SME CLUSTER GROWTH
EMPOWERED ENGINEERING

GROWTH NEEDS ANALYSIS

SYNTHESIS REPORT

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CONTENTS

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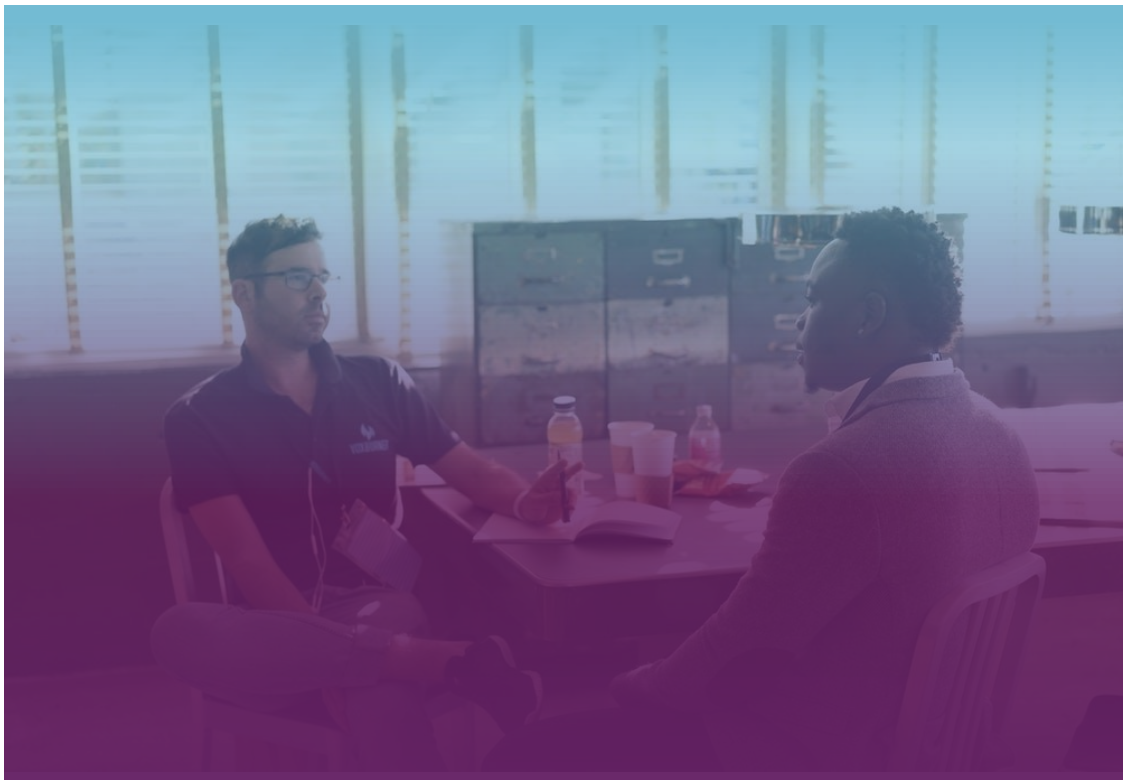


01

INTRODUCTION

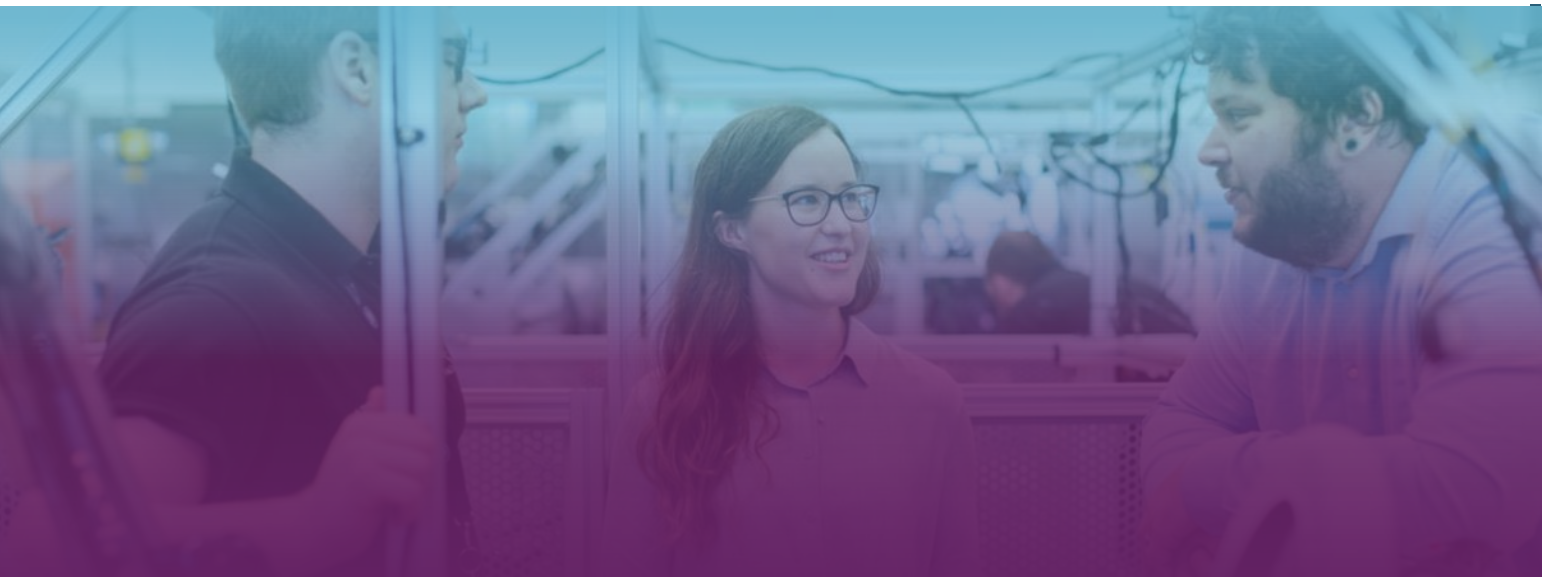
01

INTRODUCTION

Small and medium sized enterprises (SMEs) are the backbone of the European economy and improving the competitiveness of SMEs has been a main objective of European cohesion, R&D, Industrial and ICT policies, among others. Despite globalization and increasingly international competition, SMEs in Europe remain a dominant employer contracting around 94 million people[1] and generating around 56.4% of the total added value (EUR 4.4 trillion). However, SMEs face obstacles to growth, including a shortage of skilled staff and limited access to information amongst others[2] whilst the WEF's[3] Future of Jobs report states that 54% of employees will require significant re-/upskilling by 2022, particularly among SMEs. With human capital being the core of competitiveness and SMEs being the motor of the EU economy, SMEs need support to reach their full innovation potential. The UN[4] asserts that SMEs offer growth and provide a solid base for work, entrepreneurship, creativity, and innovation with regards to the sustainable development goals. However, for SMEs one of the greatest inhibitors to innovation is human resources, specifically multi-skilled and cross-functional human capital, and access to talent[5]. SMEs need to develop more 'T-shaped skills'[6], such as relational intelligence, emotional intelligence, transversal skills, an ability to recognise future trends, etc. Initiatives such as the Knowledge and Innovation Communities[7] European Institute of Innovation & Technology (EIT) have aided innovation, however they are not specifically focussed on SMEs, with the latter needing more localised networks and access to talent. Studies highlight the importance of regional knowledge clusters involving scientific organisations and universities, supplying both research and talent, in developing SME innovation excellence.[8]

There are many ways in which SMEs have a major role to play in innovation, not least in engineering. In the JRC technical report on mapping innovation priorities and specialisation patterns in Europe, engineering is identified in the top 10 most common priority areas adopted in 20 EU countries in the category of research and innovation capabilities.[9] Engineering itself is a fast growth knowledge sector that employs a large share of the EU workforce. Recent data shows that the number of scientists and engineers in the EU increased by 4% in 2018 and accounts for 17.2 million jobs[10] . Despite this, **the demand for high-skilled employees still exceeds the supply by 15% in the engineering sector**, highlighting a skills gap.[11] Accenture reports that four 'horizontal' skill sets are important for the engineering sector, including complex reasoning, creativity, socio-emotional intelligence, and sensory perception, with the first two marked with high importance in 2017.[12] In 2019, Burning Glass Technologies[13] published their Skills Taxonomy that indicated the skills that potential employers expect engineers to have which include communication, problem solving, planning and teamwork. The findings by Accenture and Burning Glass Technologies reflect the demand in developing the horizontal vector of the T-shaped skills model. (Refer to Figure 1 on page 5).

1 Clark, D. (2019) Number of small and medium-sized enterprises (SMEs) in the European Union in 2018, by size. Statista. https://www.statista.com/statistics/878412/number-of-smes-in-europe-by-size/
2 European Parliament (2017). Helping European SMEs to grow. http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/603967/EPRS_IDA(2017)603967_EN.pdf
3 World Economic Forum (2018). The Future of Jobs Report 2018. https://www.weforum.org/reports/the-future-of-jobs-report-2018
4 United Nations. Sustainable Development Goals. https://sustainabledevelopment.un.org/?menu=1300
5 OECD (2018). Promoting innovation in established SMEs. https://www.oecd.org/cfe/smes/ministerial/documents/2018-SME-Ministerial-Conference-Parallel-Session- 4.pdf.
6 T-shaped skills - a set of skills with two bars, in which the vertical bar refers to deep knowledge/skills in one area, and the horizontal bar a broad base of general supporting knowledge /skills https://agileleanlife.com/t-shaped-skills-every-area-life
7 EIT. Knowledge and Innovation Communities. What is an Innovation Community? https://eit.europa.eu/our-communities/eit-innovation-communities
8 Davey et al. (2018). State of European University-Business Cooperation. https://www.ub-cooperation.eu/index/reports
9 JRC (2015). Mapping innovation priorities and specialisation patterns in Europe https://danube-inco.net/object/document/14997/attach/JRC95227_Mapping_Smart_Specialisation_Priorities.pdf
10 Eurostat (2019). Number of scientists and engineers up 4% in 2018 https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190830-1?inheritRedirect=true&redirect=%2Feurostat%2Fweb%2Fmain%2Fhome
11 Burning Glass Technologies (March 2018). Different skills, different gaps: measuring & closing the skills gap. https://www.burning-glass.com/wp-content/uploads/Skills_Gap_Different_Skills_Different_Gaps_FINAL.pdf
12 Accenture (2018). https://www.accenture.com/_acnmedia/thought-leadership-assets/pdf/accenture-education-and-technology- skills-research.pdf
13 Burning Glass Technologies (September 2019). Mapping the genome of jobs. https://www.burning-glass.com/wp-content/uploads/2019/09/Burning_Glass_Skills_Taxonomy.pdf



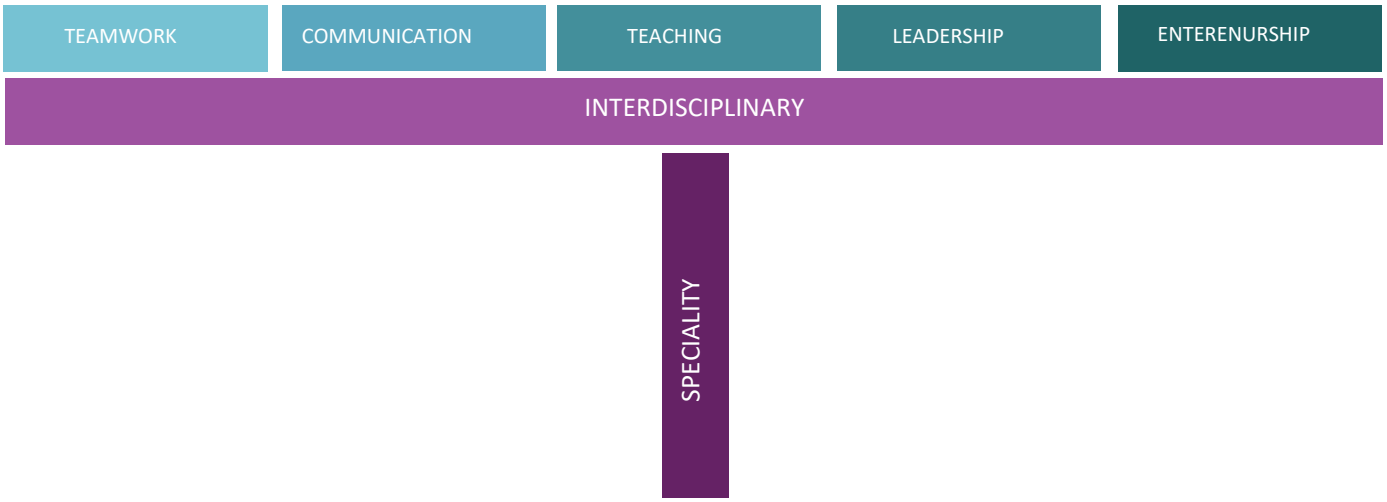
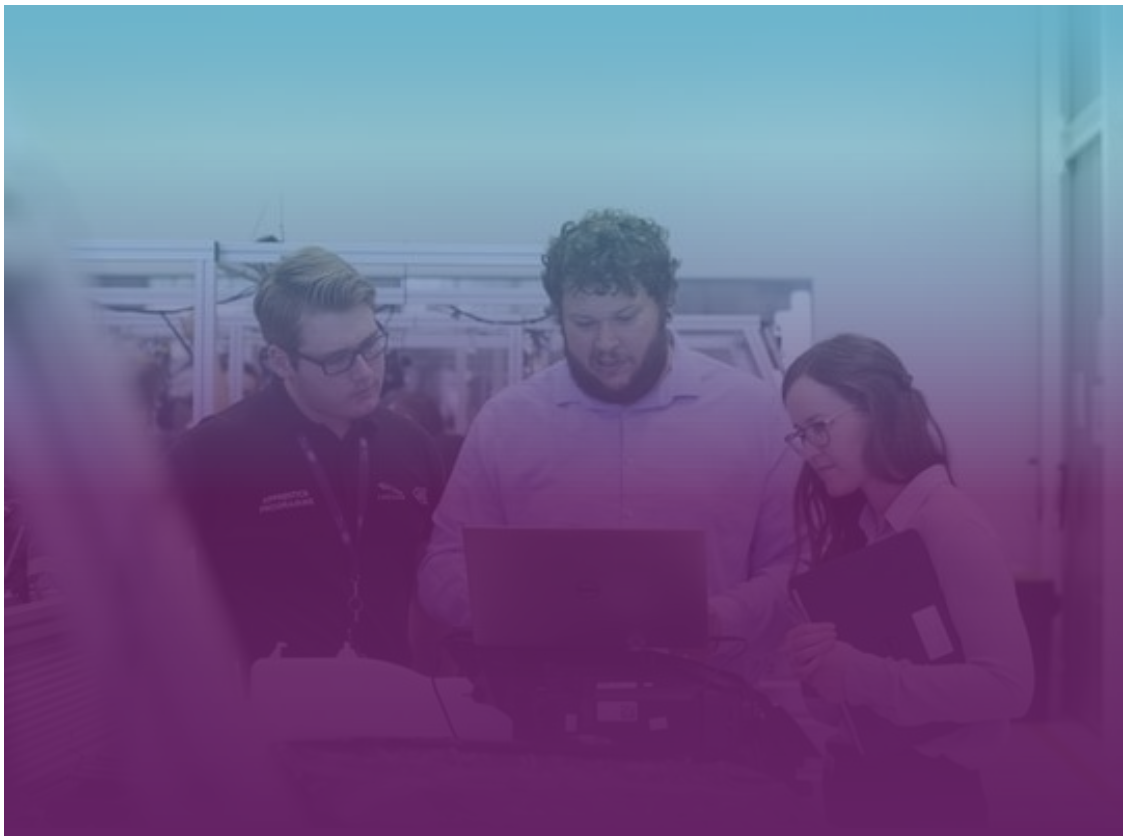


Figure 1 *T - shaped scientist and engineer by Dr. Nirmala Kannankutty, Deputy Division Director of the Division Graduate Education at the U.S. National Science Foundation, presented at Vitae Researcher Development International Conference 2017*.

In this light, the SME Cluster Growth project (a further SCG project) aims at empowering SMEs in the engineering sector to ensure their maturation, competitiveness, and stable growth by equipping them with horizontal skills and knowledge.[14] The following report aims to identify, define, and characterise the engineering SMEs growth needs. The ultimate aim is to support engineering through their growth management by providing a programme based on Higher Education Institution (HEI) capabilities and cluster opportunities at the European level. To this end, a consortium of European partners has joined forces to explore the subject (Table 1).

14 In this proposal, we consider horizontal skills/knowledge as skills and knowledge, related to the horizontal bar of the T- professional competencies.



02

Methodology

02

METHODOLOGY

RESEARCH SETTING

The project has been designed to align the interests of growth-oriented, engineering-focused SMEs with regional actors capable of supporting growth through research and talent provision as well as providing access to facilities and knowledge networks.

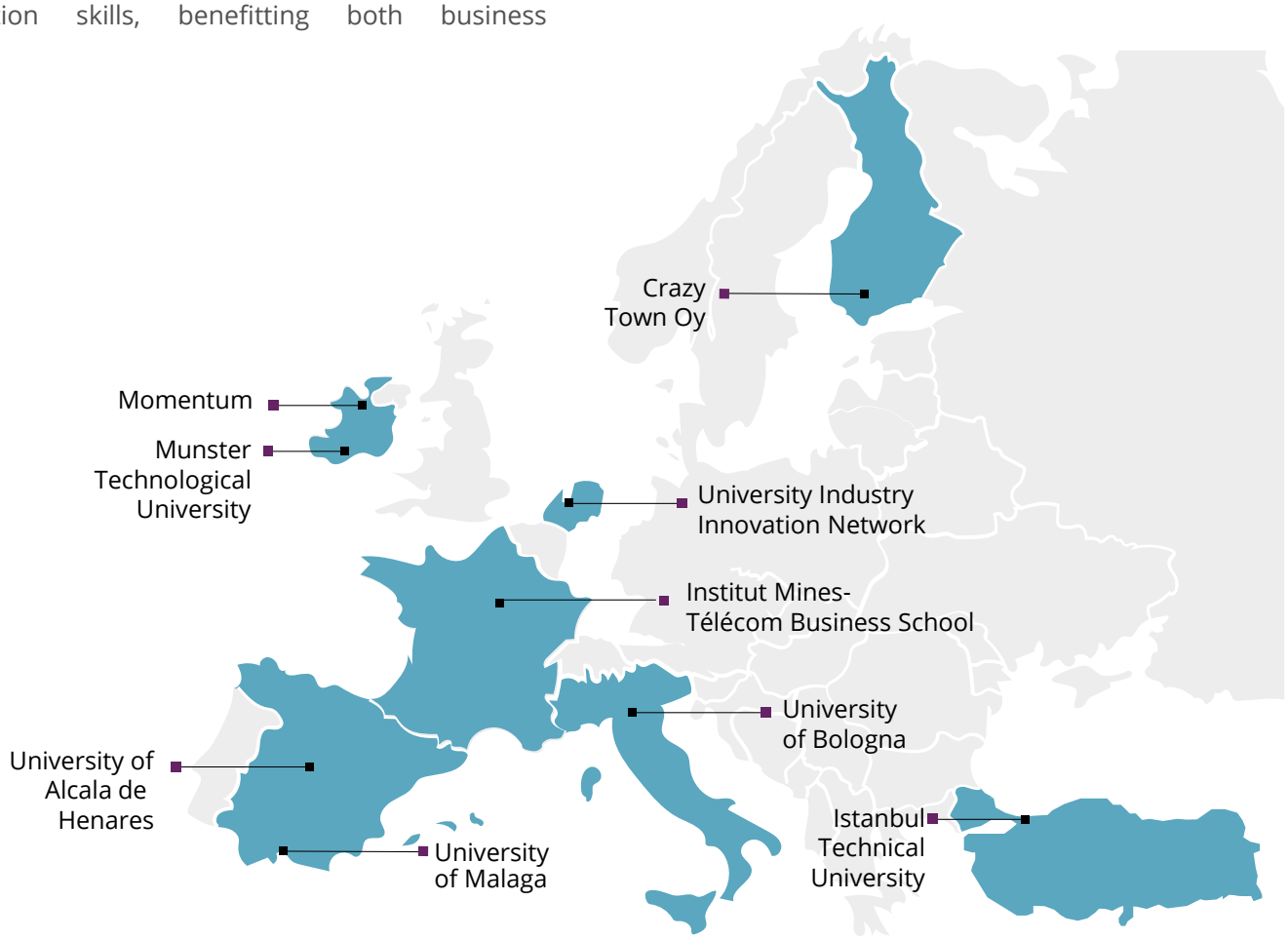
In uniting the innovation supply chain, the SCG project envisions that the research and training support directed at SMEs will be a joint effort provided by a consortium of:

- HEIs (Institut Mines-Télécom Business School, Munster Institute of Technology, University of Bologna, Istanbul Technical University, University of Malaga, University of Alcala),
- Business professionals (a business accelerator- Crazy Town Oy),
- A VET service provider (Momentum), and
- University-industry network (University Industry Innovation Network).

The ability for HEIs to support SME innovation aligns with Europe 2020,[15] the European Commission's (EC) ten-year strategy for 'smart, sustainable, and inclusive' growth. In addition, the EC's 'Towards a Sustainable Europe by 203016' (2019) encourages the EU Member States, "to promote stronger links between researchers and business" by developing hubs and incubators to support sustainable development, so that "researchers and businesses can meet, exchange best practices, and spur innovation." Potential synergies between HEIs and SMEs can boost the economy and innovation capacity of their region. The Renewed EC Agenda on Higher Education17 (2017) highlights a central position of HEIs in the innovation-based economy, emphasizing the need for HEIs to have a concerted focus on nurturing its networks and resources. The Agenda makes a clear reference to the responsibilities of HEIs, such as being 'civic' and 'entrepreneurial', contributing to social and economic advancements in their regions. Cooperation with universities provides SMEs with a potential competitive advantage, as they "can easily integrate into a regional economic network" and contribute to its development[18]. Furthermore, as opposed to large companies, SMEs tend to cooperate regionally[19], providing a local pathway for talent and research to be integrated into society. Business professionals have been integrated into the SCG project to encourage various stakeholders of the entrepreneurial ecosystem to foster collaboration across regions and sectors when shaping the cluster, a suggestion also advocated by the Smart Guide to Cluster Policy[20] by the EC (2016).

15 European Commission (2010). EUROPE 2020. A European strategy for smart, sustainable and inclusive growth https://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf
16 European Commission (2019). Towards a sustainable Europe by 2030. Reflection Paper. https://ec.europa.eu/commission/sites/beta-political/files/rp_sustainable_europe_30-01_en_web.pdf
17 European Commission (2017). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS on a renewed EU agenda for higher education. https://eur-lex.europa.eu/legal- content/EN/TXT/?uri=CELEX%3A52017DC0247 es
18 Neagu, C. (2016). The importance and role of small and medium-sized businesses. Theoretical and Applied Economics. Volume XXIII, No. 3(608), Autumn, pp. 331-338 http://store.ectap.ro/articole/1217.pdf
19 Davey et al. (2018). State of European University-Business Cooperation, https://www.ub-cooperation.eu/index/reports
20 European Commission (2016). Smart Guide to Cluster Policy https://s3platform.jrc.ec.europa.eu/documents/20182/84453/Smart+Guide+to+Cluster+Policy/fd0f16b9- 0759-43ca-b950-ec0192e220c8
21 European Commission (2016). Smart Guide to Cluster Policy https://s3platform.jrc.ec.europa.eu/documents/20182/84453/Smart+Guide+to+Cluster+Policy/fd0f16b9- 0759-43ca-b950-ec0192e220c8

Therefore, the participating business organizations are perceived as crucial to ensure that the project unfolds according to the given direction (Crazy Town, Momentum, UIIN). The outputs of the SCG project address the actions specified in the New Skills Agenda for Europe[21] (2016), aiming to improve understanding of the demand for skills and jobs and increase relevance and quality of training in areas such as entrepreneurship, management, and innovation skills, benefitting both business professionals and university students. The project objectives are strongly aligned with partner objectives. The industry cluster focus in each partner location is also in line with the smart specialisation (RIS3) priorities identified for those regions, i.e., Andalusia[22] (University of Malaga), Comunidad de Madrid[23] (University of Alcala), Emilia-Romagna[24] (University of Bologna) and the European Commission[25] (2010).



PARTNER ORGANISATION	HEI OR INDUSTRY	COUNTRY	CONTACT
UMA	HEI	Spain	Rafael Ventura Fernández: rventura@uma.es
Crazy Town Oy	Industry	Finland	Toni Pienonen: toni.pienonen@crazytown.fi
MTU	HEI	Ireland	Kevin, Fitzgibbon: Kevin.Fitzgibbon@mtu.ie
IMT-BS	HEI	France	Adeline Leroy: adeline.leroy@imt-bs.eu
Istanbul Teknik University	HEI	Turkey	Zeynep Erden Bayazit: erdenz@itu.edu.tr
UNIBO	HEI	Italy	Herica Righi: herica.moraisrighi@unibo.it
Universidad de Alcalá	HEI	Spain	Fernando Perales: Fernando.perales@uah.es
UIIN	Industry	Netherlands	Alexandra Zinovyeva: zinovyeva@uiin.org

Table 1 *Partner Organisations*

21 European Commission (2016). Smart Guide to Cluster Policy https://s3platform.jrc.ec.europa.eu/documents/20182/84453/Smart+Guide+to+Cluster+Policy/fd0f16b9- 0759-43ca-b950-ec0192e220c8
22 Smart Specialisation Platform. Andalusia S3 Priorities. https://s3platform.jrc.ec.europa.eu/regions/ES61/tags/ES61
23 Smart Specialisation Platform. Comunidad de Madrid S3 Priorities. https://s3platform.jrc.ec.europa.eu/regions/ES30/tags/ES30
24 Smart Specialisation Platform. Emilia Romagna S3 Priorities. https://s3platform.jrc.ec.europa.eu/regions/ITH5/tags/ITH5

RESEARCH DESIGN

The empirical research consisted of a systematic literature review regarding SME Growth. The search was carried out in Web of Science (and OTHERS) and included only peer-reviewed articles published in English in the areas of management, business, public administration, and education, grey literature, and literature in each partner's languages. The search yielded 6 papers that were included in the literature review. In addition, the partner organisations carried out systematic reviews of scientific and grey literature regarding engineering SMEs in their respective countries. Each partner focused on the global literature review of a specific topic ,using scientific literature, government reports and international organization reports.

Each HEI partner produced a report summarising the findings of their primary (interviews) and secondary research, highlighting specific cluster growth needs and challenges, existing challenges against business growth and available support systems.

A concise report resulted from an extensive review of relevant scientific and grey literature in the fields of SME growth and university engagement to support SME Growth to provide a background and foundation for understanding the subject including:

- Investigate SME growth barriers and needs
- Identify a broad range of characteristics that enable growth to happen

ACTIVITIES

This **desktop research activity** has been executed through a number of sub-activities:

01

First, a **topic review** on the concept of SME Growth – An initial literature review has been undertaken by the HEI partners and UIIN to provide a basic understanding of the SME Growth literature as outlined in the Desk Research Guideline. Second, a Regional Report – Desk research by all HEI partners to increase their understanding of SME growth in their own regions.

02

Expert interviews execution and analysis has been undertaken in order to acquire deep, exploratory-style insights, experiences and opinions from experts/consultants, business owners and HEI personnel about different factors of SME growth, including understandings of growth, growth strategies, transformations, main motivations and challenges, key success factors, main needs of growth SMEs, unique abilities of leaders, cooperation for growth, cooperation with universities and training needs. The objective was to collect information via structured in-depth interviews with 28 experts through a designed methodology for the candidate selection and execution of the interviews.

03

Finally, an analysis of the Growth Needs at regional and cross-regional levels was executed through a **survey** aimed to investigate the specific barriers and needs of the Engineering SMEs in the six selected regions in terms of growth. The survey was launched by all the partners to collect extensive data about the barriers and needs, to be quantitatively analysed. The survey precisely described the section, number, and type of questions.

Case study collection 65 case studies have been realised based on SME owner and growth experts' experience. The use cases helped to identify good practices and concrete insights on several subjects describing a successful growth project as: conception of growth, growth challenges, growth good practices (including HR, innovation and good operation management). The use cases offer deep descriptions of growth stories and how the people involved in strategic decisions have ensured the growth strategy and implemented it successfully through all the challenges raised before, during and after the growth phase. To provide a comprehensive report, the "Growth Needs Analysis Synthesis Report" then collates all the results from the desk research, expert interviews, survey, and councils. The global objective is for the report to be published in a downloadable format, to be disseminated to and promoted among over 800 external stakeholders directly and to a wider audience through social media, and to create a framework for better understanding of SME Growth Activities.

Institut Mines-Télécom Business School

ANALYSIS

The analysis of each study was carried out by **Institut Mines-Télécom Business Schools (IMTBS)** and evaluated by the partner organisations on a regular basis.

01

For the **systematic literature review**, a content analysis was used to identify how extant literature described the topics, that is, the qualities, knowledge, skills (i.e., competencies), drivers and barriers regarding SME growth.

02

For the **qualitative interviews**, another content analysis was conducted, facilitated by Nvivo software. In the first coding cycle, we identified sentences in each transcribed interview pertaining to relevant insights on the competencies, needs and good practices, as well as barriers and drivers. In a second coding cycle, we sorted our initial codes into more detailed categories to understand the specific characteristics of the researched topics. This led to the identification of sub-themes. The process was iterative, moving between the different cycles until consensus about the relevant topics, their sub-themes, and their characteristics was achieved. As such, the systematic literature review of the scientific and grey literature grounded our inquiry in recent theoretical debates and managerial discussions in the field of management and leadership. Particular attention was given to the concepts seeming obvious for the interviewees but that could be further explored to try to develop an original and critical approach.

03

For the **quantitative study**, the data from the online questionnaire was analysed in Qualtrics. The dataset was first screened to detect and clean the data of unengaged responses, missing data, and other possible problems (outliers, skewness, kurtosis, where applicable). The final dataset used for analysis had 368 responses. To get a first impression of the data, the research team computed simple descriptive statistics (absolute and relative frequency, min, max, mean, standard deviations, cross-tabulation with chi-squared statistics). Following these descriptive statistics, additional exploratory and confirmatory factor analyses were computed on skills and knowledge. While the systematic literature review and the qualitative study explored SMEs' perception of good practices for growth and their personal perception of the drivers and barriers, the quantitative study tested insights on a large dataset to underline the needs and the readiness to collaborate with HEIs. In what follows, the findings and results from the qualitative and quantitative studies are presented and discussed

ABOUT THE SURVEY RESPONDENTS

Almost 60% of the survey respondents were business directors, and almost 20% were other executives or senior management. Only a slight majority (~52%) of the survey responders were the actual founders of the company, of which almost 60% are engineering companies and over 60% are privately owned and another 26% are family-owned businesses. The most recently established business was founded last year, in 2020, while the oldest appears to have been founded in 1892, though most of the businesses were founded between 1985 and 2010.

In respect to cooperation, over 40% of these businesses collaborate with other businesses, with around 19% reporting cooperating in business clusters. Only around 20% of businesses report collaborating with universities. For those businesses that collaborate with universities, about half have one year or less experience doing so, with most of the other half evenly distributed between 1 and less than 20 years of experience. Only three companies reported having more than 20 years' experience in UBC.

With regards to the industry, outside of manufacturing (44%) and professional, scientific, and technical activities (~18%), the fields of the businesses are distributed fairly evenly among the single and low double-digit percentages amongst the other options.

Most companies experienced growth between 0 and 19% per year over the last five years, however companies staying the same size were the single largest group reporting (~29%). Around 9% of the respondents also reported reducing their workforce, while only 3% increased by more than 100% each year. Financial growth has followed a similar distribution, with most companies falling between maintaining current turnover and growing by 19% (~75% combined), with an even distribution between staying the same, <10% growth, and 10-19% growth.

The **aspirations for growth** were varied, with most falling between staying the same and up to 99% growth (~95% combined). Out of this group, the most common response was up to 10% growth (~42%), followed by 10-19% growth (~22%). In terms of turnover, most companies lie in between 0-10 million euros turnover (~80%), evenly split between those less than 2 million euros, and those between 2 and 10 million euros. Fewer than 20% of respondents saw earnings up to 50 million euros. Each company invests differently in R&D, with a wide scope of responses reported.

03

SMEs GROWTH

03

SME's GROWTH

In terms of general spirit, the following are the main insights to draw a coherent and efficient program to support SMEs in engineering, addressing point by point the studied topics which are all essential in the framework for this type of company.

THE EFFECT OF SMALL BUSINESS MANAGERS

SMEs SPECIFICITY

Neoclassical microeconomic theory presupposes that at a given market size, the company will increase sales until the unit selling price of its products equals their marginal cost (Mansfield 1979; Samuelson and Nordhaus, 1989). However, this theory has proven its inadequacy to explain the growth or non-growth behaviour of a company in general (Rumelt, Schendel and Teece, 1991). Schumpeter (1942) first demonstrated the importance of the role of the entrepreneur in the phenomenon of growth. Contributions to the subject of growth in SMEs are often limited to the economic aspect and put aside the sociological aspect, yet the impact of the will for growth among leaders on growth itself is certain (Thibodeau, of Amboise and Gasse, 1995: 13).

In an SME, the strategic decision-making power is in fact almost entirely in the hands of the leader. Although they may be influenced by others at times, it is the leader's will that triggers action. This differs from large companies where the "strategic summit" is more subject to the multiplicity of contacts with the outside world (Mintzberg, 1979). Investigations on the impact of entrepreneurial orientation of a firm tend to confirm its association with firm success (e.g. Becherer and Maurer, 1997; Lumpkin and Dess, 1996; Shepherd and Wiklund, 2005; Wiklund, 1999), "The more entrepreneurial oriented a firm is, the more it will grow" (Eggers et al., 2013).

Summarising the above: forgetting therefore that the motivation of the leader is an essential factor of growth itself would have the result of negatively impacting growth because if there is no strong human impulse, no company can grow or assume its growth. It will only end up creating problems that prevent the entity from surviving.

According to a project manager at a Finnish university, management and owners need to establish a growth-culture and mindset while providing support to maintain the spirit of transformation. The key issues are the capabilities and attitudes of the leaders and owners of SMEs. Everything starts from the top, the personal ambition of the founder of the company, their strategy and the size/turnover goals that are planned with a management team. Unless they are broad-minded and have the ability to seize opportunities, their teams will fall on themselves according to a project manager at a Finnish university, an SME owner and university program manager based in the Netherlands, an SME CEO in Czechia, and a consultant.

If well managed, however, the challenge of growth in itself can be motivating. This was the case, for example the founder of an insurance agency based in France. Originally, it was the challenge that interested him, an interest he shared with his partner. During their studies, they were exposed to different modes of entrepreneurship and growth, developing an interest in the challenge of rapid growth. For them, there was a rather sharp learning curve that interested them when they left school. What reassured them in this choice was that they were willing to accept the pace that goes with it. Thus, the entrepreneur's vision is another key success factor for growth.

It needs to be in the DNA of the SME owner/manager to be able to seize opportunities at the right moment, says a Business advisor at a consulting firm. Since growth strategies are linked to the vision of the entrepreneur. A Co-Founder of a data collection firm based in Spain mentioned that this vision is almost a concept in itself and can be considered by some as the main quality of an entrepreneur, namely, his ability to have a vision to define a three-to-five-year strategy.

This vision must be clearly expressed and articulated in order to be transmitted, according to a Business owner and university program manager in the Netherlands & and the Managing Director of a business consulting firm based in Finland:

"Having a clear vision and being able to translate it into small manageable tasks while remaining focused. Very often, we see entrepreneurs changing their focus as they see a new opportunity arising and therefore not sticking to their initial growth strategy. The ability, once this vision is fixed, to be obsessive of its application is therefore essential. Leaders are people-centered and have the ability to identify the right skills, keep the goal clear and make sure that the goal is the same for everyone, have the ability to look ahead, identify opportunities and be bold"

Managing Director of a business consulting firm based in Finland

Many factors describing the typology of the leader have already been identified as factors affecting their desire for growth. The age of the CEO has an impact on growth, as does his level of education (Kolvereid, 1992; Strese et al., p.453-52, 2018), which further raises the question of the type of education. The question of employee leaders (who are neither founders, nor heirs, nor buyers), is a matter of debate. Some note that whether the leader is the founder or not may have a significant influence (Delmar and Wiklund, 2008). The salaried manager can push the growth of his company out of need for personal accomplishment (Davidsson, 1989) or other economic motives that are owned only by the company.

The capacity of leaders can even bring growth, regardless of the preferred growth modality. According to a university project manager in Finland:

"SMEs - their owners and leadership - who can read the trends, identify emerging topics and stay on top of their game by seizing opportunities - generally succeed. It doesn't matter if it's new product development, new market development or diversification. There are many good examples of engineering SMEs that have transformed their business model by changing their focus from products a service business or combination of both."

The close structure and direct surroundings of the executive also have a positive influence when structured, especially for high-tech SMEs (Kotkin, 1986; Feeser and Willard, 1989).

Some negative factors of the leader, with implications for the SME, have also been observed. Very strong personalities who have shown an immense will to impose an idea can become a negative factor later by refusing to change their mind even though the environment in which the company operates is no longer the same. The company could then abruptly stop growing and even go bankrupt (Zaleznik, Larçon and Reitter, 1979).

STRATEGIC GOALS AND OWNER-PREPAREDNESS

In addition to the motivation to grow, it appears that growth strategies will fail if CEOs are not prepared to grow. Willpower is not enough; however, it is difficult to establish a link between growth and the leader's perception of what success is. This is because growth is commonly accepted as a factor in qualifying success and performance, even as some business leaders can define success in another way. The strategy of SMEs is not based on a presupposition of performance, but on the perception of business leaders and their personal motivations. They are the ones who will determine its intentions, including its growth intentions. A link has been established between the motivation of those who want their business to grow and who will in fact establish a strategic plan and those who have already achieved their realization about their business and will not establish a plan (Weberet al., 2015).

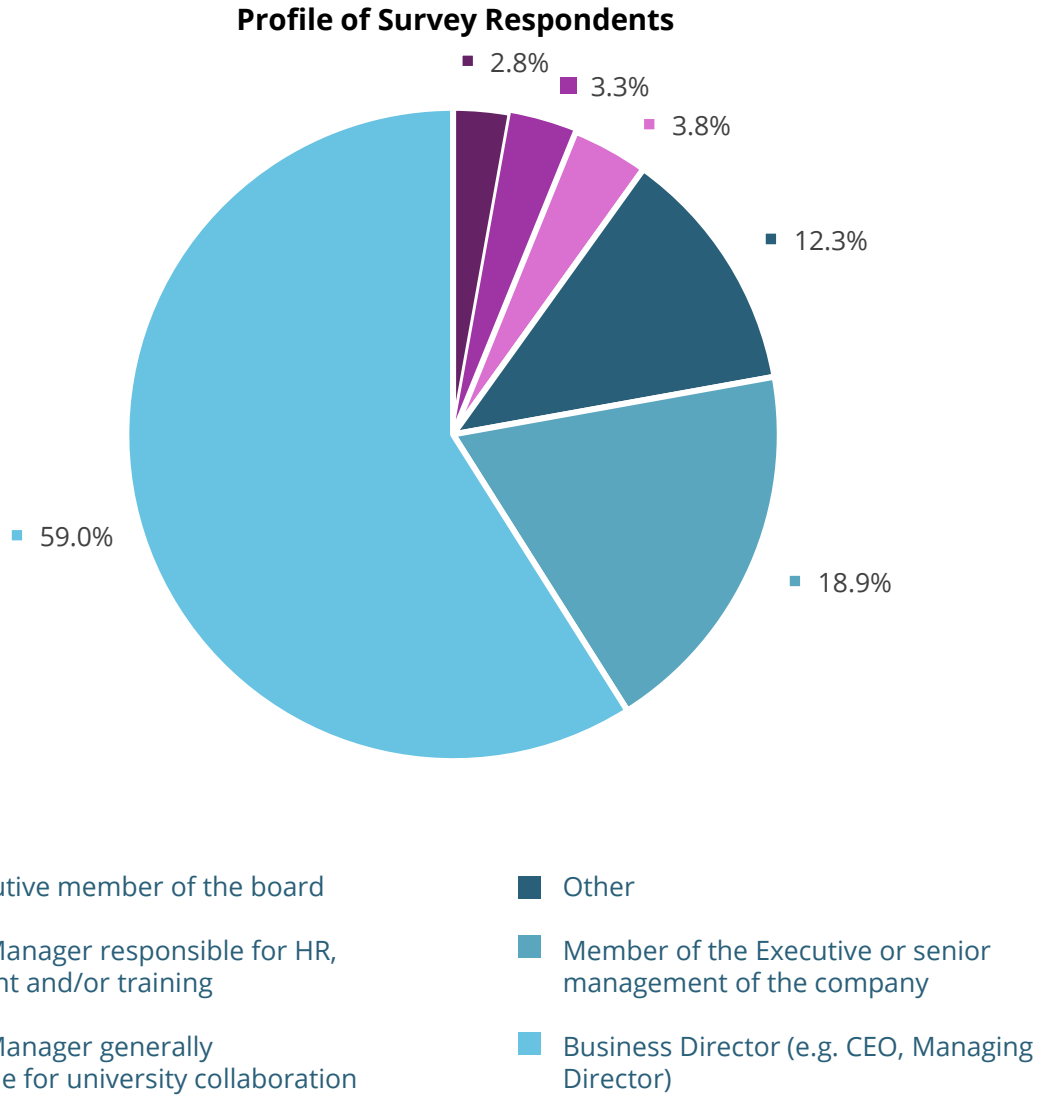
Previous growth seems to be an important explanatory factor for the desire for future growth. Some establish that if there has been will in the past, it is likely to continue in the future (Davidsson, 1989; Kolvereid, 1992). Others point out that if past results have been disappointing, there will be a "desire to outbid" and a desire to grow more (McCarthy et al. 1991).

> *"The motivation and leadership of managers are critical as they grow. So, the development of their leadership and management skills are important, as well as the ability to lead their teams and their capacity to mobilise networks. Another important aspect is the ability to identify and seize opportunities."*
>
> **Business development and investment promotion director at a technology park in Andalousia, Spain**

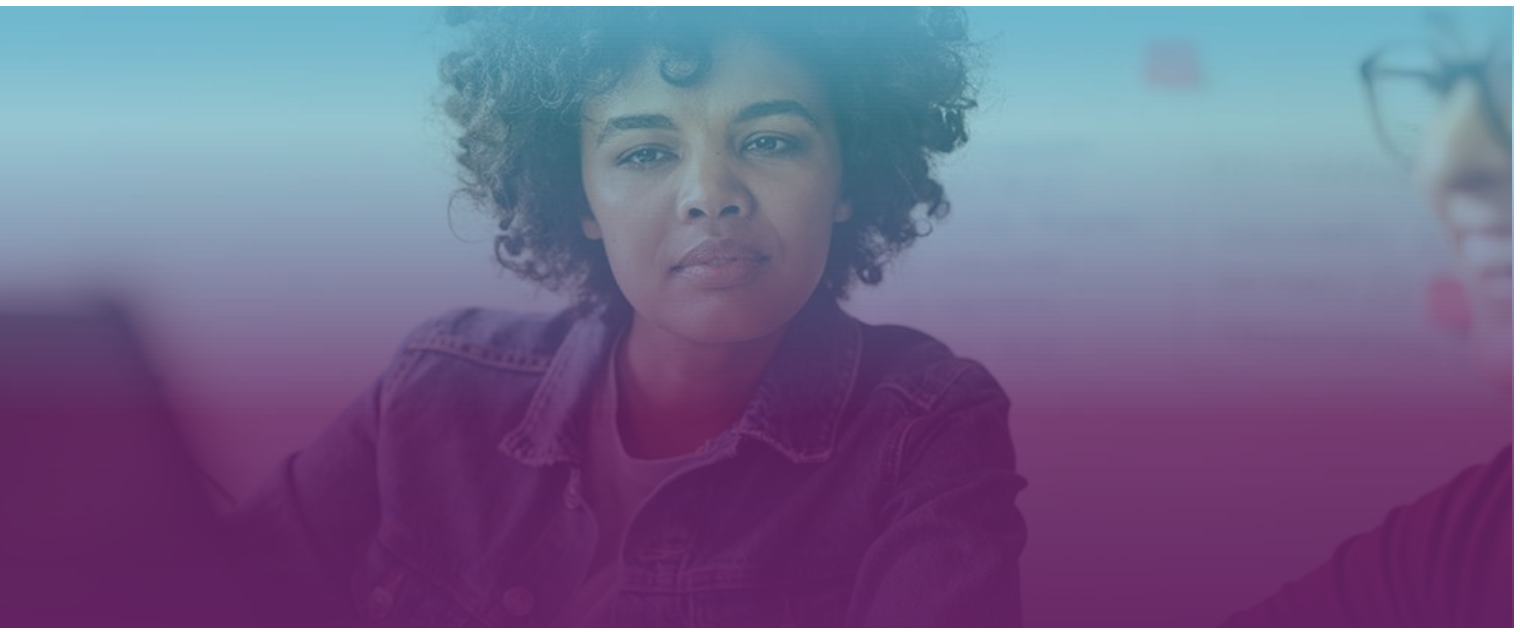
> *"It's a huge workload with a steady pace, the biggest sacrifice is that it eats social life at first, even today it takes 80% to 90% of his time. The weeks are long, the weekends sometimes sacrificed. Because they want to do much better and faster. Yes, today they can be content to work until 7pm, but if they work until 10 or 11pm, mechanically the productivity of the manager is doubled, especially when launching projects where you must produce because it makes a difference."*
>
> **Founder, Insurance firm based in France**

WHAT DID THE SURVEY SAY? WHO'S PART OF THE GROWTH STRATEGY?

According to the survey, we can underline the fact that the strategy is still mainly a CEO's work and not co-constructed with the internal team. We can also note that the second and third type of board members involved in strategy are R&D and marketing people who are involved in product management. Nevertheless, human resource managers are not part of strategy development despite the fact that coordinating talent acquisition is critical and perceived as a real pain point through growth management (see later)



Graphic 1 *'What is your position within your organisation?' (as answered n=211)*



The satisfaction of the founder as a measure of success

Founder satisfaction, a factor that is specific to a founder, has been found to orient how the founder themselves views the success. Beaver (2007) argues that SMEs use an applied approach to chase "success" in business and that success is often articulated by references to growth. Strategic orientation is based on a business owner's perceptions, motivations and desires (O'Regan and Ghobadian, 2006).

> *Consequently, the personal motivations of small business owner (SBO) will influence whether they intend to grow their business"*
>
> **O'Regan and Ghobadian, 2006**

> *Certainly, for some owners, just being in business is success enough, while for others, it is about doing some societal good*
>
> **Weber et al., 2015**

While growth is a complex, multifactorial, and multimodal process, so is the leader's will and perception. Even if growth is influenced by internal and external factors, the will of the leader may be linked to intrinsic and extrinsic motivators. One Interviewee, the *Co-Founder of a strategic data processing firm based in Spain,* identifies the business owner as the first source of motivation and then the...

> *"market demand aligned with the internal motivation to reach new market access. Most of the time, the main motivation is generated at owner and management board levels".*
>
> **Co-Founder of a strategic data processing firm based in Spain**

Motivations of owners for SME growth can be of various kinds:

As an entrepreneur, the main motivation is the capacity for generating a new project from the beginning, following your own culture and business philosophy. There is a strong internal motivation to develop something unique supporting self-growth.

Co-Founder, AI development company based in Spain

In most of the cases, the main motivation is the need to survive due to local market death or loss of local competitiveness

General Director of a Brussels-based business and innovation centre

Earn as much as possible and reach such a quality of life, so that one can concentrate on doing work they like

A CEO at a startup incubator in Brussels

Furthermore, although some factors influence growth in a company, such as ownership structure and/or governance; engineering/manufacturing, SMEs lack a growth strategy, as their main goal is to survive their day-to-day challenges.

Operation development manager of an innovation organisation based in the Netherlands

Desire to increase profits and grow is an important source of motivation" and stay the best "competition provides the necessary motivation to change marketing strategies. When competitors multiply, businesses are driven by the desire to stay ahead of the competition in order to maintain their market position

General Manager at a science park in Turkey

"The most common motivation is the necessity for change that originates from the emergence of a key person or other external factor, such as pandemics

Managing Director at a Finnish business growth consulting firm

Other studies have combined quantitative measures, such as job creation, as sales growth is not a measure of success for smaller companies. This is the best measure in the continued satisfaction of the founder. Organisational performance through the growth process has often been used to describe small business success (Murphy et al., 1996). Therefore, the criteria used to measure growth are often related to sales, market share, assets, profitability and employees (Dobbs and Hamilton, 2007), "As pointed out previously, the tradition in the strategy literature (as it relates to larger firms) indicates that growth is an imperative (or even a synonym) of business success, although alternate motivations do exist." (Weber et al., p.32, 2015).

Negative impacts of events such as an economic crash or deliberate life choices can also have a strong impact and even undermine the preparation of business leaders (Wiklund et al., 2003; Wiklund and Shepherd, 2003; Dobbs and Hamilton, 2007).

Thus, **the four items** that can be identified to **measure success** are *(Weber et al., 2015)*:

01 **"My company has met or achieved my personal goals"**

02 **"My company has met or achieved my financial goals"**

03 **"My business is an economical success" in itself**

04 **"I've accomplished what I wanted to do with my business"**

Based on this classification, it is possible to define several types of Small Business Owners regarding their perception of success and willingness to grow. The table below clarifies how to support SME growth based on the Small Business Owner's perception of growth, of the business itself and willingness to grow.

	PERCEPTION OF SUCCESS	WILLINGNESS TO GROW	CORPORATE SIZE	STRATEGIC PLANNING
Lifestyle of the SBO (respect a lifestyle & personnel achievement are the most important)	Business seen as a success	Not beyond a few employees	Rather sustainable micro-enterprises (average 14 years)	In the short term
Upside Potential Entrepreneur (Entrepreneur who want to grow its business as large as possible)	Consider themselves already prosperous	Want to grow as much as possible	SME	High growth-preparedness and strong willingness for strategic planning
Lost Cause (Entrepreneurs who do not wish to grow beyond a few key employees)	Consider as unsuccessful	Don't want to continue their growth	Older owners with high turnover and low profitability	No willingness for strategic planning
Uncertain trajectory (SBOs who want to grow but do not yet consider themselves successful)	Don't consider themselves successful yet	Having as much success as possible		Turnover, potential for increased employment and turnover

Table 2 *Small Business Owners classification summarised from Weber et al. 2015 (p.33-34*

CASE IN POINT
Rodolphe Roy - CEO of ATS

Rodolphe Roy

ATS is an industrial engineering company founded in 1989, 32 years ago. Originally, it was only the design office in mechanics and industrial piping that were subcontracted in the steel and chemistry industries. From the service to the design office, introducing new industrial products means producing a new process or product for the customer. The investment cycles became more and more distant and the Design Offices were working less, so they preferred to outsource, and independent design offices were created by recovering dismissed employees from different groups and private offices were integrated that will be able to work for different groups in different industries.

ATS Provide transversal services of most of the 18 industrial sectors counted in Bercy. There is a 19th sector, offering solutions industries of the future, that was created transversally. With 200 people, 16 million euros of turnover and 4 sites, ATS has grown from their historical location in Burgundy to spread to Creusot and Dijon, and has an agency in Nantes and a site in Porto, Portugal.

Rodolphe Roy has a strong relationship with his company. He has always had a humanist vision of and ambition for the company. His ambition for the company is that it would support transformation and contribute to enhanced well-being. What really motivates him is his enjoyment of the work, otherwise he wouldn't be able to get up in the morning, so it has to be the same for the customer, an aim of bringing enjoyment, satisfaction, positivity and enthusiasm into the industry.

He knows what he is doing today, however he does not know what he will be doing three years from now. Serving a just cause is a key motivator for him, the management committee, and all the employees. The challenge of attracting young students is huge. Engineering was somewhat badly handled when the public authorities wanted to transform France into a service sector, a decision that we are now realizing was not a good one.

He and his fellow entrepreneurs bring back a desire to work in an industrial sector and that is what carries it. He is an ambassador for entrepreneurship in France to try to restore this desire. From the beginning he recognized himself in this movement. Pleasure at work and acceleration through two major pillars: the digital transformation that he particularly likes and our social and environmental responsibility. For him it was never cosmetic. The current generations won't stay if there is no real transformation and no real CSR commitment.

Nevertheless, an entrepreneur's vision should correspond to the team's capacities. The entire structure should be prepared for growth, says A trainer in digital transformation at an AI company based in Madrid, so business owners' development of leadership and management skills are important, in addition to their ability to lead their teams and capacity to mobilise their network. Presence in the sector and networking can multiply and support growth, but a negative culture within the company will negate the effect of the networking.

> *The abilities of the executive lose effectiveness if there is no alignment between his desire for growth and the culture of his company*
>
> **Managing Director of an Urban Planning Business Cluster in Spain.**

One interviewee, who is the Head of an SME association in Emilia-Romagna, emphasizes the fact that apart from any motivation, growth in itself can be a habit, a normal objective linked to the culture of growth in which entrepreneurs are immersed. She also states that Emilia Romagna companies are used to growth, with entrepreneurs of this region born into growth environments and full of initiatives in addition to being great workers. In short, they are used to the fact that their business has always increased over the years, and she highlighted that growth is not just a trend but a natural predisposition.

In the last two years this trend has not necessarily continued. Some sectors continue to perform very well, while others such as tourism, have struggled. For those who are not doing well, the ability to survive has emerged. CNA also serves the tourism trade sectors, so surely what they are experiencing is a period of survival, not growth. The Head of Industrial Policy Department at an Emilia-Romagna-based SME association says that

> *Often they do not have individual but collective initiatives to give the possibility to keep these lines active without investing in a single company*
>
> **Head of Industrial Policy Department at an Emilia-Romagna-based SME**

This is an interesting conception if we consider the sacrifices that growth requires to business owners.

THE OWNER'S SACRIFICE

This notion of a willingness to grow, not growth at all costs, is essential since part of the growth of SMEs is based on the sacrifice of the leaders themselves.

	HIGH PAST GROWTH	WEAK PAST GROWTH
Willingness to grow high in the future	Continued growth	Acceleration
Willingness to grow low in the future	Deceleration	Stagnation

Table 3 *Growth classification (Koza et al., 2012)*

Four types of the **leader's personal resources** can be mobilized:

01 Financial sacrifices
02 Personal conditions or relational sacrifices (interpersonal relationships)
03 Energy or personal sacrifices (time and knowledge acquisition)
04 Personal characteristics (personal orientation and worldview).

The investment of these resources may be justified in the short term if the owner takes a long-term approach to their use, where the gains will be greater than the investment. The **CEO and Co-founder of a France-based insurance firm** feels it takes huge sacrifices, but it is a conscious choice:

> *"Because it's a choice, but they were aware of it. It's a huge workload with a steady pace, the biggest sacrifice is that it eats social life at first, even today it takes 80% to 90% of my time. The weeks are long, the weekends sometimes sacrificed. Because we want to do much better and faster. Yes, we can be content to work until 7pm, but if we work until 10 or 11pm, mechanically, the productivity is doubled, especially when launching projects where you must produce. It eats up social life, becoming your favourite topic of conversation. It's hard to pick up and, financially, the beginning is not simple on a personal level. I put aside plans to get married and buy a house, which were not goals for me. Ensuring such growth makes it difficult to even plan holidays. Today I am reaping the rewards and now I have the time to play sports and music. I can organize myself as I want, even teleworking from Tunisia. I have gained prestige; it's gratifying to run my company, and this generates respect."*
>
> **CEO and Co-founder of a France-based insurance firm**

The risk of loss affects the owner's willingness to sacrifice. Culture can have an impact, because financial, relational, and personal sacrifices have different meanings in different cultures where risk aversion is greater or less great and the notion of personal sacrifice more or less valued. Planning is expected to channel and improve continued growth when coupled with relationship and personal sacrifices, while owners who have not been able to achieve continued growth need a plan to justify financial sacrifices. It is also important to note the difference between the notions of risk and sacrifice, as high personal sacrifices are not always considered high risk, they may be considered high risk in some circumstances, but not in others.

Finally, there seems to be a real reluctance among many executives to grow, which not only slows down but also blocks growth, often as soon as the company has reached a very low workforce or turnover (Braden, 1977 and Cooper, 1982; Davidsson, 1989). A Finnish CEO underlines the fact that a business owner, to support growth, must have a very specific personality:

> *"You have to be the right kind of people. There must be the courage to make decisions. The company must have a good relationship with the financier. The most important thing is to have faith in it."*
>
> **Finnish CEO of a manufacturing company**

Interviewees cite a lot of various and rare qualities that a growth SME owner needs:

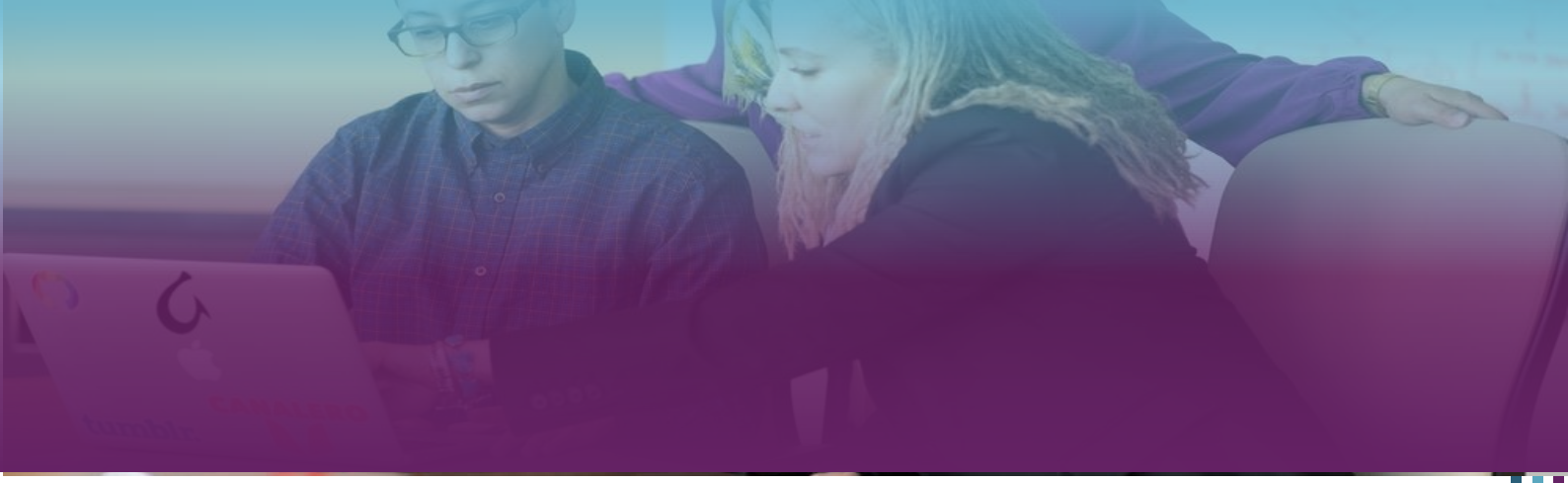
Looking at the owner or manager, this person needs to be quite open minded -as opposed to being autocratic- as they need to remain open to feedback and/or challenging ideas. Owners who are aware of their strengths and weaknesses are better able to surround themselves with experts that can fill the gaps. They need to have the ability to see and seize opportunities, taking measured risks, balancing them with the management team, but ultimately not being afraid to make the final decision."

Business owner, University Program Manager in the Netherlands

Business leaders need to have a combination of several abilities, such as honesty (with employees, partners and clients), communication skills (internal and external), planning skills, technology knowledge concerning the state-of-the-art and competitors offer, organization and tasks delegation."

Co-founder of an AI firm based in Madrid

Yet the Operation Development Manager at an innovation organisation pointed out that it is difficult to find someone that captures all these characteristics. It is more common for companies to bring these skills together within a team to create a culture and mindset within the company that reflects these values.



SUPPORTING SME OWNERS

Without looking for a hero, the business owner role is a tricky one and they might need help. The business leader must be able to identify skills gaps in his workforce and fill them by either hiring new staff members or upskilling current staff members. A business leader must have the ability to identify the need for department managers that can oversee activities and handle the 'heavy lifting' of running the business. Individual business leaders cannot take on the entirety of the workload as the business grows, says the Head of Education and Innovation Policy at an Irish business representative group.

As a Business advisor for a Dutch financial support company, points out:

Passion and drive are very crucial, especially in SMEs where business leaders have the tendency to cover different roles at the same time. Passion is also necessary to inspire and manage the team around the entrepreneur and to get traction on the first customers that will then become ambassadors of the company's products/services."

SMEs are successful if the leaders can form a good team and achieve organizational change. As a result, it is vital for leaders to be educated, capable of analysing their work on a global scale and capable of positioning the company. All the skills mentioned above should be exemplified by the leader themselves or the team surrounding them, says the general manager of a Turkish science park

According to the Head of Industrial Policy Department at an Emilia-Romagna-based SME association

There is a lot of creativity, they are companies that often have many ideas and are not ready to give up. There are entrepreneurs who are hungry for growth, but it is not certain that they will be able to grow. Let's say that they understand the value of the opportunity, they are also very used to risk

So, in summary, indeed, business owners have to want to grow, but they first have to know how to grow. Training the manager allows both mastery of knowledge and theories and the opportunity to meet with interpreters to articulate exceptional skills and fully engage the company in the long term.

CASE IN POINT

CEO and co founder at a France-based Rent Guarantor

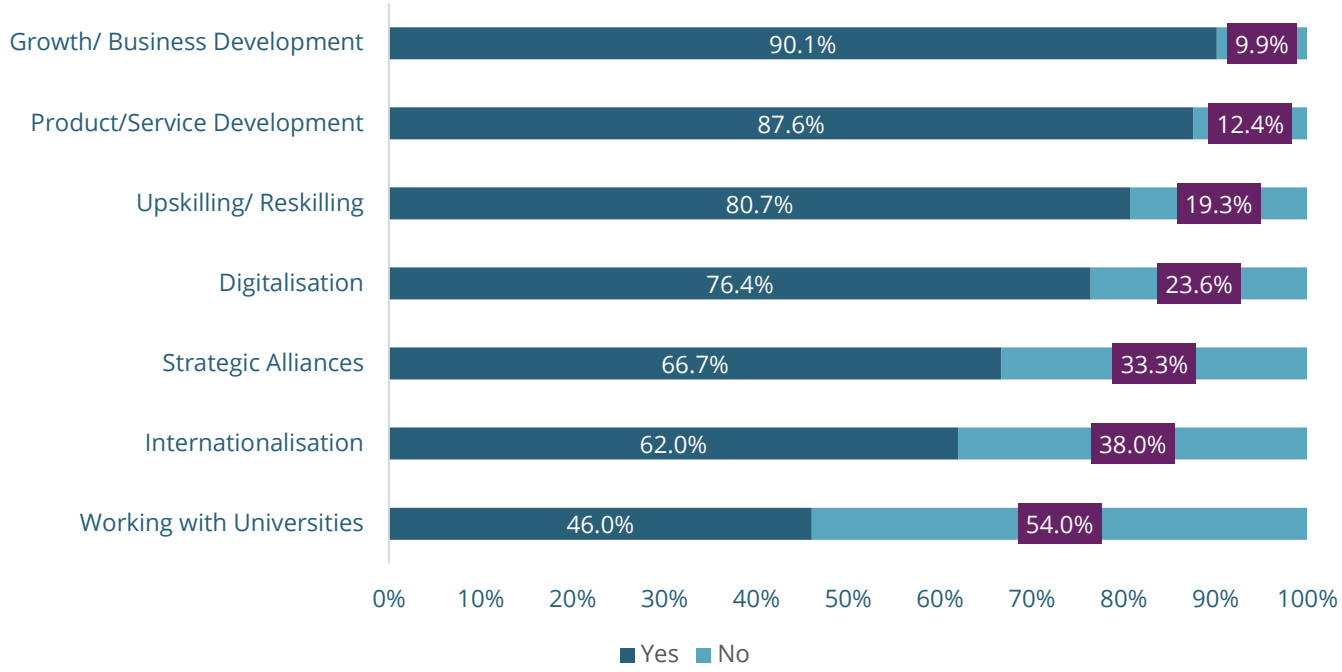
The company is an innovative insurance company. He graduated from the entrepreneurial master X – HEC (French business school), a few years ago. When interviewed, the founder explained that the HEC curriculum changed his life. He had originally gone through an engineering school in Lebanon where the business forum was a little disappointing compared to the global diversity in the Paris region, where he could live a campus life and have the full student experience of going out, travelling and being exposed to workplace experiences through internships. He did several internships, first with a founder who didn't raise any money for his company, then another in finance and audit at EY in La Défense, then a final one in Berlin in a start-up. The Berlin internship was at a start-up in business development, enriching him by strengthening his skills and inspiring him to project himself. He ended up working very closely with the founder, who was very versatile and managed 50 people at the age of 27. This person introduced him to people who gave him feedback. The entire HEC ecosystem was generally in this mode, operational and rewarding returns which few establishments can bring.

One interviewee, *a business owner and a program manager for a strategy program in a Dutch university,* gives the example of one of his clients, who currently has a 27 million euros turnover and who has planned to reach 30 million by 2027. To get there, the management team came up with several ideas, such as opening a new branch or increasing the number of customers they have within their current markets. This highlights the importance of starting with a strategy.

? What did the survey say? What kind of strategy

Companies have plans to develop external strategies for growth: business development (90.1%), product and services development (87.6%). They also have plans to boost their growth internally: digitalisation (76.5%), upskilling/reskilling (80.7%). Internationalisation and strategic alliances seem to be considered less (62% and 66.7.%) potentially % respectively, possibly because they require more time and specific competences.

It is interesting to note that only 46% of respondents have planned a strategy to work with HEIs in the next 12 months. This is a striking result as HEIs could be a reliable added value for product and services development, as well as for digitalisation and upskilling/reskilling, and shows a challenge for this project. of motivation and then the...c



Graphic 2 *Q32 - 'Do you have strategy for...' (as answered yes and no)*

In addition to the initial difficulty of growth and its immense responsibility, the role of the manager changes as the company grows and they are responsible for setting the conditions for this growth and monitoring it:

"Sometimes an owner-manager, as they start out, they have no choice but to take on responsibilities in several areas of an organization. Sometimes as the business grows, the structure or the capability required to support that growth may not be put in place. What is not always something obvious to achieve is making difficult decisions, for example stepping back at the right time, scaling into a COO role instead of remaining as the founding CEO when the company gets to a certain point – can stifle the growth as much as anything else. Sometimes managers struggle to make it because this has been their child, their baby, their business. And as it has grown, they now have new challenges to deal with. Some deal with it well, others don't."

A Regional Director of a SME support agency in the Irish government

leader must also be able to take a step back and reflect.

It is through recognizing where their own deficiencies are, and equally to fill those gaps with strong candidates that can help them to grow the business

A Regional Director of a SME support agency in the Irish government

Leaders that recognize their own weaknesses are those that get there faster. Which is not always an easy thing to do, when you're living and working in the business every day, it's a challenge to step back and reflect on what that is. Equally in many instances the adage of 'surround yourself with good people', is hugely relevant. My company employs a mentor to help management see the environment

CEO of a Finnish manufacturing company

A business owner and university program manager in the Netherlands confirms that:

For most companies, SME growth is business as usual, but they could benefit from a wingman, by pairing SMEs with a consultant for a few hours per week, or with an advisory board/external board member. It can all be beneficial but depends on the open-mindedness of the SME owner."

A business owner and university program manager in the Netherlands :

But growth management is a complex challenge, in particular finding a way to grow but also managing growth.

GROWTH: CHALLENGING A PREREQUISITE FOR SUCCESS

Growth seems to be the totem of strategic management. A simple word that brings together multiple realities, multiple issues, and multiple consequences. Still, growth is a concern for leaders in the context of public policy. The injunction is far from sufficient, and growth is not guaranteed. It depends on external and internal economic conditions since private enterprises operate in a competitive environment (Porter, 1980; 1990).

Different modes of growth may exist based on a product and market strategy, in that a company may or may not attempt to diversify. The company may also decide to grow its own assets (Return on Active) or through investments and acquisitions (Return on Investment) (Ansoff, 1957).

So, the size of the company has an impact. It has an impact on growth modalities, since smaller firms will achieve most of their growth through organic growth while large companies achieve growth through acquisitions. On the other hand, strong and rapid growth, especially for companies of a larger size, is made through acquisitions and not organically (McKelvie and Wiklund, 2010).

What did the survey say?
Barriers to Growth

Of the 13 items tested, it is interesting to note that the identified barriers are mainly external ones: access to funding (38.62%), tax regimes (37.32%), administrative burden (36.11%) and lack of high skilled managers (38.09%). Internal factors seem not to be barriers according to a company's perception: internal lack of innovation capabilities (not relevant as a barrier for 46.94%), internal lack of technological capacity (47.97%), and business owner willingness (not relevant for 61.49%).

These results are very interesting because they show that the responders may not be aware of the fact that the first opportunities for growth come from the resources of the company itself. The central place of the leader's will does not also seem to be identified. (To be followed through the question on growth levers...)

GROWTH MANAGEMENT

A value-based culture allows the company to act and perform in a way that promotes superior financial performance. Culture must be transmitted and based on a functional and structured business model. The culture provides a clear vision and objective, and the base will allow managers and employees to understand what is expected of them. However, this vision may remain blurred. The strategy, if not a prerequisite, is nevertheless a factor of success in that it allows managers to describe and plan how they will use and interconnect the available resources, to re-articulate a higher added value in connection with the market.
To meet the objective, it is necessary to establish a strategy, something that is not always the case in SMEs- General Director for a Brussels-based business and innovation centre. Most companies are micro and are focused on covering local market needs. For that reason, they may not have defined a proper growth strategy, says the general director of a Brussels based business and research centre. The main goals of some SMEs are simply to survive their day-to-day challenges - Operation Development Manager for an SME innovation organisation.

This refers to the notion of understanding what growth itself is, since it is not simply a question of increasing one's turnover, but rather articulating the means to achieve a clearly defined objective. According to the experience of a business advisor at an SME financing firm based in the Netherlands, “for SMEs, growth is understood as increased turnover, increased number of employees” and not a phase requiring coordination and preparation, a process that can be very painful.

If growth is well managed, it can become a motivating factor, says the CEO and co-founder at a France-based rent guarantor. “As new skills have been learned and shared,” even in the case of the CEO of a Finnish manufacturing company "The biggest growth has always come from acquisitions.”
The first element for growth is an extremely sharp knowledge, for example what the CEO and co-founder at a France-based rent guarantor and his partner practiced, meeting with 300 people before launching the company to understand their market. The operation development manager in an innovation organisation at an English university also places this market knowledge at the top of the prerequisites for growth:

> *"First, SMEs' understanding of their market.”*

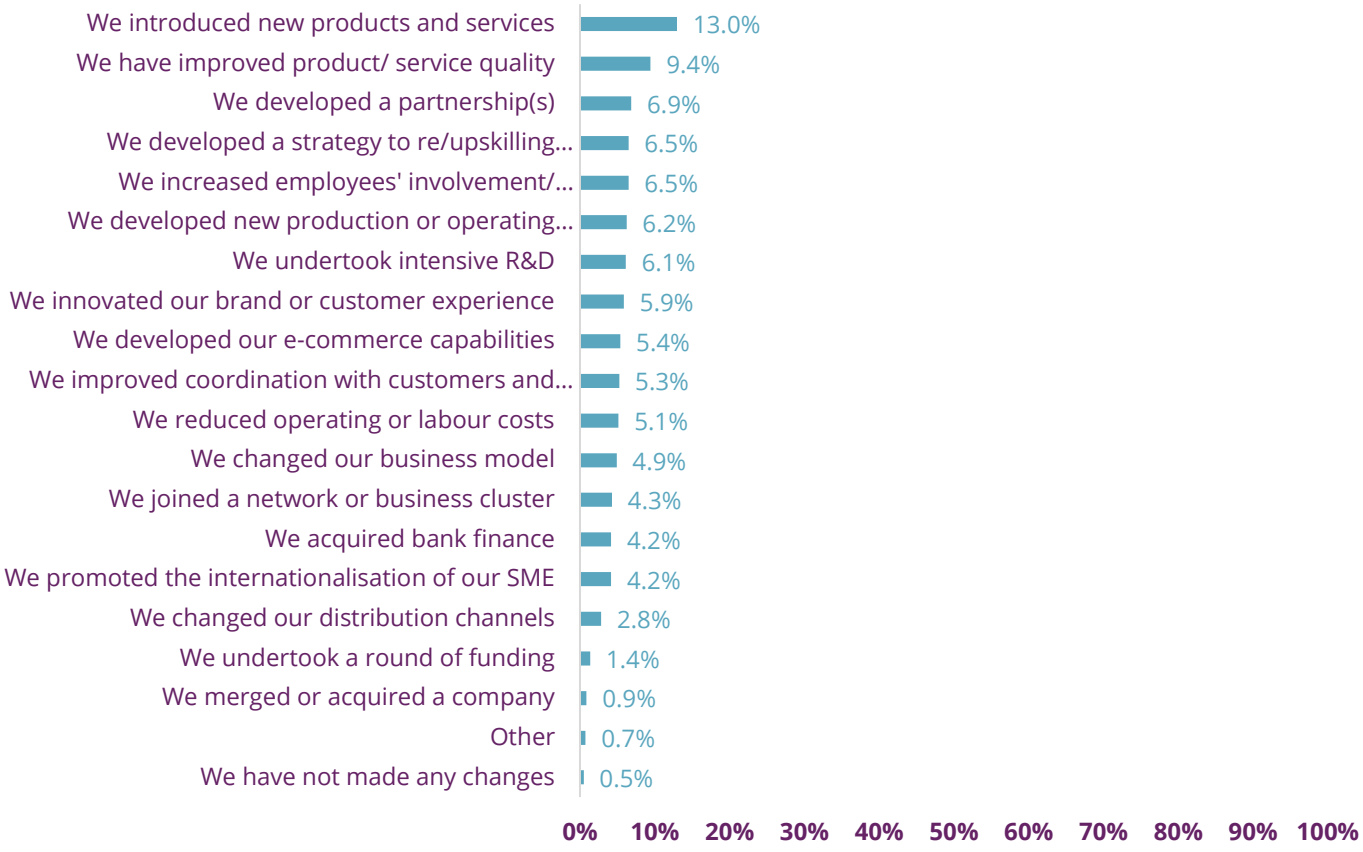
It is also necessary to know what the company is capable of to avoid going down a path that it might not be capable of. The managers should have a clear understanding of general capabilities and where their SME fits in the value chain, mentions the operation development manager at an innovation organisation in an English university.

SMEs often have to go through various strategies along the way, so a strategy must be adaptable and ready to change, not set in stone. In the beginning, the CEO of a Finnish manufacturing company specialising in conveyor’s company was a pioneer in information technology and hardware. Competitors have caught on, so the strategy has had to change. Modularity was prominent at one point then fell off, but it has come back a bit; not as a bulk sector, however.

What did the survey say?
Tactics for the Next 12 Months

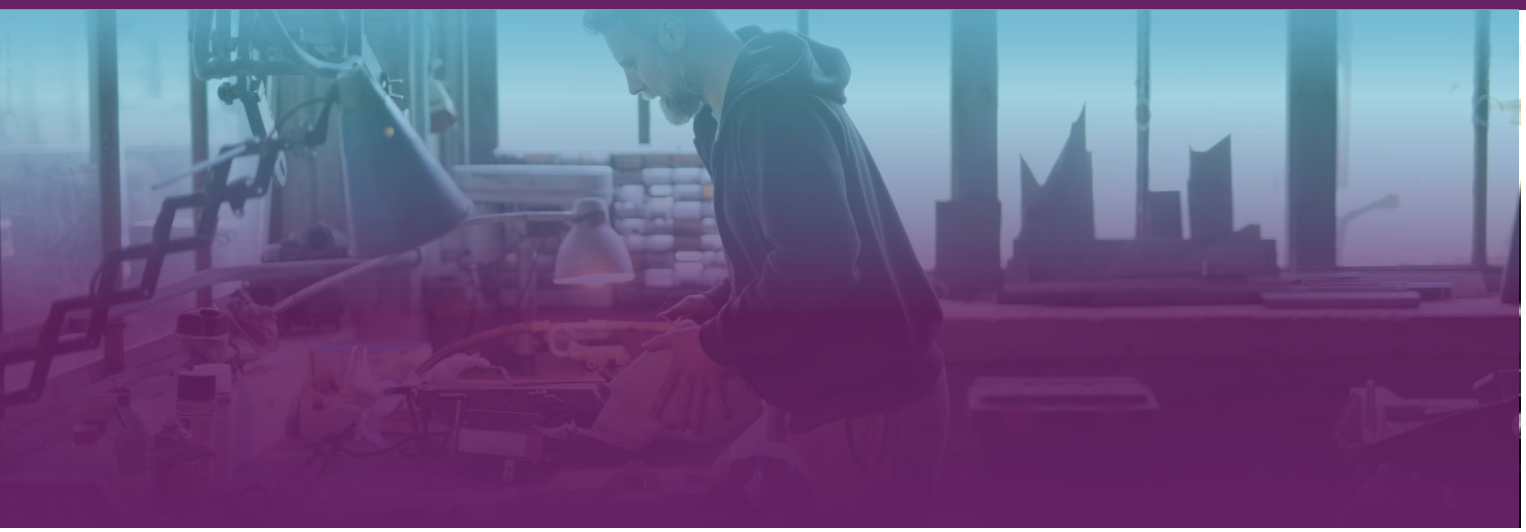
The results here are very mixed. Also, it is not possible to identify a tactic favoured mainly by companies for the next 12 months, perhaps due to COVID impacts, the timing of the survey or economic down fall. Perhaps it is possible to emphasize the fact that the product seems to be at the centre since the two most prominent items are the development of new products and services (12.97%) as well as the work around the quality of it (9.42%).

It is also possible to note that companies do not favour major changes leading to in-depth reorganizations of the company, such as a change in the business model (4.90%), a reorganization or a change of distribution network (2.82%), an acquisition (0.86%) or the search for funds (1.35%) for a strong development. This could be because either the company does not identify growth levers on these points in the short term, or because the skills to assume these more radical tactics are lacking within the company.



Graphic 4 *Q42 - 'In the last 12 months, which of the following tactics for growth have you implemented?' (percentage of respondents answering 'yes')*

Planning has a positive influence on the performance of mid-sized firms provided that not all competitors use it (Powell, 1992) and that it remains a differentiating factor in the market. The success factor here also plays on the speed with which an SME will be able to find and use external resources that it does not have internally (due to its small size and therefore its reduced finances) and the low diversification of its skills (Jarillo, 1989). Thus, SMEs may have an interest in betting on their internal capacity and inventiveness since the highest growth rates are achieved by companies that practice a strategy of gaining market share rather than return on investment (McDougall et al. 1984).



CASE IN POINT

Federica Facchini and Martina Malagoli – HR manager at HPE Coxa

HPE Coxa is the result of two distinct companies, HPE and Coxa, that merged in 2009. HPE was founded in 1998 as a consulting firm, offering services to other companies primarily in the automotive sector, but also motorsport, automation, and defence. Initially HPE carried out exclusively engineering studies. In 2009, it started to grow the desire to integrate the engineering studies carried out with the production phases, something that became reality with the merger. The company has been in constant development since the merger, both in numerical terms (therefore in terms of staff growth) and in terms of activities (in the sense that initially they only carried out design, simulation, and production activities). Since then, they have been putting in the effort to keep up with all the innovations present in the sector and to develop all the activities that are not present but that are going to be important to carry out the product development. Additionally, they created new departments to allow them to develop an engine from scratch, that is, starting from the blank sheet and reaching the production and even testing phase.

Nowadays, the two realities coexist within the same building while maintaining a distinct identity. HPE still remains linked to the entire engineering part, while Coxa maintains a focus on the production and construction part. HPE was born as a consulting and an engineering services organization always looking to cooperate with customers and offer services in the best possible way, and after the merger they were able to create their own identity and the ability to develop their own products.

Martina argues that they are focusing on two strategies: increasing their revenue and discontinuity through external acquisitions. They have not been able to clarify this last point considering that they are still in the negotiation stage.

Federica explains that those who work in a service area must have the sensitivity and ability to make fast changes. On the other hand, a change in the production has obviously different needs and timing. HPE Coxa must focus on the professionalisation of their resources. She believes that changing a production process that was built over many years is more challenging and riskier for a company in general. Service companies find it easier to deal with changes. These movements, according to Martina, are financed with internal and external resources.

Federica relates that even companies with an active growth attitude (using their own resources or acquiring other parallel sectors) can grow for a certain period but then reach a plateau of. According to her, the next few years will be characterised by huge changes for the industrial world. The pandemic has showed that many things are or will necessarily have to change. Federica points out that climate change and the environmental emergency is one of the main challenges for the next several years. She argues that resources are obviously scarce, the environment is suffering, and everybody is now realizing it in all parts of the world. Due to irrational growth in the economy, and therefore of industry, future generations will no longer be able to afford the way we are currently living. According to her, this will be the main challenge of all companies: that is, to be ready for rapid change. In this context, the leaner, faster and more capable to face and understand new challenges and adapt, the more companies will be able to stay in the market.

The newfound awareness in the 1990s of the importance of strategic planning allowed the introduction of greater rationality in managerial practices into small firms, where empiricism was previously the rule (Mintzberg, 1994). Planning allows the proper preparation of the capabilities of the structure to support a growth phase and recruitment for example. One of the most important elements for a growing SME is access to the right workforce to achieve growth and then support that growth. HR is a particularly specific pain point.

For the general director of a Brussels based business and research centre,

"The main challenges are related to the team generation, combining internal and external resources with different roles, skills and responsibilities."

Easier access to HR resources allows the company to grow faster. On the other hand, delays in recruitment will reduce its expansion. The particularity of growth in the engineering sector is due to the predominant technical aspects of the activity. Having strong technical and technological capacity does not often correspond to having a good and efficient managerial vision, says the Head of the Industrial Policy Department at a SME association in Emilia-Romagna. They also note that the career path of business leaders is reborn from their very technical training. Very often they were trained very well to track customer needs but not a strategic vision. Knowing where to find people can be a real pain in engineering sectors as some parts of the sector are not well known or attractive, according to the CEO of a Finnish business accelerator

The CEO of a Brussels-based startup incubator confirms that for example:

"Manufacturing is not a desired sector, therefore there are rather few people applying and finding the correct people for frontline sales, marketing, and/or experienced experts in ICT (i.e. digitalisation) is difficult, leading companies to fill these positions from abroad

Meanwhile, during a growth phase, newcomers are essential, as is the retention of former employees. While the growth HR position is expensive, additional training and development is essential to maintaining the workforce as is upgrading it to keep the structure growing. For all employees, including managers, the lack of experienced management level employees to help identify growth patterns and strategies is an issue. Having experienced high-level workers means that growth can be more strategically managed and sustained. Access to top talent is mainly a cost issue. SMEs are competing in a market where larger companies have the resources to be able to pay higher salaries, according to the head of education and innovation policy at an Irish business lobby.

Among the essential factors for good growth management, the HR function is therefore extremely important in the retention of employees and their training, strong added value in the market, or the discovery of a niche market. If growth management is impacted by HR difficulties, these points could be dealt with through the notion of value through

"Corporate culture, a moral compass to navigate growth and pass it on to teams that don't just rely on the founders to maintain HR. A defined vision and mission of the company allows effective recruitment. When recruitment and management are effective and common."

(CEO and co-founder at a France-based rent guarantor).

The factors influencing growth that can be cited are numerous, according to the operation development manager in an innovation organisation at an English university. According to a trainer in digital transformation at an AI company based in Madrid Other conjunctural issues may rise during the growth phase like cash management based on cash flow. The Co-founder of a data usage firm based in Madrid mentions that the main challenge in all SMEs is the salary payment at the end of the month and is a strong factor affecting the product development

Mismanaging cash can be fatal to the company, because although in most cases there is a well-defined medium range strategy, daily cash flow is not considered sufficiently which may lead the company to rupture, says the cofounder of a Madrid-based digital transformation assistance firm.

A particularly important difficulty in the engineering sector is the high development costs. Service and product development for other companies' (B2B) approach is critical to support SME growth. In addition, cost analysis is critical to determine improvement processes as well as pricing strategies. According to the general director of a Brussels based business and research centre, a status quo confirmed by an innovation manager at a science and technology park in Almería:

> *"Economic barriers are the most relevant in the Innovation at the Science and Technology Park of Almeria, since they are related to the availability of capital to generate new lines of business or enter new markets. "*
>
> **Innovation manager at a science and technology park in Almería, Spain**

The explanatory factors of duration and strength of growth are multiple and not all documented. Because growth is a phase and not the result of a single decision

GROWTH, A TRANSFORMATIONAL PHASE THAT IS DIFFICULT TO IDENTIFY

Most studies assume that growth is linear. However, this is not the case. Even companies that are experiencing an extremely rapid growth phase go through phases of stability. The growth process is rather erratic, including phases of higher or lower pronounced growth, plateaus of stagnation and decline. Thus, the phases of growth are difficult to identify and sometimes depend on the emotional perception of leaders.

Be that as it may, it is interesting to make the distinction between problems that can be cyclical and hinder growth by slowing growth down and those that are related to the structuring of the growing company itself. SME growth is both economic and human, with both linked in the best of both worlds. A continuous growth pattern is doing more and better than before. Economic growth must be based on financial management by asking the questions "Can my economic growth alone drive my human growth, or do I have to invest?" and "am I doing better to make it sustainable?" according to the CEO and co-founder at a France-based rent guarantor.

The transformation linked to growth can be painful because when growing, SMEs suffer its impact at all levels: human resources, talent acquisition, board and intermediate management, access to finance and management team according to the co-founder of a data usage firm based in Madrid. Major transformations are generated by the need for better management of the economic resources, like debt capacity and appeasement, which is related to human resources (salaries and board structure), according to the cofounder of a Madrid-based digital transformation assistance firm. SME growth generates a global impact in the SMEs, requiring a higher quality service assurance, new relationships with clients, equipment, and human resources investments. In general, it represents an increase in the quality and technical requirements, according to the *general director of a Brussels based business and research centre*

The first ones to have to change and be the engine of change are the managers and business owners. They need to adapt to new ways and question their thinking, says a project manager at a Finnish university.

This is not that easy because of time limitations that SME owner/managers experience. They are restricted in terms of what can be achieved in relation to training and hiring when there is no time to engage with universities, according to the CIO of an Irish research and technology organisation.

Growth is time consuming, before, during and after the phase.

One of the main issues facing SMEs coming out of a period of growth, especially unplanned growth, is in access to capital, if the company tries to grow in a different way, i.e. not organically - a regional director for a business support agency in the Irish government. Companies need to be mindful of having the skill set in place to be able to continue beyond the growth period or understand what they need to bring in as an organization, whether it be middle or senior management, to be able to effectively manage that growth and have transformational change for the business.

Succeeding at internal reorganisation does not prevent problems. For those who have efficient internal processes and procedures in place, they usually experience more external problems such as a new market that they do not know how to approach or adapt to, says a business owner and a program manager for a strategy program in a Dutch university.

A regional director for a business support agency in the Irish government points out the impact of the transformation:

"A lot of the transformation seen by Enterprise Ireland has been from companies when they pass the 50-employee mark. After this point, it is a very different company with a very different structure from a HR perspective, management layers are needed, and different functions are brought in to manage the business."

Recruiting and increasing the number of employees as well as the arrival of new people can change the dynamic of a team. New structures and processes are needed, and the importance of leadership grows. The strength of manufacturing companies is that they already have structures in place, and process thinking makes it easier to deal with an impact, such as recruitment, says the CEO of a Finnish business accelerator.

The CEO of a Brussels-based start-up incubator says that mistakes can happen during recruitment meaning that recruitment needs to be coherent and structured. A company needs to recognise what skills and knowledge are needed at what stage and hire people or let them go.

The link between the risks that the manager is willing to take, and the level of growth is obvious for the general manager of a Turkish science park

"Market development and business expansion are directly proportional to the risk that the company's leader is prepared to take, and the number of SME managers willing to take risks in Turkey is limited."

Trying to sustain a phase of growth over time is difficult, such as trying to explain the growth dynamics. Sustainable growth is an issue, because against all odds, and even if it does not appear obvious at first glance, growth does not necessarily mean something positive. For growth to be positive, it must be properly controlled because growth is managed and it requires resources and capital; for example, cash flow must remain positive at all times according to the CEO of a Finnish manufacturing company.

Indeed, this phase can be linked to many factors: a change in the structure of the company, its transmission. In general, all factors profoundly change the business structure from its original form (McKelvie and Wiklund, 2010). In addition, the company's intentions, objectives, and missions can be changed by incorporating new members into its management team, as well as new desires and development axes during the financing rounds.

Thus, there is little point in trying to characterize and define precisely what growth is and what modes are involved in it because it is a varied and multifactorial process. Sometimes desirable, as in emerging technology-intensive industries (Toulouse and Bourdeau, 1994), strong growth is both more feasible and even a condition for survival. But for other companies, growth may also prove unsustainable in the long run due to the increased costs in terms of capital needed related to this growth, such as increased capacity or the arrival of new managers and HR resources. Thus, growth-related needs can make this growth impossible and in fact unsuitable (McKelvie and Wiklund,2010).

GROWTH, A DIFFICULT PLACE TO CROSS

Thus, growth, far from being an enchanted dream, is above all a difficult phase to pass, because it has consequences for the organization that supports it. What is certain is that growth is a plan and needs to be managed because it leads to many challenges.

According to an innovation manager at a science and technology park in Almería, Spain:

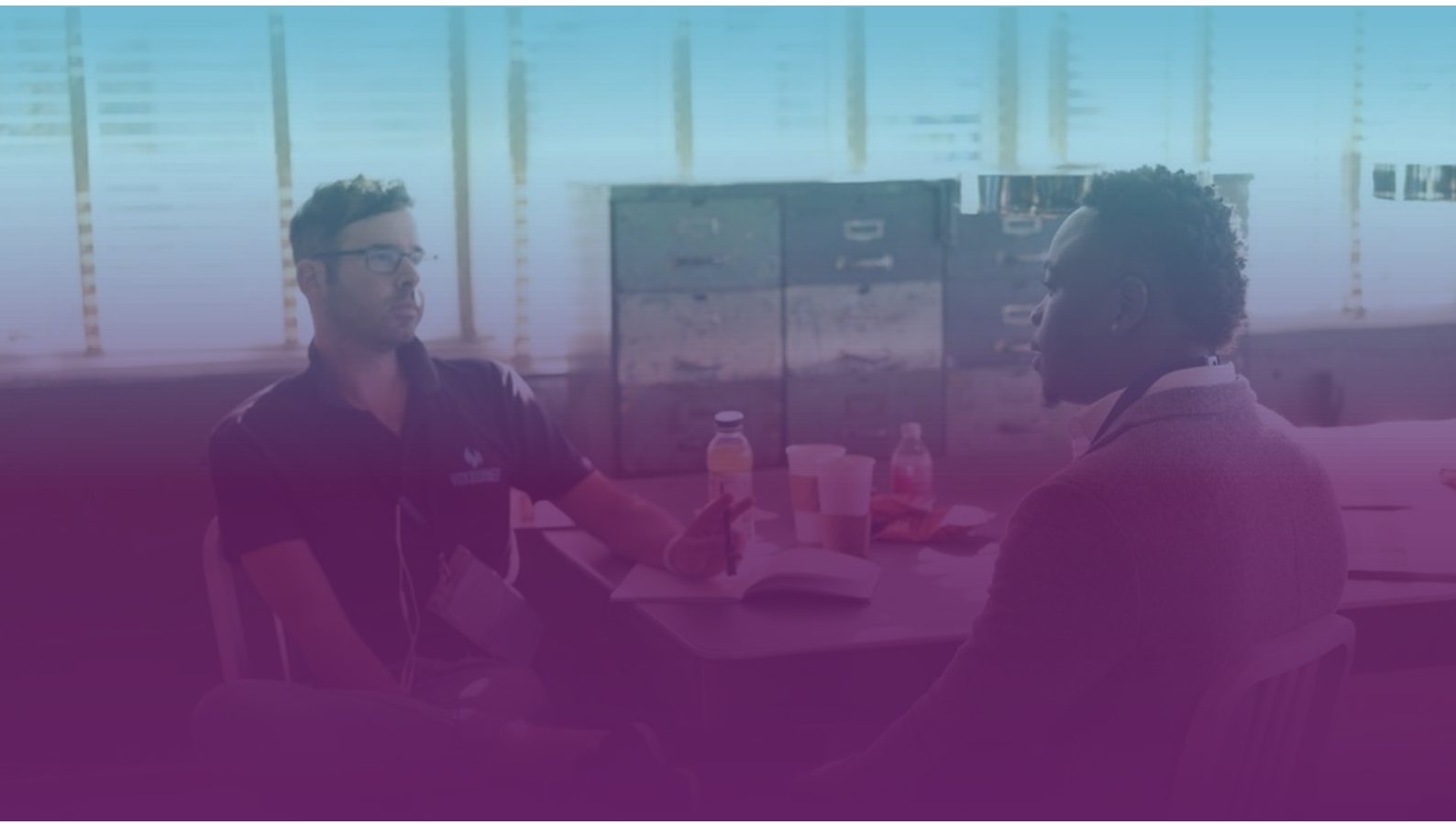
"During transformations of increased staffing, economic stability, and increased revenues, SMEs face obstacles including administrative difficulties, delegating activities, company restructuring, and the lack of professionalisation of CEOs."

Studies that tend to consider growth as a presupposition use notions of life cycles, and developmental stages.

The model called "the theory of the stages of business development" has been initiated by Chandler (1962) and developed by Scott (1973). Chandler and Scott focused on the large, diversified company. Their theory has been applied to small and medium-sized enterprises (Greiner, 1972; Maidique, 1980; Scott and Bruce, 1987).

An organization cannot grow by maintaining the same structure (Haire, 1959) and growth necessarily causes difficult transition phases (Greiner 1972; Chandler, 1962; Scott, 1973). Every new stage in the life of an organization and de facto reorganization corresponds to new skills and new funding in terms of growth, but also in terms of its slowdown (James, 1974). A slowdown may increase turnover, make staffing and overall coordination tough (Chandler, 1991; Rumelt, Schendel and Teece, 1991: 23).

Moreover, the importance of a structure ready to welcome and take advantage of growth can be noted. SMEs need scalable business models. The presence of innovative and scalable business models allows business growth, rather than technology itself, according to *The operation development manager in an innovation organisation at an English university*.



CASE IN POINT
Redmond McDonnell – CEO of Design Pro Automation


Redmond McDonnell

Redmond McDonnell is CEO of Design Pro Automation and an accountant by profession. He spent 12 years in Ernst & Young, mainly working in both audit and corporate finance roles. He also spent time as part of the audit and compliance role and working with the Entrepreneur of the Year program. His clients were a mix of large multinationals both in the tech and manufacturing space, as well as some indigenous SMEs that may have come into EY through the EoY program, with a diverse background of customers.

The Company: Design Pro is a systems integrator, bespoke machine builder, automators & robotic programmers, mainly working in the MedTech space in Ireland. Enquiries come in from MedTech companies, they may have a particular manufacturing process, they show Design Pro their products and describe how they are currently being made on-site and ask them to design a machine or a full production line from scratch that would automate that process. Design Pro has a full design team, a full automation team for the assembly, and build team. They also install all their lines on customer sites in order to do low-volume, high-value projects.

In 2021 they expect a turnover of approximately 6 million euros. 80% will be made up of six to seven large projects with the remaining 20% made up of 100 to 150, small, bespoke tooling or jigs and fixtures. That is what is meant by low volume high value. Redmond McDonnell clearly identified the challenges for growth.

KEY CUSTOMER CONCENTRATION RISK

The biggest risk was key customer concentration risk, which was one way identified back in 2017. 50% of the company's turnover could have been on one key customer, so that was a major risk. They made a strategic decision to improve their marketing to prospective customers in case a key customer for whatever reason tailed off, so that they would not be in jeopardy as a company. Subsequently, the capital expenditure (capex) cycle of that customer did tail off and it only really came back this year (2021). There was a lull in the company activities during 2018 and the first half of 2019 but the work that they identified earlier helped Design Pro cope with that. They are in a positive space now because of that decision.

EMPLOYEE RETENTION

Employee retention is always a challenge because the company has been built on a lot of key skill sets and knowledge in the company. It is of the utmost importance to ensure they have employees engaged in the company and they understand where it's going and where the company focus is, to retain their talent. This is because they need to grow their teams by placing people as 'buddies' of the initial employees so they can learn from them, a partner system. That's key because even though they build machines, and they have a product, those machines are built by the knowledge of the individuals, and it's 'a bunch of engineers who are coming up with concepts and developing unique systems.'

CAPITAL INVESTMENT: EQUIPMENT, FLOORSPACE & DIGITISATION

Redmond confirmed that this industry sector is highly capital intensive, and there's a need to constantly invest in new machines and upgrading. Design Pro invest in CNC machines; in addition, there's a need for more floor space. Also, Redmond states that there is a need to invest significantly and continually in digitisation.

In one example of a capital-intensive project, the company is currently planning a project to build a VR experience room to showcase what they can do with their VR software, which can be used as a design sign-off tool. The company is constantly adding new floor space, e.g., putting in a mezzanine floor. Other capital-intensive items include buying demo robots, buying demo pieces of equipment, upgrading tooling facilities, or upgrading the building. Redmond states they spend six figure sums every year in terms of capex projects to stay relevant and at the forefront of what they do.

Such investments 'always need to be planned well in advance and understood, and we need to be making decent profitability in our jobs to be able to support that.'

ACCESS TO CAPITAL

Access to capital is starting to be a challenge to growth because up until now it's been quite organic growth and the company doesn't have debt. To expedite their growth, Redmond is seeking either a partner company or a small acquisition to help grow and supplement the team, as well as increase the turnover based on whatever that company may do. Access to capital for those types of acquisitions is important now, but only in the last two years

According to *the operation development manager in an innovation organisation at an English university*, this ability to absorb growth is based on "flexibility within the supply chain. Some SMEs are very flexible and have a lot of control and autonomy within the supply chain and it is easier for them to innovate. Others occupy a more rigid position within the value chain, which limits their ability to innovate."

Growth is context dependent. It is much easier to realize growth for a software company than for a construction or civil engineering company operating in a location that only has the market for three bridges a year. Growth depends on the market the company is active in, and the scale and the size of the company according to*a business owner and a program manager for a strategy program in a Dutch university.* The image of the company is also important, including its leader's self-perception of the company in the world. This is also connected to the leadership of a company. For t*he operation development manager in an innovation organisation at an English university,* this brings us back to the notion, once again, of the structure of the company itself.

The CEO and co-founder at a France-based rent guarantor highlights a triptych to watch in the **good practices of growth management**:

01

STRESS MANAGEMENT

02

TEAM MANAGEMENT

03

MAINTAINING A GOOD RELATIONSHIP WITH ASSOCIATES

The management of growth is more necessary because according to a project manager at a Finnish university:

"Markets and business can evaporate from under SMEs within months instead of years. Nowadays, more transactions happen in one quarter than previously happened in one year, a pace which is too fast for most businesses."

"The professionalisation of business leaders is even more necessary because the rapidly changing market has an impact on product cycles, which are becoming shorter and require more specialisation, making the professionalisation of staff a challenge, so much so that in some cases it requires a large investment"

Business development and investment promotion director at a technology park in Andalusia - Spain

The importance of the leader or manager is pointed out as essential in the growth process, as described by the managing director of an urban planning business cluster in Spain, regardless of the growth model envisaged or the desired level of growth for the company. Growth depends on the business model the entrepreneur has in mind. For some, the business is their livelihood and as such, the practice is not necessarily growth oriented. For others it can be understood organically without an initial objective, betting on the process, often without a set goal, which limits the risk.

This theory of stages of development has one limitation: it presupposes that all companies go through the same stages, including phases of growth. However, this is a presupposition that does not consider the fact that most companies do not grow at all. Growth must therefore be seen as a transformational process.

MULTIFACTORIAL PROCESS

Managing growth is a challenge

01 **Growth can kill a business**

02 **Growth is a specific life phase of a company that generates special needs, a specific strategy**

03 **Growth is an exercise requiring special involvement of the company's leaders and has in fact, an impact on them** (McKelvie and Wiklund, 2010)

The growth of a company is therefore not only determined by economic factors, but also by human parameters relating to the manager as well as to its main partners (Davidsson, 1989; McCarthy Schoorman and Cooper, 1991, Kolvereid, 1992).

The literature on stages of development attests to the statistical frequency of an event that affects SMEs that have experienced significant growth since the early years of their activity, the "leadership crisis" (Churchill, Neil and Lewis, 1983; Hambrick, Donald and Crozier, 1985; Clifford and Cavenaugh, 1985). For reasons of differences in competence or how to lead when a company reaches a certain stage, there is a drop in performance that can result in the replacement of the founder-entrepreneur by a trade manager.

What did the survey say?
Facilitators for Growth

Of the 8 options offered in the survey (access to finance, tax incentive policies, policies oriented to SME Growth, flexible administrative structure, access to high skills, human resources, positive market conditions, innovation capabilities and the ability to use technology), the 5 most important items identified by companies to facilitate growth are ability to use technology (35.4%), policies oriented to SME growth (36%), access to funding (37.9% of respondents), access to high skilled human resources (40.5%) and tax incentive policies (41.2%)). The survey may help to conclude that the facilitators to growth are wide and based on public policies, but also on the regional capabilities to attract high skilled employees and the innovation and technological culture developed within the ecosystem.

Since growth is neither eternal nor an end, we would propose to try the idea of a "maturity model", the different states of development that a company can know such as ignorance, the non-identification of the problem at the origin of the problem, the awareness of the problem, the passive or active acquisition of knowledge about potential solutions and the implementation of solutions.

AREA	CONTACT	CONTRIBUTION
Business Environment	Co-founder of a data usage firm based in Madrid, the general director of a Brussels based business and research centre, the CEO of a Finnish business accelerator, the CIO of an Irish research and technology organisation, Head of Industrial Policy Department at an Emilia-Romagna-based SME association	Analysis and assessment of the entry and exit barriers as well as the current and future demands from the client side. Identification of the right target market. Focusing on listening to customer needs instead of working solely on product development
Human Resources	Managing director of an urban planning business cluster in Spain	In the case of Smart City Cluster, challenges to growth include finding sufficiently trained staff, compliance with regulations and administrative burden. This lack of simplicity in administrative bureaucracy is an obstacle to work, in some cases costly and unnecessary, which compromises the profitability of companies.
	CIO of an Irish research and technology organisation	Availability of skilled workers and the need to train them when they enter an organisation
	Head of education and innovation policy at an Irish business lobby	Hiring of top talent comes with difficulties for smaller companies as they are competing with larger multinationals for whom financing the hiring process isn't as large an issue
Relationships with larger companies	Head of Industrial Policy Department at an Emilia-Romagna-based SME association and L Gonzales	The multinational has many other advantages, including the brand, but they have also been supported by small businesses where they found very advanced realities

AREA	CONTACT	CONTRIBUTION
Networking	Head of Industrial Policy Department at an Emilia-Romagna-based SME association and the CEO of a Finnish business accelerator	The value of these networks is precisely to put these companies in contact with realities other than their own. Attempting new projects that may not go on, but it is a circuit that never stops. That is, companies that do not just stay doing what they have always done and realize that there are accessible and perhaps important opportunities.
Executive Management/ Leadership	General manager of a Turkish science park, A trainer in digital transformation at an AI company based in Madrid, the head of education and innovation policy at an Irish business lobby, and the CEO and co-founder at a France-based rent guarantor	Board management skills: marketing, sales, management. The management of the growth strategy is almost an art in itself and requires hindsight and reflection. The prerequisites of keeping a company growing include common OKRs and corporate culture. Common OKRs, easily identifiable to understand where you want to go over a year
Agility	The co-founder of a Madrid-based digital transformation assistance firm	There are many diverse factors impacting successful growth: Agility, horizontal company structure, project passion, team support and training and technology investment.
Innovation	An SME consultant, the general director of a Brussels based business and research centre & the CEO of a Finnish business accelerator	The integration of innovative elements (both at technical and managerial levels)"
Internal analysis and comprehension of the company's capabilities	CEO of a Finnish business accelerator & the CEO of a Brussels-based start-up incubator	In-house knowledge of the company's growth capabilities. A certain degree of transparency, particularly regarding bottlenecks, enables receiving feedback and assistance. The ability to tolerate change, learn new skills, learn from old habits. Scale the business. For SMEs to make the change, even if there is a leader who is open to change, the company must be economically free at some point and have a structure that can bear this risk
Structure and Strategy	General manager of a Turkish science park & Global development manager based in Turkey at a multinational clothing manufacturing firm	For SMEs to make the change, even if there is a leader who is open to change, the company must be economically free at some point and have a structure that can bear this risk. Establishment of a sustainable strategy and business model. Employees of SMEs that have grown successfully have better technical knowledge, and they make long-term plans while making strategic decisions.

Table 4 *Good practices according to the interviewees (summarised points)*

GO INTERNATIONAL

Internationalisation has been defined as the process of going beyond domestic operation and operating internationally (Bose, 2016) and it is considered an essential factor to consider to promote small and medium enterprise (SME) success. As everything globalises, the traditional idea of international operation solely applicable for larger corporations is no longer valid. Smaller firms worldwide have driven attention to the increasing importance of internationalisation for SMEs.

Going international confers strategical advantages to the SMEs, which can achieve:

- Higher competitiveness, which reverts to better results in its natural market, in a very direct way and with short-term effect.
- Better knowledge of the international offer, which means a better competitive defence of the business and a more appropriate strategic approach.
- Use of the company's surplus capacity.
- Meeting of new potential customers.

According to Steinhäuser et al. (2020) and Laufs and Schwens (2014), SMEs are different from large firms regarding internationalisation and have characteristics that may influence their decision to enter international markets. Some of these characteristics concern their structural, management and property constraints, in addition to those related to financial and human resources (Johanson and Vahlne 2003). Other factors involve their behavioural strengths (Paul et al. 2017).

SMEs focused on engineering and ICT services have some characteristics that hinder the success of internationalisation and imply an additional difficulty to compete in international markets (Erramilli & Rao, 1990), services are intangible and perishable, there is a simultaneity between production and consumption and "a priori" trust of the consumer is required.

Many studies (Krull, Smith and Ge, 2012; Ooi and Richardson, 2019; Coviello and Martin, 1999) use internationalisation theories to show the particularities of the process of internationalisation of SMEs focused on engineering consultancy. In this case, the internalisation starts from the initial motivation to go abroad, going through the selection of markets, the forms of entry into them and the subsequent consolidation in the market. One of the key challenges is the SMEs' aversion to operating globally. In the UK, some companies want to grow their agenda, however, these same companies seem to be averse to exporting their business models and growing globally. There are still a surprising number of companies that do not export or export very little according to the operation development manager in an innovation organisation at an English university.

Coviello and Martin (1999) conclude that some intrinsic organisational characteristics of engineering consultancy companies (e.g., the relevance of highly qualified staff, the high degree of involvement of the customer and the nature of project-based business) are the keystones to understanding the internationalisation process of these companies.

According to an innovation manager at a science and technology park in Almería and a Business development and investment promotion director at a technology park in Andalusia, Spain:

"Companies in the Innovation at the Science and Technology Park of Almeria grow because of the processes of internationalisation, innovation and technification of their processes. In the case of the Technology Park of Andalucía, the most sought-after and effective growth strategy among its SMEs is internationalisation."

Other characteristics have also been identified, such as the high uncertainty in the workflow, and the dependence on the growth of the sectors that the engineering companies serve. There is a considerable gap between export know-how and export need. Caused by the fact that in Finland, large flagship companies use engineering SMEs as their subcontractors. Consequently, these SMEs had not had to think about international growth because the flagship company is a reliable partner that provides a safe way to grow. The CEO of a Finnish business accelerator says that growth opportunities are industry specific, however.

On the other hand, it should be considered that engineering consultancy companies have fewer barriers to transferring technical knowledge to other countries than other services companies that are highly affected by the laws of the country (e.g., legal and auditing firms).

It is also well known that governments at a national, regional, and local level and public policies play an essential role in the way SMEs go abroad since they are critical to providing the right environment and incentives. However, the role of the government should be facilitative, not imposing, and public financial support should never be more than 50% (Wilson, 2006) since SMEs which become overly dependent upon public support will not be sustainable. In this context, (Wilson, 2006) also provides a wide range of policy approaches that can be adopted to promote SMEs to go international, most of them from the economic framework and other action fields.

These policies options are: Provide financial incentives and assistance, cut the administrative burden of cross border activities, encourage trade and investment, reinforce the legal framework, create an openness to internationalisation, make information about international trade and business readily available, promote the provision of targeted and quality business support services, reform education in order to prepare SME to access foreign markets or building of networks both cross-sector and cross-border.

Resulting from a literature review, the following subsections explore the SMEs' main barriers that jeopardise the internationalisation process as well as best practices to promote going international

LIMITATIONS FOR SMEs TO GO INTERNATIONAL

The increase in global competition, the drop of barriers to international trade and the improvement in communications and information networks has led SMEs to go international. Still, small and medium-sized companies approaching international markets without being aware of the obstacles and without preparation can seriously damage a company. For the SME, adequately facing internationalisation implies an international strategy oriented to handle the challenges and difficulties involved in the company's consolidation. In this sense, and based on previous studies, the OECD (2009) provides an in-depth understanding of SME internationalisation barriers. Several firm-level surveys investigating barriers to SME internationalisation were undertaken by private individuals and public organisations in OECD, APEC, and other economies over the world.

Findings regarding the top-ranked barriers to the internationalisation of SMEs are listed below: :

01 **Shortage of working capital to finance exports.** Limitations in finance and related physical resources are highlighted as a leading barrier to the internationalisation of SMEs.

02 **Limited information to locate/analyse markets.** Inadequate knowledge of the overseas market also emerged as a top barrier suggesting that information gaps remain a critical challenge to SMEs even in the current era of extensive information availability.

03 **Inability to contact potential overseas customers.** The difficulty of locating/obtaining adequate representation in target export markets, the problem of gaining access to a suitable distribution channel in international markets and finding an appropriate foreign market partner are three key impediments to the internationalisation of the SMEs.

04 **Lack of managerial time, skills, and knowledge.** Managerial risk perceptions and lack of knowledge about international markets were significant reasons for not engaging in international trade. The importance of skilled human resources in all areas of economic activity, including market innovation, was also widely acknowledged. Engineering companies often lack international export skills according to the CEO of a Finnish business accelerator.

The OECD survey also concludes that these findings on the importance of firm-specific resource barriers appears to have validity across sectors – from traditional manufacturers to high-technology sectors such as software design. Despite this, the OECD report cites Ojala and Tyrvainen (2007) to highlight that software companies face industry-specific internationalisation barriers:

> *"Research among SME software exporters concluded that some of the entry barriers observed appeared to differ from the findings of earlier investigations, which have mainly involved large manufacturing firms. The sector-specific barriers highlighted relate essentially to the intensive information flow and customisation needs of software products and the localisation needs and requirements of international software markets".*

There are other surveys both from the European Union and from member states (European Union, 2015; Spanish Ministry of Industry, Commerce and Tourism, 2019) that have obtained similar results to the OECD survey. They report that small enterprises have not acquired the needed digital skills to deal with e-commerce and other valuable instruments for internationalisation, so they are not sufficiently exploiting the potential of cross-border sales over the internet. In addition, small companies have difficulties adding to the workforce a management team with a high level of training in foreign markets and retaining the highly qualified people who know how to correctly design the internationalisation strategy of the company. A study carried out by the European Union (European Union, 2015) remarks the smaller the company, the more critical this barrier becomes. Regarding external barriers, SMEs find that internationalisation has a high cost and small companies have more difficulties accessing external sources of financing, not only because it can be costly (in terms of endorsements, guarantees, access to information, etc.) but also because large companies have greater access to more diversified sources of financing. Likewise, among the external obstacles encountered by SMEs, the following should be noted: lack of aid and inadequate public support, bureaucratic difficulties, lack of information on markets foreign markets, facing trade barriers (regulatory framework in third markets, customs costs, etc.) and the greater difficulty in adapting to cultural differences, the most of them mentioned in both national and transnational reports.

COURSES OF ACTION AND BEST PRACTICES

National and transnational institutions and agencies make financial instruments available according to the needs of each company to promote SMEs going international. Surveys reported in the previous section also provide recommendations to help and accompany SMEs in their internationalisation process, offering better information on foreign markets and business opportunities, as well as specialised human capital training activities to address these markets.

These are some of the courses of action suggested (European Union, 2015; Spanish Ministry of Industry, Commerce and Tourism, 2019; OECD, 2009):

01 **Increase information about available** resources and services to promote going international. Major awareness campaigns are important. Companies must be made aware of the benefits of internationalisation and be provided with more and easier access to public support.

02 **Promote comprehensive support for the company** in its internationalisation process. It should be paid attention to misconceptions about barriers. The type of support offered might need to be adapted according to the stage of international development of the firm.

03 **Promote better diagnoses of SME needs** in terms of internationalisation and support programs to promote the regularity of exports. In this sense, efficiency could be gained by organising the collection and analysis of information on market developments and the legal and institutional environment in foreign markets at the EU level, allowing local agencies to focus on being an efficient interface with their national business community.

04 **Adapt the instruments for supporting** the financing of internationalisation operations of SMEs and strengthen their dissemination. Governments must improve the access of micro and small SMEs to existing public financial support mechanisms and relevant information sources. This can be achieved by enhancing the national contact points with the EU to make SMEs aware of lines of financing for international cooperation projects (Eureka, Eurostars, Era-nets, etc.).

05 **Promote foreign investment**, aiming the instruments for internationalisation business not only at exporters but also at importers.

Facilitate digitisation of SMEs as a dynamic element of its activity as an exporter. Policies must be developed to support greater use of the Internet by SMEs

WHAT SPECIFIC FINANCING PROBLEMS DO SMEs FACE IN GROWTH?

Small and medium sized enterprises (SMEs) are the main pillars of many economies, and they boost national productivity and competitive advantage. Moreover, there is an increasing recognition that SMEs have a significant effect on economic development, such as the majority of new jobs are generated by a small number of growing SMEs (Brown, Ross, & Lee, 2014). However, accessing external finance is a major burden for SMEs, slowing or even halting growth in some cases. Access to capital is a critical point highlighted by companies. Financing growth is expensive, say a project manager at a Finnish university and a business owner and a program manager for a strategy program in a Dutch university.

> **For a business development and investment promotion director at a technology park in Andalusia:**
>
> *"Lack of funding is the biggest challenge for the Technology Park of Andalucía. Funding options, mainly of a private nature, are very limited. Venture and bank capital are needed to continue growth."*

The accessibility of external financing for SMEs is an important research topic among academics and a major concern among policymakers around the world (Berger & Udell, 2006). Following the global financial crisis in 2008-2009, concerns about the accessibility of external financing for SMEs have grown (Brown et al., 2014), and the lack of external finance has been identified as a key reason for the world economy's slow recovery. Specifically, after the financial crisis of 2008, there has been a surge in interest in the topic (Fraser et al., 2015). According to Brown et al. (2014), this issue, however, is not new. Difficulties in obtaining finance was first stated in the MacMillan Report[15] of the Committee on Finance and Industry, published in 1931. The MacMillan Gap[7] is a concept that was created to define the difficulties that SMEs deal with when they are seeking to access funding. Since then, the notion that smaller businesses face significant capital problems has been severely embedded in public strategy (Hughes, 1997). Throughout the 1970s, small businesses began to gain popularity, and studies such as the Bolton report emphasized the awareness that SMEs had specific trouble acquiring external funding. More recently, the Rowlands Review published in 2009 approved that SMEs experience difficulties in achieving growth capital to support their growth and expansion. When competition, which limits growth, in the sector is strong, financial issues further hinder growth to some extent by changing the level of risk where progress can be made, explains The CEO of a Finnish manufacturing company.

It is generally acknowledged that there is an equity gap in the providing of small volumes of equity financing to SMEs. The equity gap is described as a collection of boundaries relating to the amount of equity finance required by viable and successful companies that are incapable of raising the capital they demand (BIS, 2012, p. 10). As a result, it is thought that smaller businesses face higher interest rates or more stringent security requirements than larger businesses (Storey, 1994; BIS, 2012), limiting their ability to expand (Carpenter and Peterson, 2002). According to Beck and Demirguc-Kunt (2006), due to the financial domination imposed on SMEs compared to larger businesses, finance constraints are assumed to play a significant role in harming the success of numerous domestic economies.

Another important financing problem SMEs face in growth is based on information asymmetry. Specifically, there is asymmetric information between suppliers and demanders of finance. According to Yoshino and Taghizadeh-Hesary (2016), large corporations list their stock-on-stock exchanges and issue securities on bond exchanges.

15 Small and medium-sized enterprises (SME) have a shortage of capitals during their development, which implies that capital provider would not provide to SMEs capitals fully meeting their requirement. And the Theory of Information Asymmetry of the financial market offers a systematic illustration of issues concerning Macmillan Gap. Macmillan Gap is virtually a sort of market malfunctions in the financial system in the form of "equity-capital financing gap" and "debt-capital financing gap".

As a result, capital market institutional information exchange schemes will make it easier to get access to a wide variety of data needed to assess a company's creditworthiness. Most SMEs, on the other hand, have no access to capital markets. Financial institutions can track borrowers in real time, but doing so is expensive for small-loan borrowers.

Accessing financing can be expensive, as the CEO of a Finnish manufacturing company notes:

"Finnish Finnvera financing is expensive and needs to be replaced by a cheaper and clearer solution."

As a result, the knowledge asymmetry issue is exacerbated by SMEs' lack of information infrastructure as well. Related to this problem, many banks tend to lend their money to large corporations rather than small businesses. The explanation for this is that large businesses show a lesser possibility of non-payment and have more transparent financial accounts (Yoshino and Taghizadeh-Hesary, 2016). SMEs, on the other hand, are riskier from the perspective of lenders because they lack straightforward accounting details. Interestingly, it's vital to emphasize that the financing limitations faced by SMEs are not homogenous among the cluster of organizations (Brown et al., 2014). According to studies, most SMEs can acquire the funding they need, but a large number of businesses may have difficulty obtaining funding, and this percentage may have risen after the recession (Vos et al., 2007; Cowling et al. 2012). Most research shows, however, that the smallest and youngest SMEs have the poorest expectations of credit access (Canton et al, 2013).

Growing SMEs, like other SMEs, have a greater need for and use of external sources of finance, with both debt and equity funding being significant. Even when loan and equity financing are abundant and legal processes are well-defined, it is generally acknowledged that SMEs have lesser access to institutional finance Small and medium-sized enterprises (SME) have a shortage of capitals during their development, which implies that capital provider would not provide to SMEs capitals fully meeting their requirement. And the Theory of Information Asymmetry of the financial market offers a systematic illustration of issues concerning Macmillan Gap. Macmillan Gap is virtually a sort of market malfunctions in the financial system in the form of "equity-capital financing gap" and "debt-capital financing gap".

According to Roper and Hart (2013), there have been four major theories proposed for this:

01 Lending to SMEs can entail greater risks than lending to larger, more developed businesses. Small businesses have higher mortality rates than larger businesses, reflecting the 'liability of newness,' and could be more vulnerable to market and economic shifts.

02 Large corporate borrowers may be favoured by banks and financial institutions due to institutional bias.

03 On the comparatively small loans required by smaller businesses, transaction costs are likely to be proportionally higher.

04 Accounting records, shares, or collateral can be unavailable or unable to be provided by SMEs seeking loans. This can result in informational asymmetry, either accidentally or deliberately.

Furthermore, there is mounting evidence that fast-developing SMEs are experiencing more numerous financing problems than the regular SMEs (Lee and Drever, 2014). Specifically, Brown et al. (2014) note that fast-developing business growth necessitates SMEs funding in new facilities, new products, processes, samples, human resources, all together necessitate supplementary funding compared to the regular SMEs. Credit constraints are also frequently mentioned in the literature as well (Berger and Udell, 2006). Credit constraints may occur in different ways. A weak capital market forces entrepreneurs to be dependent on self-financing or taking loans from friends and family members (Bartlett and Bukvic, 2001). Therefore, SMEs are forced to deal with high-cost short-term financing due to a shortage of capital and difficulty in accessing long-term credit. In addition, the high cost of bank credit, relatively high bank charges and fees, high collateral standards, and a lack of external equity and venture capital are all financial obstacles that SMEs face (Bartlett and Bukvic, 2001; Berger and Udell, 2006; Nizaeva and Coskun, 2018).

WHAT FINANCING GENERALLY EXISTS FOR SMEs TO GROW?

Lawless, McCann and O'Toole (2013) summarize the traditional financing sources for SME growth as follows; internal funds/retained earnings, equity (i.e., issue new shares), borrowing from private commercial banks, borrowing from foreign banks, borrowing from state-owned banks, loans from family/friends, money lenders or other informal sources (other than family/friends), trade credit from suppliers, trade credit from customers, leasing plans, the government incentives.

Finnish CEO of a manufacturing company:

"In Finland, good financial support, such as ELY. But that money must not promote sales or marketing, which should change. You must always have your own money first and only then do you get subsidies. In Finland, financial support from the state has been stopped, but elsewhere in Europe state support exists, this problem is accentuated by small companies. A basic good practice is very simple, you must be the right kind of people, you need to have the courage to make decisions, the company must have a good relationship with the financier and finally the most important thing is to have faith in the business.

According to the SME financing literature, banks are the main sources of finance (Beck et al., 2008; Lawles et al., 2013). However, after the financial crisis of 2008, bank lending to small and medium-sized businesses (SMEs) has changed drastically. That shouldn't come as a surprise because between 2008 and 2013, banks' lending capacity shrank due to increased risk aversion during a period of slowing economic growth (Fenwick et al., 2018). However, as banks withdraw from SME lending, strong online lending has made it more convenient for low-income companies and small young businesses to obtain credit without the help of the government (Fenwick et al., 2018). Recent innovations, such as supply chain finance (SCF), peer-to-peer lending, and crowdfunding, can help to fill funding gaps left by banks (BIS, 2012).

SCF is described by Pfohl and Gomm (2009) as "inter-company financing optimisation and integration of financing processes with consumers, suppliers, and service providers to maximize the value of all participating companies." According to Gomm (2010), the aim of SCF is to optimize funding across company boundaries to lower capital costs and increase cash flow. Online peer-to-peer lending, (P2P lending), is based on loaning funds directly to unrelated entities by using online platforms without the use of conventional funding agents like banks (Ge et al., 2017).

Owing to a lack of availability and behavioural obstacles of crowdfunding, a lack of financial experience, and access problems, only a small minority of small firms are using such sources of finance (Fraser et al., 2015). Crowdfunding, which includes gifting, incentive, loan, and equity models, is rapidly increasing from a low base, as those with small amounts to invest are attracted by ostensibly higher returns than those available from bank deposit savings (Fraser et al., 2015).

Crowdfunding is a form of raising capital in which start-ups may sell shares or equity in their business to a group of investors over the Internet, either directly or indirectly (Fenwick et al., 2018). Early-stage start-ups may use crowdfunding to collect "venture capital" from a broad community of people, bypassing the conventional investment method, which involves lengthy due diligence cycles and difficult negotiations about pre-money valuation and contractual terms (Fenwick et al., 2018).

WHAT POLICIES EXIST TO SUPPORT THE FINANCING OF GROWTH AND HOW DO THEY CONTRIBUTE?

Government can play a critical role in shaping the climate in which growing SMEs can thrive by providing sufficient business knowledge, promoting networks and capability growth, and ensuring the availability of suitable business finance, in collaboration with other stakeholders (Roper and Hart, 2013). It is not easy to create an enabling environment and successful support programs for long-term development, and while policy has evolved rapidly in recent years, the assessment evidence from current policy programs is still minimal. According to Roper and Hart (2013), the availability of business information and knowledge transfer between firms, as well as between firms and universities/research institutes, is at the heart of many support programs. As SMEs grow and expand, network connections and relationships with larger companies, both nationally and internationally, are increasingly relevant. Beyond the start-up process, managerial and marketing skills, as well as adequate funding and effective intellectual property rights security, are required to maintain innovation and development.

Many studies have been conducted over the years to understand what factors influence business development but attempts to conceptualise and statistically model SME growth have proven to be incomplete at best. According to Roper and Hart (2013), some studies have emphasised mainly the factors within the company, such as the entrepreneur's or owner's history, manager's and characteristics, the nature of the market, and the firm's strategies. On the other hand, some studies emphasized mainly the factors outside the company, such as regulatory context where SMEs operate. According to the latter, supporting policies and frameworks are the main determinants of SME growth.

Policy frameworks may also play an important role in promoting a net increase in the amount of finance available, especially after the recovery period of the 2008 global crisis (OECD, 2020). Table 5 summarizes main developments in SME funding strategy and outlines changes in terms of the forms of policies implemented to support debt and equity, target recipients, and related supervisory procedures and methods.

CHARACTERISTIC	AFTERMATH OF THE CRISIS	RECENT YEARS
Target recipients	General SME population	Subgroups of the SME population: innovative firms, start-ups, lagging regions, women
Support for debt financing	Significant increase in credit guarantee volumes Direct lending Credit mediation	More focus on the distribution and eligibility criteria of support measures Creation of SME banks
Support for equity financing	Equity tools were kept largely in place	Tax incentives Establishment of funds/funds of funds SME bank activities
Regulatory measures	Emphasis on financial stability Supply-side regulation (bank capital requirements)	Regulation of Fintech industry Emergence of regulatory sandboxes

Table 5 *Overview of the evolution in SME finance policies.*
(Source: OECD, Financing SMEs and Entrepreneurs 2020: An OECD Scoreboard)

The Head of Industrial Policy Department at an Emilia-Romagna-based SME association also cites the European programs, even if it is not easy, but there is evidence that even micro enterprises can access this support, and these are things that then lead to other opportunities which helps them find new networks. Specifically, officials began using a variety of methods to combat the recession's impact as early as 2008 (OECD, 2020).

The development and extension of existing credit guarantee schemes and direct loaning programs were among the main initiatives. Immediately post-crisis, these policy instruments gained in value, both in terms of the number of arrangements in service and the guaranteed volumes of arrangements already in place. Guaranteed coverage rates have also risen as well.

COVID 19 AND SME FINANCING

The coronavirus pandemic is one of the worst public health crises in recent memory, and it has also triggered a global economic crisis. Although the pandemic has an impact on both larger and smaller businesses, the impact on small and medium-sized businesses (SMEs) is more severe, due to the higher levels of vulnerability and weaker resilience associated with their size (Corredera-Catalán, di Pietro, & Trujillo-Ponce, 2021). Recent research shows that SMEs have been hurt harder by the crisis than larger companies (Chen, Igan, Pierri, & Presbitero, 2020). This effect may be seen most strongly in some industries, such as tourism, but it may also be felt by SMEs catering to local markets as well. Accordingly, the availability of SME funding has become more crucial, however governments and credit lenders have also been dealing with the shocks of the pandemic as well.

Seed financing for businesses has been hit the worst, with agreements falling by about 40% in the first quarter of 2020 compared to the same period in 2019(Brown, Rocha, & Cowling, 2020). Late-stage deals, on the other hand, have shown to be far more resilient. It's possible that later-stage agreements are less risky because the investor already knows the companies and has had the essential face-to-face connection. This indicates that the entrepreneurial endeavours most affected by the crisis are those that are still in the early stages of development and have the highest informational opacity (Brown et al., 2020). In terms of policy responses to support SME finances during the crisis, the overwhelming emphasis in the United Kingdom and other OECD economies has been support for debt finance in the form of loan guarantees and direct subsidised loans (OECD, 2020). However, there are still too many unknowns about the pandemic and its effects on various areas, specifically SME funding for our research. Thus, numerous questions arise; How are different financial entrepreneurial ecosystems influenced by crisis events? Do some financial ecosystems have greater immunity to absorb shocks and major disturbances, as some suggest than others?

In conclusion, financing is still a major issue for SMEs, especially after the 2008 global financial crises, and financing difficulties are even more severe for the growth stage of SMEs due to certain reasons such as liability of newness or informational asymmetry. To overcome these barriers, new types of financing resources and options have developed. In addition to the bank credit, which is the most dominant financial resource for SMEs, new types of financing methods such as P2P, crowdfunding and SCF are getting the attention of SMEs as well. However, they are still in the crawling stage. Lastly, policymaking plays an important role in the financing of SMEs, and it can be argued that the role of government is still significant in terms of shaping the financing opportunities of SMEs. Clusters could be of a great help and support to help SMEs regarding Growth.

SMEs WITHIN ECOSYSTEMS AND CLUSTERS

Innovation is the basis of the development of countries and companies. As the complexity of knowledge and technologies increases quickly, the ability to combine and develop new capabilities and knowledge to advance the innovation process becomes key for different players (Freeman and Soete, 2010). In this sense, the cooperation between actors and combination of competencies in an integrated system is considered the key part to encourage and improve the companies' capacity of innovating (Pisano, 1990, Chesbrough, 2003, Harrysin et al., 2008. Hagedoorn and Wang, 2010).

> *"There are many in terms of development and innovation, but they must be adjusted to the plan defined by the company.... It (cooperation) brings a lot according to the companies involved in it. SMEs must collaborate with as many partners as possible, when needed. They can provide technology, new service delivery and human talent."*
>
> **General director, Brussels-based business and research centre)**

The operation development manager in an innovation organisation at an English university suggested that the different types of collaboration can be between companies such as (1) R&D relationships, (2) Commercial relationships.

> **Turkish SME consultant Commercial relationships are an evident motivation to collaborate:**
>
> *"Organization of Joint Procurement (OSO) formed by SMEs, which aims to combine the demands of SMEs to be able to go to the market as a stronger buyer and realize purchasing with advantageous conditions."*

This first motivation can lead the company to reduce collaborations by being unimaginative about what it could bring. The SMEs used to be quite individualistic, they only collaborated with other SMEs and clusters when concrete synergies were identified. There was a lack of networking, getting in contact with other companies and consultants to share ideas and contact details according to the general director of a Brussels based business and research centre, and the general curiosity lacks to go looking for even more value.

> **This is confirmed by a business advisor at an SME financing firm based in the Netherlands:**
>
> *"SME leaders engage with each other when they see value in cooperation to increase profits and margins."*

Cooperation only happens when it serves a goal and when SMEs see the added value of getting external expertise according to a business owner and a program manager for a strategy program in a Dutch university.

The acceleration of technological change has been forcing companies to develop more dynamic and flexible structures over the years. In this scenario, companies identify their competency gaps and fill them as efficiently and quickly as possible. Most of the time, the path is found through interaction with other organizations that complement their competences (Hitt et al., 1999; Tidd et al., 2001).

These interactions, carried out in cooperative projects for innovation have been attracting great interest in recent decades. Since the end of the twentieth century, the rapid development of information and communication technologies has enhanced the globalisation phenomenon (Archibugi and Michie, 1997). Therefore, the process of full liberalisation and integration of world markets became irreversible (Chesnais 1996). However, it also interfered significantly in the design of organizations and of their processes, inducing them to adopt open architectures (Chesbrough, 2003).

In this scenario, partnerships are gaining strength, since they allow companies to focus on their core competencies and seek complementary resources from other institutions to accomplish their activities (Prahalad and Hamel, 1990; Mowery et al., 1996; Tidd et al., 2001). Faems et al. (2005) list three main reasons that lead companies to establish partnerships for innovation: accessing complementary assets; enticing the transfer of tacit and codified knowledge; reducing risk and costs inherent in the innovation process. In this context, the reason that pushes companies to engage into cooperative projects is the possibility of leveraging their resources and improving their skills and capabilities, which will help them to enhance their competitive advantages (Hitt et al., 2000).

Small and medium-sized companies are important players in a country's economy. However, in an increasingly globalized market, ensuring and improving their competitiveness has been an increasingly difficult challenge for SMEs, considering their natural limitations such as size, human resources, and capital (Perrone et al., 2010; Lin & Lind, 2016). In this context, the formation of partnerships becomes even more important for these companies in the search for competitiveness, as it allows the complementarity of skills and tools in the search for better insertion in the market, generation of innovation and increased competitiveness. Working integrated into a network supports SMEs to overcome their limitations, generate economies of scale and scope, and add complementary skills and knowledge, while maintaining the flexibility advantages that are characteristic of SMEs (Perrone et al., 2010).

It's a way of collaborating that isn't quite functional, says the Head of Industrial Policy Department at an Emilia-Romagna-based SME association. They also emphasise that Emilia-Romagna presents a particular environment to SMEs with international recognition. She declared that they cooperate frequently. When they meet at a working laboratory or university, it becomes a relationship that they carry on forever. In other words, when the spark turns on, they move forward. However, networks between companies are still struggling. They find it hard to use the formalised network tool, except on projects, even though they recognize the importance of the partnership concept. For the Head of Industrial Policy Department at an Emilia-Romagna-based SME association, networks worked poorly in that old way. The Head of Industrial Policy Department at an Emilia-Romagna-based SME association argues that other forms of collaboration work better. Considering the participation of clusters, for example, CNA is present to all clusters of Emilia-Romagna as "CNA Innovazione." Many companies have also joined these clusters as members by themselves. There, she explains that the relationship is of great value. Once they get to know university interlocutors, other companies, and innovation centres closely and can lead them to try one or two projects, other projects can be born from a small collaboration. The business ecosystem plays an important role in the growth of SMEs once it enhances knowledge and capabilities of sharing between the actors, allowing these companies to overcome their issues. A business ecosystem supports the co-development of companies around new innovation, once they work cooperatively to support the generation of products and to attend to customers' needs, facing their internal issues and lack of competences (Moore, 1993).

Optimal collaboration depends on how innovative a company is. Highly innovative SMEs tend to cooperate more nationally and internationally. SMEs with a lower innovation level tend to cooperate less, and if they do, they do it at the national/local level. When you are a low innovation company, your market and your suppliers are local, whereas when you are an innovative company working on innovative concepts, your collaborations will mostly be international, says the operation development manager in an innovation organisation at an English university. The prerequisite for any collaboration and "the easiest way to collaborate with other companies is having a common philosophy and working culture.” (Cofounder, Madrid-based digital transformation assistance firm.

Business ecosystem comprises different organizations that interact and cooperate with each other (Adner, 2006; Moore, 1993; Iansiti & Levien, 2004; Adner & Kapoor, 2010). In this context, the process of value creation within an ecosystem based on the cooperation network promoting the generation of added value to the stakeholders on company or inter-company level (Radziwon et al., 2017). If the commercial potential for the company is the first driver, the collaboration is a significant human asset and is perceived to be important not only from a business point of view, but also in terms of peer support and exchange of experiences, says the CEO of a Finnish business accelerator.

The CIO of an Irish research and technology organisation highlights the community of engineering clusters in Ireland and the comradery that exists between them. Clusters can have an impact, according to a regional director for a business support agency in the Irish government; key elements of the programmes run by Enterprise Ireland, which takes business leaders away from their own environment into one with their peers and allows them to step away from the business for a brief period. It eliminates distractions and allows them to network and collaborate with those in similar sectors. They can then build and maintain these networks after establishing that base of trust. It can be easier for smaller companies to engage with regional networks and clusters, as opposed to large nationwide clusters, allowing them to grow in confidence and then perhaps engage with a larger group.

The Head of education and innovation policy at an Irish business lobby. notices the importance of clusters to support growth, since in her experience being a leader of an SME can be a bit of a lonely existence sometimes- having that opportunity to have a peer-to-peer contact and network is vital, even if the engineering sector can be competitive which can be a barrier to engaging with one another in a formal or informal setting. The literature shows the importance of geographical proximity to foster and strengthen the development of new technologies by SMEs (Davenport, 2005; Doh & Kim, 2014; Hervas-Oliver et al. 2021). While some regions offer a lot, the possibilities for collaboration are always very dependent on the regional context of the company.

As the CEO of a Brussels-based startup incubator points out, who finds a great opportunity for collaboration:

"There are rather few. In Finnish context, companies are used to trying to find solutions on their own".

Clusters are getting closer to existence, but their value is not necessarily exploited according to the general manager of a Turkish science park:

"There is clustering but not the cooperation that clustering requires. Furthermore, in Turkish culture, the habit of collective work serves as the foundation for collaboration between SMEs."

The example given by the CIO of an Irish research and technology organisation also highlights the regional specificities:

"Emerald Aero cluster is one of the most prominent. Ireland is a small place where everyone knows each other and that had good and bad aspects. These relationships are beneficial, but within Ireland the next steps are not always taken or pursued."

That is, the regional institutional environment is an ally to enhance their innovation capacity, considering that they do not have internally all the resources they need to innovate by themselves (Trippl, 2011; Hervas-Oliver et al., 2021). Previous studies show that the concentration of firms from related industries and/or technologies increases the growth of these companies meaning that companies that are part of regional clusters have more probability of a better performance (Boschma & Iammarino, 2009; Speldekam et al., 2020; Doehne & Rost, 2021). According to Porter (1998), clusters are characterized by the connection between a group of local-based companies from a specific industry aiming to enhance the technology production and entrance on the market. This group contains players from different stages of the value chain (like suppliers, service providers, and competitors), and associated institutions (like universities, research institutes, policymakers, and financial system). SMEs engage in clusters to improve their innovation capability, complement their competences, and exchange knowledge (Speldekam et al., 2020).

SMEs' innovation process plays an important role in boosting regional development (Doh & Kim, 2014). The literature shows that SMEs tend to be more innovative on concentrated markets, highlighting the importance of regional clusters on the generation of new technologies by these firms (Wagner & Hansen, 2005; Doh & Kim, 2014). These companies, according to the Head of Industrial Policy Department at an Emilia-Romagna-based SME association, should be supported by the entire society. It is not that the small business is a defence for bias, but because it also has an enormous social function. She highlights that the numbers on the news when a SME closes have less impact than the big ones. However, seeing a progressive impoverishment of small businesses means jeopardizing the very security of society. The social role of an enterprise and its link with general society is important to take note of.

In this logic, support could come from multinationals according to a Regional Director for a business support agency in the Irish government:

"SMEs have been supported by work being done by homegrown multinationals who have looked at their supply chain and aimed to make it as reasonably local as possible, as well as supporting companies - once they meet the certification criteria and the quality and standards criteria that's required to be part of their supply chain. They (homegrown multinationals) have been very supportive of bringing those companies and growing with those companies as well."

These networks also allow the dissemination of good practices to pull all members towards success according to the Managing Director of an urban planning business cluster in Spain:

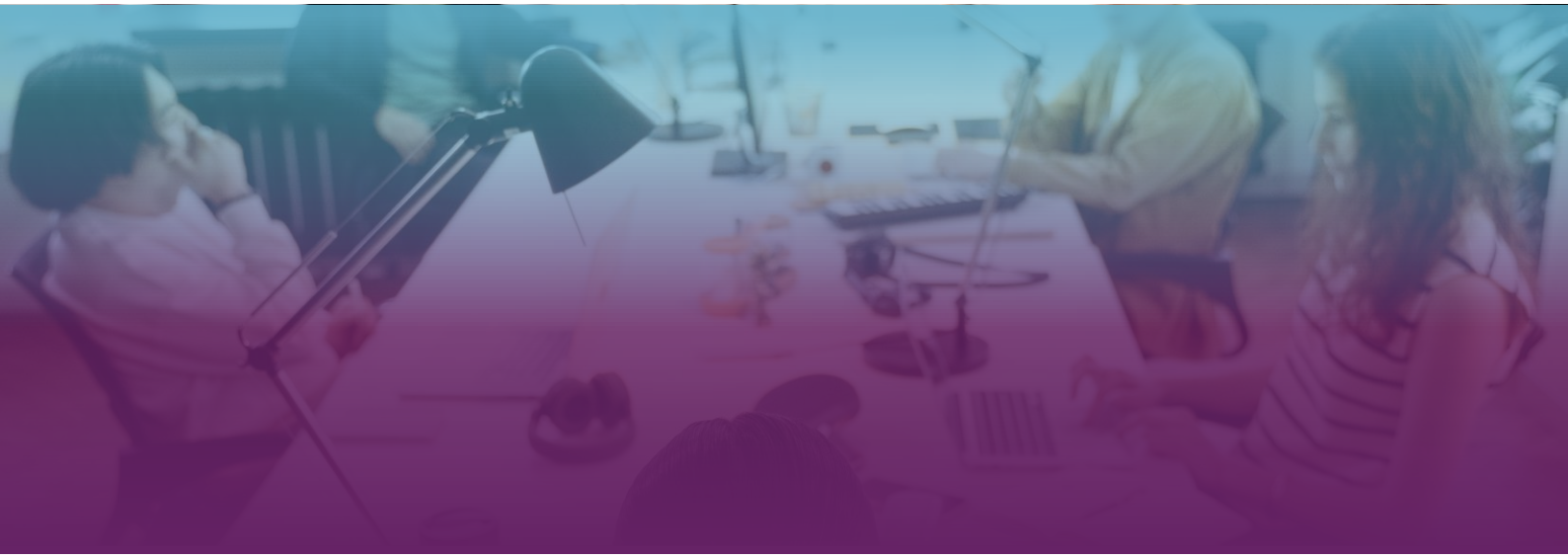
"In the case of Smart City Cluster, the main success factors among SMEs with positive growth are: i) the fact that they have found a solution to a problem efficiently; ii) the fact that they have found a way to tell what one does differently from others; iii) their superior commercial capability; iv) and the fact that they have an organisation that allows them to be cost-efficient to offer their services/products at a lower price."

In this context, although companies are the main agents in the innovation process, it is not possible to execute this process without the involvement of institutions that produce knowledge (Barber and Scherngell, 2013). It is possible to deduce that in General, SMEs can be supported to grow if they have a good ecosystem around them (Business development and investment promotion director at a technology park in Andalousia). Networks allow you to be surrounded by mentors; The accompaniment of successful entrepreneurs, or even those who have failed more than once, is of great relevance to transmit knowledge, from experience of the managing director of an urban planning business cluster in Spain. One a business advisor at an SME financing firm based in the Netherlands says that SMEs guidance for growth is very effective when it comes from other entrepreneurs as they are usually less receptive to advice from non-entrepreneurs.

The regional cluster approach reflects the interlacing between the different actors involved in the innovation process integrating different expertise and knowledge to overcome the current complexity of scientific knowledge, the continuous advancement of technological knowledge and complementing resources and capabilities. Nelson (2004) sustains that the technological advance results from the effort of several developers and highlights that it is a collective, cultural and evolutionary process that cannot be appreciated individually, but through the interaction of different actors with their different and particular competencies.

Unless what has been underlined by the literature above, these clusters are not necessarily physically located. They are hyper-connected platforms that bring people, various types of business and organizations together around interesting topics and themes. This helps everyone to be at the forefront of emerging institutions and trends, not only those that show a downward spiral, allowing everyone to see things from new perspectives. Coworking and co-creation platforms like Crazy Town are examples of hyper environments, where you experience the momentum around you and are at the forefront of picking up trends from others and sharing resources. Universities need to be more like this, says a Project Manager at a Finnish university.
Being open-minded and being open to other regions and countries is crucial, as the CIO of an Irish research and technology organisation points out. We need to educate owner/managers in the importance of chasing a customer even if that involves going outside Ireland and a need for training in relationship management across cultures in addition to educating owner-managers on the different income opportunities that are available to them from the likes of Enterprise Ireland.

Innovation is increasingly based on science, which makes research and development of new products more knowledge-intensive (Dosi, 1988), therefore taking into consideration the science-based institutions, like universities, that produce knowledge is extremely important.



Competition occurs on a global scale, with companies often restructuring their activities geographically, and benefiting both from the comparative advantages of each region and the level and competitiveness of each company (OECD, 1998). The increase of knowledge complexity encourages the generation of regional clusters to raise the innovative capacity of SMEs (Doh & Kim, 2014).

The cooperation with universities has several benefits, such as access to technology and knowledge, reputation and image enhancement, risk reduction, cost reduction, skills development, corporate values and culture enrichment, technology testing and development, new perspectives, recruitment and retention, access to qualified professionals and students (Bonaccorsi and Piccaluga, 1994; Kanter, 1999; Santoro and Chakrabarti, 2001; Nielsen and Sort, 2012: Kanama and Nishikawa, 2015; Scandura, 2016).

Therefore, universities are responsible for training human resources, producing new scientific knowledge, producing knowledge and technologies that could be applied by industry, developing inventions and prototypes, and contributing to the understanding of techniques used by companies (Santoro and Chakrabarti, 2001; Schartinger et al., 2002; Nelson, 2006; Bonaccorsi et al., 2014, Scandura, 2016). In fact, technological progress is increasingly dependent on the advancement of scientific knowledge and universities produce the scientific knowledge that supports the innovation activity carried out by firms (Klevorick et al., 1995, Cohen et al., 2002). Doh & Kim (2014) shows that the cooperation with universities in a regional cluster increases the probability of generating patents and other types of intellectual property (trademarks and new design registration).

University research frequently stimulates and increases the power of companies' R&D instead of replacing them (Rosenberg and Nelson, 2006). To do so, it needs to develop internal skills to absorb externally generated knowledge. In this sense, companies need to invest in internal knowledge production activities that help them to develop skills and competencies that will support their innovation process (Cohen & Levinthal 1989, Cohen & Levinthal 1990, Nelson 2006).

According to the CIO of an Irish research and technology organisation, cluster boundaries could be:

"Areas in which these clusters have fallen or failed to pull together are in trust or management as a whole. Steps have been taken forward in these areas, but not many clusters are identifying issues or areas where they can progress as individuals and coming together to make that happen as a group. And this inability to respond as a group for the cluster can impact need for a faster turnover of knowledge"

However, the regional benefit from local knowledge spill-overs are not results exclusively from geographical proximity, but also from the deliberate effort of the actors to cooperate pursuing the development of new technologies and problem solutions (Breschi & Lissoni, 2001; Bishop et al., 2011; Lucena-Piquero & Vicente, 2019). Lucena-Piquero & Vicente (2019) argues that the engagement of universities on cluster activities are one of the main points to these networks, especially to those working on the technology frontier.

TOPIC	RESPONDENT	EXPECTATION
Funding support Lucina	A trainer in digital transformation at an AI company based in Madrid, Co-founder of a data usage firm based in Madrid, the regional director for a business agency in the Irish government, the CIO of an Irish research and technology organisation, the head of education and innovation policy at an Irish business lobby, The CEO of an agricultural substrate company in France.	Growth can be stalled due to a lack of funding
	An innovation manager at a science and technology park in Almería, Spain	A clear example of this is the Next Generation Funds
Financial Competence Training	The general manager of a Turkish science park, Halefsart Sûmen, Head of Industrial Policy Department at an Emilia-Romagna-based SME association, The CEO of a Brussels-based startup incubator, a business advisor at a SME financing firm based in the Netherlands; Attila Dikbas, A trainer in digital transformation at an AI company based in Madrid, Co-founder of a data usage firm based in Madrid, the cofounder of a Madrid-based digital transformation assistance firm, the general director of a Brussels based business and research centre, the head of education and innovation policy at an Irish business lobby, a regional director for a business support agency in the Irish government, the CEO of a Brussels-based startup incubatori, the operation development manager in an innovation organisation at an English university, the CEO of a Finnish manufacturing company specialising in conveyors	The financial sector's relationship with SMEs is insufficient. When it comes to SMEs, financial institutions are hesitant to take risks, and he highlighted the importance of the government taking risks at this point. Furthermore, SMEs must effectively manage their R&D funds and be willing to collaborate with universities and industry finance is the driving force here, the Ministry of Industry needs to cooperate with research institutions, cluster their funds, and create funds that can better define the benefits of the output of this SME-industry cooperation. The management of the ability to relate with investors or with the world of bank credit to make investments. Training to access capital is also very relevant. Every company needs capital for investments and SMEs are often characterised by a scarcity of resources

TOPIC	RESPONDENT	EXPECTATION
Skills Acquisitions	Head of Industrial Policy Department at an Emilia-Romagna-based SME association, the cofounder of a Madrid-based digital transformation assistance firm, the CEO and co-founder at a France-based rent guarantor, Co-founder of a data usage firm based in Madrid, a regional director for a business support agency in the Irish government.	It would require some training in growth strategy by analysing success cases in your domain, if possible, showing strategies applied by similar size companies. Secondly, increasing training in communication, organizational management are critical. In a very concrete way
Networking skills	The Co-Founder of a Madrid-based digital transformation assistance firm, the operation development manager in an innovation organisation at an English university, a regional director for a business support agency in the Irish government, the CEO of a Finnish manufacturing company specialising in conveyors	Peer-to-peer networks. Communities of good practice (SMEs need to feel like they are a part of a cohort of similarly minded people). There is more value to be gained and more opportunities to be derived from collaboration with other companies in an area, in a sector, regionally and nationally, than there is worrying about competition – a mindset that is still prevalent in Ireland.
Growth management	The business development and investment promotion director at a technology park in Andalusia, the CEO of a Finnish business accelerator, the head of education and innovation policy at an Irish business lobby, the cofounder of a Madrid-based digital transformation assistance firm.	Understanding the process of growth and being able to identify the needs to invest in it to be able to manage it in the future.
Innovation Support/ Recruiting	The CIO of an Irish research and technology organisation, the operation development manager in an innovation organisation at an English university, the head of education and innovation policy at an Irish business lobby, A trainer in digital transformation at an AI company based in Madrid, Co-founder of a data usage firm based in Madrid, the cofounder of a Madrid-based digital transformation assistance firm, the general director of a Brussels based business and research centre, The CEO of a Brussels-based startup incubator	Hiring of young members to the team. Generation of new ideas and knowledge about technology and management. Collaboration with business schools. Generation of student teams in the University with complementary skills and capacities (ICT, engineering, economics and business management, law, ...) and provide them real and practical training in the SME (company analysis, new approaches, technology benchmark, etc.). The importance and value to be found in apprenticeships. Everybody knows about the large manufacturing companies because they strategically promote themselves and they brand themselves successfully Brands that younger people in particular think they want to work for, but a huge opportunity exists within an SME.

TOPIC	RESPONDENT	EXPECTATION
Innovation support/working with university	Head of Industrial Policy Department at an Emilia-Romagna-based SME association, a project manager at a Finnish university, the CEO of a Finnish manufacturing company specialising in conveyors, An innovation manager at a science and technology park in Almería, the global development manager based in Turkey at a multinational clothing manufacturing firm , the operation development manager in an innovation organisation at an English university, the head of education and innovation policy at an Irish business lobby	SME growth needs support regarding technological innovation. SMEs should be given training on how to conduct projects that will allow them to discover their innovative aspects, and this should be accomplished by bringing universities and SMEs together. Helping everyone to be at the forefront of emerging institutions and trends, not in those that only show downward spiral. Helping everyone to see things from new perspectives! Contract technology is a theme that is increasingly needed as growth increases
Innovation support	Co-Founder of a Madrid-based digital transformation assistance firm, a business owner and a program manager for a strategy program in a Dutch university,	SMEs should be given training on how to conduct projects that will allow them to discover their innovative aspects, and this should be accomplished by bringing universities and SMEs together
HR Training Needs	Head of Industrial Policy Department at an Emilia-Romagna-based SME association, the CEO and co-founder at a France-based rent guarantor	An important piece of the whole issue of the technical qualification is the argument about human resources, that is the connections with technical schools, the connection with professional-oriented universities, which proves to be a very important aspect.
Reskilling and Upskilling in digitalization	Head of Industrial Policy Department at an Emilia-Romagna-based SME association, the CEO of a Finnish business accelerator, The CEO of a Brussels-based startup incubator, A trainer in digital transformation at an AI company based in Madrid, the co-founder of a data usage firm based in Madrid, a project manager at a Finnish university, a business advisor at an SME financing firm based in the Netherlands, a business owner and a program manager for a strategy program in a Dutch university,, the general manager of a Turkish science park, the head of education and innovation policy at an Irish business lobby, the chief innovation officer of an Irish research and technology organisation	Even though there is a longevity of the employees on these companies and training program to reskilling and upskilling on [digitalisation] is important to assure the competences of the company, specially to those that were not introduced to it during their formation program. But also concerning digitalization, which needs to be recognized on the leader level

TOPIC	RESPONDENT	EXPECTATION
Internationalisation	A business advisor at an SME financing firm based in the Netherlands, the cofounder of a Madrid-based digital transformation assistance firm, the general director of a Brussels based business and research centre, the operation development manager in an innovation organisation at an English university, the global development manager based in Turkey at a multinational clothing manufacturing firm	Finally, internationalisation training modules could also be beneficial. Nonetheless, it is important to highlight that the training modules need to be tailored to the SMEs' needs. internationalisation including awareness of opportunities on how to access finance and skilled workforce. Training on how the world will be shaped after the pandemic and what new business models will emerge should be provided, with an emphasis on the differences between general management and business management
Strategy	A business advisor at an SME financing firm based in the Netherlands, the head of education and innovation policy at an Irish business lobby, The CEO of a Brussels-based startup incubator	Education around growth strategy is particularly relevant. SMEs often make the error to work "in their company and not in the company". It is important for SMEs to consult with strategy experts that can provide the company with a long-term strategy and vision. These training sessions allow them to make better decisions. Training and skills on decision-making is also crucial. SMEs do not have well-developed methodologies on how to make decisions. It usually happens according to the owner's intuition. To be able to build a good growth strategy often requires assistance from outside the company
Leadership Needs Training	Head of education and innovation policy at an Irish business lobby, the CIO of an Irish research and technology organisation, a regional director for a business support agency in the Irish government, the CEO of a Finnish manufacturing company specialising in conveyors, The CEO of a Brussels-based startup incubator	There are needs within SMEs at leadership level. One of the issues facing leaders and owners of SMEs is a lack of time. By customizing a delivery method to suit that, whether it is blended or fully online, will improve uptake of places on these leadership and business development courses. Implementation of what is learned on these courses, and the transfer of methods learned back into the business, which can be suboptimal – meaning the company does not extract the full benefit of the training

Table 6 *Expectations from clusters according to our interviewees (Summarizing of verbatim)*

CASE IN POINT

Selma Bahçıvanoğlu - Manager, Incubation and Acceleration Programs - ITU Ari Science park

Selma Bahçıvanoğlu

Selma Bahçıvanoğlu has her undergraduate degree in political science and international relations from Marmara University in 2007. Bahçıvanoğlu has her master's degree in Turkish modern history from Boğaziçi University in 2009. After working in various think-tanks funded by European Union programs, Bahçıvanoğlu started working at ITU Arı Science Park in 2013. Bahçıvanoğlu is responsible for incubation and acceleration programs in ITU Çekirdek Incubation Centre.
In early 2021, Turkish Metal Unionists Association (MESS) brought Plug and Play to Turkey. This structure brings ventures from abroad for the digitalization of SMEs under the umbrella of MESS and matches the ventures from Turkey. In addition, the Turkish Industry & Business Association (TÜSİAD) has a Digital Transformation Program in Industry, in which the technology user connects with the technology supplier. Bahçıvanoğlu stated that there are startups within ITU Arı Science Park that matched with leading companies in Turkey through this program. To exemplify, Bahçıvanoğlu also stated that the Istanbul Chamber of Industry's goal of matching start-ups operating in the field of sustainability with member SMEs.

THE ROLE OF HIGHER EDUCATION INSTITUTIONS (HEIs) IN LOCAL AND REGIONAL DEVELOPMENT

Over the last two decades, universities have expanded their role in society (Etzkowitz, 2016), replacing their image as an 'ivory tower' with being economically viable and embedded locally, regionally, and nationally. Higher Education Institutions (HEIs) are increasingly perceived as the engines for regional growth (Budyldina, 2018), proactive and crucial entrepreneurial entities (Budyldina, 2018; Brown, 2016), and a source of talent and entrepreneurship (Davey et al., 2018). Where they have mostly adhered to the first and second mission (teaching and research), universities are increasingly engaging in technology transfer and cultivating growth in local economies (Budyldina, 2018; Brown, 2016). In doing this they create local, regional and national impact. The shift has been captured in the triple helix model, combining interactions between university, industry, and government with all three ideally playing an equal role (Etzkowitz, 2016). This has been further expanded into quadruple and quintuple helix models (Carayannis & Campbell, 2009). The fourth helix represents the role of the media and culture-based public, which play their own role in the national innovation system.

The entrepreneurial university is based on four propositions (Etzkowitz, 2016). First, there should be interaction between the university, industry, and government. Second, the university should be independent of other institutional spheres. Third, when there is tension between the first two will lead to the creation of hybrid organisational formats. Fourth, as the relationship between university, industry, and government changes, there should be continuous renovation of each one's internal structure.

The concepts of engaged and entrepreneurial universities are similar. Some academic literature distinguishes between the two, with the entrepreneurial university producing and facilitating the transfer of (new) knowledge (Thomas & Pugh, 2020) and the engaged university is focused on regional engagement, while others see them as aligned.

Both entrepreneurial and engaged universities and research universities are characterised by organising group research and creating commercially viable research bases. Entrepreneurial and engaged universities are distinguished by their interaction with industry and the organisational mechanisms developed to deal with the IP of their own research. Entrepreneurial universities actively encourage academic and student entrepreneurship, spin-offs, and spin outs, and integrate academic and business elements to create for example university-industry research centres (Etzkowitz, 2016).

Entrepreneurial, engaged universities and SMEs play important roles in local entrepreneurial ecosystems that support growing firms (Malecki, 2018). A crucial vision of the universities is ensuring local knowledge utilisation (Etzkowitz, 2016). Universities play important roles in developing regional innovation policy and knowledge networks (Brown, 2016). SMEs constitute 99% of EU businesses, providing regional solutions to national and global challenges (European Commission, n.d.).

Entrepreneurial and engaged universities play a key role in SME development providing talent to these companies (Brown, 2016) while also being key supporters in developing SME entrepreneurial capacity (Alvarez-Torres, Lopez-Torres, Schiuma, 2019). Through engagement, HEIs support SMEs ability to innovate, learn, transfer, and acquire knowledge (Valentim et al., 2013), though it takes time for the SME to learn to profit from collaboration. High collaboration intensity is necessary to influence growth, as low intensity will result in negative growth (Temel et al., 2013).

CASE IN POINT
Amélia Tiscornia – COO Scoping

Amélia Tiscronia is the COO of Scoping, a company in co-op status since its creation in 1982. The story of its creation: Amélia Tiscornia was employed in a company of 150 people, when the manager died suddenly. Although the manager's children inherited the company, they chose to close it down at that time. So, the founders created Scoping. Scoping was founded in Paris but has since moved to Massy. The company now has 85 people, with the central offices in Ile-de-France with satellite locations in Dijon, Lyon, Aix-en-Provence in the Bordeaux Alpes, Toulouse, Nantes and a new location in Tours. To capitalize on human assets, Scoping has founded The Scoping Academy.

Before, they built out a policy of welcoming young people of all profiles, from observation to college to BTS / DUT (a diploma you get 2 years after graduating), Bac+3/4 in structuring the future generation to be proactive in environmental management. Currently they have 14 apprentices and 8 trainees. The best way to collaborate is to integrate young people as well-supervised professionals with a clean integration pass that shows them the job.
To transform Scoping for a learning society, they need to integrate the elements of research and make transformations internally, which for Amélia is unthinkable. She doesn't even know how to properly express her needs.

scoping ingénierie coopérative

A European Commission priority from the renewed EU agenda for Higher Education is ensuring that HEIs contribute to innovation (European Commission, 2017). To strengthen research centres and encourage research valorisation, they will step up support for university business cooperation. The aim is to ensure that efforts to develop new solutions to economic, social, and environmental problems are well-targeted to solve short and long-term challenges. Agenda implementation requires cooperation of stakeholders, including SMEs.

What did the survey say?
Subjects of Collaboration with HEI

In the main, most of the SME companies we surveyed do not collaborate with HEIs. The only exception is the traditional and only clearly identified role of university: finding new highly skilled employees through students' mobility. But even in this case, companies don't seem to identify that it's not only about recruiting, but that the relationship could go further to add even more value than what companies are used to from universities

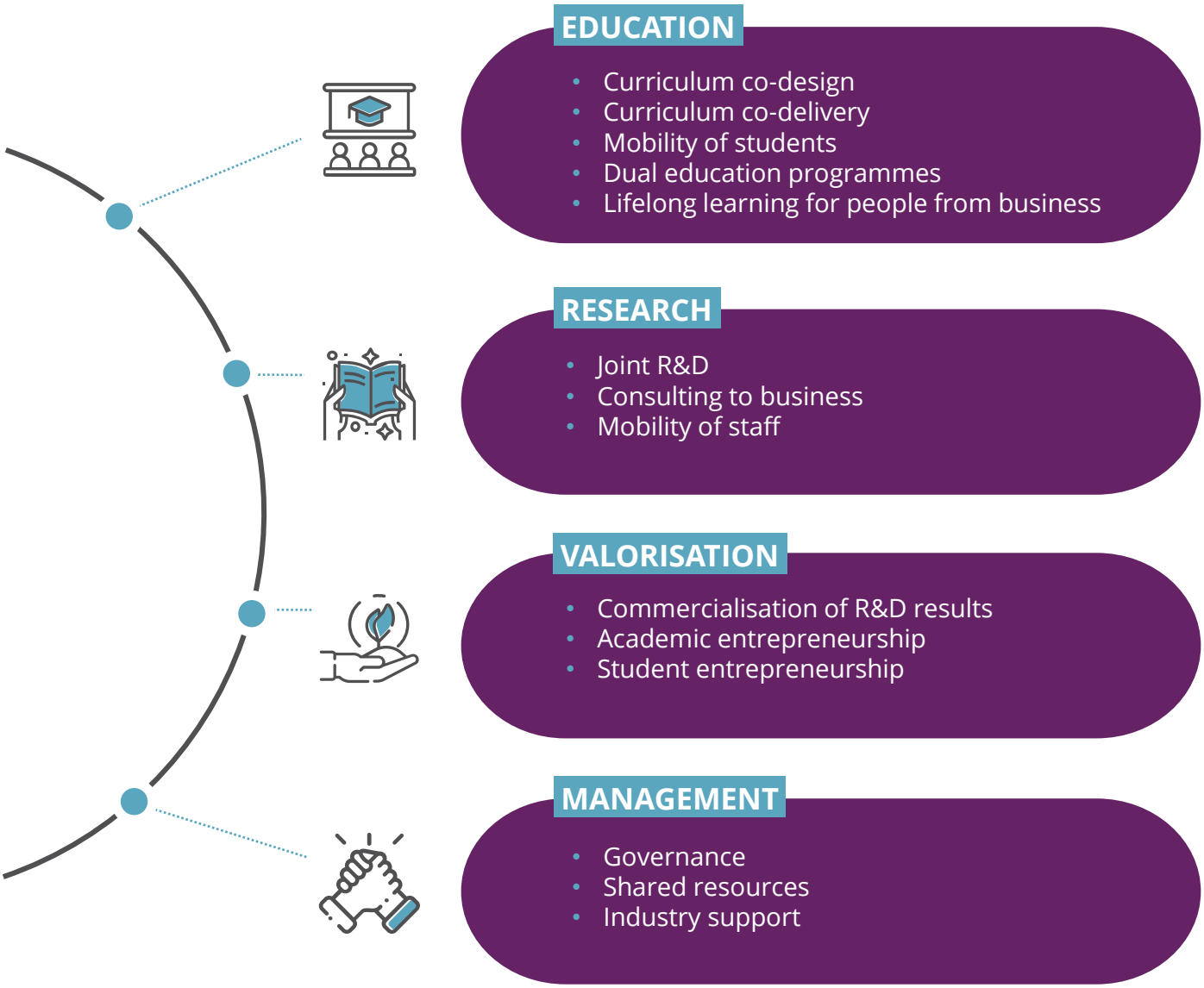
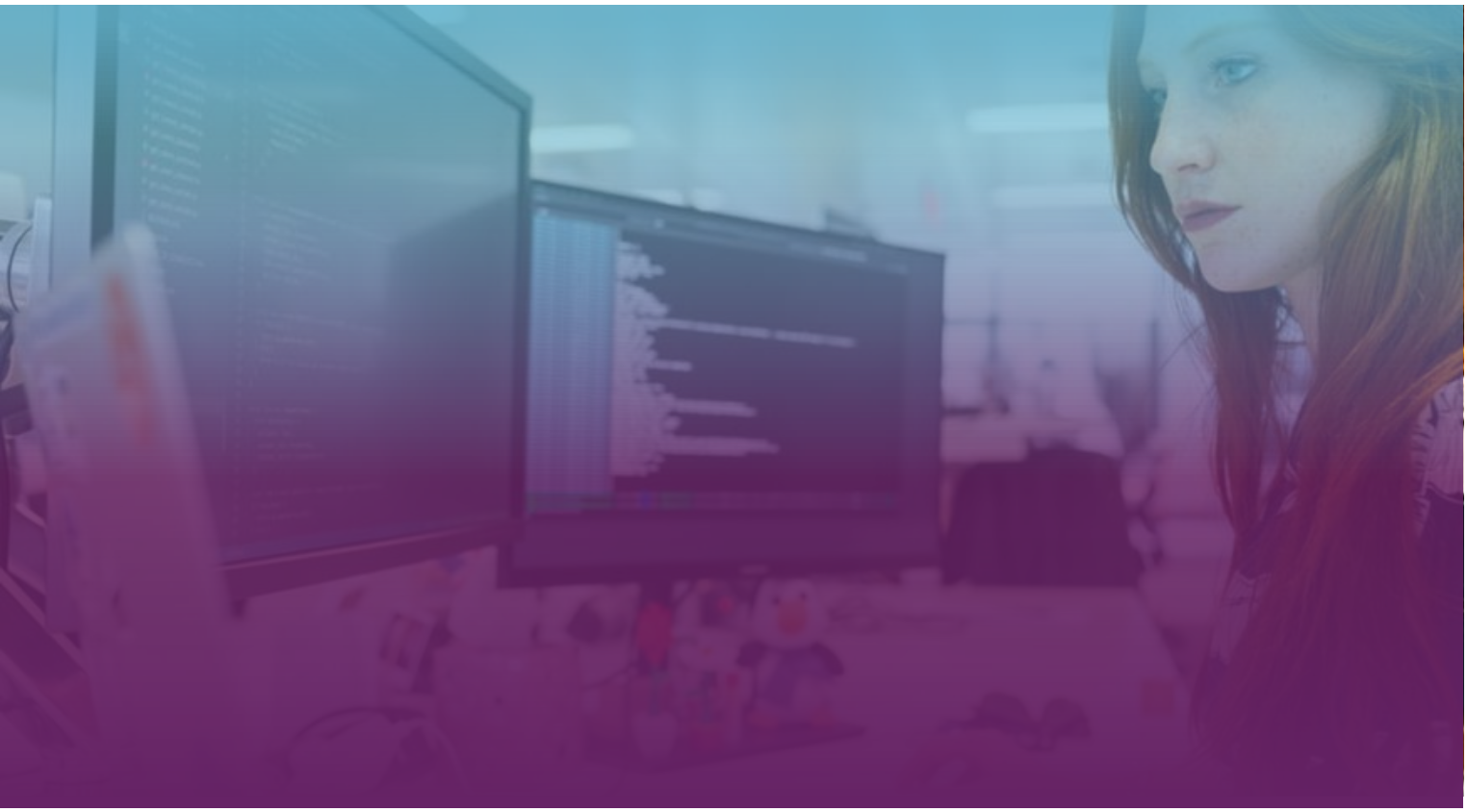


Table 7 Types of university-business collaboration *(Davey et al., 2018)*

SUBJECT	NEVER COLLABORATE	COLLABORATE	DON'T KNOW
R&D	53.6%	11.6%	34.8%
Consulting	57.7%	13.1%	29.4%
Commercialisation of R&D results	70.3%	6.5%	23.2%
Mobility of staff	70.8%	7.3%	21.9%
Mobility of students	39.9%	29.7%	30.4%
Dual educational program	61%	12.5%	26.5%
Joint delivery of curriculum	66.9%	9.6%	23.5%
Participation in Long Life Learning	66.2%	11%	22.1%
Academic entrepreneurship	71.6%	8.2%	20.2%
Students entrepreneurship	69.4%	6.5%	24.1%
Governance	72.6%	7.4%	20%
Shared resources with university	70.6%	5.9%	23.5%
University support	68.7%	8.2%	23.1%

Table 8 Extent of collaboration with HEI according to SMEs Growth survey answered by SME owners



KNOWLEDGE CAPITAL, SOCIAL CAPITAL, AND COMPETITIVE ADVANTAGE FOR SMEs

Engagement, meaning any involvement with an external actor, with HEIs gives SMEs access to additional resources, increasing internal capacities (Pereira & Franco, 2021), knowledge and social capital. It can also lead to new business opportunities, such as new market development, project engagement, venture creation and strategic network development (Rosli et al., 2018).

Engagement provides SMEs with networks to create social capital (Gordon & Jack, 2010). Social capital is a relational resource of ties and resources embedded in relationships, including social interactions and ties, trusting relationships and value systems. HEIs also support SMEs by providing knowledge-based ideas and innovations, directly improving SME innovation, and employing new graduates (Zubielqui et al., 2015). There are several streams of knowledge transfer, such as consultancy, contract research, joint research, and training. SMEs need more detail than publications provide, meaning direct interaction can better support the transfer of knowledge (Temel et al., 2013). SMEs also benefit from a more intense collaboration, allowing both parties to align their goals and objectives.

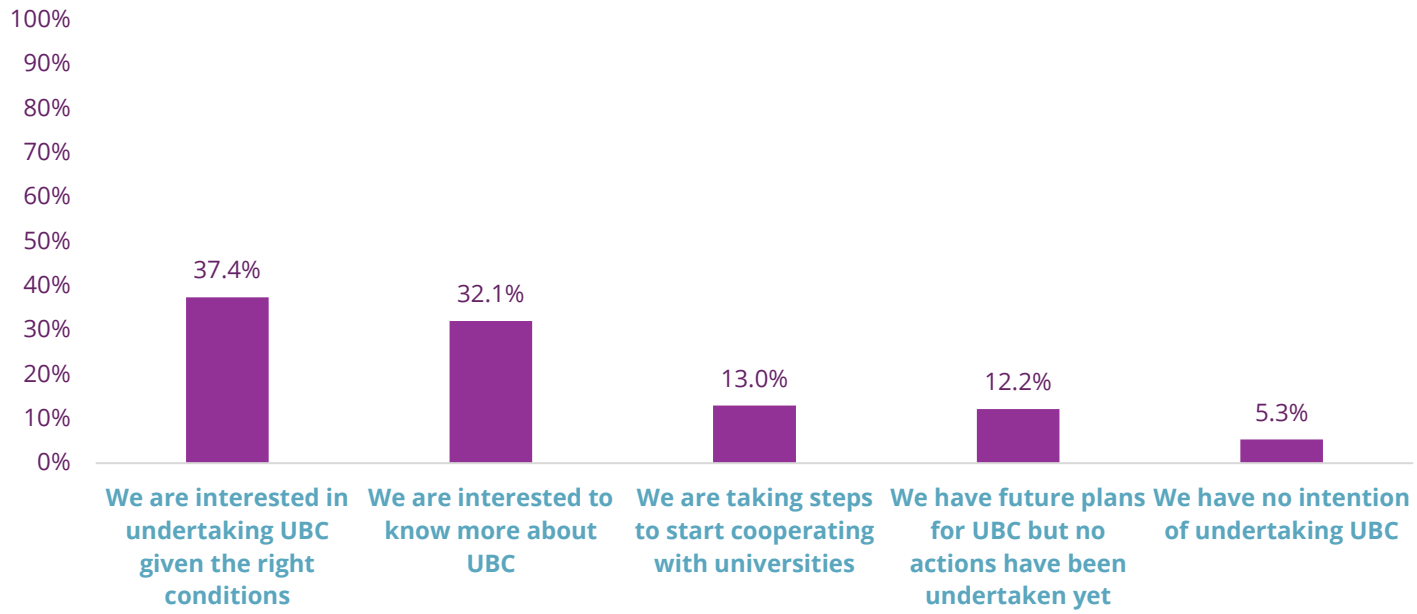
According to Fogg (2012), access to HEIs can contribute to an increase in SME absorptive capacity, allowing SMEs to better convert knowledge capital into a competitive advantage. This support can come from recruitment events and workshop programmes for SMEs and through leveraging and transforming knowledge into competitive advantages through support and reunited cohorts. HEIs also support SMEs through helping develop the entrepreneurial orientation of a company. Entrepreneurial orientation reflects the innovativeness, risk taking, and proactivity of an SME. This entrepreneurial orientation can also support the growth of SMEs (Alvarez-Torres et al., 2019).

HEI-SME ENGAGEMENT ACTIVITIES

To those who have experience collaborating with universities. According to A trainer in digital transformation at an AI company based in Madrid: this has been a “good experience, project was developed properly, including high value knowledge transfer”.

What did the survey say?
Willingness to Collaborate with Universities

The striking point here, when compared to the other results for actual engagement in the above section, is that very few respondents aren’t willing to collaborate with universities. In fact, only 5.34% really don't want to. We could conclude that companies are curious but are not sure of where or how to begin a collaboration with UBC.



Graphic 5.*Q45 - 'Please select the most appropriate of the following statements with regards to university-business cooperation (UBC)' (percentage of respondents answering 'yes')*

University support for SMEs may come in several different forms (Dada and Fogg, 2016). These support structures and how they benefit SMEs are discussed in this section and the two following sections. HEIs mainly support SMEs through collaborations, divided in four different areas: research, education, valorisation, and management (Davey et al., 2018). In total there are 14 types of collaboration, as can be seen in **Table 7**. Traditional literature and research have focused on patents, licenses and spin-offs, and cooperative R&D, but have partly shifted to include more activities, following a broadening of the understanding of cooperation (Chatterton & Goddard, 2000), particularly in regard to education and research which have developed in terms of university-business collaboration (Davey et al., 2018).

Educational collaboration can be found in the co-design and co-delivery of the curriculum, with SMEs being involved in curriculum design and providing guest lecturers (Davey et al., 2018). Employers can be involved in curriculum co-delivery through problem and project-based learning. Problem-based learning allows students to work on industry problems with external partners (Aalborg University, 2015), while project-based learning sees students working on specific projects, which are not necessarily linked to specific problems.

Employers also employ student consultancy where students work with companies on problems (Lycko & Galanakis, 2019) and the design and/or delivery of education programs through dual education programmes, which are part academic and part practical.

By providing student internship places, SMEs benefit from improved hiring practices, network, and exposure to new ideas, allowing them to increase absorptive capacity (Piterou & Birch, 2016). SMEs also benefit from the practical help of students who have expertise in a specific area (Collinson & Quinn, 2002). HEIs benefit from improved reputation and student recruitment, the input of practitioners to the curriculum and networking in the local community (Piterou & Birch, 2016).

By providing student internship places, SMEs benefit from improved hiring practices, network, and exposure to new ideas, allowing them to increase absorptive capacity (Piterou & Birch, 2016). SMEs also benefit from the practical help of students who have expertise in a specific area (Collinson & Quinn, 2002). HEIs benefit from improved reputation and student recruitment, the input of practitioners to the curriculum and networking in the local community (Piterou & Birch, 2016).

SMEs occasionally have access to free lifelong learning programmes and training such as the Yorkshire and Humberside Universities' Association (YHUA) (Macdonald, Assimakopoulos & Anderson, 2007) which include coaching and training (Kurdve et al., 2019). This provides training in business management, not only in theory but also in the study of the particularities of companies in a sector, how to manage the company's finances, how to enter another sector, as well as training in human resources. The two priorities are people and money, according to the managing director of an urban planning business cluster in Spain.

Universities provide additional education and training for employees (Macdonald, Assimakopoulos & Anderson 2007) of established non-high-tech SMEs who tend to have less educated staff (Kurdve et al., 2019; Laursen & Salter, 2004). SMEs that are in this situation are less likely to collaborate with universities (Kurdve et al., 2019; Laursen & Salter, 2004). In general, university training programmes such as the Tillväxtmotorn, described by Kurdve, Bird and Laage-Hellman (2019), aim to increase the absorptive capacity of SME managers and CEOs in terms of innovation and improve management skills, collaboration and business competence' within the company to increase competitiveness.

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What did the survey say?
SME Training Spend

The most relevant barriers for training were a lack of time, high costs and lack of budget. Other concerns were least relevant, as were availability of training providers, high personnel rotation, and uncertainty regarding training necessities. Most companies spend less than €20,000 on training per year, with €4,000 or less being the most cited, followed by €4,001-10.000 and €10,001-20.000 respectively. Around 18% spend more than €20,000 per year, with around half of those that do spend more than €40,000 per year.

RESEARCH

Joint R&D, including joint funded research, publications, theses supervision, research grants and donations, information exchange and PhD financing, is one of the most developed collaboration activities (Davey et al., 2018). Universities also benefit from SMEs through undertaking contract research on the behalf of the business. Smaller businesses are more likely to have indirect contact with universities through technical consultations, meaning smaller businesses are constrained by their resources and are more likely to make use of the knowledge provided by universities to solve urgent problems during the production and development phases (Fukugawa, 2005). However, Kurdve, Bird and Laage-Hellman (2019) suggest that many firms neglect or are unaware of the value of R&D. Staff mobility includes the temporary mobility of academics to business and of businesspeople to HEIs.

HEI could be a support more specifically, for R&D and technological knowledge, according to A trainer in digital transformation at an AI company based in Madrid

The biggest asset of HEIs is offering access to R&D to companies that do not have the financial means to develop the facilities themselves, in the words of business leaders:

"For university-business collaboration, the quickest and clearest way is to establish collaboration agreements with universities that allow companies without a research and development department to generate new technologies."

Managing director of an urban planning business cluster in Spain

VALORISATION

Valorisation relates to the third mission activities (Davey et al., 2018). These activities allow HEIs to contribute to the regional innovation ecosystem through next generation innovations, high tech new companies, and entrepreneurial talent.

Activities concerning R&D commercialisation include licencing, patenting, and sales. The activities concerning entrepreneurship include the creation of new ventures by academics (spin outs), by students (start-ups), and the co-creation by academia and industry.

MANAGEMENT

Management activities are related to the strategic nature of cooperation (Davey et al., 2018). Governance activities include academics and businesspeople serving on opposite boards and in advisory roles or regional leadership.

Shared resources between universities and SMEs include shared infrastructure, personnel, and equipment. The industry supports that HEIs offer SMEs include sponsorship, a sponsored university chair in an area of interest, informal exchange forums and workshops, conferences, and scholarships.

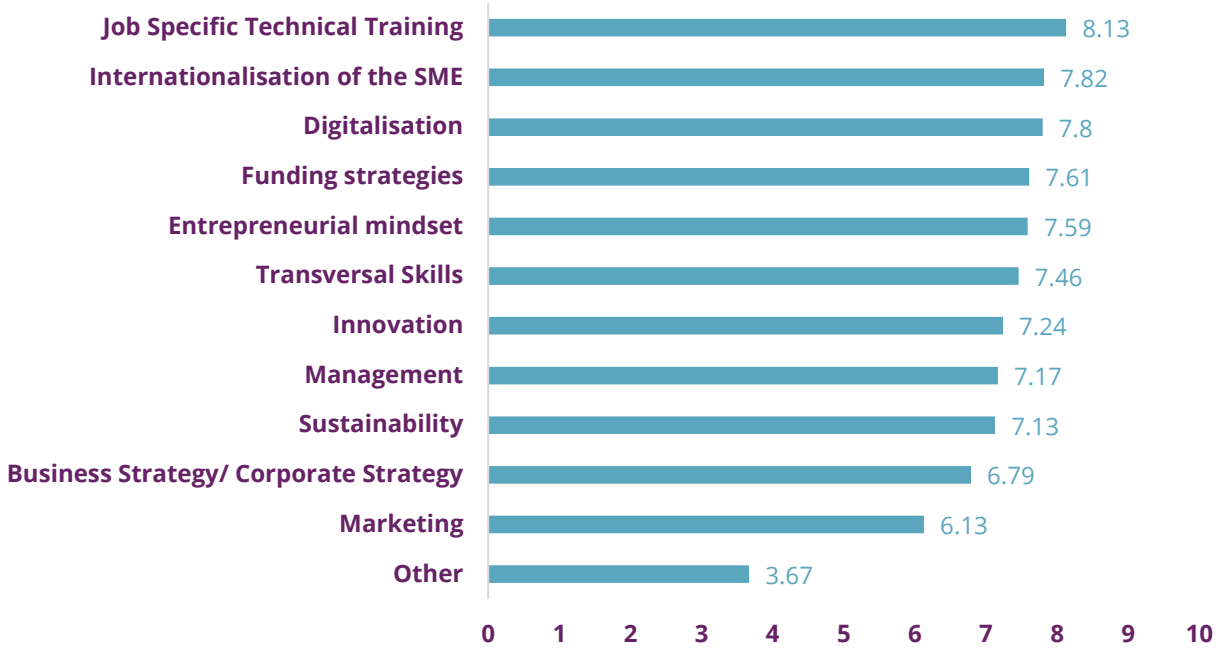
What did the survey say?

92% of the respondents offer some form of job specific training. Most do so internally, however a handful of businesses use universities and business associations, and about 17% of the respondents use a training company. Over 50% of the respondents do not train for internationalisation in their company. Those that do train for it mostly do so internally, as only 17 of the 59 respondents training for internationalisation utilise external training companies or other business associations. Companies mostly train internally for digitalisation, with only 23% not training. Most companies do this training internally, though around 21% do the training through universities, business associations or outside training companies.

For funding strategies, once again most companies train for this internally, with 52% of respondents doing so. Under 18% responded using other training methods, with the last 30% of respondents not training for funding strategy. This is similar for transversal skills, where almost 57% train internally, over 31% do not train at all, and the remaining few respondents utilize universities, business associations, and outside training companies.

Outside of internal training, which was noted by 60% of respondents, there was a more balanced distribution of those not training at all (18%), and particularly utilising universities (4%), business associations (~9%) and outside training companies (8%). Management training was reported to be done in over 70% of businesses, with internal training being the most common at over 68%. No training was noted in only 16% of respondents.

These numbers are very similar to training for business or corporate strategy, with most training being done internally (~73%), only 11 out of the 125 respondents noting other forms of training, and only 17% of respondents not training at all. For marketing training, while a large majority report internal training, a jump is noticeable for the utilisation of external companies, with 14.5% of companies reporting external training companies were used to train for marketing. Out of all these trainings, the most relevant to business priorities were job specific training, innovation, and business/ corporate strategy. Other trainings are the least relevant, as were internationalisation and funding strategy trainings.



Graphic 6 *'In order of your priorities, rate the relevance of the following training subjects' Scale: 1= "not at all relevant" to 10= "extremely relevant"*

HEI ROLE IN SUPPORTING NETWORKS

Knowledge transfer requires the use of specific networks involving SMEs and universities, who may create their own networks from this. These networks, which include incubators, accelerators and living labs, (Kahrovic, 2020) are platforms where innovative ideas and opportunities can be accessed (Dada & Fogg, 2016) I). The focus here is specifically on incubators, accelerators and living labs that are linked to a university. An incubator is a knowledge transfer tool supporting SME growth (Piterou & Birch, 2016) by providing SMEs with physical facilities, technical and administrative support, and service to support their growth (Kahrovic, 2020).

The objective is to support local entrepreneurship through innovative projects (Franco et al., 2020) and developing clusters of connected businesses (Piterou & Birch, 2016). For universities, business incubators are a strategy to support SMEs through knowledge transfer and indirectly contribute to local graduate retention (Huda & Rejito, 2020). University-linked incubators facilitate internationalisation activities of SMEs by establishing innovation and internationalisation environments and by reinforcing their entrepreneurial behaviour (Franco et al., 2020). SMEs also benefit from incubators by developing their strategic focus, gaining awareness of their core-competences and limitations, and enhancing R&D activities (Piterou & Birch, 2016). Accelerators are a special type of incubator (Kahrovic, 2020) with limited duration, around three months, during which they host SME cohorts. Living labs support SMEs creating innovation by bringing the experimentation of companies to a real-life environment (Leminen et al., 2012) with HEIs involved in the development of the product that will be tested in the living lab (Cosgrave et al., 2013).

The role of HEIs is also evolving due to the development of the start-up ecosystem as schools are increasingly developing incubation and acceleration structures that are open to companies and nourished by their know-how as trainers and coaches. For example, the CEO and co-founder at a France-based rent guarantor has chosen to join one of these structures: “We were accompanied by the HEC incubator, giving them a working environment with a real office to leave their student room, easy access to peers to compare and source information and the support of experts."

OTHER

DIRECT KNOWLEDGE PROVISION

The entrepreneurial and engaged university plays an increasingly important role as a knowledge-producer for businesses, and this knowledge provides innovation and competitive advantage (Dada & Fogg, 2016). SMEs are often bound by resource limitation and require access to ‘bundles of resources’ and knowledge makes up part of such bundles. Knowledge is considered a requirement for innovation to successfully occur (Kurdve, Bird & Laage-Hellman, 2019) and the knowledge produced by universities can generally help strengthen the innovation capabilities of businesses (Kaufmann and Tödtling, 2002). With increased innovation, SMEs may become more competitive (Macdonald, Assimakopoulos & Anderson, 2007).

It is also interesting to consider collaboration with universities as a good way to address issues not directly related to the development of new products, but they have not been directly related to growth. There have also been interns in the company.

TALENT RECRUITMENT

Universities can help SMEs find full-time staff members, placement students, interns and volunteers. SMEs also gain access to new research and innovative employees when graduates or students on work placements (Dada & Fogg, 2016). Talent recruitment related to student placement is student mobility, however, some talent recruitment is not education related support, hiring graduates for example.

Bringing fresh skills, according to the Head of Industrial Policy Department at an Emilia-Romagna-based SME association and the cofounder of a Madrid-based digital transformation assistance firm, is important. This requires developing curricula that will create profiles needed by companies, according to an SME consultant.

Universities may subsidise the recruitment of students by an SME. Often, the university will pay the student a stipend while employed at the company in question, allowing the SME to obtain new talent without any additional expense. At Nottingham Trent University, grants are given by the university to companies so that they take on interns. The intern effectively undergoes training at the company, making the search for talent less costly (Nottingham Trent University, n.d.).

MARKETING

The co-founder of a France-based SaaS firm identified the marketing value of R&D products and services resulting from a collaboration with researchers to penetrate a market more quickly by reassuring future investors and customers about the quality of the product:

> *"In the case of my company, even today, to approach the big accounts, there is a very interesting gateway. As a founder, I note that if this approach makes sense, the long term must be considered. Because the search time is long, that is precisely what will create a sustainable competitive advantage. The image of research, on the other hand, is a short-term lever."*
>
> **Co-founder of a France-based SaaS firm**

But *the co-founder of a France-based SaaS firm* did not identify the problem of time as a concern, more as a fact to be considered so that the added value developed alongside the Universities concerns growth drivers, not products likely to be soon brought to the market, so as not to miss opportunities. It is therefore necessary that collaboration be conducted with companies capable of establishing long-term strategic plans by analysing their business environment to identify the added value of interest to consumers in the future.

CASE IN POINT
Co-founder of a France-based SaaS Firm

BenHR is a young company offering companies a SaaS to help them support their employees in their digital practice, both in respect of the right to disconnect, combat fatigue specifically related to the use of digital tools and efficiency. The founder and his co-founder originally launched two entrepreneurial projects a few years ago, both linked to academia and research from the start. The first "let me think", a BenHR project, is a connected totem that you only need to touch with your laptop to put it into working mode. It was born from a student project of Caesar in his design school and rewarded by his school.

A crowdfunding campaign was launched in the aftermath, and it was as part of this project that the two founders began collaborating with researchers from Grenoble School of Management. The aim was to prove scientifically that using this totem pole had an impact on productivity at work. In this context, a project was launched to show the effectiveness of this object with two researchers.

Then BenHR was launched in the summer of 2020. In the same way as at the beginning, the founders were interested in the subject of digital solicitation through a researcher with whom they worked, who published on this subject and allowed them to understand the issues behind it. Initially, they carried out audits on digital practices for 6 months. Beginning in January 2020, they focused on the risks of digital overload in collaboration with Grenoble and Le Mans University to design diagnostics on digital practices in business in a scientific way. In the third part of the collaboration, the tool collected data through the SaaS platform, and, in this context, Ben Hr launched a research project with HEC researchers and co-defines the research themes. They provided the data that will form the basis of this research.

For the founders of BenHR, research allows them to develop more powerful models to have a lever to convince companies to collaborate with them.

POSITIVE ASPECTS

Collaboration on the totem pole, first point; every time they have sought to collaborate with researchers as a company, there has always been an excellent reception from researchers who have been very enthusiastic and willing to collaborate on concrete themes. It is also true that they were targeting the researchers contacted in a proactive approach.

Their first step at the beginning of their entrepreneurial adventure was to carry out a literature review in their school setting. It was in this context at the very beginning that they discovered that a researcher from their own school was working on the same subjects as them and they contacted him.

The other researchers they collaborated with were contacted through networking, especially within Le Mans and those specialising in HR analytics. Regarding their third collaborative experiment, they contacted Christophe Pérignon, the director of research at HEC, through the HEC incubator, and that's how they contacted the most relevant researchers. They had also read the research articles of one of the HEC researchers and contacted him directly on this basis.

Initially, the first totem project was based on extensive research done in design and related to interaction design. They had already been able to understand through this exercise the interest and modalities of the scientific approach; it was also on this occasion that they realized that it was also a very strong business argument of legitimacy. What they also liked about working with researchers was their accessibility, which was much more accessible than they thought. Because the researchers are very specialised, the founders of BenHR realized that this type of collaboration could be an accessible competitive advantage that could be a very important lever at the business level.

As young graduates, it was a very important lever and that's what allowed them to get through the doors and sign a first client. This client was convinced because the analyses were conducted based on scientific research. The image conveyed by research has always opened the doors for them, especially that of incubators. It's always been a lever of growth. Even today, to approach larger clients, there is an interesting gateway. The co-founders note that if this approach makes sense, the long term must be considered. The search time is long, but that is precisely what will create a sustainable competitive advantage. The image of research, on the other hand, is a short-term lever.

NEGATIVE ASPECTS

The relevant time scales are different. On the scale of a start-up, 3 months is long, at the university level, it's a fraction of a second. For a long-term study for example, it takes a very long time. For the totem, for example, studies have been going on for a very long time. Studies are pushed back, which is not a problem for researchers, but this slow side can be complicated for a company and even more so for a start-up.

For BenHR, collaborations have always been organised in a quiet and natural way. What became complicated, for example, is when they wanted to create a scientific board and the framework of meeting regularly. It did not suit one of the researchers who had a real fear of embarking on a commercial adventure.

In the end, there was a lack of communication and understanding between the two worlds. The cofounder believes that if these two worlds understood each other better, collaborations would go much faster. Whenever they wanted to formalise their work relationship too much, the complex and slow administrative processes caught up with them, which really complicates the relationship between the two parties when they perform their usual activities, everything goes well.

An example of the collaboration with Grenoble: on the totem part, they wanted to set up a scientific board to formalize collaboration with researchers and guide the project. It was mainly a matter of formalisation because the banking and support partners wanted this board with a charter to embody it. The collaboration was effective, but there was nothing written.

They thought that the time to review and sign the documents would last two weeks, however in reality, the process lasted so long that in the end, the research project is still ongoing, and a researcher still has not signed. In the meantime, they pivoted and began to collaborate with Le Mans and HEC. In the end, a researcher signed but they broke loose and focused on something else. The project at the commercial level is on standby, so everything is suspended for now. Formalisation put a brake on it because there was no framework and, in the meantime, they found other researchers with whom it had become more relevant.

Another example with Le Mans University: two researchers were in HR analytics. They co-constructed questionnaires with scientific methodologies to be able to assess digital stress and mindful IT and make digital profiles collaborators. They did a scientific review. This time it was the researchers who wanted to formalize by launching a chair on HR analytics with two companies. They could not help finance, another company agreed to start financial assistance, but the process is quite long. The last meeting took place a while ago and there has been little news since.

The time is not that of "deal, clack, we sign, and we go". There is no framework to work with researchers and it is felt. Or despite their many experiences of working with universities, they don't know him.

With HEC, the founders of BenHR find that it's more framed. From the beginning, a researcher explained how she works with companies. The researchers seem to be utilised more, are perhaps also a little younger; Relationships are more framed.

In general, they found the researchers on the networks via a link with the topic that interests them. The contacts really come from the networks in which they are already. About people analytics, it was the founders who made the effort to understand the methodology of research papers, understand the methodologies of research etc. Thanks to the website of his original school through which he has access to the various scientific publications. They were searching for research publications, attending popular webinars, but in fact there have been contacts and connections in very network mode

If the collaboration is satisfactory, the universities should be put in contact with enterprises in an efficient manner. For example, at Coventry University there is a programme called Knowledge Transfer Partnerships that sees the university cooperating with SMEs in R&D.

These programmes are very successful. Nonetheless, there are several bottlenecks. The first and foremost is the administrative challenge. Companies must wait a long time for their project to be approved and then again to find the right people for their project within the university, says the Operations development manager in an innovation organisation at an English university.

CAPITALISING ON OPPORTUNITIES THROUGH ENGAGEMENT

SMEs lack knowledge about available support in HEIs, resulting in missed opportunities (Pereira & Franco, 2021) that could allow universities to have more of an impact on SME growth. SMEs also need to know how to capitalize on these opportunities.

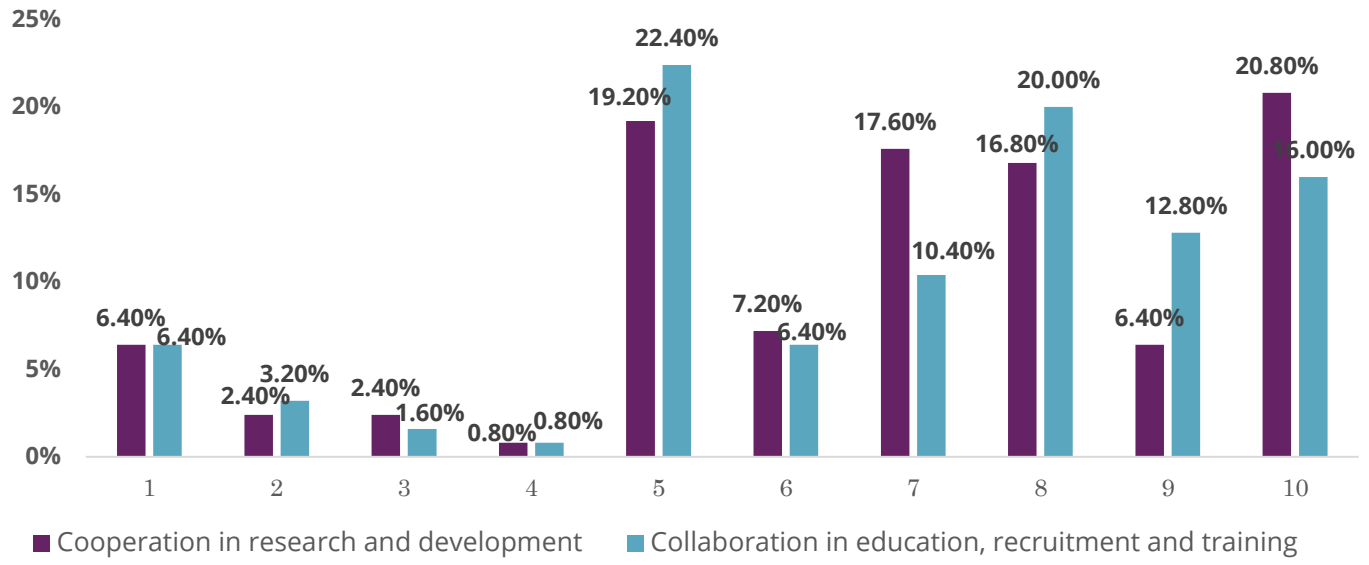
What did the survey say?
Motivations to Collaborate with HEI

Companies practising collaboration with universities seem to have identified all the advantages of this collaboration. However, among the items measured (below), access to funding does not seem to be a motivation while access to new technologies and knowledge (29.04%), new discovery at an early stage (37.19%) and access to university facilities (31.71%) seem to be appreciated and are motivators for collaboration with universities.

The main factors fostering engagement between universities and businesses are commitment, communication, trust, and leadership (Rast et al., 2015). Both parties need commitment to build and maintain engagement, allowing them to reach their aims and objectives (Moorman et al., 1992). Effective communication eases information exchange, knowledge sharing, enhancing trust and building and maintaining collaboration (Bruneel et al., 2010). This starts with active leadership support of the engagement (Rast et al., 2015).

There are three factors that SMEs need to have that lead to successful HEI collaborations (Rosli et al., 2018), a boundary spanner, committed SME leadership, and strong relationships between the university and SME. The boundary spanner connects the SME, university, and internal structures between the two (Rosli et al., 2018; O'Reilly, 2017). SME leadership will be able to allocate resources and encourage open communication, widening engagement within the SME to include those outside the scope of engagement with the university and allowing further exploration of opportunities. Policymakers and funders also have the responsibility to support the SME leaders in developing the relevant skills and capabilities (Rosli et al., 2018). A strong relationship between the university and SME will be characterised by trust, cognitive proximity, open discussions, and acknowledgement and respect for different roles and responsibilities (Rosli, 2018).

The engagement between SMEs and universities might not immediately be beneficial to both parties (Kurdve, 2020). The partnership may need to develop over time, such as starting with working with students and education and shifting to research projects and R&D agendas when trust has been established.



Graphic 7 *How likely is that you would recommend another business to engage in UBC? Scale: 1= "not at all likely" to 10= "extremely likely"*

BARRIERS TO HEI-SME ENGAGEMENT

The main barriers to engagement for HEIs are time constraints and the lack of human and financial resources (Ramit & Senin, 2015). Main barriers for SMEs are a lack of absorptive capacity (Kurdve, 2020) and confidentiality issues (Arvanitis and Wörter, 2007). Other barriers for SMEs are administrative bureaucracy in HEIs and IP negotiation difficulties (O'Reilly, 2017; Franco and Haase, 2015), lack of organisational support (Franco and Haase, 2015) and funding shortages (Dan, 2013).

The difference in organisational culture is also a barrier. Large cultural differences between both can hinder communications, as they can use different terminology, language, and communication styles (Mitton et al., 2007). Poor communication impacts the ease with which an engagement partner can be found (Dan, 2013). Differences in time horizons of both institutions is often perceived as a barrier to engagement (van der Sijde, 2012).

In many cases, according to the cofounder of a Madrid-based digital transformation assistance firm:

"Business leaders do not know the technical capabilities of the Universities." In general, prejudices about the value of collaboration with universities often prevent them from starting the process."

"Companies anticipate for example, considering the time, the rapidity of reaction of research centers, the cost."

Head of Industrial Policy Department, Emilia-Romagna-based SME association

The added value that HEIs can have has not been clearly communicated or known to companies. This can be rectified by further developing the common understanding of the benefits of collaboration among companies according to the managing director of an urban planning business cluster in Spain, the global business development manager in Turkey of a multinational clothing manufacturing firm, & the CEO of a Finnish manufacturing company specialising in conveyors.

The main disagreements are "generated by the development timing differences between public and private sectors. In addition, there is a lack of business perspective in this sort of institution", according to the co-founder of a data usage firm based in Madrid) .

This is a shame because companies could go faster in their R&D or be more efficient while, as the CEO of a Brussels-based startup incubator notes:

"Rather few cooperate with HEIs extensively- companies are used to trying to find solutions on their own".

CEO of a Brussels-based startup incubator confirms that
"companies have rather low capabilities to approach and buy from HEIs "

and an

"understanding on what a HEI has to offer, who to contact, what is needed for the cooperation."

General manager of a Turkish science park:

Cooperation with universities is done through industry chambers, but there is a general tendency to avoid cooperation with universities" First of all, the "lack of cooperation here stems from the fact that the process is poorly managed, takes a long time, and cannot be assigned to the appropriate specialist for their needs". In the end, "SMEs focus on solving their problems with makeshift solutions and view this cooperation as low added value."

An SME consultant prefers to limit the collaboration with universities to a situation that is easier to manage, set up by working with academics as consultants. For the CIO of an Irish research and technology organisation, the difficulties in collaborating with universities can arise from "the lack of apprentices/apprenticeships available and the issues that come with the shortage of skilled workers" which will unravel the relationship by disappointing both parties, since the university is unable to provide the talent necessary for the company's development and thereby justify the time spent by the company to maintain the links.

When companies are disappointed with their collaboration, they regret that

"the collaboration with HEIs does not generate added value in product commercialization or new market engagement."

General director of a Brussels-based business and research centre.

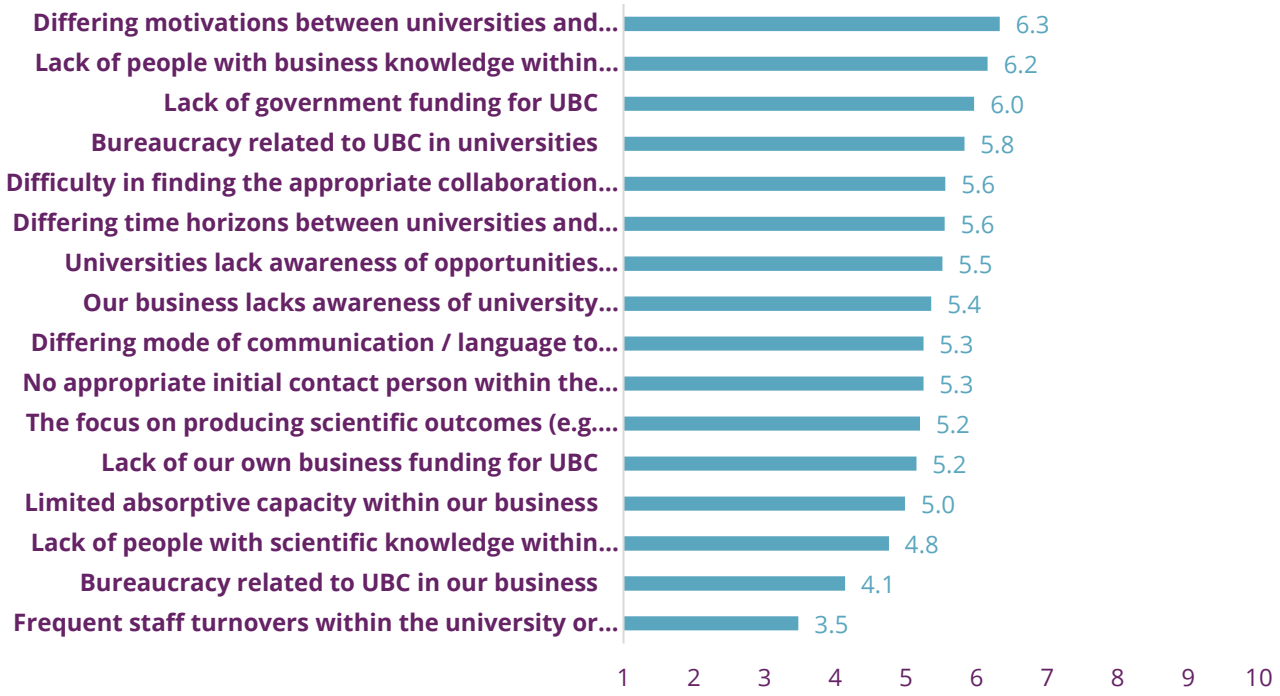
Precisely because of the misalignment in terms of project development timing, collaboration with HEI is tricky. Especially because, as *the operation development manager in an innovation organisation at an English university* points out: "Universities in the UK do not have people that are dedicated to 'client management'."

It is also difficult for companies to know who to contact and for what subjects. A concern that could be solved, according to the Head of Industrial Policy Department at an Emilia-Romagna-based SME association is the presence of intermediaries, “such as CNA, ARTER, the Competence Center, who can introduce them to the right subjects to demonstrate that this is not necessarily difficult to approach and work with universities." In these cases, companies may expect excellent results and satisfaction. Many companies have also joined clusters as members by themselves

> *“Once they get to know university interlocutors, other companies, and innovation centres closely and have tried one or two projects, other projects can be born from smaller collaborations."*
>
> **To conclude, the Head of Industrial Policy Department at an Emilia-Romagna-based SME association highlights that**
>
> *"whoever does it then goes on and then even pulls with his suppliers and becomes a virtuous circuit even for those in the supply chain.”*

What did the survey say? Barriers to UBC:

The greatest difficulties seem to be related to cultural issues since the most identified barriers are: the business lacks awareness of university research and activities offerings (42.06%). This is consistent with the fact that since companies mainly mention that HEIs can be a growth relay, they do not devote time and resources to it to seek knowledge that ignores the strategic scope. Also, if the approach does not come from the universities themselves, the situation could remain at a standstill. This is confirmed by the other two main barriers identified by respondents: lack of people with business knowledge within university (42.12%) and differing motivation between HEI and business (40.66%). If the interlocutors seem to have different motivations at the beginning and do not understand how universities work, the process is rather discouraging. Stability is appreciated since respondents note that they do not feel any difficulties related to the internal turnovers of universities (30.58%). The administrative burden also has no barrier to collaboration (31.09%). At least, on their side. (Below, items tested)



Graphic 8 *Q49 - 'How relevant are the following barriers to your cooperation with universities?' Scale: 1= "not relevant at all" to 10= "extremely relevant"*

RESOURCES REQUIRED FOR HEI-SME ENGAGEMENT

Various resources are crucial to university-business engagement (Galán-Muros et al., 2019). Human resources determine the success of the engagement, encompassing the quality, skills, knowledge, time and effort of everyone involved. Financial resources are the various funding opportunities that come from any of the actors in the triple helix model, though most funding comes from the government. While funding is essential for some types of engagement, a lack of funding may enhance engagement as universities look for funding opportunities within businesses. Physical resources include materials, equipment, and facilities that universities and SMEs use in the collaboration. Different engagement activities require different resources, some might not require any. Access to partner resources is a main motivation for engagement.

THE FINANCIAL BENEFIT OF WORKING WITH COMPANIES

The most likely way to start a collaboration is by a publicly funded project as it is a strong motivator for HEI collaboration, says the Co-Founder of a strategic data firm. SMEs are also increasingly convinced of the value of collaborating with universities and these collaborations sometimes present the opportunity for public funding.

If the funds dedicated to collaboration with universities are attractive, they still need to be understood. According to the regional director for a business agency in the Irish government, while Enterprise Ireland funding is available through innovation vouchers and innovation partnerships, companies lack understanding of what is available around them.

Yet, this partnership should be hands on from the beginning then hands off as it moves forward, according to the experience of the Co-Founder of a France-based SaaS firm:

At the beginning of their entrepreneurial adventure, Ben HR was in the incubator of Grenoble school of management. Then, as the company is based/registered at Le Mans, they were somewhat followed by the innovation centre of Le Mans which is a public structure, and which precisely tried to manage relations with researchers. And today they are at HEC incubator, and it is also through the start-up program content square, specialized in what is analytics, that they have been put in touch with the research of HEC. The team provided contact with researchers from HEC."

For them, the role of an incubator-like support structure is more about connecting, not accompanying, in the relationship when everything seems to work the right way.

HOW TO ADDRESS THESE ISSUES TO INCREASE SATISFACTION

Fixing these problems with cooperation with universities is essential, but there still exists the

"risk for the companies to enter a network that is not good, and the consequences can bring bad surprises",

says the Head of Industrial Policy Department at an Emilia-Romagna-based SME association. In general,

"their experience has shown that things can work out very well if it is done in the right way."

The question of supporting companies in their collaboration is therefore central. When they are accompanied, the added value is much more obvious. For example,

"Companies in the Innovation at the Science and Technology Park of Almeria share a clear understanding of the value of cooperation with universities and an appreciation for it, which has been promoted by the park's management"

An innovation manager at a science and technology park in Almería

NEW OPPORTUNITIES

"The UN Sustainable Development Goals and sustainability in general also present opportunities for collaboration and co-creation. Open innovation is increasingly common and presents opportunities for collaboration

Business development and investment promotion director at a technology park in Andalousia).

WHAT RECOMMENDATIONS?

It is necessary to solve the culture gap. The regional director for a business support agency in the Irish government says that a good practice could be to formalise

"the innovation culture, and that has to be a balancing between the practical applications of innovation within some of the research, versus maybe the (Science Foundation Ireland) Blue Sky type of project, which is a longer-term approach, and may take quite some time to commercialize".

Additionally, it must be ensured that the result of contacts corresponds to a business culture focused on the search for concrete results.

"SMEs often participate in clusters built by universities- often project-based, which is challenging because all activities usually end when the project ends"

according to the CEO of a Finnish business accelerator.

A physical connection is sometimes desired to simplify collaboration as it helps both sides get to know and understand each other better according to the CEO of a Finnish manufacturing company specialising in conveyors and the CIO of an Irish research and technology organisation. Small enterprises often have the tendency to engage with local schools, with little assessment done to find out if that school can produce results.

"With larger multinationals there is less concern about location and more focus placed on the level of excellence coming from the third level institution"

says the CIO of an Irish research and technology organisation.

It is necessary that the universities can communicate and above all understand how hands-on work is done in an SME on small teams.
As suggested by the Co-Founder of a France-based SaaS firm, it is equally important to help SMEs to manage their projects and priorities with universities.

The CIO of an Irish research and technology organisation points out that a

"completely seamless process might not be a possibility but something more than separate competing entities. This would mitigate any issues with delays getting to market due to disagreements between institutions."

The general manager of a Turkish science park insists on the fact that

"research funds owned by research institutions such as The Scientific and Technological Research Council of Turkey must be developed and disseminated, with a focus on industrial problems, notably for resolving financing problems, science parks must encourage industry collaboration, and that their mission should be to bring small SMEs engaged in R&D together with other SMEs and universities, as well as to provide research funds; despite everything, the process still costs a lot of money."

The gap of understanding must be filled from two sides, from the side of enterprise awareness and from university organisation and understanding of business challenges.

The first step is to include teaching collaboration in the university curriculum for students who desire to be managers.

"There is a need for an industry-based university collaboration rather than a road from university to industry",

says an SME consultant.

A possibility, confirmed by the case of a France-based SaaS firm. The founder was in contact with research already through his studies and then was already aware of its possibilities and therefore understood from the speed that UBC was one of the possible ways of development for companies.

What did the survey say?
Facilitators for UBC

Despite the fact that all the items measured seem to have their importance (see items bellow), it is particularly interesting to note that the items considered the most important facilitators for UBC are linked to human and interpersonal relationships, including existence of mutual trust (45.2%), mutual commitment (50.83%), shared goal (45%). This seems to confirm the previous results that once the collaboration is engaged, it could be rather long-term, linked to a strong human relationship and be an integral part of the company's overall growth strategy.

Graphic 9 *'How much do the following factors facilitate the cooperation of your business within university?' Scale: 1= "not at all" to 10= "to large extent"*

INNOVATION MANAGEMENT

Innovation is one of the main drivers of competitiveness for nations. It can promote economic development, provide solutions to social problems and contribute to social mobility and wellness.

According to the Oslo Manual, we can define innovation as

a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)"

(OECD/Eurostat, 2018 p.20)

A **business advisor at a SME financing firm based in the Netherlands** mentions that SME growth strategies should focus on:

- Innovation: bringing innovative, and more technological products to the market that align with today's market demands.
- Creation of new business streamlines consisting of the development of new products.
- Reliance on external funding: can either come from the public sector (government, EU), or from private investors that align with the manager's ideas.
- Growth through acquisition from private equity (Buy and Build strategy).

Among innovation, there are **four primary types** (OECD/Eurostat, 2018):

01 **Product Innovation:** Involves the creation or development of a new/renew product with the use of knowledge and technology.

02 **Process Innovation:** The change implemented in this type of innovation concerns techniques, materials, and programs that improve the process of production or distribution.

03 **Market Innovation:** It involves a new way of commercialising products or services, that could be related to design, packing, pricing, promotion, or positioning (new channels distribution).

04 **Organisational Innovation:** Related to the organisation itself, this type of innovation looks for developing and implementing new practices and procedures that modify the external relations and the way of work to improve productivity and reduce costs

Innovation attracts capital

"If you are working with an interesting trend, topic or opportunity - such as 5G - capital and resources follow. Gaining attention is also a resource"

according to a Project Manager at a Finnish university.

But innovation isn't only technological, with the potential existing for it to be a business mode, says a Project Manager at a Finnish university

"In addition to entrepreneurial mindset and skills to seize opportunities, this is vital." It has to start with customer-needs. Then seeing how it's reflected in the changes to the markets and how outside forces, or competitors may erode your business. Take for example that engineering SME moves from product business to service business or bundles them together. "

Other classifications involve elements as the degree of novelty, magnitude or intensity of the innovation (gradual or incremental/ radical or disruptive), as well as the nature of the innovation (technological/non-technological); its strategy (open/closed); the origin (technology push/market pull); and the origin and empowerment (top-down/ bottom-up) (EAE Business School, 2014). In business, innovation plays a significant role to develop disruptive business models, products, and management processes that can improve the performance of a firm and generate revenue.

Regarding a project manager at a Finnish university:

"A new competitor will either come from abroad and snatch your share with a cheaper and/or better product, or an entirely different player will disrupt the market."

Innovation can disrupt a market and capture market shares.

According to the Global Innovation Survey of PWC (2019), the most innovative business will grow three times faster than the least innovative business in the next five years. As key players of the economy, SMEs are drivers of innovation. In 2016, they represented 37.2% of the innovative enterprises in the European Union (JRC, 2021). Even if they do not invest highly in R&D activities, SMEs frequently develop innovation in products, processes, marketing, and the organisation itself (OECD, 2010).

In this context, innovation is becoming more and more important, a project manager at a Finnish university that is based on the Finnish example and its specific history, precisely:

"If an SME focuses on penetrating existing markets, this means they are extremely vulnerable. A new competitor will either come from abroad and snatch your share with a cheaper and/or better product, or someone entirely different player will disrupt the market. As a side note, it's so much easier for Finnish SMEs to understand what Ansoff's matrix is about in the first place. When you tried to talk about the framework to students in the business life in the 1980s-1990s, nobody understood what the hell you were talking about. There was no need to explore new markets or diversify your offering! In Finland it was not until the 1980s that the role of SMEs came to light. Until then they played a minor role in society. Pace of the world and markets was remarkably slower than what it is now. Nobody talked about entrepreneurship. Much of the Finnish business was centralized - we had large corporations that did bilateral trade with the USSR. They dominated the economy. Majority of SMEs did straightforward subcontracting for these Finnish corporations - there was no need for them to understand what customers were looking for, or how international competition looks like. They did not export directly. It was different compared to Denmark, for example, where there was real market-driven competition and local SMEs had to seek out new markets all the time. As a result of this historical context, only few Finnish SMEs had any growth culture at all. Our Soviet trade partners only looked at issues from an engineering point of view. Design, creativity, or innovativeness were not an issue. When the Soviet Union fell apart, it took down much of our international trade. Suddenly all our corporations and SMEs had to work like the rest of Western world worked. After the 1990s, the change has been immense. Because of all this, we have two sets of SMEs in Finland: Old school vs new culture that is more start-up-like, emphasizing growth, teams, talent and rapid development."

Therefore, innovation management increases SMEs' relevance to get the impact and results that organisations are looking for. Innovation management can be defined as

"all systematic activities to plan, govern and control internal and external resources for innovation"

(OECD/Eurostat, 2018)

These activities include the (OECD/Eurostat, 2018):

- Administration and use of resources for innovation (human and financial)
- Management of external collaboration
- Monitoring results of activities
- Supporting the learning from results

In addition to these activities, any organisation interested in boosting their innovation capabilities must consider top-management commitment, employees' motivation, the presence of a long-term strategy, and the allocation of resources, as main elements to guarantee success (Hamel, 2016, Rockefeller Foundation, 2013 and OECD/OPSI, 2019).

The Operation development manager in an innovation organisation at an English university says

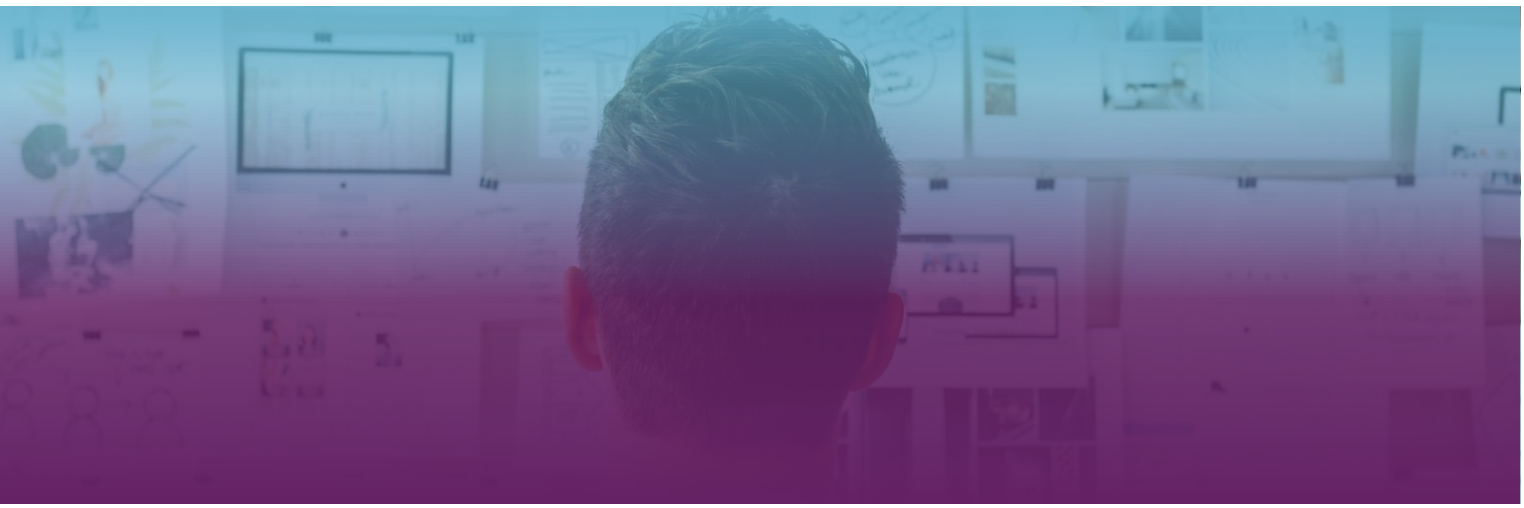
"SMEs in the engineering sector tend to follow an incremental innovation strategy. These do not understand the value of innovation and the growth path is very much reliant on traditional methods for growth." The benefits of breakthrough innovation are very important. "Although manufacturing and engineering SMEs often have their innovative inventions, they often do not necessarily understand their value. For instance, when visiting manufacturing companies, in most cases have developed their IP but remain unaware of its commercial potential and how to exploit it."

HAMEL (2006)	ROCKEFELLER FOUNDATION (2013)	OECD/OPSI (2019)
• Setting goals and laying out plans. • Motivating and aligning effort • Coordinating and controlling activities • Accumulating and allocating resources • Acquiring and applying knowledge • Building and nurturing relationships • Identifying and developing talent • Understanding and balancing the demands of outside constituencies.	• Express of Leaders Commitment • Staff members motivation • Clear, long-term vision • Financial resources allocated • External collaboration for test, execute, scale and feedback ideas • Learning from experimentation	• Management commitment • Clear role and responsibilities • Understanding of external trends and needs • Strategy and associated allocation of resources • Innovation competence development • Generic innovation processes

Table 9 *Elements to boost organisations capabilities to innovate*

Another relevant factor for innovation management is its measurement. When innovation management started to be discussed, the indicators to analyse its relevance and impact were the research and development funding, the number of acquired patents, and the number of qualified resources. After the concept gained importance, many frameworks were designed, integrating a variety of factors (Alfaro-Garcia, Fil-Lafuente, and Alfaro, 2017).

Based on the review of different frameworks, Adams, Bessant and Phelps (2006) identified seven categories that comprise different areas to measure innovation management **(see Table 9**). Thus, an organisation interested in measuring its innovation management should focus its attention on different areas, to have a broader parameter that allows it to evaluate its performance and establish future strategies.



FRAMEWORK CATEGORY	MEASUREMENT AREAS
Inputs management	• People • Physical and financial resources • Tools
Knowledge management	• Idea generation • Knowledge repository • Information flows
Innovation strategy	• Strategic orientation • Strategic leadership
Organization and culture	• Culture • Structure
Portfolio management	• Risk/return balance • Optimization tool use
Project management	• Project efficiency • Tools • Communications • Collaboration
Commercialization	• Market research • Market testing • Marketing and sales

Table 9 *Innovation management measurement areas Source: Adam et al., 2006*

Engineering, according to a project manager at a Finnish university, Project Manager at XAMK University of Applied Sciences, has a great opportunity to take in hand that allows it to innovate directly from precise knowledge:

Working with emerging trends, technologies and opportunities is the key." "Companies truly benefit from leveraging the lift that happens, when they are in the right place at the right time."

A good example can be 5G, and according to a project manager at a Finnish university:

"Let me say just one thing: 5G! It's hundreds of billions of euros worth of business opportunities for everyone. Now as of 2021, it's exactly the right moment to seize the hype and trend curve for 5G. You might be running a typical engineering SME, but when you plan to start implementing 5G, suddenly you become a forerunner. And when done the right way, you can improve productivity by 30% with 5G. This helps you to open your doors for all sorts of technology providers and partners like HEIs. Suddenly, you are interesting and take a leadership position at least as a technological forerunner. Money and networks go for those who have a vision. 5G offers all sorts of SMEs a global opportunity to leverage an emerging trend right now as of 2021. It's easy to start doing rapid pilots of all sorts."

The CEO of a Finnish manufacturing company pointed out:

"Product development is an important way to gain new customers. Product innovations lead to new growth and by investing in more efficient production."

However, technical innovation cannot do everything

"In the case of Agrilene, the strategy is essentially commercial and based on innovation," said its CEO, aiming to bring notoriety over the long term

says the CEO of an agricultural substrate company in France.

KNOWLEDGE MANAGEMENT

Knowledge management can be defined as the "coordination of all activities by an organisation to direct, control, capture, use, and share knowledge within and outside its boundaries" (OECD/Eurostat, 2018 p. 136). Regarding types of knowledge, we must distinguish between the knowledge that physically exists in facts, figures, data, and information (explicit knowledge), and the one that we acquired through experience and education and unique to each person (implicit/tacit knowledge) (Deloitte, 2015).

In this way, the practices or mechanisms to support knowledge management are focussed on three specific knowledge activities: knowledge capture, the codification of knowledge that facilitates internal knowledge flows, and activities to promote knowledge sharing inside the firm (OECD/Eurostat, 2018). To provide a wide definition and the frequent misconceptions of knowledge management, Deloitte (2015) identified and defined:

KNOWLEDGE MANAGEMENT MISCONCEPTIONS	KNOWLEDGE MANAGEMENT IS
• A stand-alone programme or project and should not be measured as such • An off the shelf product or programme that can be copied • Just about getting information and document management • Overloading people with information • Creating additional workload which will not add value • Purely a technology solution	• A way to improve efficiency and productivity to support achievement of organisational goals • Customised to the organisational structure, products, and services. • KM has an impact on systems, processes, and people. It leads to a change in employee's behaviour and attitudes • Identifying and sharing the organisation's critical knowledge • Getting the most from the intellectual capital of the entire organisation • Integrating knowledge management in daily activities, processes, and culture

Table 10 *Knowledge management misconceptions Source: Deloitte, 2015*

Knowledge management is a continuous process composed of two cycles **(Figure 1**), the first of which is focused on generating knowledge within the organisation, to be subsequently fed back through interaction with stakeholders (Colombian Government, 2021).

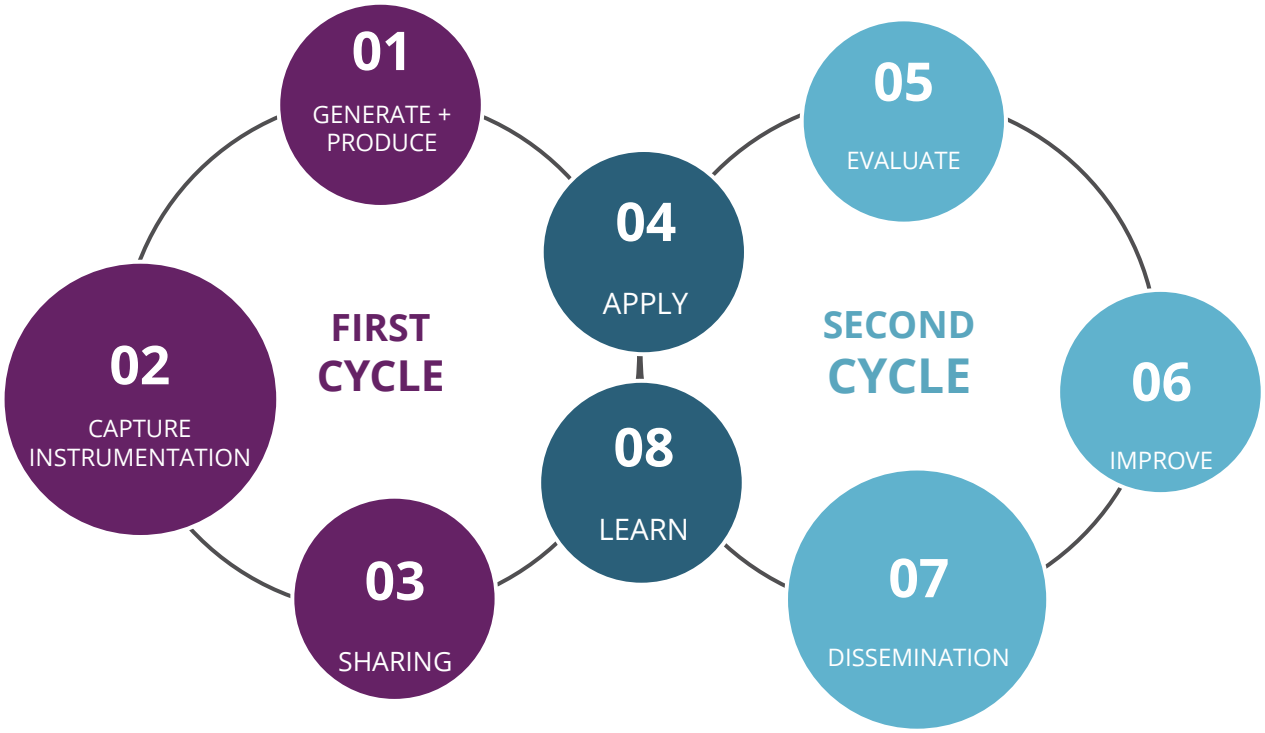


Figure 1 *Knowledge management process Source: Colombian Government, 2021*

Broadly speaking, four steps to knowledge management can be identified (IADB, 2020):

01 **Knowledge Capture:** The organisation should identify both tacit and explicit knowledge, with the intention of systematising good practices.

02 **Promote the accessibility of knowledge:** After the systematisation of information, knowledge transformed into tangible products should be gathered in one place to allow easy access, avoiding duplication of efforts for knowledge generation.

03 **Transform knowledge:** Documented knowledge can be converted into training tools for staff to enable their transition to different jobs and thus the specialisation of their human resources.

04 **Support innovation:** As an initial element, knowledge management should set the tone to generate innovation based on learning linked to operations.

Related to the phase of capturing knowledge, some of the main methods used are (OECD and Eurostat, 2018):

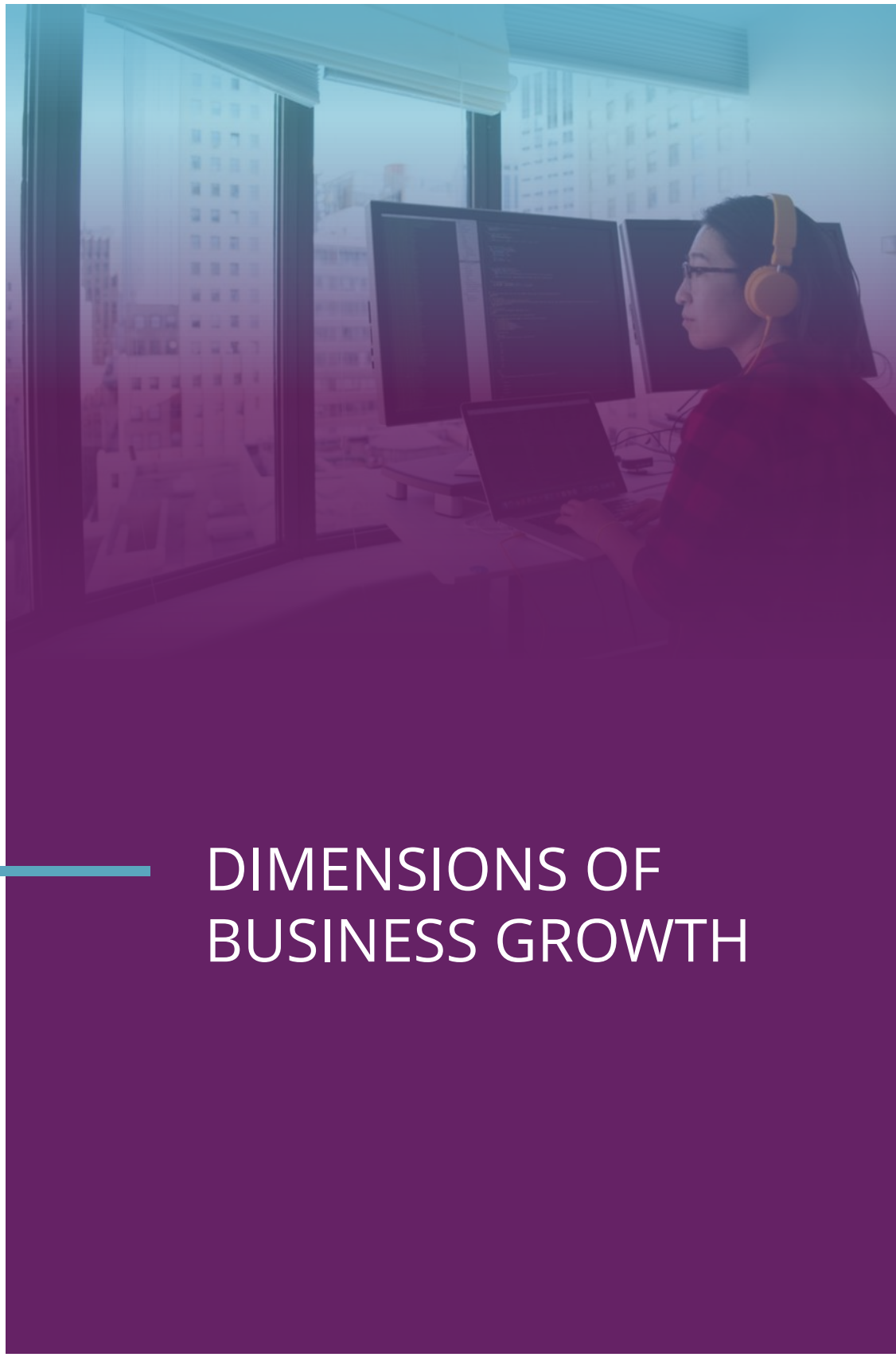
- Focus groups or innovation circles
- Teamwork in innovation projects
- Informal contacts between company members
- An open exchange of innovative ideas
- Support of different areas to address problems
- Regular meetings to discuss projects
- Iterative and Interactive projects development and delivery
- Involvement of different areas designing innovation strategies

Since innovation involves more than one process and multiple areas within an organisation, the knowledge management process should be accompanied by cooperation and mutual learning as priority elements. To develop and improve this cooperation, organisations use tool and practices. Some of them are (Centobelli, Cerchione and Esposito, 2017):

01 **TOOLS:** Audio conference/Video conference, Business Process Management Systems, Cloud Computing, Collaborative Filtering, Configuration Management System, Content Management Systems, Conversational Technologies, Crowdsourcing Systems, Chats and blogs.

02 **PRACTICES:** After Action Review, Balance Scorecard, Benchmarking, Best Practice, Brainstorming, Case Based Reasoning, Casual mapping, Coaching/Mentoring, Communities of Practice, Communities of Sharing, Contextual Inquiry, Facilitated Discussion, Focus Groups, Ideas Competition, Informal Networks, Job Rotation, Knowledge Cafes, Knowledge Elicitation, Interview, Knowledge Filtering, Knowledge Mapping, Knowledge Modelling, Knowledge Office, Learning by doing, Lesson Learned, Meeting/Task Force, Problem, Solving, Process Mapping, Project Teams Training, Rating, Seminars, Storytelling, Social Network Analysis and Work Groups.

Like innovation management, knowledge management has a direct impact on SME performance. Beyond the positive impact it can generate in terms of growth, profits, cost reduction, and return on investment, the greatest impact of knowledge management lies in human capital. Through knowledge management, creativity, entrepreneurial growth, motivation, and satisfaction of the staff can be increased



04

DIMENSIONS OF BUSINESS GROWTH

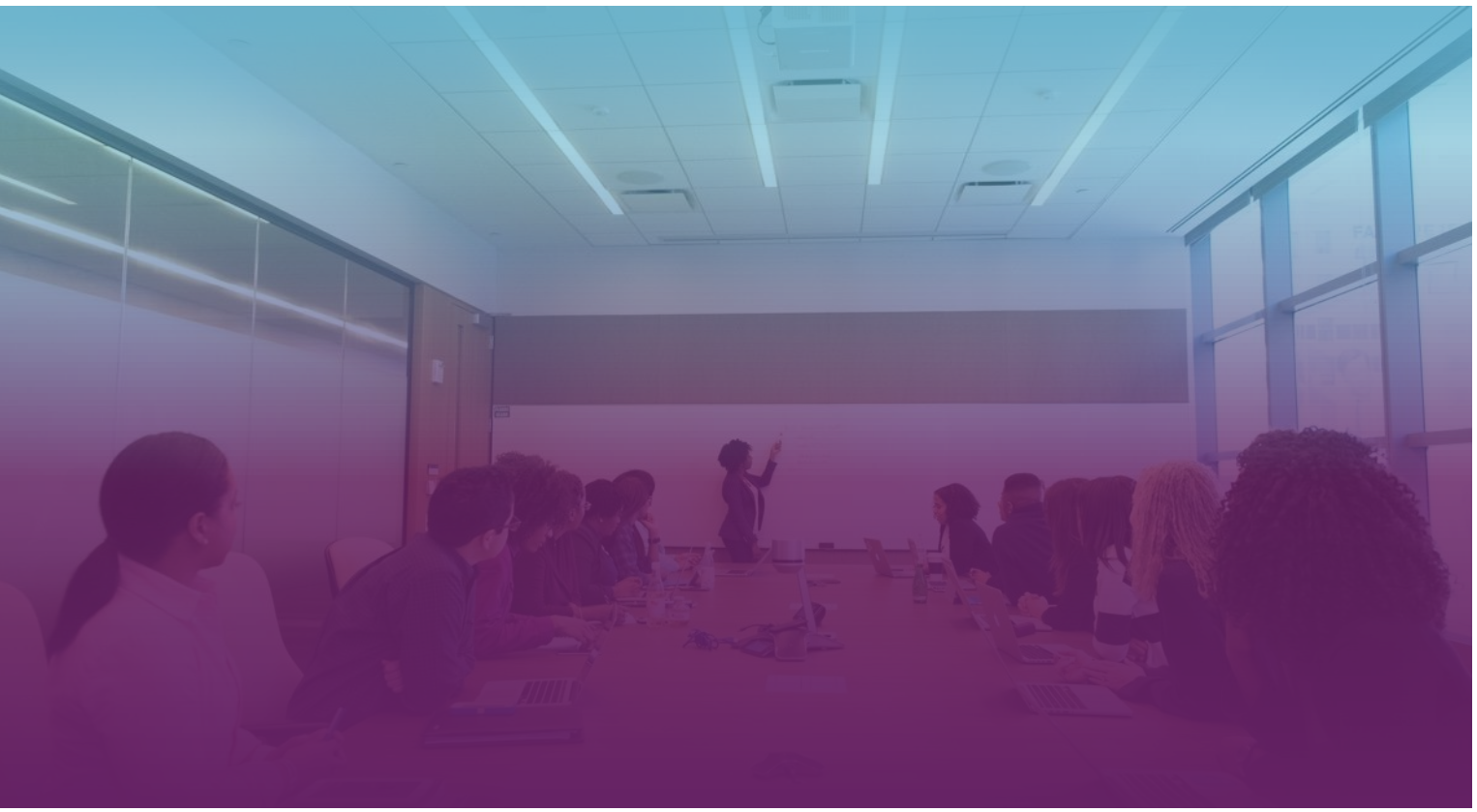
04

DIMENSIONS OF BUSINESS GROWTH

Based on the results of the research including interviews, use cases, the survey, and the literature review, it is possible to summarize the main points and highlight recommendations concerning the various topics covered in this report.

These dimensions are aimed at SME business owners and engineering SME business owners and their teams and at university managers in the context of collaboration between universities and companies and for accompanying programmes and clusters.

DIMENSION	ASPECT	ITEM
Small Business Owner	Growth	Conception of growth and reflexivity
	Support	Staff support the business owner on business decisions and personal satisfaction
		Support from business owners in other countries
		Think tanks
	Networks	Aid and mutual trust
Growth Management	Challenges	Professional and personal challenges
	Support	Post growth support
		Support for key internal positions impacted by growth
		Support strategy creation in different sectors of the company
		Getting support from HEIs
	Strategy	Supported by members of the company
		Created for each department
		Partnership strategy
Go International	Resources	Increased information about resource availability
		Awareness Campaigns
	Support	Denounce misconceptions of barriers
		Variable support based on stage of development
		Improved access for micro/ small SMEs to financial support mechanisms
		Adoption of financial support instruments
	Needs	Promote needs diagnosis to support exports
		Organising market information collection/ analysis to improve efficiency
	Foreign Investment	Internationalisation instruments aimed at imports
	Digitalisation	Promote digitalisation as a key tool for lowering barriers



DIMENSION	ASPECT	ITEM
Financing Ecosystems	Issues	Lingering issues from 2008 crisis
		Liability of newness and informational asymmetry in growth stage companies
	Types of financing	Bank credit, P2P, crowdfunding, SCF
	Policy making	Government plays a significant role in financing opportunities
HEI	Role	Pro-active and connected with local ecosystem
	Support	Support SMEs in innovation, learning, transfer and knowledge acquisition
		Collaboration activities, networks, direct knowledge provision
	Support Forms	Education
		Research
		Valorisation
		Management
		Network Support, direct knowledge provision, talent recruitment
	Support Results	Increased knowledge capital
		Increased absorptive capacity
		Increased competitive advantage
	Factors fostering Engagement	Commitment, communication, trust and leadership, availability of resources
	Barriers to Engagement	Lack of absorptive capacity, confidentiality issues, lack of resources
Innovation Management	Support	Identification of internal knowledge capital
	Training	Train management on the knowledge
	Strategy	Implement a process to capitalise on and develop knowledge based on good practices and tools

Table 11 *Dimensions of small business growth*

05

FUTURE SKİLLS

BACKGROUND

In the face of ongoing global change, which includes the rapid growth of digital technologies, globalisation as well as cuts in public funding for education (Ernst and Young, 2012), higher education institutions are being challenged to become more responsive to the knowledge and skills needs of the labour market and to better meet the demands of the employers for whom graduates will work. For economies to exploit their competitive advantage, they need workers whose knowledge and skills are well matched to the needs of the emerging labour market. However, this is often not the case. For example, it has been found that a quarter of all workers in OECD countries have less than the required skill level for their job (OECD, 2015). Adding to that, chief executive officers (CEOs) around the world cite the lack of key skills as one of the top five threats to their businesses (PricewaterhouseCoopers, 2016).

Educating skills as part of a training program

A consideration for any training program is the degree to which technical or 'hard skills' and transversal or 'soft skills' are important, and for the topic area, which specific skills are important. Whenever the function management is involved, inevitably, a set of competencies and character qualities are deemed desirable for successful execution of the task. There has been a multiplicity of studies that have reviewed the skills needed to be successful in the labour market, which will form the basis of the future skills that are recommended to be part of the training program from this report.

SKILLS FRAMEWORK

2030 skills' framework

A consideration for any training program is the degree to which technical or 'hard skills' and transversal or 'soft skills' are important, and for the topic area, which specific skills are important. Whenever the function management is involved, inevitably, a set of competencies and character qualities are deemed desirable for successful execution of the task. There has been a multiplicity of studies that have reviewed the skills needed to be successful in the labour market, which will form the basis of the future skills that are recommended to be part of the training program from this report.

Figure 2 *Future of Education and Skills: Education 2030 Framework (OECD)*

Future skills

The World Economic Forum has collaboratively assembled a set of 16 skills necessary for the labour market in 2030, which they divide into foundational literacies (often referred to as 'hard skills'), competencies (often referred to as 'soft skills') and character qualities (sometimes referred to as 'emotional intelligences' or the 'growth mindset'). These skills are designed to support future employees in their jobs to apply core skills to everyday tasks through the application of these technical skills, whilst support how they approach complex challenges and also how they approach their changing environment (transversal skills).

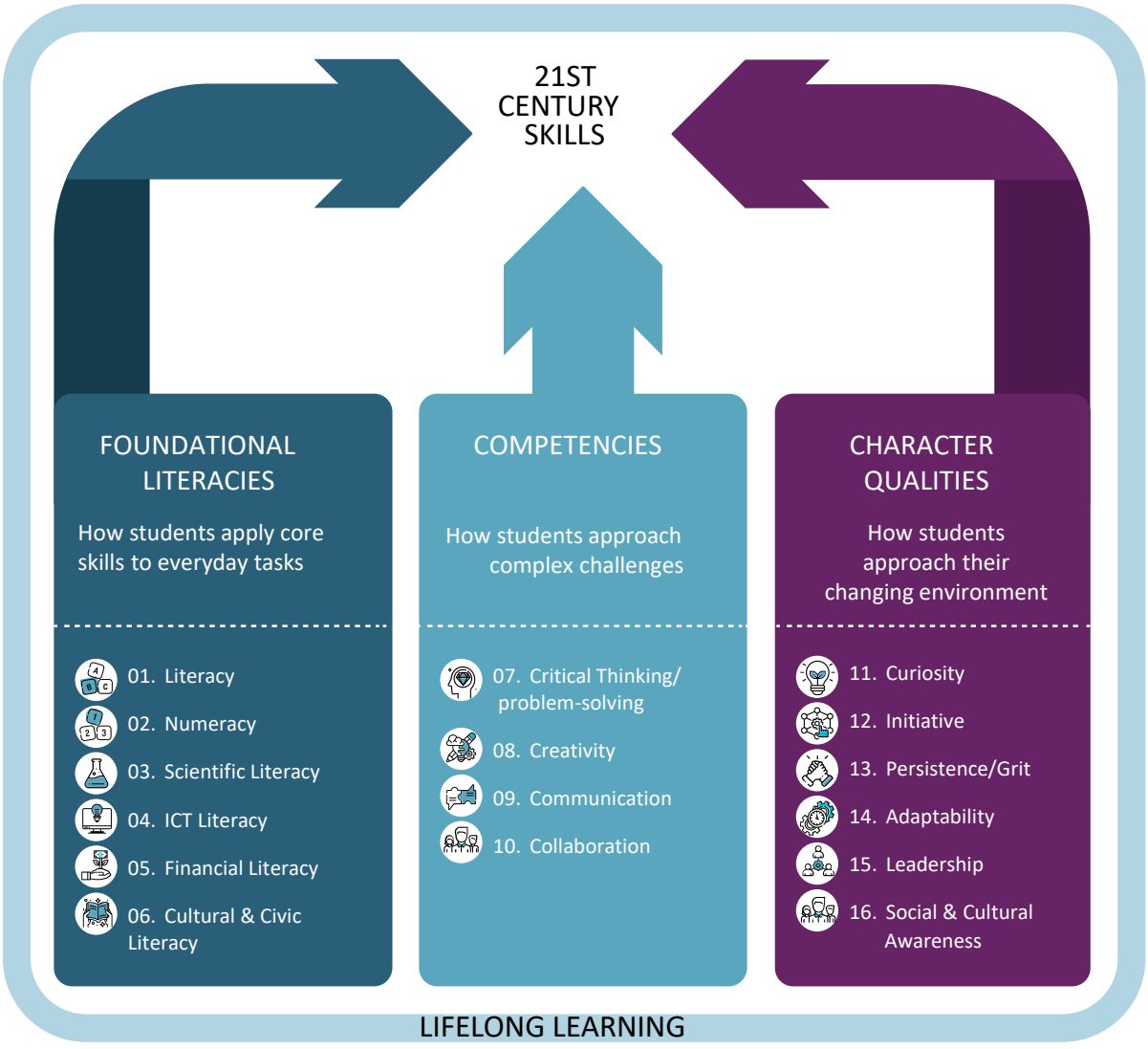


Figure 3 *21st Century skills*

Additionally, the same organisation identifies a corresponding set of methods for how 21st Century skills can be developed. These provide an illustrative set of examples for the application of these skills in an educational context.

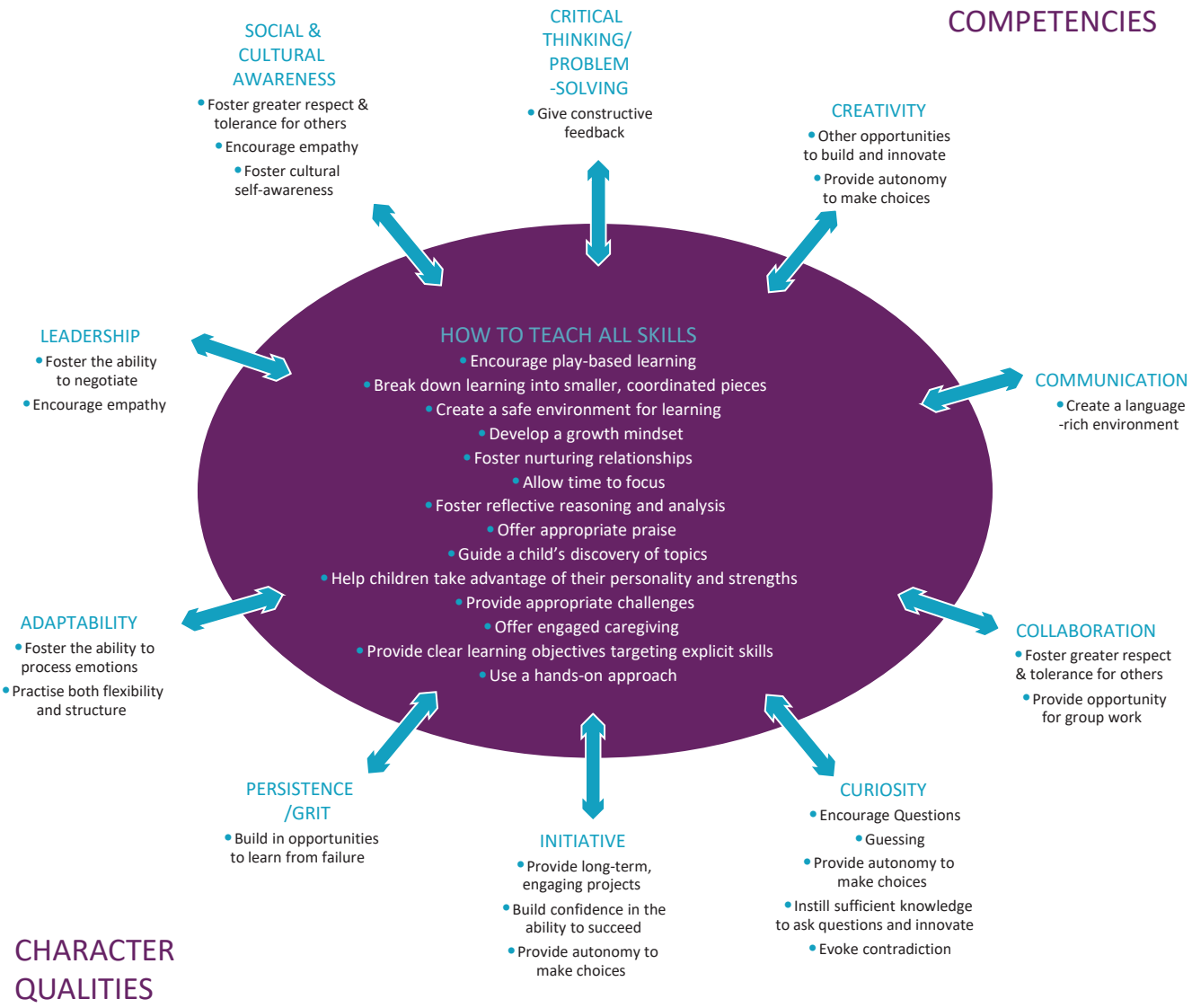


Figure 4 *21st Century skills and how they can be developed*

Engineering habits of mind

Seeking to identify important skills for engineering, The Royal Academy of Engineering in the UK created the Engineering Habits of Mind. It provided a more specific focus on the skills needed by engineering to articulate the unique attributes of engineers as well as an illustration of how to educate for engineering. They identify both a set of learning habits ('of mind') and a series of Engineering habits ('of mind'), which summarise this engineering makeup.

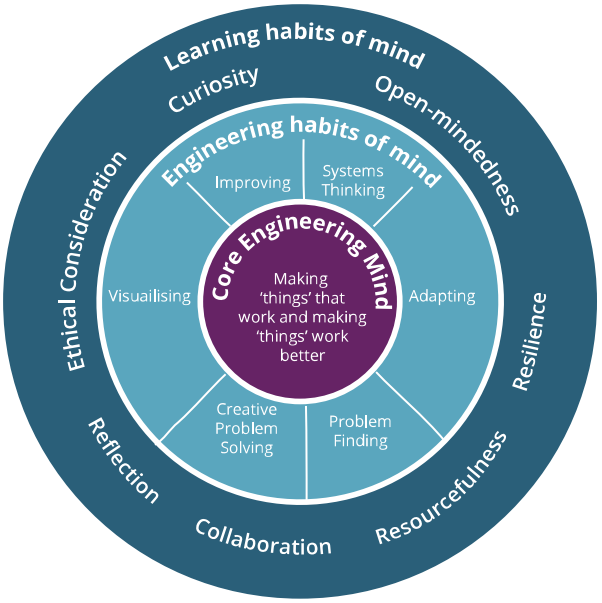


Figure 5 *Engineering habits of mind*

Entrecomp

Lastly, a model that has been adopted by the European Commission as an effective framework for those "interested in learning, teaching, and fostering the knowledge, skills, and attitudes that make up entrepreneurs". Given the importance and focus of the SME Growth project on entrepreneurial knowledge and skills, the framework provides a useful reference for the construction of the skills needed in the training program.

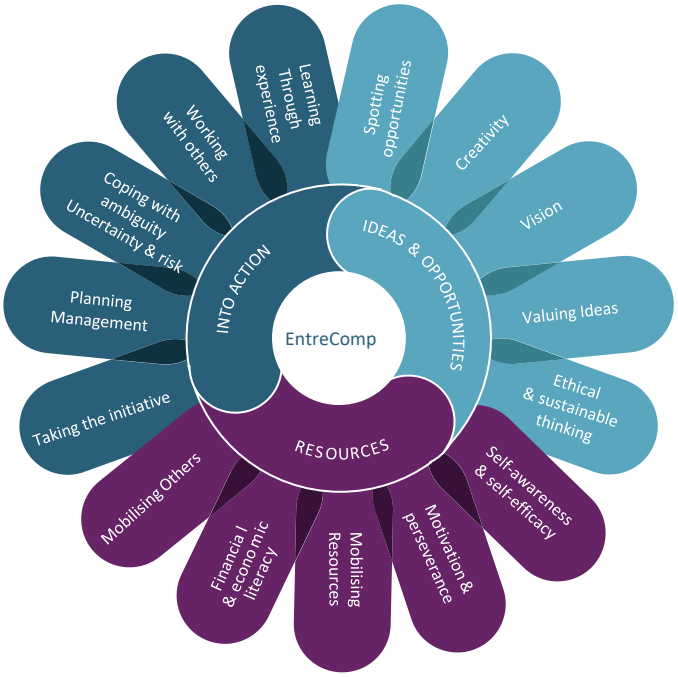


Figure 6 *EntreComp Framework (European Commission)*

06

INSİGHTS

06

INSIGHTS

In terms of general spirit, the following are the main insights to draw a coherent and efficient program to support SMEs in engineering, addressing point by point the studied topics which are all essential in the framework for this type of company.

TOPIC

SME Owners

Within the **framework of a coaching program**, it is necessary to:

01 Consider the entrepreneur's conception of growth and his or her objective in growing the business. This is not a concept with a unified definition. On the contrary, it is complex and depends on the values and culture of each individual.

02 It is also necessary to accompany the entrepreneur so that they can become aware of the reasons why he/she wants to grow, so that his/her approach is a rational one and not based on a conception of growth for growth's sake or an imperative imposed by the mythology conveyed by society.

The future skills most relevant to this subject area are critical thinking skills, emotional intelligence, creativity and capabilities for communication and collaboration. SME owners should be supported at a personal level to help them develop soft skills like critical thinking; because the first step for the success of an entrepreneurial adventure, is to step back on the old prejudices, in order to build an internal and external coherence. Then he will avoid reproducing any inaccurate or prejudiced patterns. Secondly, understanding oneself and how that relates to the vision and direction of the company for growth demands emotional intelligence. To redesign how their organisations could develop, entrepreneurs should be accompanied to rediscover their capacity to be creative as well as, in this context, to understand and exploit all the assets of their ecosystem, demanding capacity to communicate and collaborate.

Managing growth

Within the framework of a coaching program, it is necessary for the **entrepreneur / manager to understand**:

01 It is important to prepare for growth to understand the likely changes, the anticipated structure, desired culture and what it takes to execute the plan. Additionally, it is important to understand the likely impact of growth on the existing assets and the core competencies of the company, but also the likely shortcomings and ensure that the organisation is ready to support a new phase of life.

02 It is important to manage closely the growth phase of the company as the structure evolves, when the reality on the ground impacts the strategic plan and personnel, when hazards arise and when people interpret and execute the strategic plan.

03 That after a growth phase, it is important to have a phase to ensure that the growth has been well integrated and that the company, at the end of this phase, is still solid from a financial, structural and logical perspective.

The future skills most relevant to this subject area include developing perseverance, strategic thinking and social and cultural awareness. Leaders and managers, including SME owners, should be supported to develop perseverance, as it is a common mistake to deviate from the initial plans and general coherence of the company out of panic if the market does not respond quickly or appropriately to the plans. Thus, strategic rigor, controlled adaptability, and social and cultural awareness are essential to assure growth management and business owners should be helped to acquire those kinds of skills.

Go International

Within the framework of a coaching program, it is necessary for **the entrepreneur / manager to understand:**

01 The importance of international growth as a path to growth. However, international growth has a strong impact on the structure and the entrepreneur must be accompanied to understand the stakes of international growth and how its impacts on the structure in depth.

02 Be strongly supported to coordinate the right levers for growth, in a very concrete way. Whether in terms of concrete skills, ability to build and lead a growing team or in terms of financing and business models.

03 The modalities of growth itself, as it is possible to penetrate a foreign market in many ways. There is no automatism and the modalities of internationalization must be posed in coherence with the design of the entrepreneurial organization.

The future skills most relevant to this subject area are soft skills such as collaboration and communication skills as well as technical skills such as financial and economic literacy. It is true that using international business as a lever for development requires a lot of very functional skills. However, to acquire and articulate these skills intelligently, entrepreneurs and managers need to acquire a number of soft skills. Engaging and mobilizing others is one of the first ones, as there is no question of going it alone with partners. The entrepreneur must be supported to use the levers of public policies, but also international networks and local contacts. Among the tools, there must be an awareness of how to use financial and economic literacy, which enables the organisation to mobilize resources.

Financing

Within the framework of a coaching program, it is necessary for the **entrepreneur / manager** to understand:

01 External financing is not necessarily the first step in financing their growth, as counterintuitive as this may seem. Because the value is already to be found in the articulation of internal assets, skills and processes by structuring them differently in order to leverage and maximise the return on their assets.

02 How they plan to finance their growth. This includes accompanying the entrepreneurs so that they are able to explain with precision the financing plan, the objective they wish to reach, the details of the plan to be financed, the points to which the financing will be allocated and the expected return on investment for these financings.

03 Soft skills are important to accompany the financial skills to create the logic of financing and how to articulate them, how to get them.

The future skills most relevant to this subject area include technical finance knowledge as well as partnering, creativity and taking initiative. Finance, in particular, may seem like an extremely functional part of the business, where only technical knowledge and rigor count. But this is not only the case as innovation in financing can lead to business model innovation that can lead to growth. Also, SME owners need to be supported to spot opportunities, either in terms of financial partnerships or in taking advantage of the opportunity. Thus, against all odds, helping them to develop, within the framework of financial modelling, the capacities of creativity, vision, valuing ideas of their teams, ethical and sustainable thinking is an original and interesting way to accompany them in a more efficient way.

Ecosystems and Cluster

Within the framework of a coaching program, it is necessary for the **entrepreneur / manager** to understand that:

01 Building and maintaining contacts, networks, clusters and an ecosystem is vital for entrepreneurs, but requires foresight, dedication and persistence to access that value.

02 To take full advantage of an ecosystem means acquiring a certain number of soft skills, such as the ability to understand the ecosystem and its dynamics and to imagine possible partnerships in a logic of co-construction and establishment of strong links.

03 Collaboration with a cluster or a support structure is also not so obvious, neither in the perception of the value that the company can get from it, nor in the translation within the support structure. It is essential to be accompanied through this process not only on a functional basis of navigating access to the ecosystem, but also on a personal basis. In order to uncover concrete knowledge within an ecosystem, a cluster or any other support structure, the development of certain soft skills, such as communication and collaborating as well as persistence, must also be considered and supported through this evolution.

The future skills most relevant to this subject area include understanding of networks, clusters and ecosystems, collaboration competencies as well as social and cultural awareness and self-management. When entrepreneurs make the choice to join a cluster or a support structure, it can be a difficult process and there are difficulties for them to get the full value out of it. Also, it is necessary to foresee the information systems, the digital and physical layers, as well as the internal relations between the members and with the structure to allow them to progressively take the initiative, plan and manage the assets and opportunities that they can draw from these collaborations, launch others, work with others, learn through experience as well as transmit it widely.

Innovation and knowledge management

Within the framework of a coaching program, it is necessary for the entrepreneur / manager to understand that knowledge is the first asset of the company. It is this knowledge that makes all the value and on which the innovation capacities of a company are based, whether for incremental or disruptive innovations; business model innovations or technological innovations. Therefore, a coaching program must absolutely provide the anchoring of all the work done previously through the various points already addressed in the company in order to:

01 make it readable

02 easily understandable

03 easily communicable

04 easily usable

The future skills most relevant to this subject area include identifying opportunities and strategic thinking, as well as analytical and problem-solving skills: Here, the ability to spot opportunities, creativity, vision, valuing ideas, ethical and sustainable thinking are important. However, these abilities are often externally oriented or new. The first step is to accompany entrepreneurs so that they are able to evaluate what is already present within the company and to extract all the value by making it perceptible, clear, transmissible and reproducible. It is important to analyse and structure the innovation and knowledge as an asset of the company.

COLLABORATION WITH HIGHER EDUCATION INSTITUTIONS

HEIs are a key source of skills and knowledge for growing organisations. However, to be able to support them properly, it is necessary for both the SME and the HEI to be prepared.

The SME should ensure that they:

- Understand how and through which channels HEIs can provide benefit to a growing company
- They have awareness of the culture of the HEI partner and what they might be seeking from the collaboration
- Are clear about what they are seeking from the HEI partner and how the HEI partner supports their growth strategy
- Determine the right contact point for the right activity as there is often a different contact point for innovation (research), recruitment (education) and other engagement activities (knowledge transfer)
- First seek to build trust to develop a relationship with a longer-term perspective

The HEI should ensure that:

- Cooperation with industry is aligned with the missions of the HEI and that there is a top-level commitment
- They have the capacity to fully engage with an appropriate level of resources
- There is clarity about who SMEs should contact when commencing a relationship that will analyse the needs of companies and match them with internal skills to design a coherent support pathway
- There is clarity about which activities, offers and possibilities exist corresponding to the needs of growth SME
- The possibility of R&D cooperation for companies is straightforward so that they can jointly finance research
- The borders between companies and HEI become more porous and regular physical links and common information systems are developed
- Bureaucratic processes and administration must be simplified to match the culture of the companies
- They are proactive in offering turnkey solutions to companies including funding for their projects.

The future skills most relevant to this subject area for SMEs are scientific literacy, curiosity, initiative and leadership as well as creativity and critical thinking. SMEs need to find a way of balancing their short-term needs with a long-term vision to work with HEIs on cooperative R&D, whilst having a base of scientific literacy is essential for building a basis of cooperation in research. For recruitment, SMEs need to be creative in terms of how they work with HEIs to identify and recruit the best talent. Strong leadership and initiative is required for working with universities generally in order to ensure a successful outcome. The future skills most relevant to this subject area for HEIs are financial and economic literacy, mobilising resources, motivation and perseverance and self-efficacy.

Universities must be able to mobilize much more important soft skills than they do now. It is not a matter of installing a very functional administrative and communication system, but of being able to structure the ecosystem in which they are immersed in order to make sure that the actors of this ecosystem perceive all the value that they are able to provide, but also understand the assets that this value can represent for them individually and of course, how to seize it. Thus, universities themselves should develop a certain number of soft skills such as mobilising others, financial and economic literacy, mobilising resources, motivation and perseverance, self-efficacy.

CONCERNING THE GENERAL AND FUNCTIONAL DESIGN OF THE FRAMEWORK OF COACHING

Commitment by the SME leadership is essential. Indeed, if entrepreneurs themselves or the decision-makers are not personally involved in the coaching program, the impact will be substantially reduced. Ideally, we think that two or more people from the one organisation would attend or be involved at various stages to properly embed the learning within the organisation.

But for this involvement to be possible, it must be surgical, because business leaders have little time. Thus, we should propose an effective coaching program will only mobilize the company managers by alternating different pedagogical interventions:

01 **MASTER CLASSES** - to transmit knowledge and guidelines, and

02 **INDIVIDUAL COACHING** - This should be delivered on a personal basis as a manager but also on a functional basis to help them translate the elements discovered in master classes within their structure

03 **SEMI-SUPERVISED SHARING/NETWORKING** - so that everyone can discover how others extract the full value of the program within the structure is important.

Because entrepreneurs can find it very exciting to listen to other entrepreneurs, it is tempting to bring in outside speakers to illustrate the best practices of each theme. However, it is always difficult to translate the good practices of one entrepreneur to that of another industry within one's own structure. Ideally, this type of intervention would be delivered in the framework of workshops during which the external speaker could, on the basis of his own practices, help the other entrepreneurs to apply it directly within their structure and not to intervene in a top-down way.

Regarding the length of the program, it should be sufficient to address all the phases of business growth, from the preparation of growth, its follow-up, as well as its landing. The other advantage of planning a longer program is that it allows for the real development of links between the leaders, which is not the case in a program that is too short, and to accompany the company through some steps in their growth plan.

In terms of the profile of attendees, it is important to vary them throughout the various forms of engineering so that the leaders of SMEs in engineering do not find themselves locked in only with people from their own sector. However, one should not try to drive the entirety of the relationships between the leaders either. For some will also feel the need to find in others similarities with their own type of structure.

Lessons learned during COVID 19 can be applied when it comes to delivery of the program. Over the last year, we have been forced to apply the use of digital delivery, which has also allowed the development of good practices. Digital brings a lot of fluidity, especially for leaders who may be available and allows them to take advantage of the value of the program, both in interactions with other leaders, but also with members of the program, when they really have the availability.

Also, provide a no-code application or community facilitation platform that includes:

- the profiles of participants and speakers
- possibilities of exchanges (chat) and direct contact requests
- videos of the master classes and slides summarising the best practices and concepts
- functional information about the program and contacts

These solutions are both inexpensive and allow you to gather digitally the value in one place to make it accessible at any time. Also, it would be very interesting on a European program, to plan both moments of physical sharing region by region, tours to visit participants from other European regions, but also digital plenary sessions bringing together participants at a European level, provided that these sessions are reserved only for moments of sharing and co-construction and by reducing as much as possible the top-down aspects of this type of meeting, because the value here, by being in contact at a European level, is not to listen to something together, but to share and exchange on the specificities.

Finally, to deepen the European specificity of such a typology of accompaniment, it is essential to design the program taking into account the specificities of the regional differences.

Thus, when designing the program, it is important not to overlook the fact that:

- the regions offer different possibilities
- some are very focused on one industry rather than another
- the participants may have to create alliances at a European level with other participants and to do so, they absolutely need to be accompanied perfectly in understanding their market within the other European regions.

FRAMEWORK FOR TRAINING / LEARNING MODELS AND SKILLS

Based on the European Cluster Excellence Initiative, the European Foundation for Cluster Excellence provides training programmes for developing value chains and managing clusters. They use case method teaching, using both the experiences of the participants and outside case studies from highly regarded business education programmes. The core programme provides participants knowledge in cluster economics, initiatives, analysis of industry and value chains, and benchmarking/ internationalisation of SMEs, providing the core concepts and techniques for each section.[26] A second existing training programme is the Cluster Mentoring from The Next Society. This programme provides training by matching experienced managers and experts with less experienced managers who are looking to develop their cluster management. The benefits are two-fold, with the mentees receiving good practices on topics discussed during the training, while mentors often receive new ideas for their organisation from the mentees.[27] Other existing programmes include: the International Course for Cluster Management from Oxford, a short term programme for developing theoretical and practical training for cluster management and development; the "How to make your cluster a success" training from Quercus Group, training participants in different ways to ensure successful cluster development; and the Competitiveness School for Leading Regions, Clusters and Cities from EFCE and IESE Business School, providing policy best practices for economic policymakers in addition to providing methodologies and frameworks for managers to develop strategic competitiveness (Horák and Matosková, 2018).

Several accelerators in Europe provide guidance to engineering SMEs. EdTech gives SMEs access to human-centred digital education. The education ecosystem is designed to support businesses as they bring prototypes into tangible products while providing them access to general business support and market access support. As a hybrid incubator-accelerator, it provides start-ups and SMEs mentoring, education, and training, while providing analysis from experts to provide impact assessments for investors and clients in short-cycle.[28] The Astropreneurs Accelerator provides technical and business mentorship and funding support for business ideas. Additionally, it grants partner SMEs access to their network of space "astropreneurs" and runs workshops and other initiatives. Funding support comes from public and private application opportunities, to be used to overcome hurdles to market access.[29] Insurtech Munich allows SMEs to effectively fit a product into its market, providing safety and transparency to customers particularly in terms of financial stability. Through events, the SMEs relate to industry decision makers, industry experts, mentors, and investors, and bringing in insurers to assist with financial security. The combination attempts to future-proof the industry through various programmes to guide tech companies with answers and solutions to pressing needs without sacrificing capital.[30] NEPTUNE is an accelerator providing cross sectoral and cross border industrial value chain mixing. It provides support to SMEs through grant vouchers to finance idea and project development in addition to supporting innovation and entrepreneurship in individual and target groups of SMEs. This offers SMEs the opportunity to expand into global markets. They provide expertise through coaching and mentoring services, providing an initial assessment, and monitoring the day-to-day functions of the SME. The vouchers provide technology and technical services, such as product testing, adaptations, and development.[31]

In addition to traditional accelerators, there are several support mechanisms for accelerators at the European level. First, the European Innovation Council (EIC) helps narrow the spending gap in innovation within the EU, which now sees less than 1/3 of the total venture capital investment when compared to North America. This funding gap is particularly important for start-ups and SMEs, who miss out on critical funding. The EIC pilot accelerator provides direct and blended investments into SMEs and start-ups through grants (up to 2.5 million euros) and equity investments (up to 15 million euros) as well as providing coaching, mentoring, and networking opportunities. Secondly, Interreg Europe provides a database for major accelerators on the continent to offer SMEs easy access (European Commission, 2021).

26 European Foundation for Cluster Excellence, http://www.clusterexcellence.org/cluster-excellence-trainings-overview (program overview)
27 The Next Society, https://www.thenextsociety.co/cluster-mentoring (program overview).
28 IMPACT Ed Tech, https://impactedtech.eu/impact-edtech/ (program overview).
29 ASTROPRENEURS, https://astropreneurs.eu/ (program overview).
30 InsurTech Hub Munich, https://www.insurtech-munich.com/ (program overview).
31 NEPTUNE, https://www.neptune-project.eu/About-Neptune (program overview).

TRAINING/ LEARNING MODEL	GOALS	METHOD	OUTCOMES
European Foundation for Cluster Excellence (training programme)	• Develop value chains and managing clusters	Case method teaching, using experiences of participants, outside case studies from business education programmes	Knowledge in: • cluster economics initiatives • analysis of industry and value chain, • benchmarking/ internationalisation of SMEs
Cluster Mentoring from The Next Society (training programme)	• Help less experienced managers develop cluster management	• Matching experienced managers/experts with less experienced managers	• Mentees receiving good practices on topics discussed during the training • Mentors often receive new ideas for their organisation from the mentees
EdTech (accelerator)	Give SMEs access to human-centred digital education	• Support businesses turning prototypes into tangible products • General business support and market access support.	• Mentoring, education and training • Short-cycle analysis and impact assessments for investors and clients
Astropreneurs Accelerator (accelerator)	Provide: • technical/ business mentorship • funding support for business ideas.	• Grant partner SMEs access to their network • Workshops, other initiatives. • Public/ private funding	• Overcome hurdles to market access.
Insurtech Munich	• Allow SMEs to fit products into markets, • Provide safety/ transparency	Events to connect SMEs to: • Industry decision makers • Experts, • Mentors • Investors • Insurers	• Future-proof industry by guiding tech companies with answers and solutions to pressing needs

TRAINING/ LEARNING MODEL	GOALS	METHOD	OUTCOMES
NEPTUNE (Accelerator)	• Provide cross sectoral/border industrial value chain mixing	Providing support through: • Grant vouchers • Supporting innovation and entrepreneurship in individual and target groups • Expertise through coaching/mentoring services • Providing initial assessments • Monitoring day-to-day functions of the SME.	• Allows SMEs to expand into global markets • They provide
European Innovation Council (support mechanism)	• Narrow the spending gap in innovation within the EU	• Direct/blended investments • Grants up to 2.5 million euros • Equity investments up to 15 million euros • Coaching • Mentoring • Networking	• Give SMEs access to critical funding that they may miss out on
Interreg Europe	• Ease connections between SMEs and accelerators	• Provides a database for major accelerators in Europe.	• Better networks/connections

Table 12 *Trainings, accelerators and support mechanisms in Europe*

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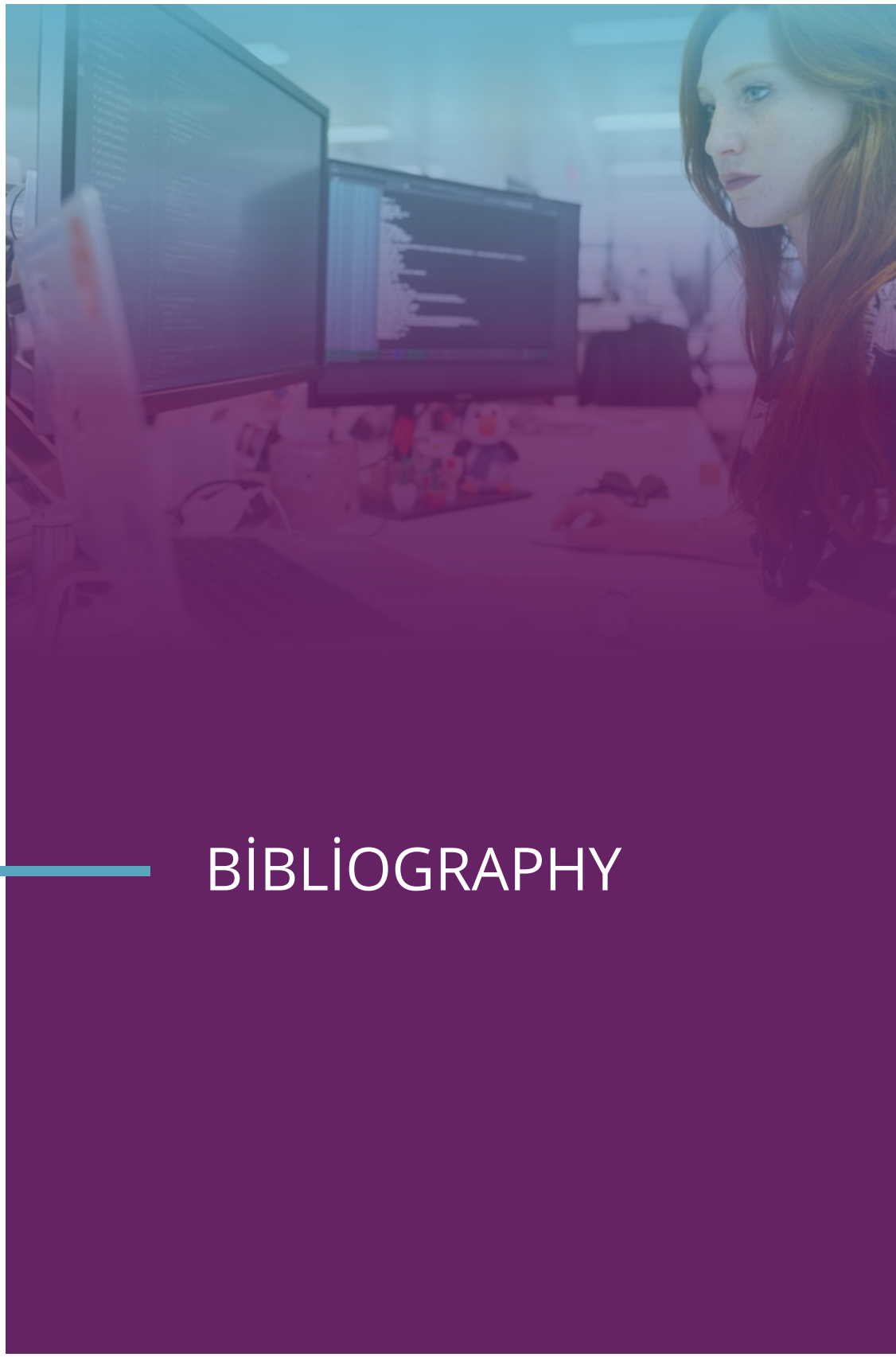

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