How do I get future-ready?

A playbook for consulting engineers in times of uncertainty

efca
European Engineering Consultancies

Content

Foreword

The world we live in is characterised by rapid change, profound crises, and a relentless search for innovation. In the midst of this constant change, Europe's consulting engineers face a particular challenge: How can we ensure our future viability in the face of a declining supply of skilled labour and exponentially improving AI solutions? How do we need to transform our business model to remain a sought-after partner in the construction industry?

Our time is marked by upheavals in almost every field. From the impact of the global pandemic to the urgent need to make our lifestyles much more sustainable, to the revolutionary digital technology that is changing our world - we are facing a plethora of change activities. But in these stormy seas of transformation, we must emphasise the urgent need for cultural and technological change.

The basis for our future viability lies in our adaptability and willingness to change. We must not stand still, but actively face the challenges. One of the breakthrough technologies that will have a significant impact on our industry is artificial intelligence combined with quantum computing. This combination promises advances that seem unimaginable today. It will massively change the way we work as consulting engineers and still we have a few short years to prepare for it.

To meet the increasing demand for design and engineering services, we need to seamlessly integrate technology into our work processes. Our order books are already well filled and additional demand, particularly in adapting to changing climatic conditions and reducing carbon emissions, will further increase the pressure on our industry. With skilled labour in short supply, this necessary increase in productivity will only be possible through the smart and determined use of advancing digital technologies.

EFCA's Future Trends Committee in collaboration with the Centre for Strategy and Scenario Planning at HHL Leipzig Graduate School of Management and Philipps-University Marburg Research Group of Strategic and International Management, has built this report by conducting a survey with 204 participants from 133 companies representing 23 European countries and interviewing 14 executives and high-level experts of leading European engineering companies and other industries. I sincerely thank all the participants and supporters who contributed their time and knowledge.

This report is a valuable tool to consider and take the right steps today. It offers guidance in a time of change and uncertainty and provides insights into the ways and means to prepare for the future. Europe's consulting engineers are about to embark on an exciting journey of innovation and progress. Let us embark on this journey together and lead our industry into a future shaped by knowledge, technology, and sustainability.

I would like to express my special thanks to the core team that made this project successful. I am very grateful for the teamwork and the strong support of Sue Arundale, Franziska Mohr, Iana Motovilnic, Serhan Bakir, Maurizio Boi, Inés Ferguson, Maximilian Grauvogl, Despina Kallidromitou, Antoine Pigot, Géraldine Tondreau, Nikola Matić, Marcin Mikulewicz, Ralf Bufler, Stefano Susani, Richard Resvoll, Torsten Wulf, Philip Mundlos and Lana Wagner. Without their great commitment, this report would not have been possible.

Jeffrey Seeck
Chair of EFCA - Future Trends Committee,
Member of Verband Beratender Ingenieure VBI
(German Association of consulting engineers)

Challenges for consulting engineers

Across the vast landscape of the construction industry, an industry that has long been known for its stability and established practises, the winds of change are blowing. They challenge the status quo and require forward-thinking professionals to adapt to not be left behind. The very foundations of the construction industry are currently reshaped by technological innovation, product revolution, and transformative business models, demanding a fresh approach from consulting engineers.

Our two previous projects have shown that the consulting engineering industry is facing far-reaching changes and times of high uncertainty. Specifically, in our first report "Which way to go? – Strategic scenarios for consulting engineers in times of high uncertainty" published in 2021 we outlined alternative pictures of the future for the industry. The goal was to get a better idea of what the future could look like for consulting engineers and create awareness for potential changes in the industry. Based on the HHL-Roland Berger approach to scenario-based strategic planning including a survey of high-level experts from the industry and external stakeholders, we identified two critical uncertainties influencing the future state of the industry – 'project demand' and 'harmonisation / openness of markets' –, while sustainability, digitalisation, and harmonisation were regarded as key trends.

From these developments, new roles for consulting engineers emerge, which were addressed in our second report "Seizing opportunities in times of disruption – How the consulting engineering industry can overcome the challenges of digitisation, harmonisation, and sustainability – a disruptive scenario analysis" from 2022. It focused on how consulting engineers can position themselves in a disrupted future. Such disruptions result from technological innovations, such as BIM, modularised construction, off-site manufacturing, drones, AR/VR, AI, and 3D printing, from product innovations particularly in the fields of sustainability, climate resilience, and decarbonisation, and newly emerging business models driven by software companies,
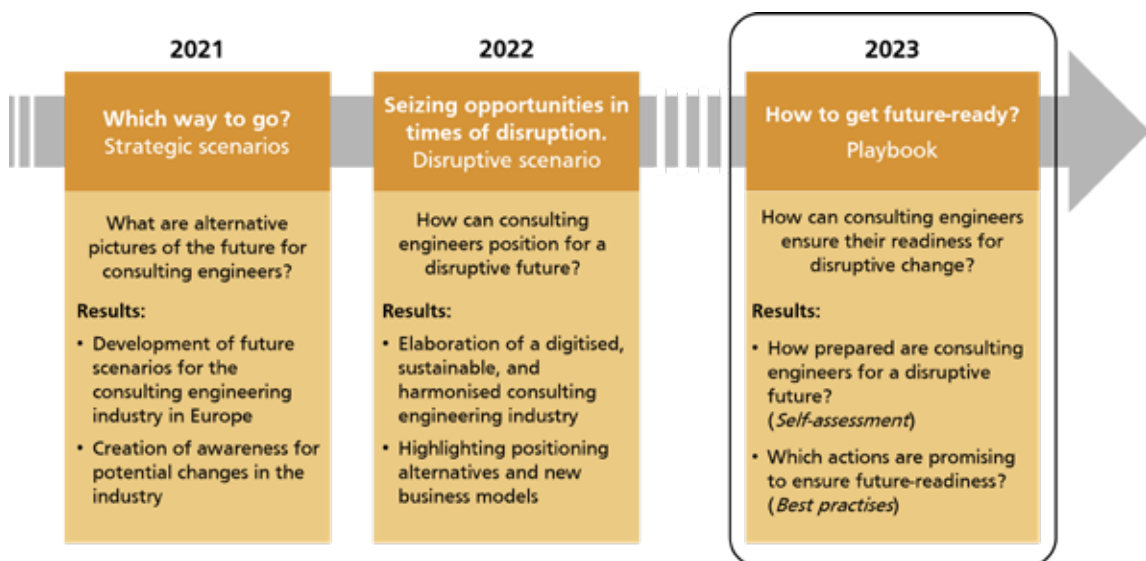

Figure 1: Trilogy of the EFCA reports from 2021, 2022, 2023

contractors, but also startups with a focus on data and advanced analytics. We highlight that, given these changes, consulting engineers must take on new roles and rethink traditional ways of working. The report identifies possible alternative business models for consulting engineers.

In addition, recent reports indicate that the economic and political situation is weighing on the short-term outlook for the construction industry (Deloitte, 2023; Roland Berger, 2022 a). Interest rates are on the rise, inflation is still high, and there are ongoing geopolitical tensions. Despite all this, the industry is showing resilience in the medium and long term.

This last report completes the trilogy by exploring how consulting engineers can prepare for the radical changes lying ahead of the construction

industry. Specifically, this report addresses the question: How can consulting engineers ensure their readiness for disruptive change? For this purpose, we explore the capabilities that consulting engineers need for a disrupted future and we highlight actions that companies commonly used as benchmarks have taken to ensure their future readiness. Additionally, we provide self-assessment tools which you can use to examine how prepared your company is for a disrupted future. Thus, this last report in our row of three is designed as a playbook, that should serve as a compass and help guide you through the uncharted territories of disruption and empower you to seize the opportunities that lie ahead. It will explore the strategies, actions, and essential capabilities that will help consulting engineers to position themselves at the forefront of the shifting industry.

Cultural change as a requirement for future readiness

Many studies, including EFCA's recent Future Trends Reports, have addressed the changes that lie ahead of the engineering consulting industry resulting from technological innovations, such as BIM, modularised construction, off-site manufacturing, drones, AR/VR, AI, and 3D printing, from product innovations particularly in the fields of sustainability, climate resilience, and decarbonisation, and from newly emerging business models driven by software companies, contractors, but also startups with a focus on data and advanced analytics (Deloitte, 2022; Roland Berger, 2022 a, 2022 b, 2017; McKinsey & Company, 2020, 2019). These disruptions put consulting engineers under pressure and require them to act decisively to adapt and stay competitive in this changing environment.

Yet, some consulting engineering companies are slow to adapt to these changes. This so-called inertia has been observed in many industries and has several causes:

1 Some companies do not react to change because they ignore it – sometimes even deliberately. The late adoption of electric engines by the European automotive industry is an example of such an ignorance of change that allows new competitors, such as Tesla, BYD or NIO, to grow. In the engineering consulting industry such ignorance of change is rare.

2 Other companies do not adopt changes in their industry, because they do not regard them as important.

3 Even more relevant is a third reason for inertia: even if the perception is accurate and changes are acknowledged as important, companies may lack initiative to adapt to new technologies. This can result from a lack of resources, the cost of change, the difficulty to balance innovation and traditional tasks, or the willingness learn and try new things. The slow adoption of AI by many consulting engineers reflects this cause of inertia.

4 Sometimes, even when they understand and want to change, companies might struggle to do so in time due to the fast and complex nature of change, a reactive approach, thinking problems are unavoidable, or not having a clear plan. Often, the desire for a perfect solution can result in missing the opportunity to get started. This can also lead to delayed or no change. In short, choosing a direction when faced with change can be difficult.
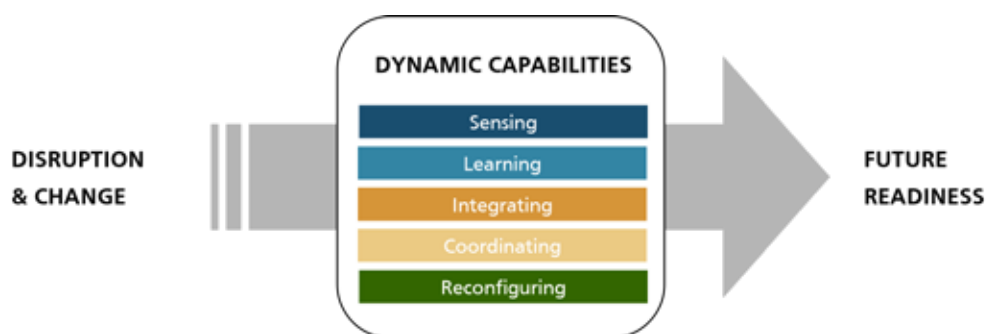

Figure 2: Dynamic capabilities as tool for future readines

Organisational inertia and a slow reaction to change have been associated with declining market shares and a loss of competitive advantage, lower firm performance, and ultimately firm failure (Hambrick & D'Aveni, 1988). Yet, inertia is by no means inevitable. As leading management thinker Peter Drucker claims: "The greatest danger in times of turbulence is not the turbulence; it is to act with yesterday's logic." (Drucker, 2012). Therefore, to effectively deal with change, companies need to develop capabilities that foster cultural change. The capabilities that research in strategic management has identified as helping companies to bring about such organisational and cultural change are called dynamic capabilities (Helfat et al., 2007).

Dynamic capabilities enable companies to adapt and thrive in a changing environment (Helfat & Winter, 2011; Teece, 2007). Specifically, companies need to be able:

- to sense changes,
- to learn,
- to integrate new knowledge,
- to coordinate change,
- and finally, to reconfigure themselves (Pavlou & El Sawy, 2011).

Together, these capabilities form the construct of dynamic capabilities which is regarded as a fundamental driver of a company's ability to deal with uncertainty and disruption, and ultimately survive such environments. Thus, dynamic capabilities represent the enablers of future readiness for consulting engineers (Schilke, Hu, & Helfat, 2018).

In this playbook, we will show, how dynamic capabilities influence the future readiness of consulting engineers, how they can assess their future readiness, and which actions they can take to foster their future readiness.
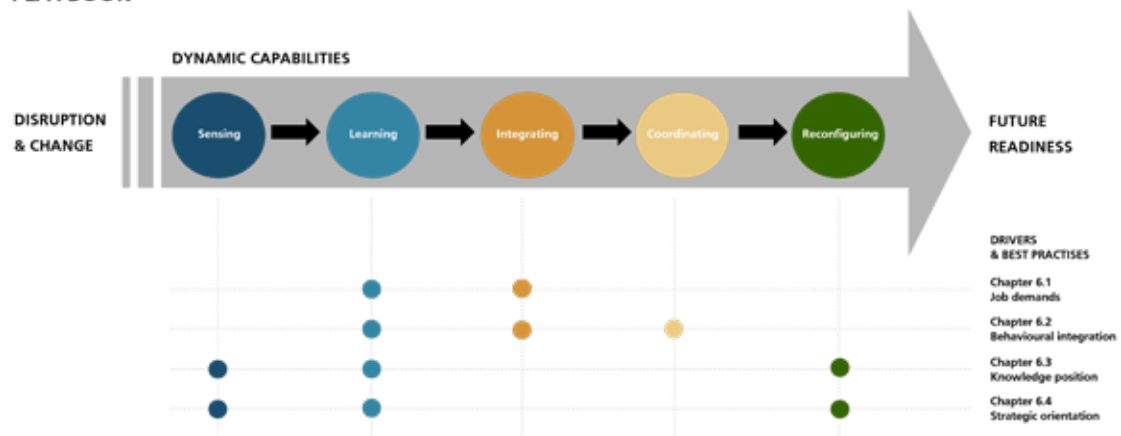
PLAYBOOK

Figure 3: Playbook Structure

Dynamic capabilities as the cultural enablers of future readiness

Dynamic capabilities enable "a firm to alter how it currently makes its living" (Helfat & Winter, 2011), because they allow companies to identify opportunities and risks in the changes happening in the industry and environment, to exploit opportunities and to adapt accordingly. They are defined as the abilities helping companies to extend, modify, and reconfigure themselves to adapt to a changing environment. Dynamic capabilities are a well-known construct, widely studied and scientifically recognised in academia and practise.

In changing environments, it is critical for companies to be quick, flexible, and innovative in their response to disruption. They need to be able to reinvent themselves and grow through transformation. Under such conditions of change, dynamic capabilities provide a path to achieve a competitive advantage. They are critical to a company's long-term success and positively related to firm performance, innovativeness, resilience, coping with change.

Sub-categories of dynamic capabilities

Dynamic capabilities consist of five sub-categories of capabilities, that are:

DYNAMIC CAPABILITIES

Sensing	Learning	Integrating	Coordinating	Reconfiguring
Identify, interpret, and take advantage of opportunities	Refresh existing skills with new knowledge	Embedding new knowledge through collective sense-making	Coordination and implementation of measures, resources and operations	Appropriate, timely and efficient adaptation to the respective environment

Figure 4: Dynamic capabilities framework

Sensing: Identify, interpret, and take advantage of opportunities

Sensing refers to keeping an eye on the market trends and new technologies to spot and grab opportunities. It involves three key routines:
- gathering market information, which includes identifying customer needs, market opportunities, responding to trends and recognising limitations,
- interpreting this information to understand what it means for the business,
- and using this information to create plans to seize opportunities.

Sensing changes and emerging technologies is vital for adapting a changing environment and taking advantage of opportunities.

Learning: Refresh existing operational capabilities with new knowledge

Learning is the process of using knowledge to improve a company's capabilities. It involves four key steps:
- gaining knowledge,
- applying and deepening understanding,
- using innovative problem-solving techniques and creative thinking to transform knowledge,
- and using this this transformed knowledge to pursue new initiatives and take advantage of market opportunities.

When a company identifies a market opportunity, it has to learn and improve its existing resources to create products or services that can capitalise on that opportunity. Learning helps to find solutions and create new knowledge, which will ultimately allow the company to do things differently and take advantage of market opportunities.

Integrating: Embed new knowledge through collective sense-making

Integrating means bringing individual knowledge to the collective level of the company. This process involves three key routines:
- sharing individual knowledge across the company,
- visualising the different activities within the company and how they work together,
- and improving group abilities.

As individuals learn new things and gain skills, they bring these assets to the companies. But just owning these skills isn't enough to make the company better. To make the company better, everyone needs to work together and share their skills and ideas to create new and improved abilities that help the company.

Coordinating: Coordinate and implement resources and activities

Coordinating refers to the ability to manage resources and activities effectively to create new operational capabilities. It involves four key routines:
- assigning the appropriate resources to tasks,
- identifying the right person for the right job,
- finding complementarities and synergies among different tasks and resources,
- and guiding everyone toward a common goal.

Good coordination is essential when transforming capabilities to ensure that everything works together seamlessly. This helps companies to create new operational capabilities that can adapt to changing market conditions and seize opportunities.

Reconfiguring: Adapt timely and efficiently to the respective environment

Reconfiguring refers to the appropriate, timely, and efficient adaptation to chances in the environment. It involves three key routines:
- understanding the market environment and identifying changes that need to be made,
- reconfiguring the resources in a way that will enable the company to meet these changes,
- and developing and implementing new products or services that can take advantage of these changes.

This is vital for success in today's dynamic and fast-paced business environment. Companies that can adapt their resources to match customer needs and the market and create new products and services have a better chance of succeeding.

Organisational effects of dynamic capabilities

Dynamic capabilities are associated with several positive effects in companies. First, they serve as a catalyst for innovation by fostering new ideas and keeping pace with industry trends. Companies that have a high level of dynamic capabilities continuously scan their environment to identify new trends, customer needs, and technological advances. In this way, they gain valuable insights that drive the development of new ideas. When a company emphasises a culture of learning, it creates an environment for employee growth and business development. Such a culture encourages curiosity, experimentation and a growth mindset that enables the company to adapt to new challenges and embrace change and innovation. Ultimately, this leads to better performance.

Second, dynamic organisational structures and a proactive attitude toward change help seize opportunities as they arise. These include decentralised decision-making processes, self-management where appropriate, and flat hierarchies for rapid decision-making. Such dynamic structures increase effectiveness, efficiency, and adaptability by promoting flexibility, creativity, and responsiveness. They also foster employee motivation and loyalty and create an environment for seizing opportunities.

Third, dynamic capabilities reduce financial risk and prevent organisational failure by helping companies manage technological change and unforeseen events. Companies with high dynamic capabilities continuously monitor the market and their internal capabilities. This makes it easier for them to anticipate and manage disruptions. It helps them mitigate the negative effects of disruption and remain competitive in times of change.

These benefits, including effective resource allocation, learning opportunities, agility, and flexibility, strengthen a company's competitive advantage. Our study shows that companies with high levels of dynamic capabilities outperform those with low levels of dynamic capabilities in the areas of marketing, research and development, strategy development, and organisational innovation. Furthermore, these companies show higher financial performance. These findings emphasise the importance of dynamic capabilities to for companies to thrive in a rapidly evolving business environment.

Dynamic capabilities in the European consulting engineering industry

In a survey of European consulting engineers, we found heterogeneity in the level of dynamic capabilities. The average company showed high levels of dynamic capabilities measured on a 7-point Likert scale, scoring around 5 (out of 7) for each dynamic capability. However, there was a substantial gap between the top 10% and the bottom 10% in the industry. The top 10% scored around 6 (out of 7) over all five dynamic capabilities, indicating a strong ability to perceive and respond to changes and opportunities in the business environment. In contrast, the bottom 10% scored only around 2 over all five dynamic capabilities, suggesting a limited ability to perceive and respond to environmental changes. This could be a concern for their competitiveness and long-term success. These findings are comparable to those of other industry studies, such as those of small- and medium-sized enterprises (SMEs) in the information technology industry (Rashidirad & Salimian, 2020) or large corporations in a variety of industries (Wilden et al., 2013).

SENSING
Top 10%: 6.0
Average: 5.4
Worst 10%: 2.5

LEARNING
Top 10%: 5.6
Average: 5.0
Worst 10%: 2.0

INTEGRATING
Top 10%: 6.2
Average: 5.6
Worst 10%: 1.4

COORDINATING
Top 10%: 6.2
Average: 5.6
Worst 10%: 1.4

RECONFIGURING
Top 10%: 6.0
Average: 4.8
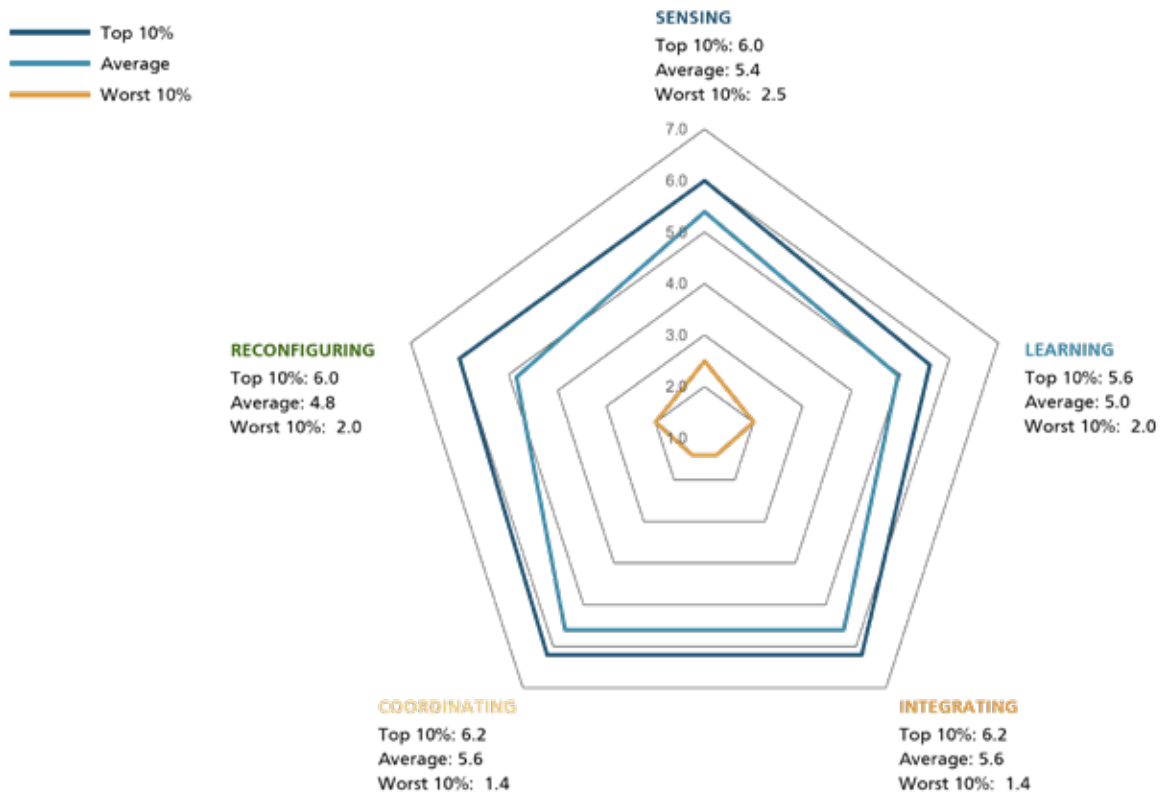Worst 10%: 2.0

Top 10%
Average
Worst 10%

Figure 5: Survey results showing dynamic capability levels in the European consulting engineering industry

Self-assessment: What is the level of dynamic capabilities in your firm?

To what extent is your company future ready? To assess your company's future readiness, determine the level of dynamic capabilities in your company using the following self-assessment. It may be helpful to have several people from different levels, including the middle and lower management, in your company complete this assessment and combine results to include more perspectives and avoid bias. To determine the level of dynamic capabilities, indicate how much you agree with each of the questions in the five dynamic capabilities categories.

DYNAMIC CAPABILITIES

SENSING CAPABILITIES	Strongly disagree						Strongly agree
We regularly scan the environment to identify new business opportunities.	1	2	3	4	5	6	7
We regularly assess how changes in the business environment will impact our customers.	1	2	3	4	5	6	7
We often review our product/service development efforts to ensure they align with customer needs.	1	2	3	4	5	6	7
We devote a lot of time in implementing ideas for new products/services and improving our existing products/ services.	1	2	3	4	5	6	7

LEARNING CAPABILITIES	Strongly disagree						Strongly agree
We have effective processes to identify, value, and import new information and knowledge.	1	2	3	4	5	6	7
We have adequate methods to assimilate new information and knowledge.	1	2	3	4	5	6	7
We are effective in transforming existing information into new knowledge.	1	2	3	4	5	6	7
We are effective in utilising knowledge into new products/services.	1	2	3	4	5	6	7
We excel at developing new knowledge that has the potential to influence product/service development.	1	2	3	4	5	6	7

INTEGRATING CAPABILITIES

	Strongly disagree						Strongly agree
We actively contribute our individual input to the group.	1	2	3	4	5	6	7
We have a comprehensive understanding of each other's tasks and responsibilities.	1	2	3	4	5	6	7
We are fully aware who in the group has specialised skills and knowledge relevant to our work.	1	2	3	4	5	6	7
We carefully interrelate our actions to each other to meet changing conditions.	1	2	3	4	5	6	7
Group members manage to successfully coordinate their activities.	1	2	3	4	5	6	7

COORDINATING CAPABILITIES

	Strongly disagree						Strongly agree
We ensure that the output of our work is synchronised with the work of others.	1	2	3	4	5	6	7
We ensure an appropriate allocation of resources (e.g., information, time, reports) within our group.	1	2	3	4	5	6	7
Group members are assigned to tasks based on their relevant knowledge and skills.	1	2	3	4	5	6	7
We ensure that there is compatibility between group members expertise and work processes.	1	2	3	4	5	6	7
Overall, our group is well coordinated.	1	2	3	4	5	6	7

RECONFIGURING CAPABILITIES

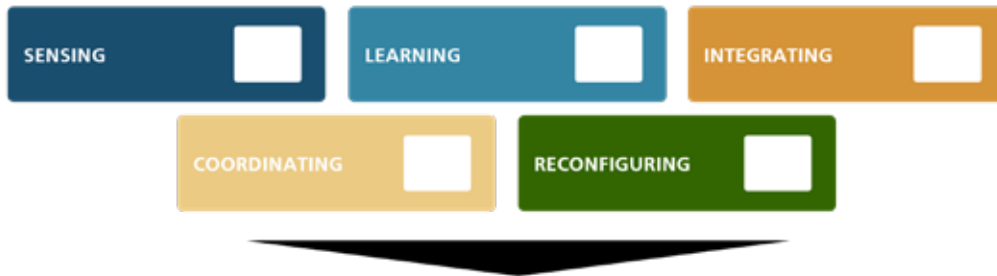|	Strongly disagree						Strongly agree
We can successfully reconfigure our resources to come up with new productive assets.	1	2	3	4	5	6	7
We often engage in resource recombination to better match our product-market areas and our assets.	1	2	3	4	5	6	7

To determine the level of dynamic capabilities of your firm, calculate the average values for each sub-capability and write the number in the box on the top of each capability. Sum them up to derive the total score for dynamic capabilities. A cumulative score of 30 and higher indicates a high level of dynamic capabilities, while a score of 6 and lower indicates weaker dynamic capabilities.

To determine the level of each dynamic capability category, mark the score for each capability in the following diagram. The orange line in the diagram represents a low level of the respective capability, while the blue line represents a high level of the respective capability.

DYNAMIC CAPABILITIY ASSESSMENT RESULTS

If you identify weaknesses in one or more capability, use the following chapters to understand what drives these capabilities and how to develop them. A self-assessment and best practises are provided for each dynamic capability driver.
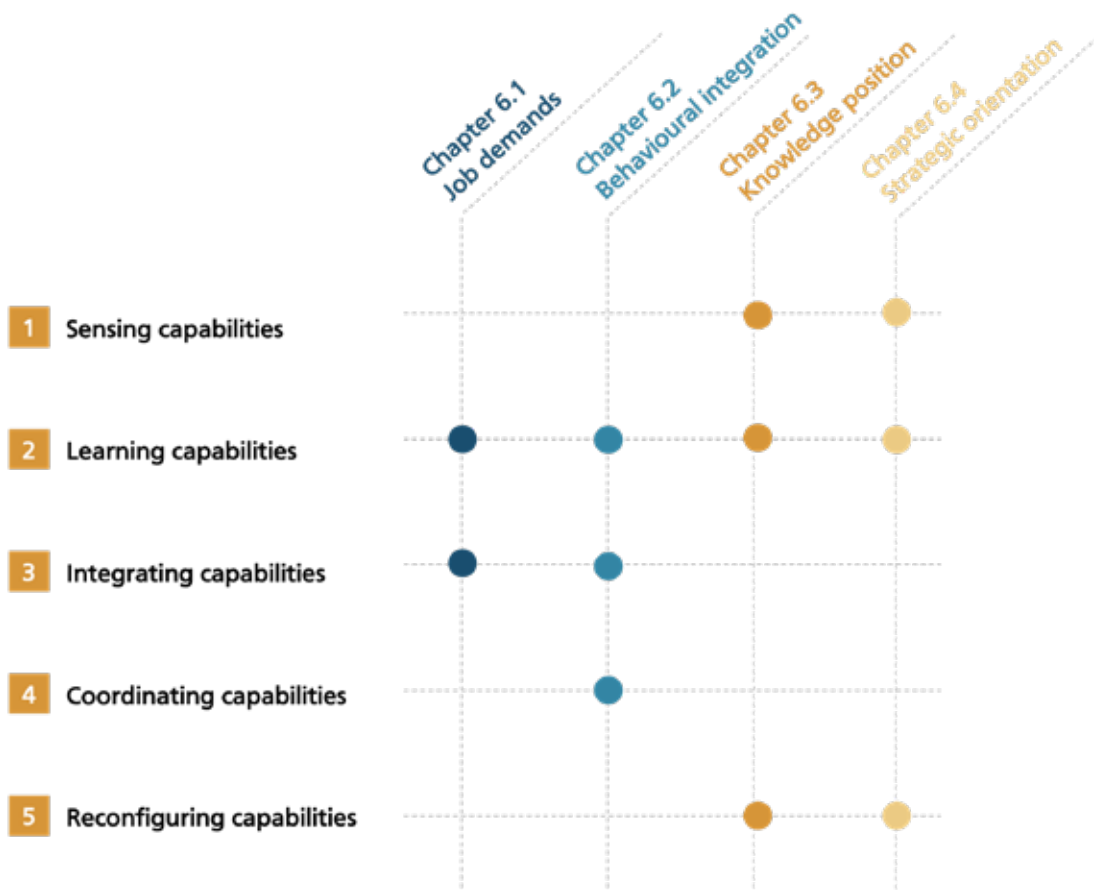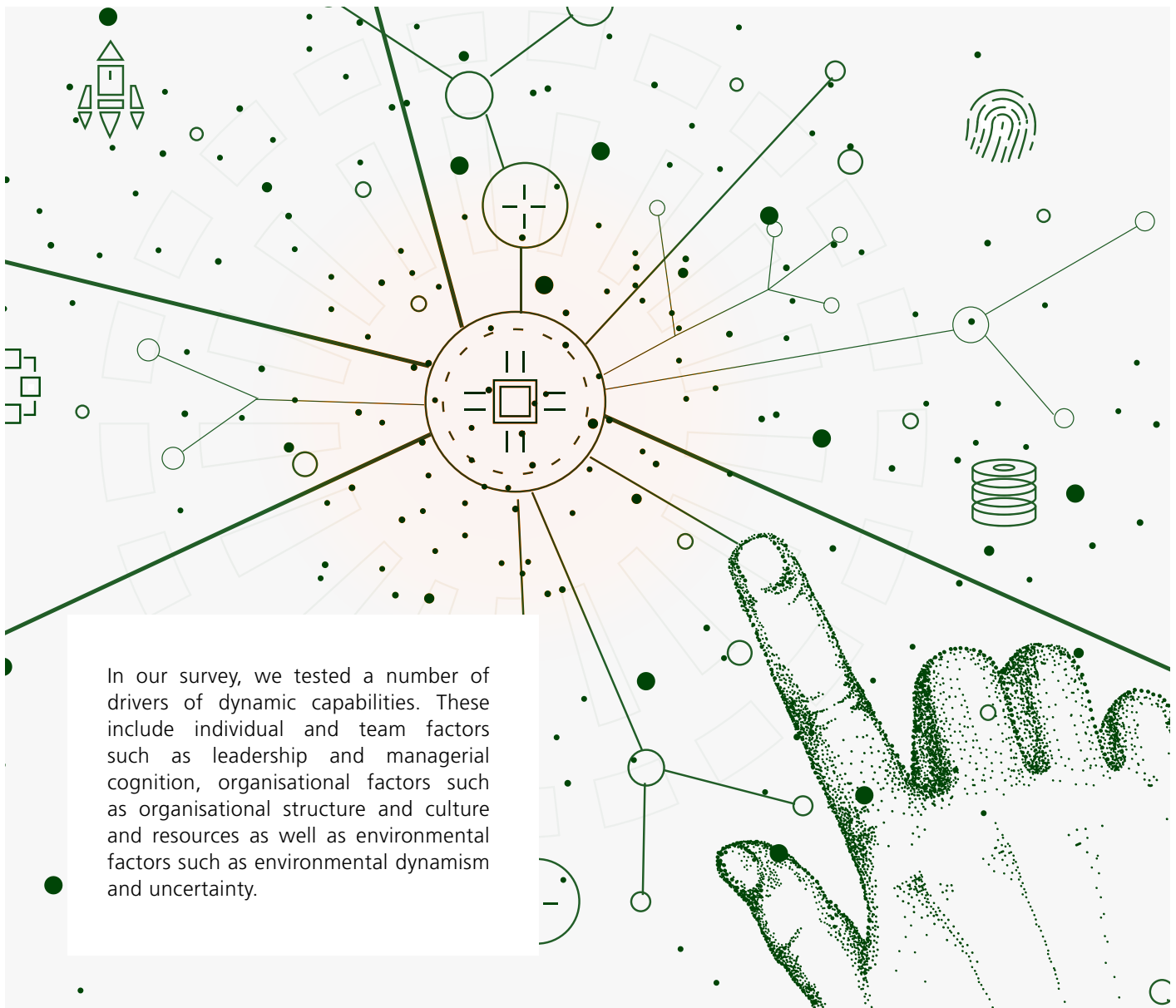

Figure 6: Chapters Overview

Implications for consulting engineers

The competitive landscape in a digitised, harmonised, and sustainable industry

In our survey, we tested a number of drivers of dynamic capabilities. These include individual and team factors such as leadership and managerial cognition, organisational factors such as organisational structure and culture and resources as well as environmental factors such as environmental dynamism and uncertainty.
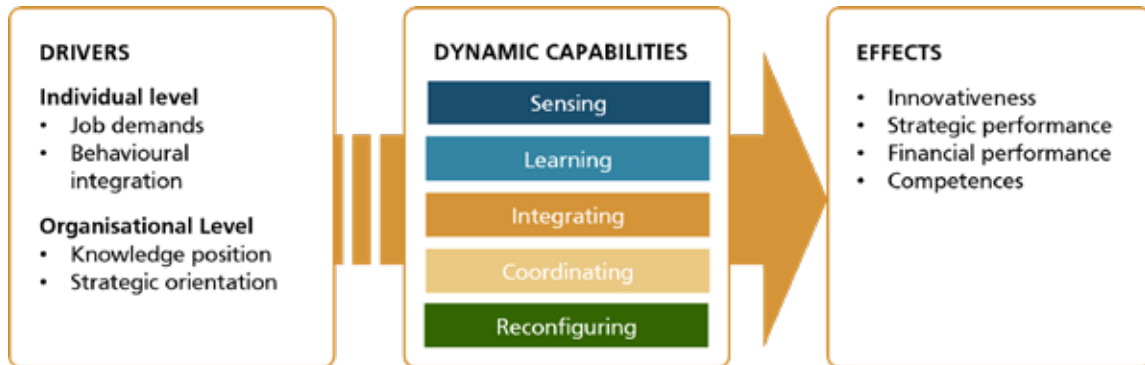
Figure 7: Drivers and effects of dynamic capabilities

Our study found that external factors do not significantly impact dynamic capabilities of consulting engineers. Instead, the development of dynamic capabilities requires internal cultural change. This means that future readiness of consulting engineers is not determined by less controllable, external influences, but can be driven through management actions. Specifically, we identified four drivers that largely determine the dynamic capabilities of consulting engineers: job demands, knowledge position, behavioural integration, and strategic orientation with an emphasis on analysis and innovation.

In the following, we will show what they are and how they influence dynamic capabilities, how the level of these drivers can be assessed, and how benchmark examples used these drivers to ensure future readiness.

Taking time for reflection (job demands)

What are job demands?

Job demands refer to factors that cause psychological stress in a company, such as high workload, time constraints, and the need to work quickly and intensely. These stressors can vary in their impact on the company due to individual experiences and work-related events. When employees or managers within a company experience a sense of time pressure, anxiety, and worry associated with job tasks, it is called "felt job stress." However, the presence of stressors does not automatically lead to felt stress. People can cope with stressors and mitigate their effects through cognitive and behavioural strategies.

How do they impact dynamic capabilities?

High job demands can hinder employees' ability to identify opportunities, develop creative solutions, and integrate them into the company. This is because it takes time and resources and when faced with high job demands, there is often not enough of either.

Our survey showed that when job demands are lower (even just by 1 point), a company tends to be better at learning (it increases by 0.205 points). This is because learning requires time to turn information into new knowledge and apply it to the development of new services or impactful knowledge. Job demands can also slow down the process of integrating this new knowledge into the company (when job demands decrease by 1 point, integrating capabilities increase by 0.242 points). Again, the process of integrating can be consuming.

In summary, this means that it is important for companies to help their managers and employees to balance their workload, so they have time to think and pursue new ideas, as this enables innovation.

To achieve this, companies must recognise that innovation and internal improvement initiatives are just as important as delivering high-quality projects to customers. By creating a culture that values innovation and encourages employees to think creatively, companies can stay ahead of the competition and adapt to changing market conditions.

Self-assessment: Job demands

To assess the level of your job demand you can use the following self-assessment tool. For each question, rate how often you feel that way. Use the provided scale of 1 = never to 7 = always.

Add up the numbers for each question and divide by eight. Write the number in the box at the top of assessment.

A total score below 3.3 indicates a low level of job demands, while a total score above 5.4 indicates a high level of job demands. If you find high level of job demands, you can use the following best practises to learn how other companies manage the job demands of employees and managers.

JOB DEMANDS [   ]

	Never						Always
Do you have to work fast to fulfil your task?	1	2	3	4	5	6	7
Do you have too much work to do?	1	2	3	4	5	6	7
Do you have to work extra hard to finish a task?	1	2	3	4	5	6	7
Do you work under time pressure when finishing a task?	1	2	3	4	5	6	7
Can you do your work comfortably?	7	6	5	4	3	2	1
Do you have to deal with a backlog at work?	1	2	3	4	5	6	7
Do you struggle with the pace of work?	1	2	3	4	5	6	7
Do you find the workload challenging?	1	2	3	4	5	6	7

Finding balance: How Scrum helps employees at NET Engineering to manage increasing job demands

In recent years, NET Engineering has seen a strong demand for its consulting engineering services primarily driven by significant infrastructure investments in Italy, which are expected to continue in the coming years. "We are 140 people at the moment, but there is a demand for projects that would require 300 people," says Silvia Furlan, CEO of NET Engineering. The company's ability to meet these demands is due to its employees' unwavering passion and strong belief in the company's potential, which fosters a sense of ownership and commitment. "Our people are very much passionate, and they really believe in the company, in what we can do," she explains.

However, Silvia Furlan also knows how important it is to balance job demands in order to stay creative and not burn out. "We have so many projects that we are under a lot of pressure to meet deadlines. But we really have to find a balance. If you don't stop, you'll burn out," she explains. To address this challenge, NET Engineering implemented Scrum as a structural tool. Scrum, an agile framework initially developed for software development but now applied across various industries, provides a structured approach to project management that emphasises collaboration, flexibility, and iterative development. Scrum is based on the principles of transparency, inspection, and adaptation and has influenced the work culture of NET Engineering, particularly through the principle of transparency. By making relevant information available in a timely manner, transparency enables informed decision-making, reducing hierarchies and enhancing faster decision-making processes and flexibility within the company.

The introduction of Scrum at NET Engineering has given employees more freedom and flexibility, empowering them to think innovatively and creatively. This time management tool has fostered an environment that values work-life balance and encourages individuals to think outside the box. By creating such an environment, NET Engineering addresses the challenges associated with high job demands. It gives employees the time and resources they need to embrace change, develop creative solutions, learn, and integrate knowledge effectively.

Through Scrum, NET Engineering has not only met the increasing demands of its clients but also nurtured a work environment that values flexibility, promotes work-life balance, and enhances overall resilience. By valuing innovation and fostering a culture of creative thinking, NET Engineering remains adaptable, competitive, and well-prepared to navigate evolving market conditions.

NET Engineering is an independent consulting engineering firm with expertise in railway, public transportation, logistics, roads and motorways, buildings as well as engineering services related to environment and water. They are based in Monselice, Italy, and currently employ 140 people.

Silvia Furlan became an integral part of her family's business 17 years ago and has since taken on the role of CEO, leading NET Engineering for more than three years.

Innovating for success: Tyréns' NEXT model for fostering creativity and managing daily business

Innovation is essential for companies that want to stay ahead of the curve, but implementing an effective innovation process and transforming ideas into new business offerings is easier said than done. However, Tyréns, a Swedish engineering consultancy company, has managed to create a successful innovation process that fosters creativity and generates new ideas, without losing sight of customer service.

At Tyréns, with offices throughout Sweden, UK, Lithuania, Poland, Estonia, and Bulgaria, innovation starts at ground level with the highly skilled employees, which work closely with clients to identify challenges and opportunities for improvement. Employees are encouraged to submit their ideas for review and funding to a centralised department called NEXT, which evaluates the proposals. This department is staffed with innovation and business coaches who evaluate the ideas, together with managers in Tyréns, and select the best ones for further agile development and testing with customers. The best ideas then apply for funding to the Tyréns Foundation, which owns Tyréns and reinvests its profits in the company. The foundation is considered an external customer which helps to put focus on innovative project delivery. The most promising innovative ideas that prove themselves during development and get through to launch can get investment to overcome the valley of death and accelerate business growth. This unique approach allows Tyréns to support innovation and digitalisation without disrupting traditional service delivery. " We believe that you cannot ask your employees to focus on innovation and digitalisation and at the same time tell them to do their ordinary business and deliver results. The risk is that it will be either/or. Therefore, we have created our business area NEXT, to own the process and guide and support our innovators," explains Johan Dozzi, CEO at Tyréns.

In addition to its innovative process, Tyréns has a strong culture that supports the development and growth of its employees. The company enables its employees to become intrapreneurs and develop their innovation ideas into new businesses with support from NEXT. In addition, Tyréns focuses not only on hiring the best engineers but also those with excellent people skills, which contributes to a collaborative and inclusive working culture.

Tyréns was founded by Sven Tyrén in 1942 with the vision of building a business on innovation and the desire to make an impact on society. Today, Tyréns is a Swedish, multidisciplinary consultancy specialised in designing cities, the built environment, and infrastructure solutions. The company is owned by a foundation. Currently, the Tyréns Group employs 3,000 people and the largest market is Sweden followed by UK, Lithuania, Estonia, and Poland.

Johan Dozzi has been the CEO at Tyréns for more than 5 years.

Emphasising communication and collaboration (behavioural integration)

What is behavioural integration?

Behavioural integration is a "meta construct" that encompasses group process elements, including social integration, frequency and quality of member exchange, and collaboration. A behaviourally integrated team is characterised by intense interaction that produces open information exchange and collaboratively based solutions and decisions. Such collectively derived decisions tend to receive higher commitment and follow-up from members of the team. Therefore, it is easier for such a firm to identify and agree on challenges, formulate, and implement responses, when it needs to orchestrate a focused, company-wide response to an external challenge.

How does it impact dynamic capabilities?

Our study found that companies that show high levels of behavioural integration also show high levels of learning, integrating, and coordinating capabilities.

When teams interact closely and share information openly, they create a culture of continuous learning. This enables the company to acquire new knowledge, adapt to changes, and stay updated on industry trends. The more behaviourally integrated a company is, the better are its learning capabilities. For every 1-point increase in behavioural integration, learning capabilities increase by 0.245 points.

Behavioural integration also increases integrating capabilities: a 1-point increase in behavioural integration leads to a 0.483-point increase in integrating capabilities. This is because when team members collaborate frequently and effectively, they can seamlessly combine different perspectives, expertise, and resources. This is essential for efficient coordination and alignment of activities that enable the company to respond quickly to challenges and opportunities. In addition, well-developed integration skills help a company overcome its fear

of change and create an expectation of a positive outcome.

In behaviourally integrated teams, decisions are made collaboratively, and team members are more engaged and assertive. This coordinated decision making strengthens the company's ability to mobilise resources, assign tasks, and implement strategies in a synchronised manner. As a result, coordination skills are improved: every 1-point increase in behavioural integration leads to a 0.405-point increase in coordinating capabilities.

Overall, behavioural integration creates a collaborative and interactive environment that promotes learning, integration, and coordination. These capabilities are essential for companies to identify, respond to, and capitalise on challenges and opportunities. This strengthens their dynamic capabilities and overall competitiveness. It is therefore critical to develop a behaviourally integrated company. This means fostering a culture of open communication and collaboration, of frequent and meaningful interactions between team members.

Self-assessment: Behavioural integration

To assess the level of behavioural integration within your company, you can use the following self-assessment tool. As explained, behavioural integration consists of collaborative behaviour, information exchange, and joint decisions. Therefore, these three sub-categories are assessed separately. For each category, follow the instructions. Use the provided scales of 1 to 7.

BEHAVIOURAL INTEGRATION

COLLABORATIVE BEHAVIOUR

Please indicate to what extent the following statements characterise the behaviour of your management team over the past three years.

	Strongly disagree						Strongly agree
When a team member is busy, other team members often volunteer to help manage the workload.	1	2	3	4	5	6	7
Team members are flexible about switching responsibilities to make things easier for each other.	1	2	3	4	5	6	7
Team members are willing to help each other complete jobs and meet deadlines.	1	2	3	4	5	6	7

INFORMATION EXCHANGE

Please think of situations in the last three years where your team made important decisions for the future of your company. How would you rate their effectiveness in terms of ...

	Low						High
... quantity of ideas?	1	2	3	4	5	6	7
... quality of solutions?	1	2	3	4	5	6	7
... level of creativity and innovation?	1	2	3	4	5	6	7

JOINT DECISION

Please indicate to what extent the following statements characterise the behaviour of your management over the past three years.

	Strongly disagree						Strongly agree
Team members usually let each other know when their actions affect another team member's work.	1	2	3	4	5	6	7
Team members have a clear understanding of the joint problems and needs of other team members.	1	2	3	4	5	6	7
Team members usually discuss their expectations of each other.	1	2	3	4	5	6	7

For each category, add the number for each question and divide by three. Write the number in the box for each category. To calculate the total score, add the numbers for each category and divide by three. Write the number in the box at the top of the assessment.

A total score above 6.1 indicates a high level of behavioural integration, while a total score below 1.7 indicates a lack of behavioural integration. To learn in which area of behavioural integration your company has strengths and weaknesses look at the individual scores for each category. The same values apply. If you find that your company lacks behavioural integration, you can use the following best practises to learn how other companies foster communication and collaboration.

Emphasising collaboration: Sociocracy 3.0 at mellon

At the end of 2021, Ronald Bönisch founded mellon. Guided by Frederic Laloux's work on "Reinventing organizations", it was clear from the beginning that the philosophy of the new engineering firm would revolve around people, not just profit. For this reason, Ronald Bönisch and his team took time at the beginning to think about how they wanted to work together in their new firm. Most of mellon's early employees were used to a pyramid structure. The new company offered a special incentive with its different structure, which led to a strong identification of the employees already in the start-up phase. Eventually, the idea arose to structure in work groups, called domains, which form a larger circle structure. Each domain focuses on a different topic, such as finance or human resources. One domain, for example, is determining the compensation scheme in the firm. However, the people in these domains are not functional specialists, but rather four to eight people who work independently in these domains for a set period of time. The domains can then be reassigned by the community at regular intervals. mellon decided not to implement management levels. While these domains do not have a department head in the traditional sense, they do have a domain representative who functions as a speaker of the domain. This is an important feature because the representative has no more power or decision-making authority than others in the domain. This allows employees to be self-directed and come up with new ideas. mellon values exploring new ideas and ways of doing things and learning as they go. "The ideas and suggestions for implementing the various themes come from the people themselves. Ideas are listened to and implemented. This leads to a very strong motivation among the people and results in people starting to flourish in the workplace," explain Ronald Bönisch and Katja Stumpf who is now a co-owner of the firm – similar to most other individuals employed at mellon. Decisions about which ideas to pursue are made by consent, and there is an opportunity for input. Surveys are a commonly used tool to understand people's thoughts.

According to founder Ronald Bönisch, this organisational structure, which he calls Sociocracy 3.0, helps mellon to be more aware of changes in the environment as well as customer needs and to be more agile in adapting to them.

As the circles of domains mesh like gears, knowledge sharing and integration are facilitated, and tasks and resources can be more easily coordinated.

mellon GmbH, derived from the Greek work for 'future', was founded in 2021 by Ronald Bönisch. The engineering office in Leipzig, Germany, has 30 employees and offers engineering and consulting services in civil engineering, engineering ecology, landscape architecture, and urban and regional planning. In addition, mellon offers services in project management, digitisation, and software development.

Architects lead the transformation to digitisation: Introducing BIM at TYPSA

In 2017, the management consultancy BCG saw signs that BIM was beginning to transform the construction industry by reorganising the value chain. They estimated that by 2025, it would be so advanced that productivity gains would be in the range of 15% to 25% (BCG, 2017). By then, the Spanish consulting engineering firm TYPSA was on the pulse of the times: in 2016, they used BIM in major international infrastructure projects, and in 2018, they created a TYPSA BIM group in Architecture to support its use across departments. This made TYPSA one of the first companies in Europe to use BIM in all projects, including infrastructure: By 2013, 90% of the production in building design was done with BIM tools and procedures. "It started in the architecture department because the architects were actually more advanced in using BIM," explains Inés Ferguson, Business Development Director at TYPSA. The company had introduced BIM to the architecture department in 2008, not only as an alternative to CAD, but also as a new methodology for collaboration and information management in building design. This was done through four internal R&D projects promoting this innovative way of working. As a result, the architects already had a great deal of expertise in using BIM. "So the architecture department created a group of very dedicated specialists within the architecture department and their work became so well-known internally and so relevant that everyone wanted to work with them," Inés Ferguson continues. The company then created a separate BIM group within the organisation to support all the different technical departments. In 2021, a Digital Accelerator was created at TEYS, a TYPSA subsidiary, under the leadership of TYPSA BIM.

In this bottom-up digital transformation, architects have become the key link between digitalisation and the "traditional" business of civil engineers. While civil engineers are often concerned with construction and complying with legal frameworks and regulations, architects are often more open-minded and creative, and therefore more focused on innovation. In addition, architects are very digital and know how to communicate effectively with engineers: their technical background allows them to understand the main concepts of infrastructure development. The architects proved to be great communicators and very empathetic. These unique skills that the architects brought were key to the digital transformation at TYPSA.

TYPSA is an independent, international consulting engineering service group and a leader in infrastructure, energy, environment, and urban development headquartered in Madrid, Spain. In 2021, TYPSA had 3,126 employees and generated revenue of 266.93 million Euros. The company continues to grow through innovation, introducing the full potential of BIM and virtual reality throughout the lifecycle of buildings and infrastructure, with a circular economy approach, creating asset management platforms and developing new value-engineering solutions.

Inés Ferguson is the Director of Business Development at TYPSA. She has been involved in business development at the company for more than 20 years.

Building knowledge (knowledge position)

What is knowledge position?

Organisational knowledge is an intangible resource that is critical to achieving sustainable competitive advantage. In today's knowledge economy, it is one of the most important resources that can help companies differentiate themselves from their competitors. This is because knowledge is universal and can be applied to many different situations.

In addition, knowledge enables a company to better anticipate changes in the business environment and determine appropriate strategic and tactical actions. The ability to understand markets and technology are two critical components of knowledge that can have a major impact on performance. In some cases, knowledge can lead to a technological breakthrough that represents an opportunity even if its market potential is not immediately clear. Furthermore, knowledge can help a firm effectively exploit an opportunity by determining the optimal design of a product to improve functionality, cost, and reliability.

In summary, a high level of knowledge allows a firm to identify and take advantage of opportunities quickly as well as to respond promptly to advances made by competitors.

How does it impact dynamic capabilities?

Our study shows that when companies have a more advanced knowledge position, they are better at sensing, learning, and reconfiguring.

In uncertain situations, making decisions without proper knowledge can lead to an error of judgement. But companies with good organisational knowledge can quickly spot opportunities and react to what their competitors are doing, which is all part of having strong sensing capabilities. They also understand customer problems well, can see where the market needs something new, they are good at judging new technologies and market potential, and are quick to seize resulting opportunities. This

is reflected in the results of our survey: for every 1-point increase in a company's knowledge position, its sensing capability increases by 0.153 points. It means that a good knowledge of the industry is a great help when it comes to understanding the industry and making the right decisions.

We also found that when a company increases its knowledge position by 1-point, its learning capabilities increase by 0.174 points. This is because when companies have high organisational knowledge, they tend to promote a culture of continuous learning, professional development, and getting better at what they do. At the same time, they are not afraid to make mistakes, because they understand that learning is done through mistakes since errors provide new, useful, and important information.

Additionally, companies with high dynamic capabilities tend to have knowledgeable and skilled staff, who know what is happening in their industry and what customers need. It is therefore easier for them to identify the appropriate key performance indicators to measure success. Our survey found that a 1-point increase in the company's knowledge position leads to a 0.255 increase in its reconfiguring capability.

In summary, to develop strong dynamic capabilities and become future ready, it is important to develop a good knowledge position by fostering learning, investing in employee development, and encouraging collaboration and knowledge sharing across the company.

Self-assessment: Knowledge position

To assess the strength of your company's knowledge position, you can use the following self-assessment tool. For each question, rate how strong your company's knowledge position is in comparison to other companies in your industry. Use the provided scale of 1 = weak to 7 = strong.

KNOWLEDGE POSITION

Compared to other companies in your industry, does your company have a weak or strong position in terms of...

	Weak						Strong
...staff with a positive commitment to the company's development?	1	2	3	4	5	6	7
...technical expertise?	1	2	3	4	5	6	7
...expertise regarding development of products or services?	1	2	3	4	5	6	7
...highly productive staff?	1	2	3	4	5	6	7
...expertise in marketing?	1	2	3	4	5	6	7
...special expertise regarding customer service?	1	2	3	4	5	6	7
...special expertise regarding management?	1	2	3	4	5	6	7
...innovative markets?	1	2	3	4	5	6	7
...staff educated in giving superior customer service?	1	2	3	4	5	6	7
...staff who like to contribute with ideas for new products/services?	1	2	3	4	5	6	7
...staff capable of marketing your products/services well?	1	2	3	4	5	6	7

Add up the numbers for each question and divide by eleven. Write the number in the box at the top of assessment.

A total score above 5.5 indicates a strong knowledge position, while a total score below 2.2 indicates a weak knowledge position. If you find that your company possesses a rather weak knowledge position, you can use the following best practises to learn how other companies strengthen their knowledge position.

Acceptance of regret: Shell's journey towards sustainable energy

Around ten years ago, Shell opened its first hydrogen fuel station. In the fall of 2022, it decided to close it, along with other hydrogen fuel stations opened in the UK in 2017. For Daniel Kunkel, Manager of the Retail Network Engineering at Shell and CEO at ubitricity, this is a great example of accepted regret, which is necessary when dealing with change. He believes that acceptance of regret is a major challenge that companies face during transformation processes. Particularly engineers often have a hard time accepting regret as it goes against their nature of creating solutions that are perfect and will last a lifetime. However, he emphasises that it is crucial to accept regret and invest in bridging technologies to meet customer needs today and prepare for the future. These investments may become obsolete in the next decade, but they are necessary to learn, create solutions, and move forward. Even though change can be risky, a lack of future orientation and therefore an unwillingness to transform imposes a great risk on the company. "To decide today not to go on this journey of transformation is to prepare today not to be there in 20 years. Stopping somewhere, because you say, 'that's just my business model', then at some point you're gone", Daniel Kunkel states. To manage the risks associated with change, Shell focuses on its core competencies and, when necessary, uses partners with complementarity skills to offer customers solutions. Not everything has to be done in-house, nor can it be. Still, this process requires investment in R&D and in learning. Some might say that Shell as a large company with large capital is fortunate, but Daniel Kunkel retorts, "Yes, but we are just moving on a different scale. If we operate past the customer, we're not successful either". That's why it's critical for Shell to understand what the customer needs. While the engineer, coming from a product perspective, might be excited to develop the product further, the customer often does not care for incremental improvements. Daniel Kunkel admits that it is an organisational balance between what the customer needs, what is possible financially, and what is perfect from the engineer's perspective. In his opinion, the thought process has to be 'What does the customer need, and how can I provide that?'.

Shell is an international energy company headquartered in London, United Kingdom, with expertise in the exploration, production, refining, and marketing of oil and natural gas, and the manufacturing and marketing of chemicals. It uses advanced technologies and takes an innovative approach to help build a sustainable energy future and invest in power, including renewable sources such as wind and solar. Shell also invests in electric vehicle charging and low-carbon fuels for transport, such as advanced biofuels and hydrogen. Shell had 82,000 employees and revenues of 261.5 billion US dollars in 2021.

Daniel Kunkel has been with Shell for almost 20 years and has been General Manager for Retail Network Engineering at Shell for almost four years. In addition, he is CEO of ubitricity, a leading provider and operator of electric vehicle charging solutions in public places. It also helps cities and municipalities rapidly deploy charging infrastructure.

Capitalising on knowledge: Dorsch's path to becoming a digital project manager

In today's business environment, traditional approaches can still produce fantastic results. "Right now, you can do fantastic business by working completely old-fashioned. There is very little outside economic pressure to change. Instead, if you want to have very high margins, you don't change," says Andreas Schweinar, COO and CFO at Dorsch. However, Dorsch understands that relying solely on past success does not guarantee future success. As a result, the company is repositioning itself as a designer of sustainable living spaces through digital project management.

Dorsch realised that only by augmenting and complementing human work with technology and automation would it be possible to do more work with the same workforce. To understand and test how and in what areas this can work, Dorsch works with partners who have the technology and runs pilots with its local teams. One example is a collaboration with United Robotics for the implementation of robotic maintenance. Engineers can enthusiastically engage in these innovative projects and management provides the right resource and staffing context. Financially, these investments are well funded by the Group. Freeing up capacity requires further consideration: working with new technologies, such as robots for maintenance, is very attractive to young engineers, making Dorsch a more attractive employer.

In addition to using technology and going digital, Dorsch is also adapting to the change from specialised engineering disciplines to developing sustainable living spaces. Unlike pure infrastructure, urban development requires interdisciplinary work, not only with different engineering disciplines, but also with economics and sociology, for example. In addition, software and IT companies with great solutions are not used to having municipalities with very individual requirements as customers. This is where Andreas Schweinar sees Dorsch's potential: as an intermediary between companies and municipalities, as a consultant for the development of concepts, and later as a project manager to oversee the implementation of these projects.

To effectively create acceptance for the new technologies and changes within the organisation, Dorsch is aware of the importance of the development of a critical mass. Rather than trying to force change from the top down, they identify individual employees or units receptive to piloting. Successful projects turn these individuals into advocates who share their positive experiences with colleagues. "Even long-time sceptics became vocal advocates after seeing the benefits," says Andreas Schweinar.

Dorsch understands the importance of proactively preparing for the future. By fostering openness, identifying appropriate partners, and implementing pilot projects, Dorsch positions itself to stay ahead of the curve. It understands that failing to engage, learn and prepare from the beginning will result in being left behind as markets change.

Dorsch is a German consulting engineering firm with more than 70 years of experience. With around 7,200 employees currently, it is the largest independent planning and consultancy group in Germany. Internationally, it has several branches and is represented by numerous projects and offices in more than 50 countries.

Andreas Schweinar has been the COO and CFO at Dorsch for more than five years.

Emphasising analytical insights and innovative thinking (strategic orientation)

What is strategic orientation?

A company's strategic orientation is defined as its decision-making activities, practises, and processes that lead to its growth. It is a company's attitude that combines entrepreneurial and strategic aspects.

This view of strategic orientation emphasises two factors. The first factor is developing competitive advantage and discovering new business opportunities through innovation, experimentation, and risk-taking decisions. The second factor is maintaining competitive advantage through analysis, organisational planning, and long-term vision.

Companies fall on a spectrum of strategic orientation. On one end of this spectrum are companies that prioritise long-term plans such as innovation and efficiency. These companies engage in product-market innovation, take some risk, develop new products quickly, and conduct in-depth demand and market analysis. At the other end of the spectrum are defensive companies with less developed strategies that rely more on management intuition, hunches, and unplanned responses to unforeseen events. These companies tend to be risk-averse, non-innovative, and non-aggressive, with a short-term perspective that places relatively little value on formal planning, demand and market analysis, and anticipation of environmental changes.

How does it impact dynamic capabilities?

Our study reveals that companies with a strong strategic focus on analysis and innovation show higher dynamic capabilities and might better firm performance.

Focus on analysis

When companies prioritise analysis, they focus on organisational planning, demand and market analysis, and long-term vision. They proactively gather and analyse market, competitors, and customer information. This leads to better sensing capabilities, with each 1-point increase in "analysis focus" resulting in a 0.382 increase in sensing capabilities. Their systematic and structured approach to information-seeking and analysis allows companies to identify emerging trends, changes in customer preferences, and market dynamics. They also tend to improve their learning capabilities, with an increase of 0.271 for every 1-point increase in analysis focus. This is because companies that focus on analytics have effective routines to identify patterns, trends, and areas for improvement. They can turn information gained into knowledge and foster a culture of learning. Moreover, they excel in integrating capabilities, which increases by 0.220 for every 1-point increase in analysis focus, as they have routines to integrate individual knowledge into the group. Finally, companies with a focus on analysis exhibit higher reconfiguring capabilities, with each 1-point increase in strategic orientation on analysis leading to a 0.179 increase in reconfiguring capabilities.

Innovation focus

Similarly, an innovation-focused orientation results in better sensing capabilities, with an increase of 0.451 for every 1-point increase in innovation focus. Companies with innovation focus are proactive in identifying and capitalising on new opportunities, developing new products or services, and staying ahead of the competition through continuous improvement and creativity. By emphasising innovation, companies create a mindset and culture that fosters the ability to embrace change more effectively in the business environment. They also display enhanced reconfiguring capabilities, with a 0.308 increase for every 1-point increase in innovation focus. By encouraging innovation, they are more likely to bring new products and services to market before their competitors. This proactive and forward-thinking approach enables the reconfiguration of existing resources, capabilities,

STRATEGIC ORIENTATION

Please indicate your perception concerning your company's behaviour during the last three years.

ANALYSIS		Strongly disagree						Strongly agree
Establish deliberated plans to cope with environment opportunities and threats.		①	②	③	④	⑤	⑥	⑦
Emphasise effective information seeking and key information identification for decision-making.		①	②	③	④	⑤	⑥	⑦
Follow formal procedures to coordinate decisions between different areas.		①	②	③	④	⑤	⑥	⑦

INNOVATION		Strongly disagree						Strongly agree
Constantly seeking new products and markets.		①	②	③	④	⑤	⑥	⑦
Usually, the first ones to introduce new brands or products in the markets.		①	②	③	④	⑤	⑥	⑦

and processes to meet changing market demands. Therefore, companies with a strategic orientation focused on innovation exhibit higher levels of reconfiguring capabilities.

In summary, a strategic orientation emphasising analysis and innovation fosters a structured yet forward-thinking culture that promotes sensing, learning, integrating, and reconfiguring capabilities. To effectively identify and respond to external challenges and opportunities, companies should integrate these principles into their strategy and foster a culture of innovation, long-term vision, effective coordination, and continuous learning. Prioritising analysis and innovation helps companies stay ahead of the curve and adapt quickly to market changes.

Self-assessment: Strategic orientation

To assess the strength of your company's strategic orientation, you can use the following self-assessment tool. Rate how strongly you agree with each statement regarding your company's behaviour over the last three years. Use the provided scale of 1 = strongly disagree to 7 = strongly agree.

For each category, add the number of each question and divide by three for analysis and by two for innovation. Write the number in the box for each category. To calculate the total score, add the numbers for each category and divide by two.

To learn the extent to which your company emphasises analysis and innovation, use the following cut offs. A high emphasis on strategic orientation on analysis is reflected by a score of 6.1 and above, while a lack of emphasis is reflected by a score below 2.8. For innovation, a score above 5.6 indicates a high level of emphasis on innovation and a score below 1.4 a lack of emphasis on innovation. If you find that your company has rather low emphasis on analysis and/or innovation, you can use the following best practises to learn how other companies build such emphasis.

Navigating change through analysis: B-ACT's clear principles

When Adam Bialachowski and his brothers took over the engineering firm B-ACT founded by their father in 1994, their goal was to expand and diversify the business. Previously, the EU, and by extension Poland, had invested heavily in water and wastewater projects, allowing their father's company to grow by focusing on this area. However, the Bialachowski brothers recognised the need to adapt to the changing landscape to ensure the company's future success. Adam Bialachowski, CEO of B-ACT, explains the company's transformation journey, guided by three key principles.

The first principle adopted by the brothers acknowledges that engineers often specialise in a particular field and prefer to concentrate on their area of expertise. However, B-ACT recognised the importance of being flexible and adaptable to emerging trends. "But as a company, you need to be able to shift to where the money will be in the future," says Adam Bialachowski, explaining their first principle. To achieve this, the company closely monitors EU reports outlining its planned investments, as Poland generally follows suit. Anticipating a shift towards sustainable and green initiatives, B-ACT has redirected its focus towards energy-related projects.

B-ACT's ability to adapt quickly, is due to its second and third principle. In addition to being a smaller company, which facilitates faster decision-making, the company actively seeks out partnerships with organisations that complement its own skills and resources, thereby creating synergies. In particular, it targets partners who have not yet established a presence in Poland. This emphasis on strategic alliances forms the second principle guiding B-ACT's approach. Additionally, B-ACT hires experienced structural engineers who have a broader skill set and prioritise project management. Adam Bialachowski states, "Our group is more of a project management group than it is a traditional engineering firm. So, we hire engineers who have experience but didn't fall in love with the work on site and now want to move into the project management role. This way, it doesn't matter if they are building a road, a railway, or a wind park, because they are project managers." Located in Bydgoszcz, a city home to one of Poland's largest engineering universities, B-ACT benefits from a steady influx of talent.

The company specifically looks for people with ties to the city, as they tend to be more loyal. By following these three clear principles, B-ACT has successfully transformed its operations to be future-ready. The company's proactive approach to identifying and capitalising on emerging trends, strategic partnerships, and a project management-oriented workforce has positioned it to thrive in the evolving engineering landscape.

B-ACT is a consulting engineering company in Bydgoszcz, Poland, established in 1994. The company has over 25 years of experience in managing, consulting, and supervising the implementation of construction projects in the field of institutional and commercial buildings, industrial, road, railway, industrial, water and sewage management. Currently, the company has 30 employees and works with approximately 150 freelancers. Over the last 3.5 years, the company has grown from 800,000 Euros in revenue to 3 million Euros in revenue.

Adam Bialachowski has been CEO of B-ACT for three years and has been with the company for almost 15 years.

From vision to reality: Herborner Pumpen's emphasis on innovation

Since it was founded in 1874, flexibility and the ability to adapt have been key values of the family-owned and operated company Herborner Pumpen. Today, it is recognised as one of the leading manufacturers of pumps for a wide range of applications, including sewage systems, large vessels such as cruise ships as well as swimming pools and water parks. In addition to offering the most efficient pumps, Herborner Pumpen embraces digitalisation and sustainability, recognising their importance in the industry.

The company recognised two decades ago the opportunity to improve its services by using digital technology to support the operation and optimisation of its pumps. "The idea to create a digital platform for this purpose emerged already in 2002," says Sascha Korupp, Technical Director at Herborner Pumpen. However, at that time, the technical possibilities were still limited, and it took a decade of continuous effort and innovation to turn Sascha Korupp's vision into reality. With the successful development of the digital platform, Herborner Pumpen can now provide its customers with valuable advice on how to operate and optimise the energy efficiency of their pumps. "We want to digitally support our clients through our platform," says Sascha Korupp, explaining the objective.

The ability to formulate a strong vision and effectively execute it has remained a defining factor in the success of Herborner Pumpen. By sensing and embracing emerging trends such as digitisation and sustainability early on, the company stays ahead of the curve. Sascha Korupp emphasises the importance of having an open mind and actively engaging with others to receive continuous feedback, stating, "If you go out into the world with your eyes wide open, you will see what is going on around you, and you will need to bring that into your business. This is what we expect from our employees as well." By fostering a culture of innovation and continuous improvement, the company ensures that it can adapt to changing market demands and stay at the forefront of the industry. Sascha Korupp summarises the company's recipe for success as follows: "Having a strong vision, being disciplined, and working step by step to make our vision a reality."

Founded in Germany in 1874, Herborner Pumpentechnik GmbH & Co KG has established itself as a major supplier of a wide range of pumps, including those for swimming pools, ships, sewage systems and industrial applications.

As a family-owned and operated business, it has gained significant recognition and has become a leading player in the European and North American public pool sector. Headquartered in Herborn, Germany, the company currently employs 135 people and has a turnover of 21 million Euros.

Sascha Korupp has been an integral part of Herborner Pumpen for over three decades, dedicating more than 32 years of his career to the company. For the last 25 years, he has been Technical Director.

Empowering construction: CONXAI's proactive approach to move beyond today's challenges

Embracing change, moving quickly, and enabling its customers to do the same, is in CONXAI's DNA. To do this, it has found that it is important for everyone to be aligned and have a common understanding and interpretation of the opportunities and WHY something is being done or needs to be done, as well as the underlying risks. "Aligning different understandings, views, and interests is important, but it can take time. However, once people are aligned, everything moves much faster. That's why we always start with WHY," says Sharique Husain, founder, and CEO of CONXAI. "And we take the same approach with our clients."

CONXAI observed that most companies in the construction industry tend to focus more on solving the problems they are facing "today", rather than what they would face few months from now. It learnt that it is important to not only talk about the impact and benefits, but to actually show the potential customers what CONXAI can do for them. In addition to short demo videos, it offers small tests, a proof of concept so to say, of a few weeks. By participating in these tests, potential customers can experience the practical applications of CONXAI's technologies and services in their contexts. This hands-on approach allows customers to get a clear understanding of the business case and gain confidence in CONXAI's ability to deliver the target outcome. Starting with such smaller projects can pave the way to a larger project. CONXAI describes its approach as "Think big, start small and grow as you go."

CONXAI's approach is based on two concepts. The first is the IKEA effect: the increased value of do-it-yourself products (Norton, Mochon, & Ariely, 2012). By participating in the solution or product creation, customers tend to be more committed to its adoption. For this reason, they are encouraged to be involved earlier in the process. This approach of "partnering with customers" also gives CONXAI a different perspective on its offerings. Most companies focus on selling products, software, and technology instead of actually solving customers' problems," says Sharique Husain, referring to the "jobs to be done" theory (Christensen et al., 2016) which is the second concept. In his experience, sometimes the companies not only want the tool, but they also want someone to help them use the tool to solve their problem.

After all, there is always a risk of failure when trying something new. Yet failure is looked upon badly. But as Sharique Husain quotes the 13th century German philosopher, Meister Eckhart: "The price of inaction is far greater than the cost of making a mistake."

CONXAI is a team of AI engineers, data scientists, and designers helping the Architecture, Engineering, and Construction (AEC) industry leverage the vast amount of underutilised data to unlock greater economic value using advanced AI technology. It provides a platform that can process large amounts of data from disparate sources and turn it into actionable knowledge. Its focus is on improving productivity and knowledge loss issues in the construction industry, where 90% of project data is not used at all and 30% of collected data is lost as soon as a project is completed. CONXAI is located in Munich, Germany, and has currently 25 employees.

Sharique Husain founded the company in 2021 and has been CONXAI's CEO since then.

Driving change in Italy's highway infrastructure: The transformation journey of Tecne

Sometimes crises provide the impetus for change. After the tragic collapse of the Morandi Bridge in Genoa, Italy, Autostrade per l'Italia, the company responsible for managing and maintaining a large part of Italy's highways, was under pressure to find a solution for its ageing infrastructure. As a result, Tecne, the engineering company created and owned by Autostrade per l'Italia and responsible for coordinating the maintenance, upgrading, and modernisation of Italy's infrastructure, began its journey. The first step in the process was a tight and intense partnership with the management consultancy McKinsey to develop a transformation plan; the collaboration lasted for 18 months. "We have the technical engineering knowledge, but McKinsey knows how to build an innovative consultancy business," explains Stefano Susani, CEO of Tecne.

In this transformation process with McKinsey and his team, he found four things to be key in managing change. The first is the value of a transformation office. At Tecne, about 50 people work in this unit, and their job is to think about how the company can become better and keep the pace of its transformation plan. According to Stefano Susani, this cannot be done by the management or the owner of the company alone: a dedicated team is needed. The second is the ability to recruit the right people and ensure an influx of talent, together with developing the existing talents of the company. To this end, Tecne operates its HR division in a manner similar to consulting companies, searches for continuous inspiration from leading thinkers around the world and works closely with Italian universities. In addition, it focuses on training its current employees in its Centres of Excellence. These internal 'engineering schools' focus on the study and application of international best practises in specific and critical construction and infrastructure maintenance fields, ensuring Tecne's proactive and primary role in the development of safe, innovative, sustainable design solutions. Thirdly, Stefano Susani stresses the importance of understanding the customer: "And the only way to understand the customer's needs is to sit in his office and share his problems and challenges". He recommends not being afraid to think outside the box and go beyond the traditional services of an engineering firm if that is what the client needs. Finally, he points out the value of partnerships and collaboration in the transformation process as well as of forming joint ventures to meet specific needs.

After all, companies cannot grow indefinitely because financial and human resources, skills, and specific knowledge are finite, still, they need to change continuously.

Tecne SPA is an engineering company of the Autostrade per l'Italia Group. Its specific mission is to carry out all the engineering design and construction management activities required to carry out the large number of investments foreseen in Autostrade per l'Italia's Industrial Plan, which amounts to 14.5 billion Euros in investments and 7 billion Euros in maintenance up to 2038. Tecne is in charge of coordinating all maintenance, expansion, and modernisation activities on the 3,000 km road network, as well as engineering activities related to the country's strategic infrastructures. Tecne currently employs 1,000 people.

Stefano Susani has been the CEO of Tecne for more than 2.5 years and on the board of Autostrade per l'Italia for more than 3 years.

Conclusion

The consulting engineering industry is undergoing a profound transformation as it faces significant disruption from technological advances, innovative product development, and business model shifts. This disruption is being driven by the accelerated adoption of digital solutions that leverage novel data-driven approaches. In addition, there is a growing demand from customers and regulators for green and sustainable construction projects, leading to the establishment of new industry standards and greater levels of harmonisation. These factors, combined with the resulting reduction in market barriers, are forcing engineering companies to re-evaluate and adjust their strategic positioning within the industry. To take full advantage of the opportunities presented by these disruptions, consulting engineers must change internally and actively understand and develop individual dynamic capabilities that will enable them to be future-ready even in times of uncertainty. To this end, this report serves as a playbook, recommending actions that consulting engineers must take to develop the necessary capabilities. Specifically, these actions include:

Taking time for reflection (job demands)

High job demands can inhibit employees' ability to sense opportunities in change, develop creative solutions, and integrate them into the company.

They can lead to missed developments, inhibit learning and the pursuit of new ideas, and slow knowledge integration. To foster a dynamic capability, companies should help employees balance their workloads and encourage innovation. By valuing creativity and innovation, companies can remain competitive and adapt to changing market conditions. NET Engineering using Scrum and Tyréns' NEXT model are examples of best practise for managing work demands and innovation without losing sight of the competition and your own performance.

Emphasising communication and collaboration (behavioural integration)

Behavioural integration, characterised by intense interaction and open information sharing, fosters a culture of continuous learning, integration, and coordination. Collectively derived decisions and higher levels of commitment enable effective resource mobilisation and synchronised implementation, enhancing dynamic capabilities. Developing a behaviourally integrated company through open communication and collaboration enhances competitiveness and enables effective responses to challenges and opportunities. Examples of best practise include mellon's Sociocracy 3.0 and the way TYPSA has implemented BIM across the company.

Building knowledge (knowledge position)

Organisational knowledge is critical for sustainable competitive advantage. It enables companies to identify opportunities, respond to competitors, and effectively reconfigure resources. Fostering a strong knowledge position through continuous learning and employee development is key to developing dynamic capabilities and becoming future-ready. Shell's culture of accepting regret and Dorsch's quest to become a designer of sustainable habitats through knowledge capitalisation are examples of best practise for building strong knowledge positions.

Emphasising analytical insights and innovative thinking (strategic orientation)

Companies with a strategic orientation that focuses on analysis have higher sensing capabilities, while those focused on innovation have higher reconfiguration capabilities. Analytically oriented companies prioritise planning and market analysis, which enhances their ability to sense environmental changes. Innovation-oriented companies prioritise experimentation and risk-taking, enabling them to reconfigure resources effectively. Developing strategic orientations that emphasise analysis and innovation enhances dynamic capabilities and

competitiveness. Examples of best practise include the clear principles of B-ACT, CONXAI's approach of looking beyond today's challenges, Herborner Pumpentechnik's vision, and Tecne's transformation office.

Finally, developing dynamic capabilities takes time and effort. Trying something different and new can be challenging and risky. However, what the best practise clearly demonstrates is that standing still is never the answer. Wanting the perfect solution, thinking, and working in traditional patterns, and having a reactive mindset does not serve the future readiness of consulting engineers. Instead, they need to start embracing change by focusing on customer needs and being open-minded. They must begin to foster a company's culture that emphasises learning and collaboration, where failure is not seen as a bad thing, but instead as a valuable step to learning and innovation. Only by taking these bold steps can consulting engineers truly develop dynamic capabilities and become future-ready in times of uncertainty.

Method

To understand the factors influencing the development of dynamic capabilities in the consulting engineering industry, a pan-European survey was conducted from 25 January to 24 March 2023. The call for participation was distributed via EFCA's LinkedIn account and via email to the national consulting engineering companies.

The management from European consulting engineering companies were asked to assess their dynamic capability levels and possible drivers on the individual, organisational, and environmental level. To measure dynamic capabilities a scale by Pavlou and El Sawy (2011) was used. This measure captured sensing capabilities, learning capabilities, integrating capabilities, coordination capabilities, and reconfiguring capabilities. They were assessed

on the basis of 3 to 5 items per sub-category using a 7-point Likert scale. A firm's specific dynamic capabilities are calculated as the mean values of the respective items. Consequently, higher scores (up to 7) indicate a higher level of dynamic capabilities in a given dimension, while lower scores (down to 1) indicate comparatively lower dynamic capabilities.

Potential drivers were assessed on the individual, organisational, and environmental level. Individual level drivers included job demands, leadership, top management informational diversity, behavioural integration, coping with change, and knowledge sharing. On the organisational level, the drivers slack, social capital, intraorgansational communication, strategic orientation, performance, and knowledge position were measured. On the environmental level, competitive pressure, environmental dynamism, and stakeholder pressure were assessed. To measure the effects, or in other words, the future-readiness of consulting engineers, organisational innovation as well as financial and strategic performance were assessed. The findings of the survey suggested

DRIVERS

Individual level
- Job demands
- Leadership
- TMT knowledge diversity
- Behavioural integration
- Experience with change
- Knowledge sharing

Organisational Level
- Slack (resources)
- Social capital
- Intraorg. communication
- Strategic orientation
- Past performance
- Knowledge position

Environmental level
- Regulatory pressure
- Environmental dynamism
- Stakeholder pressure

DYNAMIC CAPABILITIES
- Sensing
- Learning
- Integrating
- Coordinating
- Reconfiguring

EFFECTS
- Innovativeness
- Strategic performance
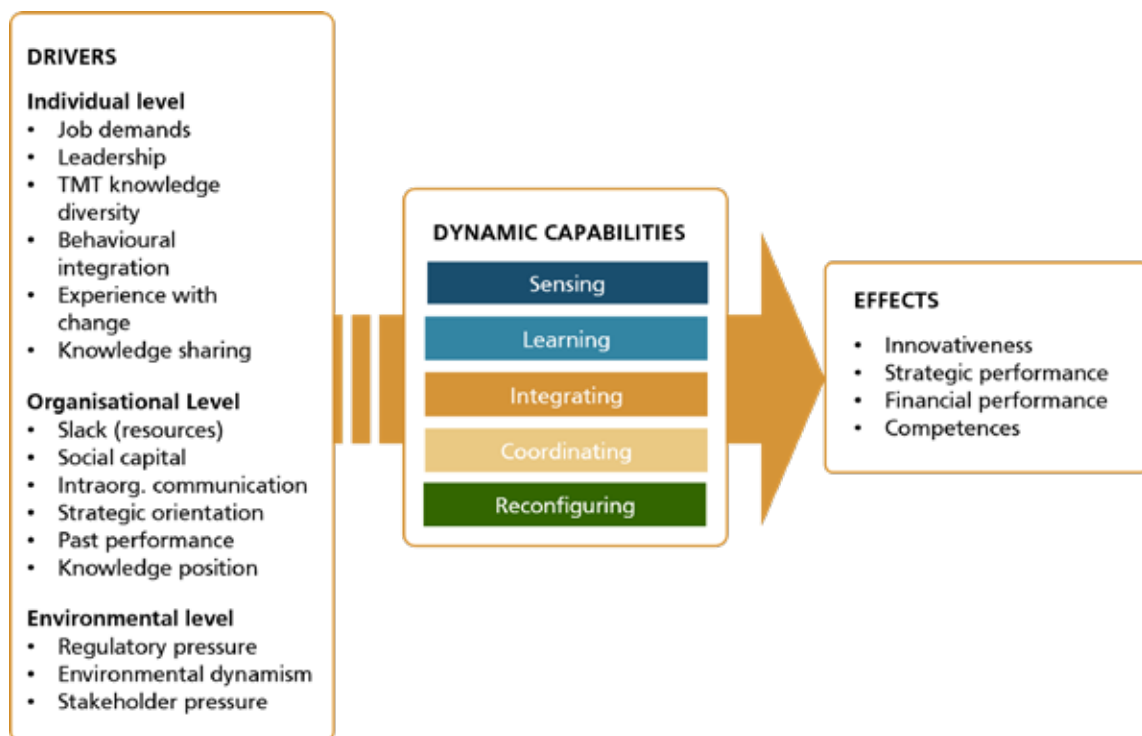- Financial performance
- Competences

Figure 8: Organising framework of drivers, dynamic capabilities, and effects

CHARACTERISTICS OF THE AVERAGE SURVEY PARTICIPANT

COMPANY CHARACTERISTICS

ENGINEERING SERVICE SECTOR
Construction of buildings
Infrastructure work

FOUNDING YEAR
1980

REVENUE
5-19 million €

OWNER
Family or single person, holding at least 70%

PARTICIPANT CHARACTERISTICS

POSITION
CEO/Managing Director

HIGHEST EDUCATION
Master's Degree

GENDER
Male

AGE
52 year
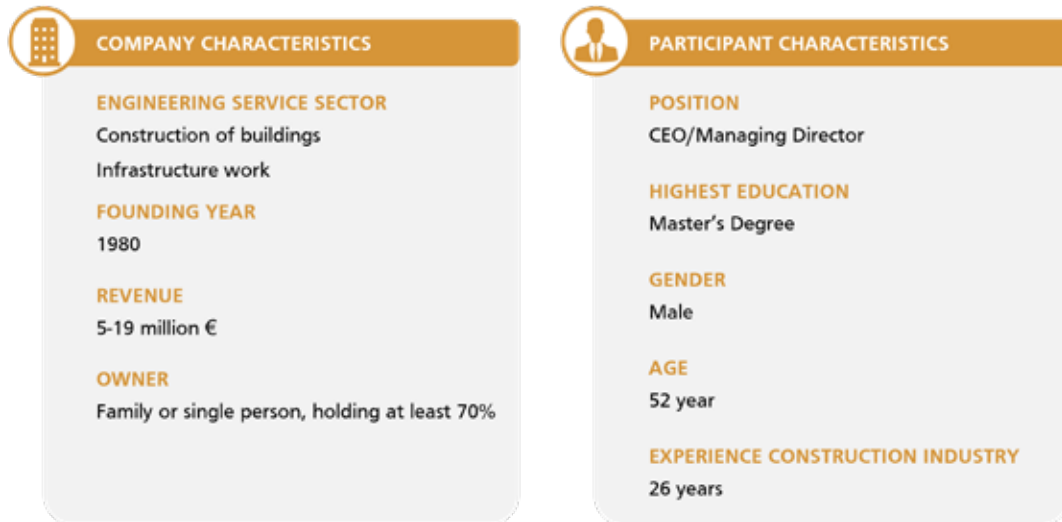
EXPERIENCE CONSTRUCTION INDUSTRY
26 years

Figure 9: Characteristics of the average survey participant

job demands, knowledge position, behavioural integration, and strategic orientation to be the relevant drivers in achieving dynamic capabilities in the consulting engineering industry.

A total of 204 responses were received from 133 consulting engineering companies, representing 23 European countries. The sample included top-level executives and influential decision makers, with 61% being CEOs/managing directors, 8% management board members, and 12% extended TMT members. More than 50% of participants held a Master's Degree or MBA degree and 14% held a Ph. D or Doctorate degree, indicating a highly educated group of participants. On average, participants had 26 years of professional experience in the construction industry and 16 years with their current company, highlighting the expertise of the participants.

Revenue of participating companies ranged from less than 5 million Euros to more than 5 billion Euros in 2021. Notably, 60% of participating companies had revenue of less than 20 million Euros, reflecting the dominance of small companies in the construction industry. Most of the companies were owned by a family or an individual who held at least 70% of the shares. They were engaged in the construction of buildings and infrastructure.

In addition, 14 interviews with leaders from consulting engineering and other industries provided stimulating insights into best practise for developing dynamic capabilities and experiences with change.

Appendix

We would like to express our sincere gratitude to all the interviewees who generously shared their time, expertise, and insight to develop the cases in this report. Their valuable contributions have played an integral role in the development of this report and are greatly appreciated.

We kindly acknowledge the following individuals and their respective companies, who participated in the interviews:

Adam Bialachowski   CEO B-ACT, Poland

Andreas Schweinar   CEO Dorsch, Germany

Daniel Kunkel   Manager of the Retail Network Engineering Shell, UK

Despina Kallidromitou   CEO Epsilon Group, Greece

Inés Ferguson   Business Development Director TYPSA, Spain

Johan Dozzi   CEO Tyréns, Sweden

Katja Stumpf   Co-Owner mellon, Germany

Markus Koschlik   Professor Duale Hochschule Baden-Württemberg (DHBW), Germany

Ralf Bufler   CEO CDM Smith, Germany

Roland Bönisch   CEO mellon, Germany

Sascha Korupp   Technical Director Herborner Pumpentechnik, Germany

Sharique Husain   CEO CONXAI, Germany

Silvia Furlan   CEO Net Engineering, Italy

Stefano Susani   CEO Tecne, Italy

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