/hybrid courses

The need for flexibility also applies to the course formats and the introduction of more **virtual or hybrid courses** can help meet this customer need. Courses are generally evolving towards **blended learning,** with a mix of virtual and on-site teaching, depending on topic. Covid-19 has acted as an accelerator for acceptance and adaptation of digitalization, both in terms of using digital communication tools and digital learning tools in general. To some extend **self-studies** are also demanded and offers the possibility to decide your own speed for gaining knowledge and your certificate on a course – or simply to access a repetition before an exam.

Networking

Despite demand for flexibility and shorter courses it seems like **professional students also appreciate the access to a network** with other participants and peers when the topic is very innovative and specific or when the LLL course is of a longer duration.

UNIVERSITY	STRATEGY FOR LLL
CTU	Going forward, CTU will focus more on distant education and more communication techniques in general to be more flexible. Furthermore, they will be changing all labs to virtual labs to enable streaming. A Future strategy for CTU is also to offer more multidisciplinary courses as it makes people more ready for the market.
DTU	At DTU LFL, they find that there is an increasing demand for easy and fast ways to educate yourself. It's our impression that participants would rather not have 100% online courses, as they also come to create a network and to be able to discuss with peers, and this can be difficult to do online. However, it is positive that participants don't necessarily have to show up for everything if some elements can be made online. DTU LFL is therefore looking into how we can create a more optimal blend (hybrid) of physical and online lectures in our LLL programs, which in turn may also make them more attractive for participants outside DTU's immediate geographical region.
TALTECH	TalTech believes that in 3-5 years', time, most courses will be conducted virtually. Hybrid learning has already been tested and was found to have given the worst outcome. TalTech puts a high importance on interaction in these types of courses and in their opinion, it won't work in a hybrid setting. Either courses should be 100% virtual or 100% classroom. At the current moment, 20-30% of LLL courses are virtual. Before the pandemic, if was less than 10%.

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY	TU/E is currently focusing primarily on the next 1-2 years since they don't know in which direction the market is moving in terms of content and participation. In 5-10 years, TU/E expects that LLL will have a higher focus on the university, and that they will receive a higher number of LLL participants.
Technical University of Munich TUM	TUM wants to focus increasingly on blended learning programs, the combination of presence, networking opportunities in form of cases, challenges, and the possibility to investigate what is going on in the research and laboratories. However, receiving a classic lecture can easily be done online. If you want to focus on knowledge, you can then do it at your own speed, and it allows for repetition if necessary for the individual student. TUM must increasingly be flexible and adapt, based on needs and demands of the customers.
X ÉCOLE POLYTECHNIQUE	At L'X they find that LLL becomes increasingly important. In France, business schools have traditionally conducted the majority of continuous education for engineers, as many engineers seek to learn business skills to supplement their technical knowledge when they obtain higher positions in their companies. However, the LLL market for technical skills is not very well developed. At L'X they now experience a trend towards requests for training on more specialized needs, compared to earlier where the demand was more for general competences. Going forward, L'X expects to focus increasingly on online and hybrid teaching, while still maintaining some physical presence for most programs.

5. DEVELOPMENT OF NEW COURSES

In the process of grasping how LLL works across the EuroTeQ universities, we attempt to gain a better understanding of how new courses are being developed and what market demand the universities are experiencing.

Some have a **feedback or research procedure** for further development, and some **collaborate** with companies or partners. LLL courses are developed at universities according to one or more of the three approaches:

Inside-out

Outside-in

Collaboration
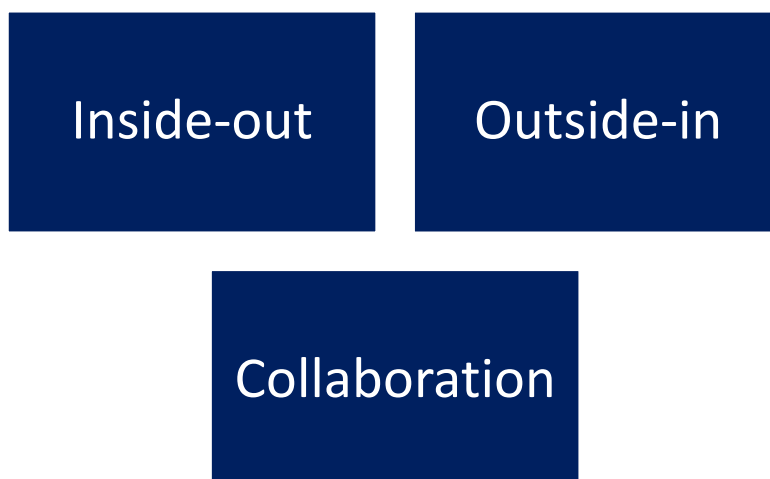
Inside-Out: University professors develop courses based on their own research area, preferences, habits, or suggestions from students.

Outside-in: The university uses market data on technology or market developments to pinpoint unmet needs for the development of certain competences. New courses are developed to tap into this market opportunity.

Via collaboration: In collaboration with companies, the university develops tailor made courses to meet specific company needs, so it becomes more consulting than training. As part of the exchange, the company signs up a fixed number of employees for the course. In collaboration with other partners and organisation partnerships are made to gain access to lecturers with expertise on a specific topic, but also to co-brand and achieve access to their members for recruiting new participants for LLL.

Where do university LLL departments experience the greatest demand?

The answer to where the greatest demand is seen in continuous education courses is not unequivocal. However, it is possible to distinguish some general trends.

Topics can be divided in **engineering and technical** topics and in more **management and commercial** topics.

Engineering and technical

Most EuroTeQ universities experience demand in areas where **engineers need upskilling** to meet (new) requirements in their workplace led on by trends in the market, changes in legislation or as a part of their personal development as experts in their field.

Main topics mentioned include evermore dominant technologies in modern society, such as:

- IT/digitalization; data science, cyber security, artificial intelligence, 5G
- Industry 4.0, additive manufacturing
- Natural science and engineering (supplement)
- Energy, wind energy, energy transition, energy prices
- Ventilation, heating
- Sustainability, smart cities,
- Food safety

The value propositions for each university of course reflects hot topics and expertise at the universities but also in the countries in general.

Management and commercial

But also, courses to support and equip engineers to expand their job and their career to management level or even to gain insight and competences to start-up own business or to become a board member such as:

- Management/leadership
- Project management
- Accounting
- Administration and logistics

It is again emphasized in the interviews that **shorter courses** are increasingly demanded as students seek to expand their knowledge and their network within a specific topic of interest and not necessarily to gain another Bachelor or Master.

Relevant results based on the interviews: "How are courses developed?"

UNIVERSITY	DEVELOPMENT OF NEW COURSES
CTU	The courses offered by CTU are based on the **needs of the students**. The educator will ask students what they are interested in and adjust the course topics accordingly. **Topics:** CTU stands out from the rest of the universities by primarily focusing the LLL courses on U3D: **University for the third generation** Subjects include: • History • Art • Architecture • Computer • Main interest is in the languages as many people are coming in from abroad and need to pass a test to get a job • Drawing courses/ drawing programs
DTU	Traditionally, courses have been developed from an Inside-out perspective: DTU researchers are not schooled to consider the market and are not rewarded if they work like that either. In the academic system they are evaluated on the number of articles they publish, not the hours spend on continuing education or how much they collaborate with companies. Therefore, courses have traditionally been developed based on what the professor/department wants to teach, hereafter, the course is accredited and not until after that, the market gaps will be investigated. DTU LFL's journey towards being a single point of entry for all LLL at DTU includes a plan to increasingly support DTU institutes with market and behavioural data to find benchmarks and to validate and find gaps in the market before the courses are developed.

	Topics • Food safety (especially after Covid19) • Sustainable construction • Wind Energy • Digitalization • Leadership • Sustainability • New Technologies
TALTECH	New courses are developed together with the lecturers. Courses are developed on the following basis: 1. Based on market research/ legislation changes 2. Companies approach the university about courses they are interested in 3. Lecturers suggest courses they would like to teach **Topics** • IT and programming • Basic IT skill courses due to digitalization in many industries and spheres. • Leadership courses • Accounting courses • Administrative skills. Furthermore, a lot of courses are offered for renewing engineering skills (200-300 people take these courses each year). Topics for these courses could be within areas such as ventilation, heating etc. These courses are not elective but must be taken based on qualification requirements (decided on by the qualification authority).
TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY	Currently, courses in TU/e are developed in different ways: 1. Professors offer courses they develop themselves. 2. Companies come to the universities and ask for specific courses. 3. Market research: TU/e receives data on market potential from a private research company and choose the hottest topics based hereon. **Topics** • Energy & energy transition • AI • Smart Cities • Logistics • Data Science In general, there is a demand for shorter courses to improve specific knowledge, skills, and network. Their position is not (yet) focused on gaining certificates (masters). TU/e aims at mid-career professionals with Bsc or Msc degrees, and it is their perception that if people already have a master's degree, they don't necessarily care about getting another one. Furthermore, it is TU/E's experience that focus is shifting towards shorter learning instances, not long master tracks, and that students prefer a combination of online and offline learning.

TUM (Technical University of Munich)	New courses in TUM are developed based on: • Market analysis/research pointing to unmet needs for certain courses • Through collaborations with companies or organizations The scientific research, which is being done at TUM, is transferred via certificate programs offered by the LLL into the society and companies. The development process is therefore influenced firstly by research at the university that is to be transferred and secondly by a market and needs analysis. **Topics** • Programs in leadership development, digital transformation and tech oriented subjects experience a high demand at the moment • Digital transformation as a cross-section subject for different professional groups • Data scientist as a new job profile • Sustainability topics experience a high demand, focused on the target group of engineers: sustainable resources, biogenic and alternative materials, robotics & AI (artificial intelligence) as a high demand as well.
L'X (École Polytechnique)	At L'X there are two concerns when developing new courses: • Is there a market? • Does L'X have the strengths in this area? In their experience, students move to where the demand is, so L'X offers courses based on the trends in the market. Companies can also come with a specific course request, but it is very expensive to develop new tailor-made courses. **For companies**: There is a big demand for programs designed for companies. The companies want feedback on their challenges and advice from the professor. Therefore, the professors sometimes make the switch from pure training to more consulting. **For individuals:** Individuals want training in the latest developments within certain fields, such as cyber security etc. L'X is currently trying to learn more about how to develop programs for individuals. L'X have a **feedback procedure**: they have both professors and "real life people" involved in developing the programs which makes it more applicable. They make sure the professors understand the company and its reality. **Topics** • Digitalization • Data & AI • Security of systems • Energy & energy prices • New technologies, how they transform the companies and how will it change the way we work. • Additive manufacturing • Industry 4.0

6. MARKETING STRATEGY – HOW DO THE UNIVERSITIES MARKET THEIR COURSES?

We can conclude that **marketing is generally not a high** priority in the universities' LLL departments. Most rely solely on Word-of-Mouth and that participant will seek out the courses themselves based on the university's reputation in the local area.

Most of the universities are present to some degree on **social media mostly Facebook and LinkedIn**, but it isn't harnessed strategically to a very high degree, which again can probably be attributed to the fact that most LLL departments don't have any full-time employees dedicated to marketing.

Furthermore the **usage of Search-engine-optimization or analytics tools** differs within the marketing resources of the LLL institutes. To promote courses on Social-web can be described as basal method of digital marketing, if there is a range up to the qualitative and quantitative application of digital marketing tools, which can be described as more elaborate. As a conclusion in terms of digital marketing there is still room for improvement.

The marketing effort in the field of LLL seems however, to be somewhat related to the **degree of centralization** in the universities' LLL, as universities with very centralized LLL structure, also tend to put more resources into a coordinated marketing initiative.

The **single point of entry** associated with the **centralized structure for LLL** can also make it easier for customers to find and sign up for the courses accommodating their needs. As an example, data from DTU showed a high churn rate for participants searching for courses on the university websites previously. Following a process of establishing a webshop from where most LLL courses are available, the customer experience has increased significantly, and a far higher number of visitors are converted to customers.

Some universities mention that LLL has **not previously been a high priority** for the university, and consequently hereof, they are not very known for offering continuous education. As an example, DTU is one of the universities with a clear strategy for attempting to change their positioning in the LLL market and become more known for continuous education and establish a position as thought leader. One of the ways this is done is with the launch of the podcast Tech Folk, where DTU researchers share their research and what impact it can have on society.

UNIVERSITY	MARKETING STRATEGY
CTU	Each faculty at CTU has a PR-department, but they mainly work with the ordinary study programs. CTU is present on Web, Facebook, social networks, Instagram, and works together with associations of industrial partners. However, there are no specialized pages (landing pages) or campaigns targeted for a LLL audience. Participants interested in LLL courses will therefore need to look actively for information on different institute webpages.
DTU	DTU LFL identified the challenge of potential course participants to find a way through the DTU course jungle of offers. To accommodate customer needs better, DTU LFL was established as one point of entry to all LLL courses at DTU with the ambition of assisting in matching people with the right course. DTU LFL has a marketing team of 8 full time equivalents dedicated solely to continuous education (from January 2022) With the podcast Tech Folk, we are aiming to make DTU LFL less intimidating and placing us on the map of continuous education. LLL Alumni work as excellent ambassadors as well. Marketing is also done with website, social media (Facebook, LinkedIn), Google Adwords, word of mouth, printed ads.
TAL TECH	TalTech markets their courses on websites, through unemployment agencies, and through social media (mostly Facebook, and a little bit on LinkedIn, but the average target group is a bit below the level in there). Executive education is mostly marketed on LinkedIn. There is no dedicated marketing team, the project managers do most of the marketing themselves (except campaigns twice a year). There is no plan for changing the marketing approach in the future as TalTech is working close to their limit for how many courses they can offer. They don't offer big courses, so they manage to fill up the classes fine with the current approach. If the courses don't attract enough participants, they are cancelled, but it has not been a problem so far.
TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY	Currently students find the courses through the website or network/ word of mouth. There is currently no marketing team in place. TU/e is in the process of centralizing their LLL, and when this separate unit is established, they will handle marketing campaigns for all courses. Maybe one full-time equivalent will be hired to handle this. In the future, they plan to market courses via LinkedIn and contacting the learning and development managers directly in the companies they want to develop courses for.
Technical University of Munich TUM	TUM markets its LLL offerings through B2C/B2B fair offers, Google Ads, social media campaigns on Facebook and LinkedIn, ads in print/online and newsletter-marketing, through network-marketing with multipliers and TUM's graduate network In the future, TUM plans to adapt its courses to a changing market, e.g., by using SEO/SEA Analysis.
X ÉCOLE POLYTECHNIQUE	L'X has no marketing team or marketing strategy yet, but there will be in the future. So far, they have sold courses solely by word of mouth and based on their strong brand.

7. STRENGTHS AND WEAKNESSES OF THE UNIVERSITIES AS COURSE SUPPLIERS

Universities' uniqueness and strengths

All six EuroTeQ universities are **leading technical universities** with high international rankings, long histories, and solid reputations for delivering excellence in education and research.

Furthermore, several of the EuroTeQ universities have strong profiles within technology innovation and consider themselves the go-to-institution for state-of-the-art research-based education programs and courses. As such, the universities find themselves in the **unique position of having a trusted brand associated with high quality education and highly skilled professors and lecturers**.

Courses offered by universities are often extensive and of a very high quality. Universities have a **monopoly on offering ECTS accredited courses**, which further validates the quality of the course contents and ensures transferability across borders.

The universities each have specific research areas where they are **remarkably strong and well-known and have particularly well-reputed researchers and professor on staff.** Leveraging their global positions of strength, most universities choose to offer LLL courses within these spearhead fields of expertise.

Most of the universities have **strong industry ties and are engaged in widespread collaborations** and projects with industry partners. In addition, all universities have a strong international network.

Accreditation – strength or weakness?

One of the unique value propositions of the EuroTeQ universities as course suppliers is the **monopoly of offering ECTS accredited courses or programs**. ECTS accreditation is perceived as a seal of approval, and also makes the "value" of the courses more directly transferable to other countries and education structures.

However, there is a discussion to be had about whether ECTS accreditation should still be considered an **important strength** as the accreditation of courses also come with several **drawbacks**. The ECTS accreditation can be a **time-consuming** exercise and thus it **hinders the LLL departments in being agile** in their response to market opportunities. This, in turn, can cause universities to **lose momentum** in terms of developing and offering courses meeting the needs of the industry, as other, non-university, suppliers can develop courses much faster without having to go through an accreditation process first.

In addition to this, several interviewees mention, that **professional learners seemingly care less about earning ECTS** when they have already completed a master's or a bachelor's degree (and many of the universities LLL departments caters primarily to this segment). Bearing this in mind, **the unique value proposition** of offering ECTS accredited courses**, might not be as important** as it is perceived to be.

For these same reasons, some of our interviewees mention that in fact not all types of LLL courses are accredited in their institutions at the current moment.

UNIVERSITY	STRENGTHS & UNIQUE VALUE PROPOSITIONS
CTU	CTU is the only technical university in Prague, the oldest technical university in Europe and constantly improving its ranking amongst universities Strong research areas of the university include architecture, e-force group and artificial intelligence. CTU offers a big range of technical topics and students are taught in small classes, allowing the professor to focus on the need of each student CTU's alumni networks and groups are very happy about still being part of the university.
DTU	DTU has a strong Global reputation for excellence in general and is a very trust-associated brand locally as well. The university is a frontrunner in research, technology & innovation, a pioneer within the topic of sustainability, and furthermore has strengths within cyber security and wind energy DTU LFL has created a brand of its own and is becoming a known player within continuous education. Most LLL courses are ECTS accredited.
TAL TECH	TalTech is particularly strong in engineering, IT, sciences, and leadership courses. Their Courses are generally longer and more extensive than other courses and ECTS are provided for most. TalTechs strength is to have different initiatives to provide different facilities They also know-how for start-up schemes, and they try to provide LLL courses for them as well.
TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY	TU/e's regional position is unique with strong industry collaboration. TU/e has the highest number of IP registration in Europe and a strong innovation profile in general. The university courses offer a combination of knowledge excellence and application to real life cases.
Technical University of Munich TUM	TUM has strengths in technology, research and through well-established international networks. Their approach to make programs evidence and research-based makes TUM unique and successful in the market. Their achievement is a combination of the partnerships, the strong research, and the ability to transform that research into high quality programs.
X ÉCOLE POLYTECHNIQUE	The key to L'X's LLL courses is the mixture between tech and management. L'X tries to keep this balance to be able to compete against business schools, who have much more experience in LLL but without the technical part. L'X has a particularly strong brand, and a degree from L'X therefore gives participants a high market value, meaning that they will get job offers that they wouldn't otherwise have gotten. All programs are taught by professors together with industry people. It's good for the professors to meet companies to give them a better understanding of what is going on.

Weaknesses of the universities as suppliers of LLL courses

The challenges concerning LLL at the EuroTeQ universities are very different.

At the universities where LLL is organized in a **decentralized** way, individually in the different departments of the university, the internal organisation is generally missing the central control and overview of its LLL offerings. This weakness again extends to participants who will have to do all the research themselves to identify the right courses for their needs.

For several of the EuroTeQ universities, offering continuous education courses is **still a relatively new and immature business area**, and consequently hereof, they don't have a strong market position as a supplier of continuous education in the minds of their customers.

Universities suffer from the fact that they are **large public organisations** and therefore not fast and agile enough in adapting and developing courses to meet the changing demand in the market. From our analysis, we find the perception that several of the universities' private competitors understand the market better and are adjusting faster.

Some interviewees mention that their teachers and professors generally like to teach for professionals, because they are connected to the industry and can contribute with interesting experience and perspective to the lessons. However, it's a challenge that most universities currently **have no incentive system in place for motivating professors and lecturers to engage in developing courses targeted for continuous education**, and as such there is not sufficient enticement for the lecturers to give LLL priority in their daily work.

A very specific weakness mentioned by École Polytechnique, is the fact that potential LLL **students are intimidated** to apply for admission as they perceive the university courses to be too demanding and admission criteria as being too hard, which results in some students not applying due to fear of failure.

University	CHALLENGES AND WEAKNESSES
CTU	The main challenge for CTU is the lack of centralization. An ambition for the future would be to increasingly streamline LLL procedures on all faculties, contrary to the current situation where everybody is solving everything ad hoc.
DTU	For DTU LFL, it is a challenge being part of a big public machinery. Our competitors are smaller private suppliers who are more agile and can easier adapt to the companies' needs. The universities have monopoly on the ETCS accreditation, but until now it has not been much part of the branding. ECTS accreditation is a sign of quality and should probably be used more actively. Furthermore, DTU LFL has the challenge of still being much of a black box for outsiders in many ways. There is a need to make the public more aware of what DTU LFL has to offer.

TAL TECH	TalTech hasn't done much in terms of marketing and in that respect, they are much behind their competing course suppliers. For competing suppliers, in many cases selling courses is the only thing they do and therefore they must sell it more aggressively.
	Further, it's their perception that competitors may also be quicker to understand market demand and react to it, than the university, and their prices for courses are often lower.
TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY	The challenge for TU/e's LLL is to find a more agile way to create courses and move faster to meet the needs of the market.
	Internally, time and ability to invest is a big challenge for TU/e. There is a big interest to develop courses, but time is an issue as staff is completely overloaded, and LLL courses are not rewarded. Teachers generally like to teach for professionals, because it is connected to the industry, but there is no incentive system in place for this, and therefore not really any win for the teachers in doing it at this point.
Technical University of Munich TUM	For TUM, pricing and prioritizing constitute the main challenge.
	In Germany, the state will cover the costs of bachelor programs and for the pre-experience master programs and they are therefore free for students. LLL constitutes a transformation phase where participants now must pay for their own education, and this poses a challenge.
	Competitors such as the Chambers of Commerce are often funded by the state and can therefore offer courses at a very low cost and high quality. Thus, it is really hard to earn a profit for TUM in this market.
ÉCOLE POLYTECHNIQUE	École Polytechnique is a very reputable institution. This poses a challenge for LLL as potential students are intimidated by the level of teaching taking place and therefore don't even consider L'X as an option.
	This is further reinforced by the fact that L'X is traditionally very selective. The EMBA for example, has a very narrow intake.
	Because of this, potential course participants don't expect to be selected and many will not apply for the fear of rejection.

8. COMPETITORS IN THE MARKET

Since the universities in EuroTeQ offers a broad range of continuous education courses, there are several competitors to consider in the market. In the paragraphs below we will address international competitors and local public and private competitors of courses for continuing education.

International competitors

Some universities abroad must be perceived as competitors in a world that is becoming even smaller due to digitalization and increasing demands for online courses.

One particularly notable competitor abroad is **MIT Professional Education,** where continuing education courses are offered for science, engineering, and technology professionals on-campus, online, in an international location, or at a company site. The mission of MIT Professional Education is to provide a gateway to renowned MIT research, knowledge, and expertise for working professionals engaged in science and technology worldwide, through advanced education programs designed for them.

According to the interviewees, MIT's programs are perceived as expensive, difficult to get into and taught at a very high level, but also more commercial and traditionally **very strong in adapting their offers to the continuing education segment.** Because of the distance and pricing of MIT programs, they may only be perceived as a competitor for very high level and prestigious leadership programs. However, with **online and hybrid courses becoming ever-more in demand**, MIT's Digital Plus Programs[2] (DPP) can constitute a stronger competitor in the future.

Programs offered as Digital Plus Programs is categorized as follows:
- Online Professional Certificates
- Online Individual Programs
- Online Blended Corporate Programs

Local public competitors

Even though all six EuroTeQ universities are leading technical universities there are some local competitors both regarding engineering and technology but also in management and commerce for the EuroTeQ universities that are offering continuing education in those fields.

Engineering and technology

Referring to the interviewees, the competition is mostly not very strong, but can come from

- More specialised technical universities, schools, or institutions, that are focusing on specialized educations e.g., agriculture
- Other technical universities offering LLL and localized in the other end of the country, and therefore can be more convenient
- Less high-level technical universities, schools or institutions that are better priced and demands less qualifications to enter courses
- Other local suppliers of continuous education that offers hybrid or online courses
- Other government agencies like the state, ministries, or non-university scientific research institutions.

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[2] "Our Digital Plus programs go beyond online, blending cutting-edge content delivered using the best of online technology and traditional classroom instruction, to enable effective learning outcomes in a flexible, collaborative learning environment."
Source: https://professionalprograms.mit.edu/

Management and commerce

The EuroTeQ universities in Copenhagen, Paris and Munich also offers courses for continuing education with more focus on management and commercial and this gives some competition from **non-technical universities like business schools** and in Munich even for the local Chamber of Commerce (Handelskammer).

Local private course suppliers

In the competitor analysis we have chosen to go into depth with the value proposition of private suppliers in the home markets, as we believe the private suppliers differ the most from the institutes in their approach to continuous education courses, and therefore may also hold the most substantial learning potential for our universities LLL departments. To dig deeper into the offerings of private courses suppliers, a questionnaire about the main private competitor was sent to representatives for each university's LLL department. The findings from the questionnaires will be addressed below.

One EuroTeQ university stands out when looking at private competitors:

At **TU/e** the perception is that universities lack behind on professional development and education in general. TUE's aim is not to earn money on LLL or to attract more participants – they rather see LLL as a CSR[3] task. It is more about strengthening connection to research and the industry. TU/e have a position as thought leader and hand over the teaching topics to private suppliers when they no longer constitute the newest science/ technology. TU/E's only focus is on peak competences e.g., research topics and they do not concentrate on professional development like personal leadership, project management, communication skills.

A look at the main private competitor for each university

UNIVERSITY	Main private competitor
CTU	Generally, CTU do not perceive private course suppliers as significant competitors as they are more expensive than the university and offer only a few courses per year.
DTU / TUM	DTU and TUM have strong competition from private suppliers of LLL from the Danish Technological Institute (DTI) and Fraunhofer Society for the Advancement of Applied Research (Fraunhofer). Both private competitors have distributed locations over the whole country and offer a broad range of more than 1,000 courses within technology, manufacturing, communication, energy, and IT. DTI offers additional courses within management and personal development. Both offer a range of courses in varying length, including masterclasses and certificate programs.

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[3] Corporate Social Responsibility: a management concept whereby companies integrate social and environmental concerns in their business operations and interactions with their stakeholders.

TAL TECH	TalTechs main private competitor for Lifelong Learning is Baltic Computer Systems Koolitus (BCS Training). BCS Training has a strong focus on IT (management, development, and security) and management courses in general. They offer more than 200 short-, medium- and long-term courses per year for beginners as well as for professionals. They are very successful and certified as Microsoft Silver training partner and are winning more public procurements.
TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY	TU/E's main competitor is TIAS Business School (TIAS)4 with an explicit focus on executive education. The programs are primarily in leadership development and transformation. Other topics include accounting, finance, controlling, governance, health, HRM, information management and technology, marketing and commerce, public management, strategy, innovation, and leadership and more. Courses range from day courses to masterclasses, advanced programs, Masters and MBAs with the main target group being leaders, managers, and professionals to boost their personal and professional development and that of their organization.
⚜	No data was received from L'X and as such, the nature of their competitive situation will not be addressed in the following.

Differences between universities and private course suppliers

Based on the competitor analyses received from the university representatives and the available data from the interviews, we find that the main differences between the EuroTeQ universities' LLL departments and course offerings and that of their main private competitors fall into the following five categories.

Shorter courses

Private competitors of **DTU, TUM and TU/e** are all focusing more on offering shorter courses for as short a duration as 1 day. The shorter courses are typically more targeted and therefore may be perceived as a more efficient way of learning for participants. In some cases, their pricing is also lower (due to the shorter duration). These are very competitive elements when businesses and organisations are investing in and supporting employees in upskilling within specific topics via continuous education courses. However, shorter courses do not to the same extent allow for social and professional networking which is also an important element of continuous education for many participants.

Online and hybrid courses

Private competitors for **DTU, TUM and TalTech** are offering more online and/or hybrid courses. The online or hybrid format offers more flexibility for the participants and is less time and travel consuming than courses requiring 100% physical presence.

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4 Note that TIAS is a business school affiliated with Tilburg University and Eindhoven University of Technology, but private owned.

More applied learning

DTU, TUM and TalTech all mention that courses of competitors utilize a very applied teaching method, where theory to a high degree is integrated with and applied to the reality of participants.

Better known for offering continuous learning

In **Denmark, Germany, and Estonia,** the main private competitors of the universities´ LLL departments, have a stronger reputation as a supplier of continuous education and are more well-known in this area than the university.

Stronger focus on marketing

TU/e and DTU both perceive their main private competitor as having a more significant focus on marketing their courses. Both competitors employ a very commercial approach and are active on social media.

9. OPPORTUNITIES AND THREATS

Opportunities are external factors that may contribute to the organisation and build up strengths, whereas threats are problems or risks caused by external factors that the organisation may face. Summing up from above following can be extracted to represent the most essential.

Opportunities

Engineers' need for upskilling

Several interviewees experience a growing demand in the market for continuous education. The need for upskilling of engineers' is increasingly led on by trends in the market, changes in legislation or as a part of their personal and professional development as experts in their field. The EuroTeQ universities have a very strong market position as leading technical universities and are therefore in a unique position to extend their value proposition further into LLL courses, taking advantage of their existing strengths within education and research and innovation of technologies in the modern society.

Low brand awareness in the LLL market

The EuroTeq universities have a low brand awareness in terms of offering LLL in their home countries. There is a good chance that a stronger marketing effort (potentially coupled with a centralization of the LLL courses) will lead to higher awareness and interest for continuous education courses offered by EuroTeQ universities. One very promising opportunity for the partner universities could therefore be to exploit the unique position of having a trusted brand associated with high quality education and highly skilled lecturers and transfer it to their LLL offerings.

Applied learning with strong relationships

The demand for customized and applied learning, where continuous learning courses are developed and executed in cooperation with industry partners, are an opportunity to be leveraged by the EuroTeQ universities. Most of the universities have strong industry ties and are engaged in widespread collabo-

rations and projects with industry partners. Extended partnerships with organisations and companies to develop, execute and market new courses based on applied learning is an opportunity to leverage for LLL in the EuroTeQ universities.

Micro-credentials

In most countries, the private suppliers of continuous learning offer comparatively shorter courses than universities. This is in line with the general perception amongst interviewees, that demand for more targeted and efficient learning is on the increase amongst continuous education participants. EuroTeQ universities can adapt their LLL offerings to this trend by focusing more on the development of (stackable) micro-credentials, thereby offering an alternative to the traditional extensive university education programs.

Threats

Online/hybrid education

With online and hybrid courses on the rise, the market is becoming more flexible in time and space. With this new flexibility, international competitors can increasingly assert themselves to professionals seeking to upskill and as such, a whole new layer of competitors should be considered. EuroTeQ universities should consider increasingly developing and offering courses to accommodate the increasing demand for online and hybrid education.

Decreasing demand for ECTS for continuous education courses

Universities have a monopoly on offering ECTS accredited courses, which validates the quality of the course contents and ensures transferability of credits across borders. However, ECTS are not necessarily a particularly strong selling point for continuous education participants if they already have completed a bachelor's or master's degree. In addition, the ECTS accreditation process can be lengthy and comprehensive, thus in fact putting the universities behind private competitors in terms of reacting fast in developing new courses to accommodate trends in the market.

10. CONCLUSION

A SWOT analysis is used to conclude on the current situation for EuroTeQ including all six universities as suppliers of continuous or lifelong learning for engineers. Only findings in the report are considered in this analysis.

SWOT Analysis as an instrument for assessment

As a conclusion we chose to do a SWOT analysis as it is a straight-forward model that assesses what an organization can and cannot do as well as its potential opportunities and threats.

The SWOT analysis helps us to identify our organisations´ strengths, weaknesses, opportunities, and threats. It can guide us to build on what is done well, address what is lacking, seize new openings, and minimize risks.

The SWOT Analysis considers internal and external factors:

Internal factors:

Strength: internal factors of an organisation that are positive and add to the benefit and profit of the business.
Weakness refers to an attribute that is internal to the organisation and results in a disadvantage to the organisation or hinders its output, productivity, or revenue generation.

External factors:

Opportunity refers to a situation where there is something favourable to the organisation that the organisation can use to its advantage.
Threat is an unfavourable situation in the market that causes a disadvantage or potential harm to the organisation.

Considering these factors, our organisations should build on maintaining the strengths, building on the weaknesses to develop them into positive features, tap the opportunities by immediately working towards them and safeguard itself from the threats.

Figure 2: The figure shows the model of a SWOT Analysis with its components in 2x2 grid

SWOT Analysis for Lifelong Learning at EuroTeQ universities

STRENGHTS

- The EuroTeQ partner universities have a unique position of having a trusted brand associated with high quality education.
- The EuroTeQ universities each have specific research areas where they are remarkably strong with particularly well-reputed researchers, professors, and lecturers on staff.
- Universities have a monopoly on offering ECTS accredited courses, which validates the quality of the course contents and ensures transferability across borders.

WEAKNESSES

- At the EuroTeQ universities where LLL is organized in a decentralized way, central overview and alignment of courses, marketing, and administration is missing.
- EuroTeQ universities are not strongly positioned in the market for LLL.
- Universities suffer from being large public organisations and therefore not fast and agile enough in adapting and developing courses to meet the changing demand in the market.
- There is no incentive system for motivating professors to develop courses for professionals.

OPPORTUNITIES

- Engineers' need for upskilling is increasing, and the universities are therefore in a unique position to extend their value proposition further into LLL courses.
- The missing awareness and interest for continuous education courses offered by EuroTeQ universities can be met by a stronger marketing effort, coupled with a centralization of the LLL courses.
- There is an opportunity for offering courses with more applied learning, based on already strong collaborations/partnerships with companies and other organizations.
- The demand for flexibility in structure and length of courses and educations can be met by developing more (stackable) micro-credentials.

THREATS

- With online and hybrid education, the market is becoming more flexible in time and space and more competitors will be accessible for participants of continuous education.
- There's a decreasing demand for ECTS for continuous education courses. This can be a threat, as it puts the universities' LLL behind private competitors in terms of reacting fast in developing new courses to accommodate trends in the market, while at the same time not providing the intended competitive advantage.

11. SOURCES

Websites

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https://euroteq.eurotech-universities.eu/initiatives/lifelong-learning/
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Literature

Kotler, P., Lane Keller, K., Brady, M., Goodman, M., & Hansen, T. (2016). Marketing Management. (3. ed.) Pearson Education Ltd.

Interviews

Scripts with all interviews with the executive managers are available

CTU: Vladimir Janicev (on behalf of Dana Dubnova, Head of Dept. for Education and Students Affairs)
DTU: Karina Rothoff Brix, former Managing Director of DTU Learn for Life
TalTech: Hanno Tomberg, Head of Lifelong Learning Department Open University
TU/E: Chantal Brans, Program manager TU/e professional education
TUM: Bernhard Kraus, Managing Director TUM Institute for LifeLong Learning
L'X: Frank Pacard, Président, École Polytechnique Executive Education