Suvi Pukkila

Preparation and maintenance of a strategy-driven development plan with the roadmap process

Thesis
Spring 2022

Master of Business Administration

International Business Management

SEINÄJOEN AMMATTIKORKEAKOULU

Opinnäytetyön tiivistelmä

Tutkinto-ohjelma: International Business Management

Tekijä: Suvi Pukkila

Työn nimi: Strategiapohjaisen digitaalisaation kehityssuunnitelman muotoilu ja ylläpito tiekarttamenetelmällä

Ohjaaja: Beata Taijala

Vuosi: 2022   Sivumäärä: 102   Liitteiden lukumäärä: 1

Työssä selvitetään, voiko tiekarttamenetelmää (*Roadmapping*) käyttää strategiapohjaisen (4–5 vuoden) kehityssuunnitelman muotoiluun ja ylläpitämiseen. Menetelmää sovelletaan liiketoiminnan digitaalisaation tarpeiden hahmottamiseen, strategiseen linjaukseen, suunnitteluun, aikataulutukseen sekä synergioiden löytämiseen liiketoimintastrategian kanssa. Keskeistä on, että menetelmän avulla strategia muodostuu yhdessä tekemisen kautta. Näin se toimii apuna myös viestinnässä ja osapuolten sitouttamisessa. Menetelmä yhdistää erillisiä strategiaprosesseja ja käytäntöjä lisäten resurssien tehokkaampaa käyttöä. Erityisen tärkeä osa tiekarttamenetelmän iteratiivisuutta on mahdollisuus saada mukaan uusia osallistujia, joilla on tärkeitä näkökulmia ja asiantuntemusta.

Opinnäytetyön tutkimusmenetelminä käytettiin toimintatutkimusta ja tapaustutkimusta. Opinnäytetyö esittelee vaiheittaisen, havainnollisen tiekartan luomisprosessin sidosryhmien tunnistamisesta, haastatteluista ja työpajasuunnittelusta sekä miten strategian kohdistaminen, fokusointi ja järjestyskartoitus tehtiin tapausyrityksessä. Roadmap luotiin maailmanlaajuisen COVID-19-pandemian aikana, ja tämän vuoksi merkittävässä roolissa ovat digitaaliset yhteistyöohjelmat ja työkalut. Työssä esitellään tarkemmin virtuaalisia yhdessätekemisen työkaluja, jotka soveltuvat digitaaliseen tiekarttaprosessiin.

Työ esittelee, miten world café- ja palvelusuunnittelumenetelmien avulla voidaan mahdollistaa luova ja innovatiivinen strategianluontityö, jossa keskiössä on yhteistyön hyödyntäminen. Lopputuloksena luotiin yrityksen tarpeet täyttävä digitaalinen teknologiaroadmap. Työ osoitti, että käytetyt menetelmät sopivat tarkoitukseensa. Vastaavaa prosessia ja menetelmiä voi hyödyntää missä tahansa liiketoimintatilanteessa, jossa tarvitaan kokonaisvaltaista, liiketoimintayksikköjen rajat ylittävää virtuaaliympäristössä toteutettavaa kehitysyhteistyötä.

[1] Asiasanat: roadmap, roadmapping, strategia, kehitys, virtuaalinen

SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

Thesis abstract

Degree programme: International Business Management

Author: Suvi Pukkila

Title of thesis: Preparation and maintenance of a strategy-driven development plan with the roadmap process

Supervisor: Beata Taijala

Year: 2022   Number of pages: 102   Number of appendices: 1

The thesis study found out if Roadmapping would be a suitable method for planning, formulating, creating, and maintaining a strategy-driven 4–5-year (digital) development plan. The method is used along a journey including the recognition of a business need, a process of strategic alignment, planning, scheduling, finding synergy with the business strategy, communication, and commitment through doing together.

The benefits of Roadmapping for an organization are the integration of processes and policies for supporting the efficiency of the integration of all the resources into the business operations. A particularly important aspect of the iterative nature of Roadmapping is the opportunity to engage new participants with important perspectives and expertise.

The thesis provides a step-by-step illustration of the roadmap creation process, from stakeholder identification, interview, and workshop planning and how the strategy alignment, prioritization and sequence mapping were made at the case company. The roadmap was made during the global COVID-19 pandemic, and therefore digital collaboration tools were utilized to a full extent, which are therefore introduced in more detail as suitable tools for the digital roadmap process.

The usage of World Café method together with service design methodologies supported the process, enabling a creative and innovative virtual setting for the co-creation process, with facilitation and providing a roadmap canvas for evidence. The research method of the thesis study was a combination of action research and case study.

This outcome of the thesis can be utilized for any business initiative that requires a holistic cross-business, co-creation development process in a virtual environment.

[1] Keywords: roadmap, strategy, digital, development, virtual

TABLE OF CONTENTS

Pictures, Figures and Tables

Introduction

In this thesis, the research question is to evaluate does a roadmap method, together with a service design and the World Café method, suite for a co-create cross-functional, mutually agreed future foreseen planning for a large corporation, in a virtual environment. Thesis was made by observing, interviewing, and studying the documentation of the case company. The outcome of this thesis is a documented process work of how a strategy driven (digital) development roadmap was planned, formulated, and facilitated in the case company during 2020–2021. Research will supply a visual illustration, a roadmap canvas, and a joint summary outcome of how to plan, formulate, create, communicate, and support a strategy driven (digital) long-term development roadmap for purposes of any future foreseen planning work. The journey started from the realizing of a business need by networking and collaborating with the organization's top management and stakeholders from tactical to an operational level. This thesis will provide guidance on how to combine business level strategy to the total plan and how to schedule co-creation sessions and finally how to analyze the roadmap result outcome for the companywide prioritized IT development portfolio.

The selected research method was a combination of an action research, and particularly inductive approach of it, and a case study, because the identified problem was how to create a roadmap and if a roadmapping method is suitable for formulating a strategy-driven long-term digital development plan, and how well the World Café and a service design methodology will support roadmapping in the case company, which is a multinational and cross-functional. Researcher took part in a working group and was involved also to daily actions, and as action research is a systematic study of actions in a professional setting that researcher works, this is an observation and documentation work of researcher on the topic that she was working on, while case study research analyses data and defines the theoretical conceptual structure, what was in this thesis the

documentation and the case company's secondary data provided to the development process of the roadmap.

The case company in this thesis was established in 1834 and is a global engineering company, providing engines, spare parts and field maintenance for energy and marine sectors, business to business (B2B). According to its webpages (2022), it is a global leader of future technologies. It works in over 200 locations and has 17,000 employees, with over 140 nationalities in more than 68 countries around the world. Company is listed in Nasdaq Helsinki.

Case company has three business units, and this thesis will focus on one of the business units (called "case company" in this thesis), supplying sustainable solutions for global energy sector. According to the company's annual report (2021), business unit's products and solutions include storage, engine power plants, hybrid power plants. Services include lifecycle solutions, lifecycle upgrades, spare parts, and field services. Business unit had personnel (12 /2001) 4,980. Case company business line is focused to the customer delivery projects and is heavily a project-based organisation.

Case company started a digital transformation journey to escalate its business and product development to respond to the change in the global business environment. The digital transformation journey requires foreseen mapping of current digital maturity and future enablers. Case company is an excellent research environment for this thesis to observe, document and analyze of how and if a roadmap method is suitable for planning of said transformation journey, since the case company is a global, multi-national and gross-functional engineering company with well-established management and governance structures. The collaboration process, as it's done with people in social context and around future unknown and complex knowns, is supplying traits of evidence and observation possibilities for this thesis.

In the first months of the year 2020, the case company's management team required an assessment to be made to name interdependencies, enablers and future capability

requirements and technology opportunities. Assessment was also important for the management to be able to forecast resource needs and conflicts for prioritized developments, that will enable digital transformation. This thesis is an observation, analysis, and a participation work of a creation process of the case company's strategy aligned (digital) development roadmap in the alignment of good corporate governance, by use of roadmap method together with the World Café and service design methods. Thesis was done during a global COVID-19 pandemic, so the whole thesis research was done in a virtual environment. This thesis will illustrate a process of planning, leadership, scheduling, work and consolidation to create a sustainable roadmap focused to annual action plan(s). In a prior COVID-19 environment Roadmapping would have been facilitated in face to face (F2F) workshops with interactions to participants, by usage of pen, paper, and wall to wall whiteboards with sticky notes. This thesis will supply a suitable and sustainable solutions for making foreseen planning in virtual business environment and provides evidence that a virtual setting is suitable for a large roadmap process, supplying a workable solution for distance working force.

This thesis work will research objectively one roadmap process work done in the case company: a process made by Roadmapping to create a shared and visual representation. This thesis will supply guidance on how to choose correct stakeholders, engage and help team come together in a hectic business environment most efficiently. This thesis will guide how to plan and formulate purpose for the workshops and interviews and will also guide how to align with business unit level strategy implementation schedule. It is also important to plan time and resources for roadmap work, and this thesis will supply guidance for scheduling. **Target was to develop a committed cross business, strategy driven 4-5-year (digital) development roadmap with key short-term focus areas.** This thesis will supply a step-by-step journey and illustration from stakeholder identification, interview and workshop planning work and how the strategy alignment, prioritization and sequence mapping was made in the case company. This thesis will also supply illustration usage of the World Café method together with the case company's service design

support for enabling creative and innovative virtual setting for co-creation process. This roadmap was made during a global COVID-19 pandemic and therefore digital collaboration tools were used to the full extent, which are therefore introduced in more details in this thesis for suitable tools for digital roadmap process.

Even though this thesis was made for the case company, it will provide a common framework for any foreseen planning work in co-creation with all stakeholders, with agile method and with modern digital collaboration tools. This thesis will also supply suggestions and a frame to what is prior needed in order to create a Roadmapping process. This thesis outcome is valuable for any organization that wishes to create a short- or a long-term future vision statement and wish to create an annual action plan according to map action needed to fill identified gaps. Collaboration and creating a strong networking and common language requires careful planning and execution of a roadmap work, and this thesis will supply usable, ready-made illustrated examples for any such initiative.

Research was done by taking part in planning work together with the case company's operational development (OD) and information management (IM) departments. Primary data sources for this thesis were the case company's management documents, comments, and interview results, coded and clustered directly for purposes of this roadmap outcome. Interviews for company's top management were composed with both closed and open questions in a friendly environment in virtual (Microsoft Teams) meetings and an observation of said interviews supplied valuable support material for this thesis. Other sources of information were gathered by taking part in collaboration meetings and in governing forums, where data was combined and analyzed. All received information was data-labeled and categorized to support actual object of case company. This research will provide a documented process with examples, conclusion with corrective actions from lessons learned collected during the process.

1 Strategy will combine all plans

In this chapter, key theoretical frameworks are presented in more detail, those being strategy, innovation strategy and digital strategy, with relation to each other and a roadmap as a process and a product. Development and governance supply the umbrella for framing the research environment, since good management processes would help companies to execute their strategies and use their capabilities and apply the "plan, do, check, act" logic of the continuous improvement process.

1.1 Strategy in general

Maybe the world's most famous strategy book is Sun Tzu's (500 B.C), *Art of War,* written in China originally for the war strategy. Even though the book was originally used for military purposes, its quotes are today used also for business strategy planning. This would show that strategy has been known over thousands of years; it is a plan of action or actions needed to achieve a long–term goal. Probably the most important quote from the Art of War is "win without fighting", meaning that in business context, to capture a market without too much noise over it and prepare contingency to overcome the competition. Sun Tzu continues to say that the greatest of virtues is to be **prepared beforehand** for any contingency.

Business strategies written by Alfred Chandler (1962), Peter Drucker (1973), and Michael Porter (1985) are reflected in this thesis. A strategy framework like Porter's Five Forces helps company managers to understand & analyze business and environment around it, and to predict elements for making **decisions for future**. Business environment is a combination of all internal and external factors that may affect how companies work. A strategy is the basis for every decision made in an organization and strategy formulation is a specific process of making a choice about what actions are needed to reach the company's future goals, the future vision. According to Cascade (2021), traditionally in strategy there are seen three different layers (Figure 1) that are together making a strategy pyramid.
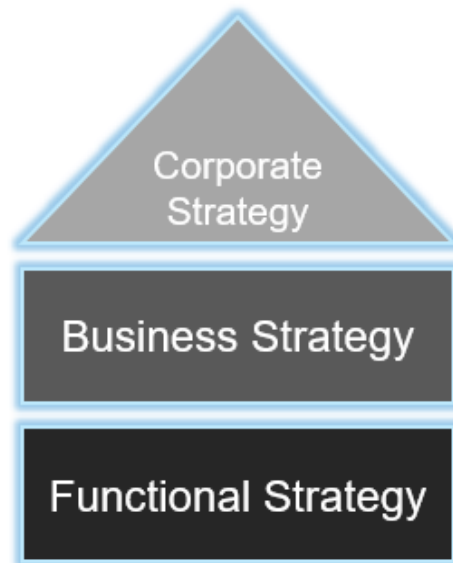
Figure 1. Strategy pyramid (Cascade, 2021).

According to Cascade (2021), in the **corporate strategy** level different methods and analysis can be used to decide the business around company and other effecting factures in external environment, that would affect in the decision making. The main purpose in this level is to decide, how to make competitive advantage to the rivalry. Corporate level includes a vision, values, strategic focus areas, goals, and most important key performance indicators. **Business strategy** level would focus on creating effective improvements to support the corporate strategy in every department with very operational decisions that are normally called tactics instead of strategies. The purpose in this level is to plan how to achieve those goals. It is important to include as many managers as possible to increase buy-in and ownership among all. **Functional strategy** level is those day-to-day actions to be taken to reach desired outcome. The purpose in this level is to make sure departments collaborate and work together. In this level the strategy is executed and implemented and for that reason it's important to make sure each employee in the company, in various levels understand and work towards common goal.

Drucker's (1973) definition of strategy is written like this *"the purpose of strategy is to enable an organization to achieve its desired results in an unpredictable environment"*. Drucker developed the theory of the company against the theoretical background of society and practice of innovation, that is a systematic change organized with a goal, and action driven renewed vision. Stein (2010, p. 30) highlights Drucker's social practice in strategic planning by saying "as a rule it is necessary to design the company for the change, and to create change rather than reacting to it*".*

Organizational culture is critical to the creativity and innovativeness of a company. Martins and Terblanche (2003, p. 64–74) write that it is important to find use cases with clear objectives if a long-term vision is needed to make it more digitally tangible. This will enable sustainable maintenance of transition and will help in strategy implementation. Regarding the vision and strategy sub-dimensions, the study mention roadmap creation for supporting strategy alignment like:

> when organization has a clear company vision and strategy and communication is effective to all, it has impact towards innovativeness and performance. Organizational competitiveness should be obtained in company vision when actively and periodically updated. By creating a strategic roadmap management will align organizational development activities by matching the desirable targets with the recommended activities in each period and utilize resources efficiently.

Porter's (1985), statement of competitive strategy highlights the company's process to choose most suitable strategy to itself: "Strategy is about being different and it means deliberately choosing a diverse set of activities to deliver a unique mix of value", meaning that companies choose to be different. Every company needs to have unique value proposition what prove them to be the best in what they do.

Interpretation by Gavris and Maier (2020, p. 3), of Porter's competitive strategy is that Porter believes the whole organization should be analyzed since every management function is responsible to achieve company's strategic goals. The attractiveness of organization in

relation with the economic environment and sustainable strategy with long-term goals, needs to be according to the competition. Porter (1980) presented Five Forces framework, that effect and influence in competition. For company to evaluate competitor's rivalry, supplier's power of negotiation, buyers' power of negotiation, threat of new entrants, and threat of substitutes and relationship of those. Organizations need to adapt to the outside demand and to internal competition, to make sure they have the needed resources and capabilities to achieve the company's strategic goals. To be able to secure the right capabilities in the team is not easy in a challenging business environment and therefore a long-term forecasting and strategic planning are essential. Argument made by Javarathmm (2007, p. 70–85), Five Forces framework does not take into consideration the innovativeness and partnership which are trending today.

Criticized also by Stonehouse and Snowdon (2007), Porter's Five Forces is too static in circumstances when the industry conditions change fast. In a turbulent business environment firms need to form strategies continuously by developing knowledge-based competences based on continuous organizational learning.

1.2 Innovation strategy

By Robbins (1996), an innovation strategy is a strategy that promotes the development and implementation of new products and services. To become a digital company, the first step is to have an innovative culture and from the strategic point of view, firms that focus on innovation can create unique products and services, which are difficult to imitate. This supports Porter's strategy statement of unique value proposition and support statement of Stonehouse and Snowdon (2007), a need of knowledge-based competences with continuous learning. Approach by Brand (1998, p. 17–22), visualized by Norawat and Nathasit (2019, p. 59), in Figure 2 show the guideline promoting innovation activities after organizational vision and strategy approach, supporting also governing of a corporate support sustainability performance. This figure illustrates that **initial** means organization

does mention about innovation, but it has not been included it as a part of strategy. **Defined** means that strategy and vision of the organization on innovation are defined; however, the goal and guidelines are not clearly defined and effectively communicated to all employees. **Aligned** means that innovation strategy is clear, and it has been linked with an organization's goal. The organization has communicated it with the employees, but their understanding towards the organization's vision on innovation has not been checked. **Integrated** means that innovation strategy is integrated as a part of company's vision and goal. The guideline for implementation and development is clearly defined. The organization has communicated with the employees effectively and checked their development progress toward the organization's vision. **Mature** means that innovation strategy is integrated as a part of the company's vision and goal. The guidelines for implementation and development are clearly defined. Organization has communicated with all the employees, and it is regularly checked. The strategy is routinely reviewed, and it can be revised as needed to cope with the changing environment. Employees' opinions are collected and analyzed to improve the strategic goal and guideline for implementation.
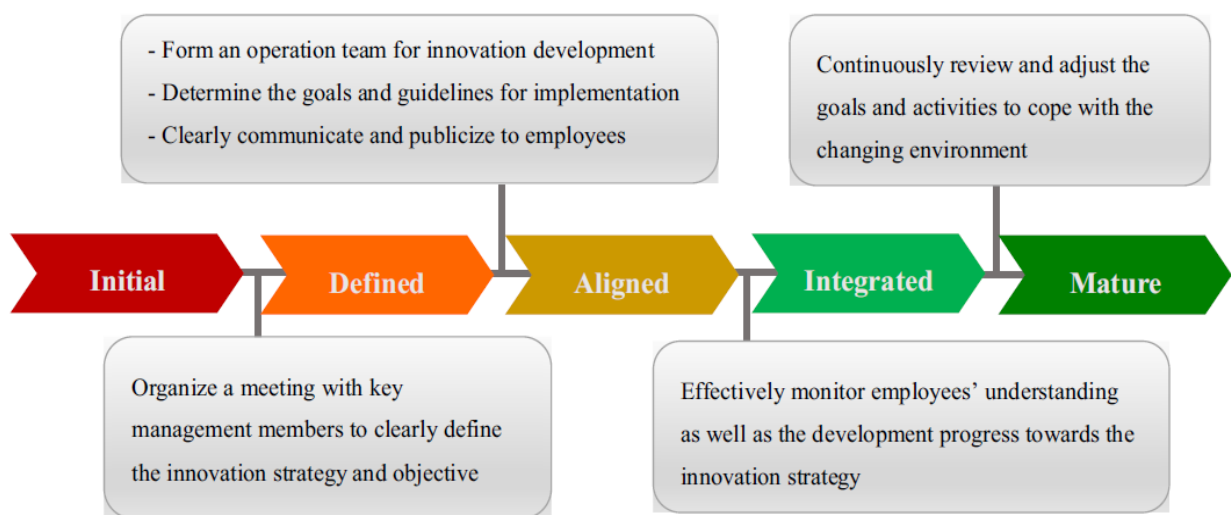
Figure 2. Innovation activities approach (Brand, 1998).

Like Porter (1985) states on strategy that wish is deliberately to be different, in the digital driven business environment new product functionalities, services, processes and value creation chains enable competitive advantages. Market entry for a new competition is easier just by copying database innovations. The reason for companies' challenges in this issue is lacking digital maturity and/or digital transformation is unclear. Few companies have developed digital strategies or have planned approaches for developing them. To create a unique value mix in unpredictable environment is the combination of strategies of modern digital driven company today is not familiar. Organizational culture is the key to success of any company and according to Kiron et al. (2016) companies must develop company mindset closer to the digitally mature, that would support a collaboration, use of data in decision making and to embrace risk and to create a distributed leadership structure, rating of company culture like visualized in Figure 3. A change–oriented mindset is the most important, followed by digital and technology literacy and strategic thinking; "today, people with deep technological knowledge are expected to have also solid skills in areas such as communication".
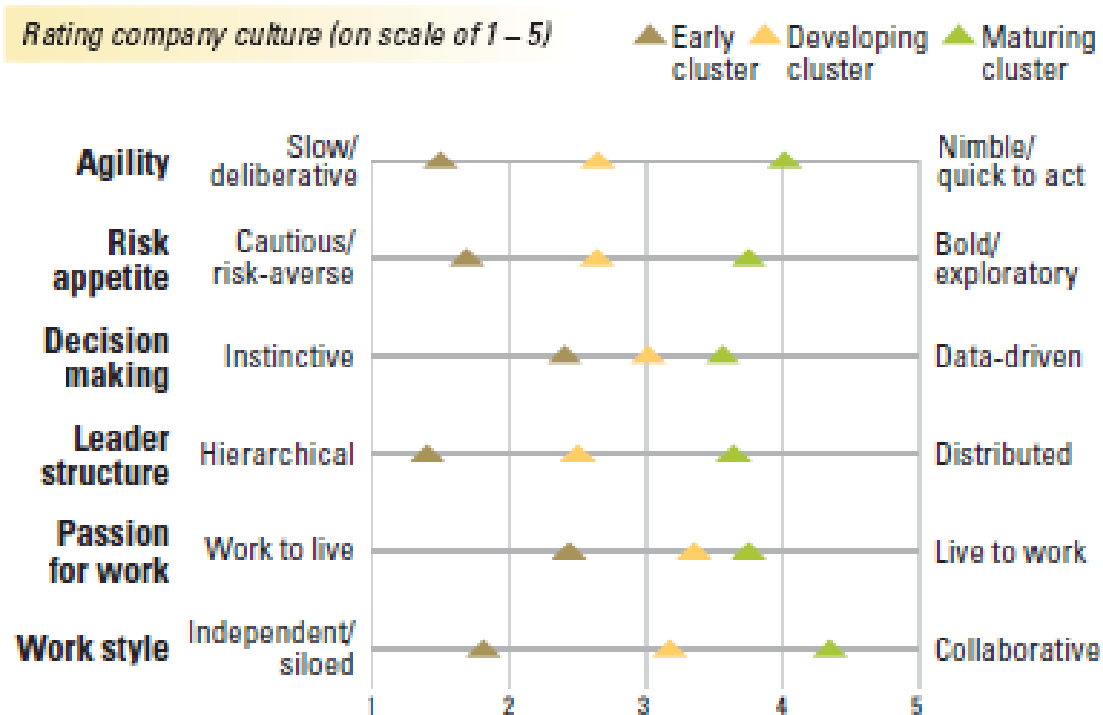
Figure 3. Digital maturity scale (Kiron et al., 2016).

Certain environmental circumstances, strategic approaches, the values and actions of the top management, organizational structure and technology cycles can be associated in ways with organizational cultures that would support creativity and innovation.

1.3   Digital strategy

Digital strategies are limited to the organizations and industry in which they work. Lipsmeier et al. (2020) state that digitalization is facing almost all economic sectors due to technological development of information and communication technologies (ICT), that are enablers for the future database innovations in products and services and functionalities in value creation. This requires essential change in all companies, and therefore digitalization is a

strategic core decision, together for fostering organizational culture that will support innovation. A digital strategy describes the overall vision of a company in the context of digitalization, including the strategic measures to achieve it in all levels of organization. It will describe actual short-, medium- and long-term digitalization goals and actions in the context of products, services and value creation, as well as for the organization and culture of the company. He further argues that key obstacle to digital transformation of companies is the lack of digital strategies that coordinate the digitalization initiatives in line with a common strategic direction.

Lipsmeier et al. (2020, p. 174) write that digital strategy creation process in Figure 4 looks synergies between company strategy levels and is following the same structure levels of company strategy being corporate-, business- and functional. Corporate level includes core competences, strategic focus areas and corporate culture. The second level of strategy, business strategy, will need to execute the corporate goals. Strategic guidelines and goals of individual functional areas are firm with framework of sub-strategies.
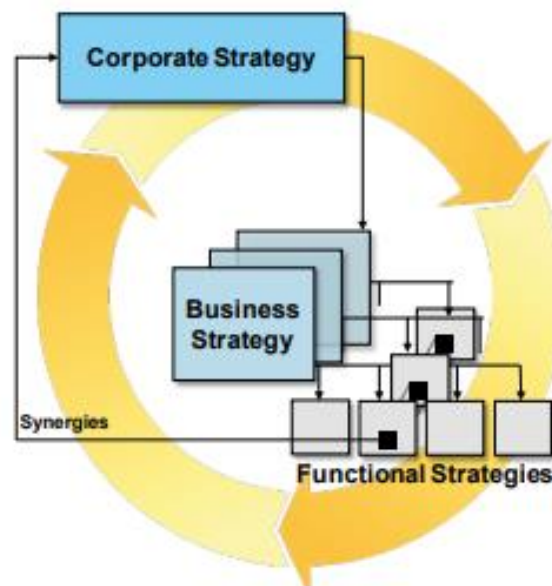
Figure 4. Digital strategy levels (Lipsmeier et al., 2020, p. 174).

According to Accenture (2021), *"digital strategy looks at the activities and processes that need to be transformed to provide better services for customers"*, and when this move has been made together with company strategy, digital leaders have found opportunities and advantages for growth. However, today many companies' roles and responsibilities are not clear and in what level the digital strategy should be positioned. Following to Lipsmeier et al. (2020), there is no link to the company strategy or any other level of strategies or if it should be separate strategy, or even only a document. Elements of strategy that should be coordinate digital transformation are not clear.

According to Favaro (2016), the following questions would supply a basic understanding of digital technology and would save time and resources to implement technology that would not supply a competitive advantage:

1. Does digital technology change the business you should be in?
2. How could digital technology improve the way you add value to the business you are in?
3. Could digital technology change your target customer?
4. Does digital technology affect the value proposition to your target customer?
5. How can digital technology enhance the enterprise capabilities that differentiate you from your competition?

Catlin et al. (2016), say that data driven organizations are 23 times more likely to get customers, six times as likely to keep those customers, and 19 times as likely to be profitable as a result this is clear treat of industry rival.

1.4 Digital strategy research

Digital strategy research is a young research field (Figure 5) and the path of evolution of digital strategy is unknown. By Lipsmeier et al. (2020, p. 175), IT strategies were first

introduced together with the business system planning. Digital strategy was not recognized as a part of business strategies. In the 1990s first research papers align common development of IT and business strategies.
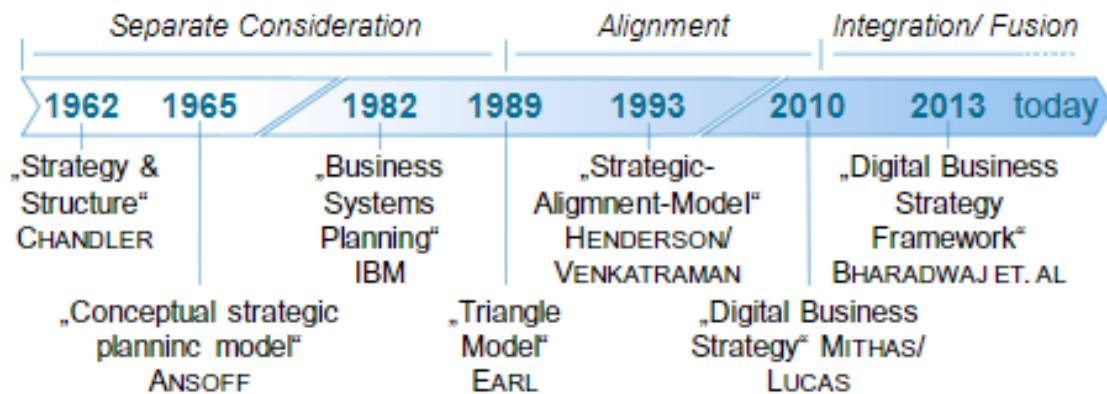
Figure 5. Evolution path of digital business strategy (according to Lipsmeier et al., 2020, p. 175).

Mithas and Lucas (2010, p. 5) state that clear alignment is not needed, and that the IT strategy is an integrated part of the business strategy. Porter (1985), argue that there are three principal ways to gain a competitive edge by using IT. First is by changing the industry structure. Second is to outperform competition by using IT. Third is to create new business by using IT.

Anandhi (2013) developed the most well-known framework in the context of a digital business strategy. He found four key themes to guide the thinking of digital business strategy. The four themes are 1. the scope of digital business strategy, 2. the scale of digital business strategy, 3. the speed of digital business strategy and 4. the sources of business value creation and capture in digital business strategy. The importance of digital strategies is well highlighted in frameworks provided, but the clear structure of digital transformation is not there. That is following the statement made by Accenture (2021) of companies missing digital strategy maturity and actions.

Chandler (1962) has defined strategy as "the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals" and suggest that "strategy follows structure". The essence of a strategy is the creation and use of an advantage. How management create and implement a strategy and strengthens competitive advantage is important to the success of company. Teece (2010, p. 301) retells Chandler's points by saying that an economy could not thrive without good managers.

McKeown and Durkin (2016, p. 2) write that "a digital business strategy manifests itself by the way of technology–enabled education and data collection married with cycles of focused innovation, which are manifested by using technology" meaning that if technology and strategy are united with tactical excellence disorder of industry can be created and an advantage used. Digital transformation is also fundamentally changing the nature of work and organizations. According to Cummings and Worley (2015), new leadership styles are needed, and future leaders should emphasize creativity and collaboration especially when talking about how to lead the digital world. In 20th century technologies assessed human work and leaders completed power over work. Researchers believe that a structure supporting teamwork, a flexible working process and unofficial relationships among work groups are more suitable for an innovative organization to sustain organizational competitiveness.

Kiron et al. (2016) state that organizations need to accept risk taking as part of their way of working, and digitally mature organizations are used to taking risks, and its acceptable way of working. Digitally mature companies supply employees with opportunities to develop needed digital skills. Companies are also simplifying their hierarchical leadership structures and fostering collaboration and turning cross-functional teams into more agile and letting formal structures fade or disappear. The recruitment process also needs to be agile, since permanent and conditional labor will not be able to keep pace with all talent needs in fast changing business environment. To evolve and compete in a digital business involves an

alignment of company's organization with the demands of digital business by thinking new ways on how and by whom work is done (Figure 6).
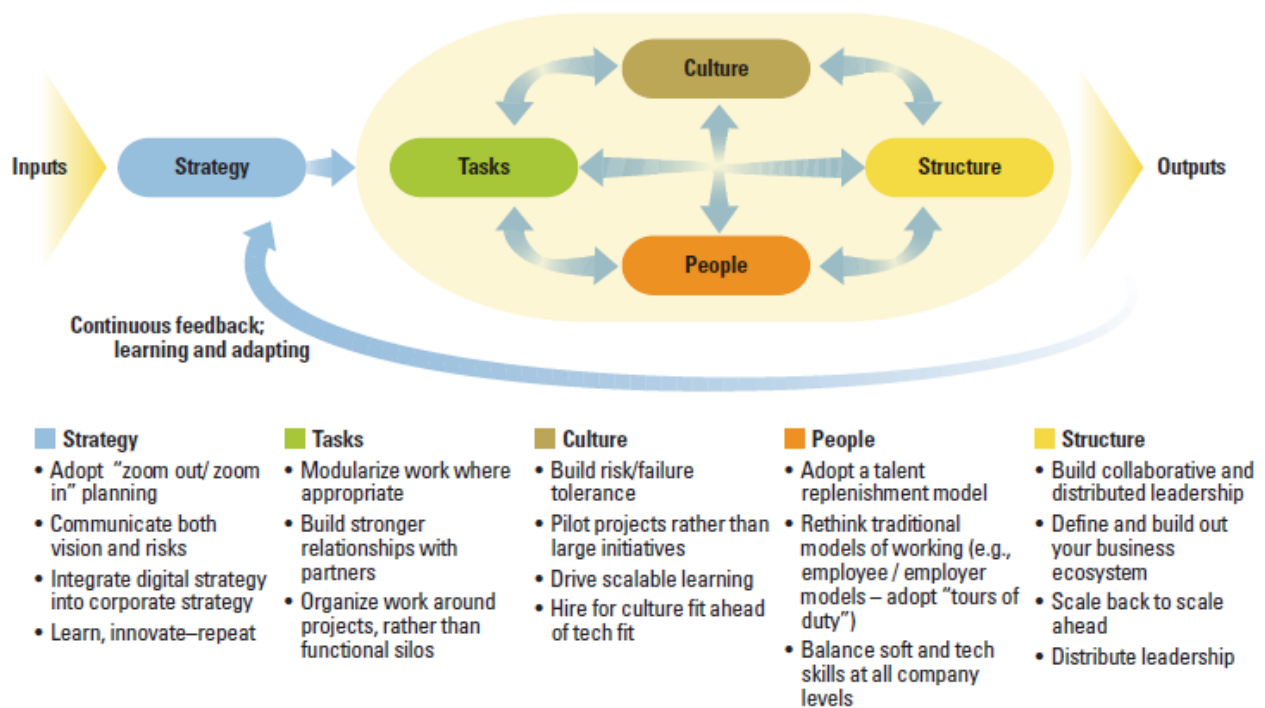
Figure 6. Digital resemblance of company culture, people, structure, and tasks (according to Kiron et al., 2016).

1.5 New Leadership

According to Jaques (2017), a suitable leader for an innovative organization should motivate followers to generate innovative ideas rather than command and control. Mendenhall (2008) states that "the leader innovates; the manager administrates. The leader inspires, the manager controls. The leaders see the long term; the manager sees the short term. The leader asks, "what and why"; the manager asks, "how and when". Organizations that move from experience–based, top–down decision–making to data-driven, bottom-up decision–making will drive learning from the future. After WWII, the Japanese realized that quality technologies what upskill work weren't effective without empowering

leaders, that guided cross-functional teams and Western firms followed decades later. According to Cohen (2014, p. 16), Drucker describes four methods for engaged workers, to support employee satisfaction. Those were:

1. Aiming for careful placement and promotion.
2. Demanding high standards of performance.
3. Providing workers with information.
4. Encouraging workers to acquire managerial vision.

According to Leavy (2020), leadership expert Amit Mukherjee introduced seven principles that offer a valuable template to corporate leaders to understand the future digital age leadership essentials. The seven principles are:

1. Digital technologies reduce, or eliminate, the value of an elite group's skills or knowledge and enable – and may even require – the automation of its work.
2. Digital technologies augment the capabilities of less-skilled people, enabling them to undertake tasks they couldn't earlier.
3. Digital technologies enable – and may even require – work to be distributed over time and geography.
4. Digital technologies enable – and may even require – work to be increasingly thought-driven instead of being muscle-powered.
5. Digital technologies create needs that aren't predictable and/or add disproportionately great value.
6. Digital technologies expose organizations to radical transparency, which may – or may not – benefit them individually, or their networks or society at large.
7. Digital technologies interact with, and affect, an organization's external environment.

Digital technologies interact with the environment, they can destabilize the world in milliseconds, so traditional strategy works in predictions, but a digital strategy is based on scenarios and simulations. This requires different kind of planning. Today best leaders create products or services based on unusual ideas. An excellent example of that is Tesla's leader, Elon Musk. Doing something different creates more value than merely doing something faster or cheaper. Diversity is essential in digital technologies and discovering and serving unpredicted needs create customer value. According to Mukherjee (2020), the new digital world requires management to have true collaboration instinct since no group has the intellectual property necessary to do creative, mission-critical tasks. The corporate leadership standards are usually culture–specific and biased in favors of men. Leadership tends to rely on three linked assumptions:

1. Most people working together are governed by the common organizational culture, policies, processes, and structures of a single company.
2. Most employees share a handful of cultural, lingual, religious, racial, and political heritages.
3. A company's leadership standards embody the world view of its dominant executives.

According to Mukherjee (2020), in the digital world, leaders are executives that have wide knowledge rather than comprehensive knowledge, and they can navigate in-between spaces and it gives them the essential skills to collaborate with others with different knowledge, skills and life experiences. Supporting this argument are skills listed by Frada (2022), based on Lindegaard interview, to unlock the business potential in sustainability framework, innovation, venturing, and collaboration is the key. It all happens in an ecosystem and in partnering, and organization needs to evolve to be more collaborative. A strong networking culture will be the main skill needed to succeed in collaboration and venture. Other items are:

1. A holistic point of view (intrapreneurial skills).

2. An ability to constructively handle conflict.

3. Optimism, passion and drive.

4. Curiosity and believe in change.

5. Tolerance for and an ability to deal with uncertainty.

6. Being an adaptive, fast learner with a sense of urgency.

7. A talent for networking and/or strategic influencing.

Strategy is certainly framed in terms of the future, but according to Defense Secretary of US (UNITED STATES) White House Donald Rumsfeld (2002), future is indefinite because of endless "known unknowns"; the things you know you need to know but are not yet known and "unknown unknowns" are the things you did not even know you needed to find out. Strategy must be made because it would supply some order and structure for the future planning. Today's leaders need to be able to see the future and see the change before it happens, and that is why becoming an intentional futurist is so critical. Organizations understand the importance of learning from the future.

According to Accenture (2021), "intentional futurists are the kind of leaders, who will not just survive, but thrive, as the word continues to change rapidly and radically". And that only six percent of executives are completely confident in their organization's capabilities to foresee and respond to future changes. Organizations that move from experience–based, top–down decision–making to data-driven, bottom-up decision–making will drive learning from the future. The move to empowered, multidisciplinary teams require people to take on more complex roles that combine tasks once performed by people in two or more traditional roles. The authoritative teams have more ability to develop a range of needed digital skills. Building new teams for future organizations means promoting a diversity of perspective across the teams, and whole organization. That can be seen supporting Porter's competitive strategy.

Accenture (2021) further argues that after setting up common tools for working, organizations can encourage employees to collaborate in an interdisciplinary manner, with the core business, operational and data-science units working side by side. The goal is to bring

diverse perspectives to the table to ensure initiative address strategic priorities, as well as to highlight the user's needs and quickly find any needed operational to be fixed. A technology–supported approach to naming required skills will also need to be met with an organizational culture that empowers individuals to make choices based on their strengths, interests, and other personal criteria. This can be seen aligning Mukherjee's (2020) three assumptions mentioned earlier.

1.6   Development and governance

The process of the information technology (IT) strategy has been to inform what kind of technologies for the company to invest in based on the current direction of the business. In today's world the enabler to survive is to transfer data into information and information into insights, since quick decisions based on intelligence will make the difference in competitiveness. Companies today need to align both business, innovation, and digital strategies, and make sure all strategies are part of the governance processes. According to Mithas & Lucas (2010) said governance includes five steps. First it needs to be agreed what are the key IT decisions, who should make them and how. Second is how IT function should be organized (cost or profit center). The third step is to agree how much to invest in IT and into what kind of projects. Fourth is the prioritization and justification of different IT projects that will support the company's key strategic focus areas. The fifth step is to agree what projects are done in-house and what are to be outsourced or rented. These decisions vary based on the company processes that stress revenue growth or cost reduction in digital business strategy.

According to Project management Institute (PMI, 2017), "IT Portfolio Management is the discipline of managing IT investments as you would do a financial portfolio, balancing potential return, fit with objectives, and risk assessment. Enables organizations to set up and adopt a formalized process for measuring and checking the value of IT investments"

In the case company the governance definition is written in internal communication material (2021) as follows:

> a purpose of the governance is to ensure all development initiatives will be key to realizing the company strategy with aligned priorities. To have end to end process focus on digitalization and agreed capability developments will have clear interconnected development roadmap and optimized resourcing. Decisions are made based on smart technology choices to optimize the IT landscape and full transparency on IT spend with joint commitment and priorities.

Digitalization affects all levels, systems, and structures of a company. It is not a portfolio management of projects or programs, it's a dynamic continuous process of development. For long-term sustainability digitalization must be strategically treated. Most critical action for an organization to wish a transformation into digital innovator is to build a digital business strategy. Traditional thinking of strategic levels from corporate strategy, business level strategy and sub-strategies course challenges for developing a digital strategy.

The blended physical and virtual worlds bring opportunities for organizations to create more value for their customers, employees, and organizations by improving interactions. According to Accenture (2021) remote experiences mean less travel, easily onboard of new employees, or conduct lively brainstorming meetings, less bottle necks and lower carbon emissions. Also, realistic 3D images of virtual prototypes cut waste in the manufacturing.

1.7 Roadmap

Innovativeness is the key to digital transformation, and that innovation needs to be addressed. Plessis (2007) notes that knowledge management, including knowledge creation, knowledge sharing and knowledge accumulation, can name gaps of knowledge and define the steps to fill those gaps to improve. Long–term growth requires development through the continues innovation with organization innovativeness and structure. For understanding the

need of every management leading innovation for value creation is to acknowledge the key enables that drive organization towards innovativeness (Figure 7), like according to Marina (2007, p. 69) how to measure status of an innovative transformation and how to utilize analysis results to develop a strategic roadmap for improving its level of innovativeness and how roadmap is guiding development activities in period of time.
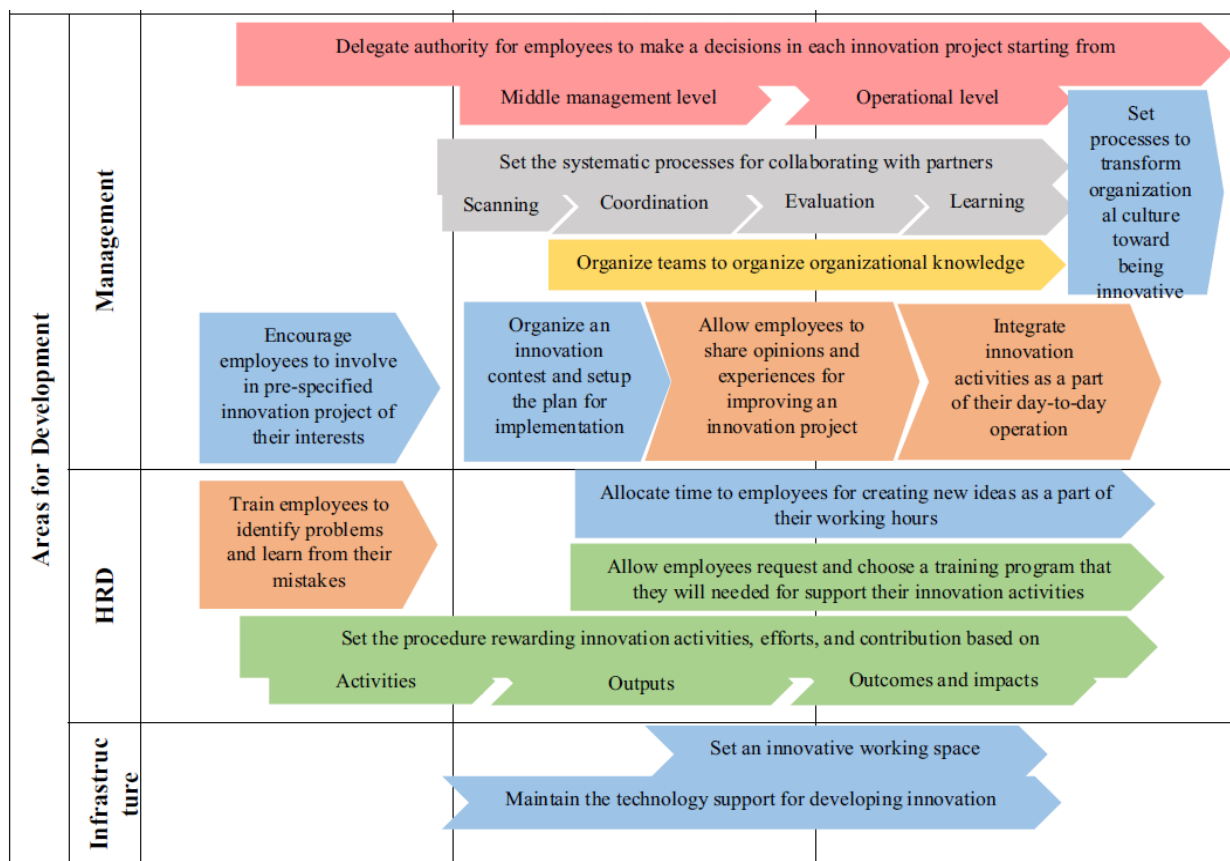
Figure 7. Illustration of strategic road map of a company development activities toward innovative organization (Marina, 2007, p. 69).

According to Garcia and Bray (1997), a Roadmapping technique is used more as a management tool for enforcing innovation, strategy, and policy. Benefits of Roadmapping for an organization are integration of processes and policies. Albright and Kappel (2003) state that for supporting efficiency of all resource's integration of Roadmapping process into part of

the business operations is a key. Vishnevskiy et al. (2015) complement thought that Roadmapping helps communication between different business functions, like R&D, sales, delivery, marketing, H&R and creates needed mutual understanding (common language) and integrate the capabilities and business requirements of each department.

A Roadmapping highlights participation and supplies practical help to facilitate the process by enabling all participants from technical experts to senior management and junior members to play a full part of the process. It eases planned discussion that is critical to the process of reaching a collective agreement, it is enabling different views, priorities, and concerns to be associated, discussed, combined, and summarized into common set of outcomes. Roadmapping enables impact and relevance of each technology part of a business strategy to be improved fast and steadily with identification of the gaps and duplications. Roadmapping supplies help in communication both at the operational, tactical, and managerial level and providing an audit trail for the management level for assurance in validity of programmes.

Kappel (2001, p. 31–40) note that all kinds of forward-looking documents are called roadmaps. It can be also called the journey in time. Illustration of a roadmap has been used in the field of education with long history. In politics "Roadmap for Peace" publication share performance-based and goal-driven roadmap, with visible stages, timelines, target dates, and benchmarks, a two-state solution to the Israeli-Palestinian conflict (Middle East Quartet, 2003). Roadmap term is also used in the legal context, where roadmap is set of procedures. In the finance area, roadmaps include terms like mechanism, coordinating mechanism, aligning decisions, active management, investment coordination.

Willyard and McClees (1987) raise the awareness of roadmap process as method that has been used since for different purposes in different businesses and industries (i.e., focusing on the method/tool/process) and in Motorola, roadmap method was fundamental tool for balancing.

> The amount of attention paid by business managers to short–range issues versus long-range issues; to operating versus strategic matters; and to technology versus the many other professional disciplines that must be managed in successful company.

Method is though lacking theoretical substance, mainly because it was started to use by the industrial engineers, tackling real life forecasting issues in large companies. Willyard and McClees (1987), further argue that the biggest value of Roadmapping is not the documentation created, but the roadmap **process.** Galvin (1998), state that for best process to collect and evaluate the content of roadmaps, is to include as many professionals as possible in regular workshops for all the suggestions to be considered and to openly evaluate the harmonies that will appear and that everyone should have been given the equal rights for opinion, from minority views and other.

The study of Vishnevskiy et al. (2015) conclude that Roadmapping technique is a useful method to combine corporate, innovation and technology strategies to develop an organizational long-term strategy. Mintzberg (1979, p. 69) states "a strategy is a pattern in actions over time". Action needed to get to the goal are following accordance of Chutivongse and Gerdsri (2020) assessment model in Figure 8 for measurement of an organizational status and areas for further improvement, based on the gaps between current state and desired target state with three phases; making assessment model for being an innovative organization, assessing an organizational status and diagnosing of the areas in need of a improvement; and developing a strategic roadmap to bridge the organizational gaps to improve the level of innovativeness. The management team should also re-visit the status of roadmap outcome time to time and adjust roadmap accordingly.

The Roadmapping framework is designed to gather and integrate evidence and insights from a range of innovation. From system stakeholder perspectives related to system activities, linkages, and elements, at various stages of innovation lifecycles. A particularly

important aspect of the iterative nature of Roadmapping is the opportunity to engage new participants with important perspectives and expertise.
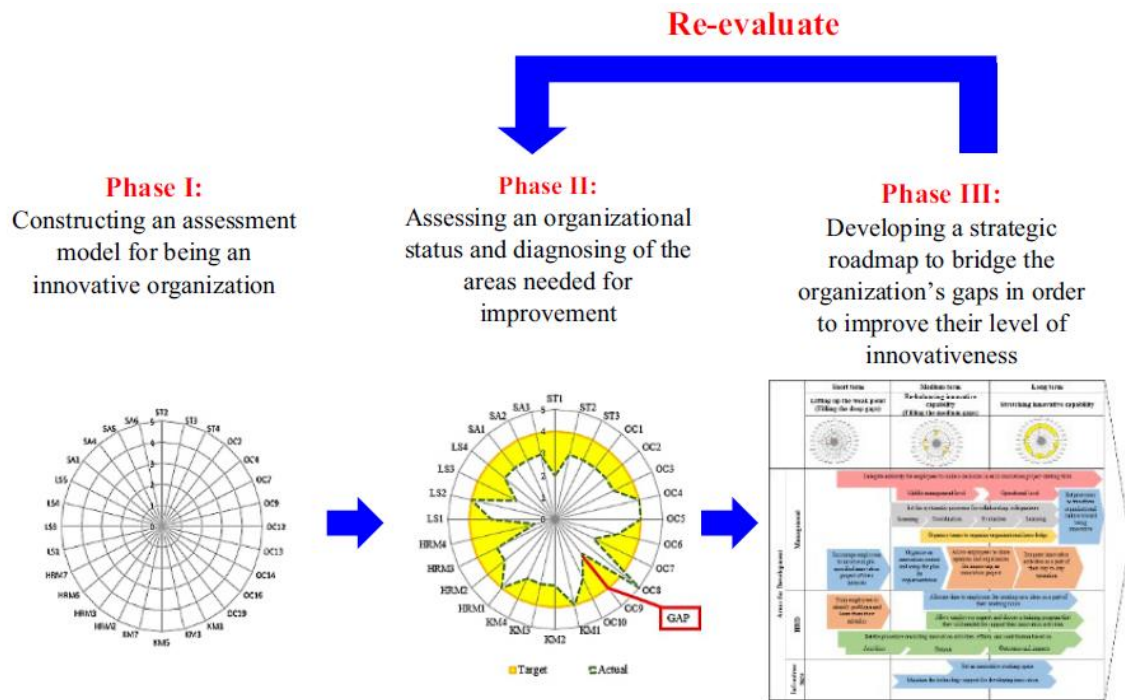
Figure 8. Analytical approach for Roadmapping (Chutivongse & Gerdsri, 2020, p. 55).

According to Chutivongse and Gerdsri (2020), digitalization named digital use cases need to be aligned with the digital guiding principles and objectives. For identification of (digitalization) initiatives can be used (digital) target picture including all functional areas in Figure 9.
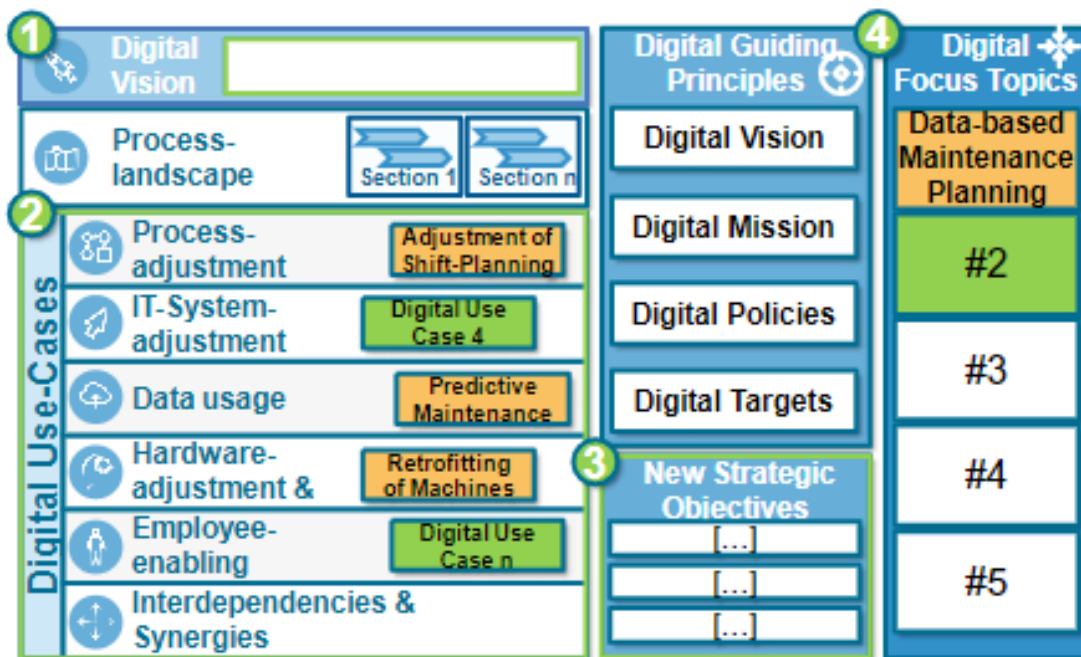
Figure 9. Digital target picture and context value creation (Lipsmeier et al., 2020, p. 177).

When the digital projects and/or programs have been selected, an implementation of roadmap of business level with specification of development chronological sequences are needed for realize digital transformation. Barker and Smith (1995, p. 5), published an overview of British Petroleum's (BP) Roadmapping foresight approach saying that an approach for unpacking the corporate strategy; vision and strategic goals to the identification of priorities in technology part and how balanced scorecard and Roadmapping foresight approach can be integrated. They also recognized the benefits of the visual nature of Roadmapping in terms of communication of the outcomes and in obtaining structured discussion and for constructive debate facilitation.

Groenveld (2007) states that the original description of the "product–technology Roadmapping" has been replaced by "business Roadmapping" to highlight the goal of this type of Roadmapping, i.e., developing a 5–7-year vision of how the business is likely to develop. He also emphases that Roadmapping must be an ongoing process and that it is a part of

business cycle. The framework of a Roadmapping process is based on a double workshop sequence; the first workshop is to share the information and set up a common view between participants and the second workshop will generate the actual roadmap.

The European Industrial Research Management Association (EIRMA, 1997) published a guidance document on technology Roadmapping (TRM) and the working group of EIRMA states that **time** is the primary parameter of the technology Roadmapping–if there is no time, then it is not a roadmap, and adapted roadmap structure with time association in Figure 10.
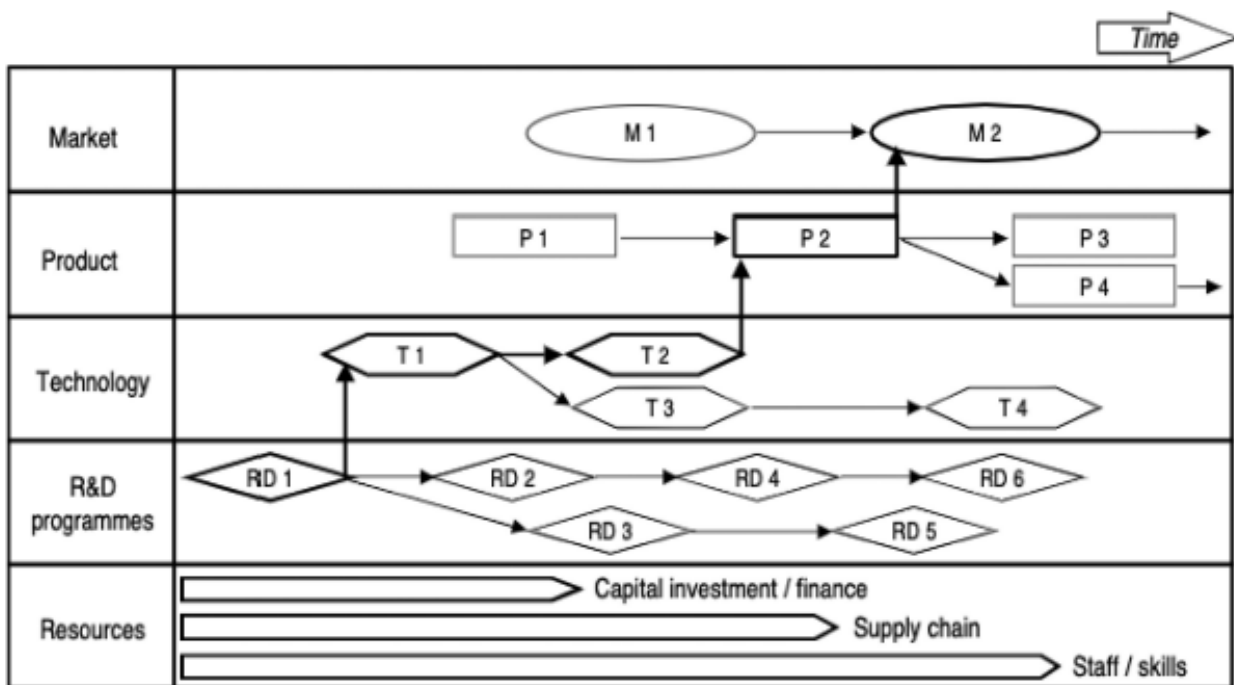
Figure 10. Generic roadmap structure (adopted from EIRMA, 1997).

EIRMA also outlines the "backwards" and the "forwards" methods. Backwards in time targets are defined at the beginning and Roadmapping involves finding out how to reach a given target. Figure 11 illustrates backcasting method by Becque. Forwards method the targets are the result of the process building upon involving the evaluation of potential, the possibilities it opens for the satisfaction of future needs. A similar method of backcasting highlighted here was used and communicated in the case company's roadmap workshops process.

Okada et al. (2020, p. 170) also use backcasting-oriented roadmap design for sustainability, including four steps: preparation, developing vision, developing path and postworkshop activities.
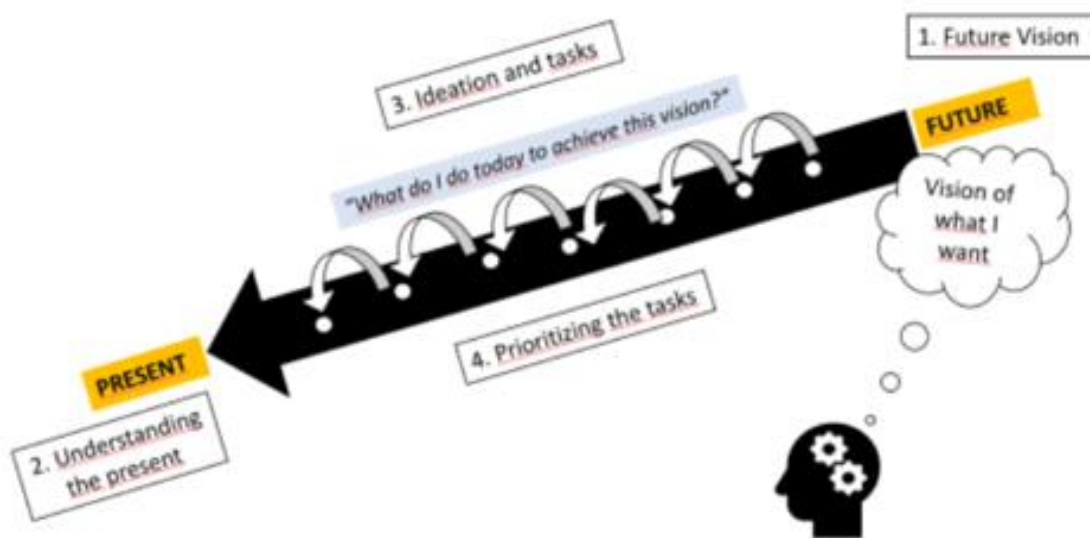
Figure 11. Backcasting (Becque, 2015).

Technology Roadmapping has become an important framework tool for long-term forecasting and planning of technology strategy development. It is important to structure visual roadmap framework to foresee evidence failure and use the agile and iterative nature of Roadmapping process to tackle them and build enablers.

The National Aeronautics and Space Administration (NASA, 1976) deployed a Roadmapping even before the first documents described technology Roadmapping & deployed it through workshops. Figure 12 show from 1976 a "overlapping sequence of events that are necessary in order to bring product to marketplace in the coming decade", that represent

the characteristics of the Roadmapping with multi-layered, system based, Roadmapping framework as visual foreseen evidence.
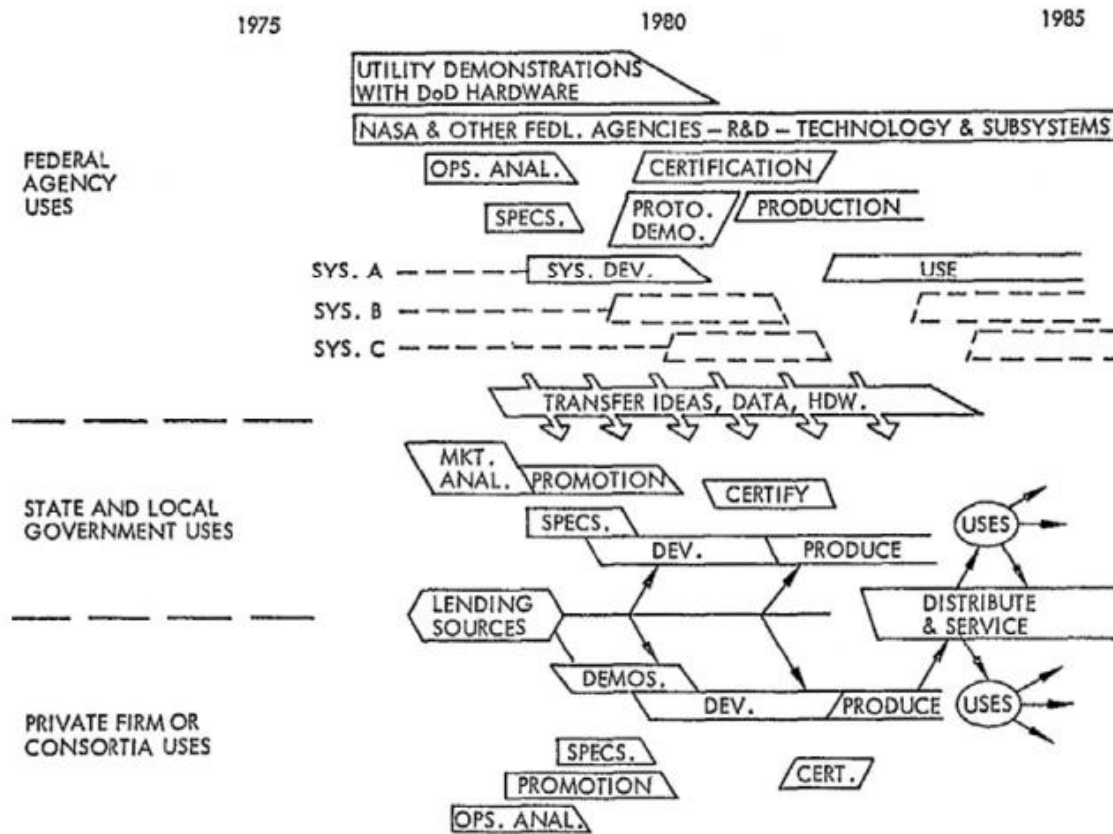
Figure 12. Lockheed's roadmapping framework (Aderhold et al., 1976, p. 116).

A good example of visually structured roadmap to support the communication of high–level overview is few years later in 1979 by John Neal (Acting Assistant Director, Division of Fossil Fuel Unitization, DOE) roadmap layers of 2nd and 3rd generation technologies and the fuels layers with simultaneous routes connected to the 2nd-3rd generation pathways (Figure 13).
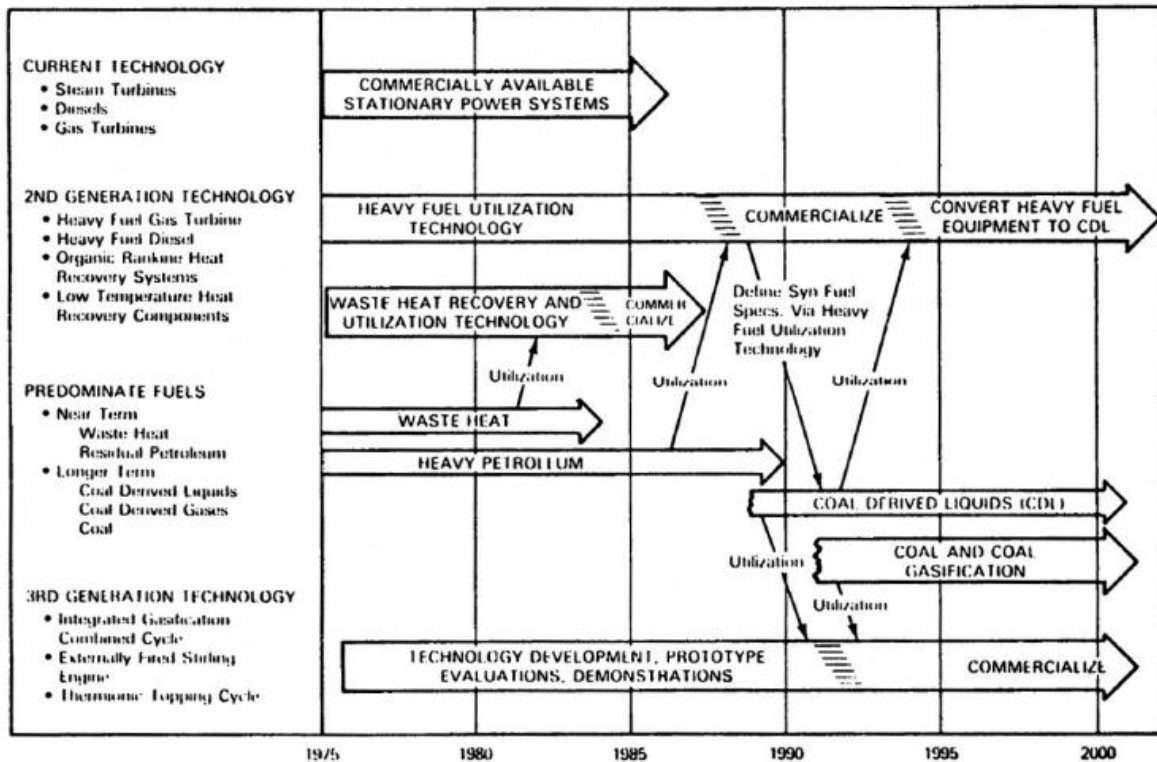
Figure 13. Heat engines and heat recovery development strategy (Neal, 1979, p. 19).

Lee, Phaal and Lee (2011) specify benefits of using Roadmapping and claim that it creates consensus among the decision makers on the need for the modern technologies, mapping resources and that mapping reduces the complexity of the decision–making and its speed of the implementation. Roadmapping normally includes process of study, normative and strategic analysis. These phases are potential decision-making gates for the foreseen revision. The visual roadmap canvas supplies different evidence patterns to follow like; evidence cluster patterns, evidence linkage patterns, stakeholder input patterns, visible illustrated in Figure 14.
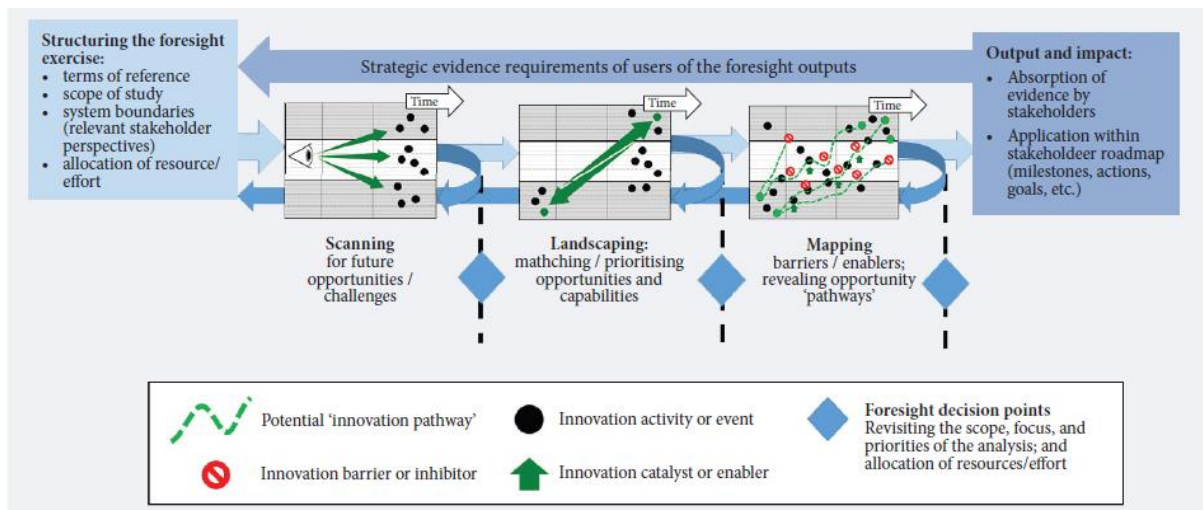
Figure 14. Iterative nature of extended Roadmapping exercise (Lee, Phaal and Lee 2021, p. 77).

2 Research environment

In this chapter research environment is framed and presented in more details. Case company is a global business to business engineering & construction company with multiple locations and time–zones. Case company is focused to customer delivery projects and is heavily project-based organisation.

The case company has established a common language in strategy creation by involving all employees in the strategy creation process. Innovation is fostered with continuous learning and competence development. The case company management systems aim is to generate added value for the stakeholders, achieve company's strategic objectives, support sustainability performance, manage operating risks and aims to enhance the company performance through the "plan, do, check, act" logic of continuous improvement process.

Development and its governance provide an umbrella for framing the research environment together with the business environment, including internal and external factors. Operational development (OD) portfolio is kept as part of the business line dashboard and visible to all with details of each item. Developments are linked to the strategic capabilities and operational development forum is combining the portfolio and the prioritization is done in the joint engagement forum on a quarterly basis. Business control functions will support the businesses in the decision-making and analyses to ensure the achievement of financial targets. In the case company, OD portfolio management team has overall operational development process responsibility for the approval of the company controller's team, providing the monitoring and controlling frame.

This thesis was made during a global COVID–19 pandemic, that challenged the traditional format of a co-creation process for a roadmap and forced into a rapid integration of modern digital collaboration tools. Stakeholder management in roadmap creation process was also somewhat challenging in virtual environment with forced distance working structure.

2.1 Case company

Case company has three business units, and this thesis will focus into one business unit (**called "case company" in this thesis**), and according to the company's annual report (2021) it is providing sustainable solutions for a global energy sector. According to the company's annual report (2021), business unit's products and solutions include storage, engine power plants, hybrid power plants. Services include lifecycle solutions, lifecycle upgrades, spare parts and field services. Business unit had personnel by the end of 12 /2021, 4,980. According to the case company's webpages (2022) company's people strategy's key focus ares for next 5+ years are:

> creating an inclusive culture that drives performance – In order to create a culture that supports purpose and values, to build diverse teams collaborating cross-organizationally to actively shape ways of working and mindset. Embrace trust, wellbeing, and work-life balance as prerequisites to achieving sustainable performance. Fostering a learning organization with a strong growth mindset – continuous learning, competence development and growth, as well as the continuous evolvement of the organization strengthens. Leaders reinforce learning and empower everyone to take responsibility for their own growth and development.

Similar as by (Kiron, et al. 2016, Aligning *the Organization for Its Digital Future* – research paper), is the case company focusing towards changing the company's culture towards more a change–oriented mindset, being still in the initial stages. Case company is supporting the change by fostering learning and innovativeness with several platforms that enable collaboration and co-creation.

Case company (internal communication pages, 10.5.2022) explain a company-wide collaborative innovation platform enables the handling of ideas in a transparent and efficient way and gives all employees the opportunity to be a part of the ideation process. An innovation platform supports the existing innovation processes by creating transparency on the ideas given and their status as well as increasing the odds of connecting similar ideas from the early phases of ideation. Platform has features like community

engagement, making it possible for everyone to contribute to the ideas by commenting and voting even without an idea of their own. Lipsmeier et al. (2020, p. 173–178), state that digitalization and future data–base innovations in products and services require a fundamental change in the companies, and therefore digitalization is a strategic core issue together for creating the organizational culture enabling innovation. Therefore, the research environment of the case company's vision of renewable energy future supports the mission of creative and innovative organization, that determinates the organizational culture to foster innovativeness and creativeness.

2.2   Case company strategy formulation

Companies that unite both digital and corporate strategies are leading the game. Below Figure 15 is illustrating the case company's business strategy creation process, which is in alignment with Alfred Chandler (1962) who defined strategy as *"the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals"* and suggested that *"strategy follows structure".* The essence of strategy is the creation and use of an advantage. How management create and implement the strategy and strengthens the competitive advantage is important to the success of a company. Chandler points out that an economy could not thrive without good managers. Case company involved every employee's insight into the process of finding strategic capabilities. Bold move not done before, enabling people to know what was expected from them so that they're able to execute on the changing strategy.

Figure 15. Strategy planning process (the case company internal documentation, 2022).

The business strategy process starts from analyzing the business environment scenarios that will be the basis for strategy formulation, which is then taken forward by finding those strategic priorities and objectives, following the ISO 9001 standards. An annual execution plan with actions and defined business metrics includes periodical must win battle-projects together with programs and the strategic actions and area plans. The fast evolving and changing business environment with growth of digital technologies where large amount of data is to be handled and managed force companies to transform their business architecture and adopting the strategy where data is creating business value. It is also important to connect the company strategy creation with the strategy implementation, for enabling sustainable solution. The digital strategy will improve competitive advantage, but also it will create a need to revisit and change business models through the "plan, do, check, act" logic of continuous improvement. According to McKeown and Durkin (2016, p. 5–6) today the strategy creation and implementation cooperation with digital strategy needs to be a continuous evolution. Digital strategy implementation needs to create a concrete plan and actions with monitoring and there also needs to be time to find critical resources, stakeholders, capabilities:

> Digital business strategy manifests itself by the way of technology–enabled education and data collection married with cycles of focused innovation, which are

manifested using technology" meaning that if technology and strategy are combined with tactical excellence disruption of industry can be created.

In the 2020 the case company's business unit management required an assessment to find interdependencies, enablers, and future capability requirements & technology opportunities. In the case company setting, to get the business understanding transferred from top management, capability owners, subject matter experts, and transfer that knowledge into data, processes, people, and tools (capabilities) development needs a supporting company strategy vision in period, long-term vision planning and short–term action plan collaboration and that planning was needed to be organized in structured fashion. This environment supplied suitable setting for action research and a case study by participation in the working group supported data gathering, analyzing, and planning future actions for the case company.

2.3   Global COVID–19 pandemic and digital solutions

According to the World Health Organization (WHO, 2022), the COVID-19 pandemic was declared by WHO on 11th March 2020 and in two years, as of April 2022, it had killed 6,01 million people globally and caused more than 500 million cases, being one of the deadliest pandemics in the history.

A global COVID–19 pandemic created challenges for normally face to face alignment meetings and workshops in the case company, so working group needed to come up with innovative ways to have same co-creation atmosphere and still provide creative structure for the workshops as face to face with wall-to-wall whiteboards would have provided. At the time of the planning work, remote work was only forced among employees, so the learning and adaptation level was in the early learning curve state. Many of today's enables were not yet familiar to all.

According to Laura LaBerge (2020), summary of executives' survey was evident (Figure 16) that to stay competitive in a new business and economic environment companies need to

have new strategies and practices and technology's strategic importance is seen important building block of business, and not only source of cost efficiency. A survey also reported an increase in remote working, a change in the customer needs and preference for remote interactions. Also was reported that migrations to the cloud increased and that after the crisis this direction of change will remain and funding of digital initiatives and number of people in digital or other technology roles have increased.

This case company's roadmap was done during a global COVID-19 pandemic, that forced business to use remote working methods for collaboration. The pandemic speeded the use of digital solutions globally and different tools and services were taken into use rapidly to support business activities, like meetings and customer collaboration. This speeded up the change to the digital economy in total. Businesses around the world were being forced to implement remote work routines, digitalization and its benefits are becoming clearer today. According to Haines (2021), the virtual teams are performing equally well as the traditional face to face teams. Supporting this statement, according to Microsoft (2020) the numbers using its software for online collaboration climbed nearly 40 percent in a week in March 2020 when COVID-19 broke, so the shift to remote was happening at once.

Share of respondents, %

	Changing customer needs or expectations[1]		Increasing migration of assets to the cloud		Increased spending on data security		Changing ownership of last-mile delivery within the industry value chain[3]		Qualification of additional suppliers to build redundancy in supply chain	
		Increase in remote working and/or collaboration		Increasing customer demand for online purchasing and/or services		Increasing use of advanced technologies[2] in operations		Increasing use of advanced technologies in business decision making		Increase in nearshoring and/or insourcing practices
Organizations experiencing specific change, %	63	93	34	62	37	37	20	21	21	15
Believe the change will stick, %	62	54	54	53	53	50	49	49	48	41
Believe the change will not stick, %	18	23	27	27	27	30	28	35	31	35

Figure 16. Digital change remaining (McKinsey & Company survey, 2020).

A global COVID-19 pandemic effect to business and its boost towards a digital technology leap is critical in keeping business continuity, especially since pandemic was longer than expected at first. It also forced companies to develop internal ways for remote work and collaboration. Prior COVID-19 organizational cultures were deep in silos, delay's ability and collaboration resulting experiment pace failure to match rate of change in the business environment. According to Laura LaBerge (2020) now it's time to make bold plans for a post COVID-19 environment. Mapping of the changes in crucial strategic information will help to mitigate immediate risks and drive towards an ecosystem thinking with customers, partners,

and employees. This is valid as companies deal with a large amount of data in a fast-evolving business landscape.

The pandemic increased the need to simplify and focus to avoid being overwhelmed. Crisis forced companies and employees to learn to improve performance accordingly. The more people or organizations are added into the common solution process, the faster the learning happens. This collaboration curve is essential for innovative companies. According to Laura LaBerge (2020), companies can adopt digital changes 20-25 times faster than expected, and implementation of solutions were 40 times faster than pre-pandemic conditions. Prior-pandemic lack of prioritization was the leading reason digital transformations and capabilities were not adopted. Now it's been understood that the operations don't have to work perfectly before they are being adopted.

Employees are now working remotely and it's much easier to run on remote basis, key investments have been made to enable a virtual communication and learning for fast adaption is essential, there is new opportunities for the companies to take advantage of this development. This will provide new possibilities for wider collaboration with subject matter experts that might not previously have been able to join face-to-face workshops. New digital transformation has helped to create a landscape that encourages innovation and technological adaptation moving forward, beyond COVID-19 pandemic.

2.4   Case Company Management systems

Business models and processes, according to the case company (internal communication material, 2021) are the tools to show how a firm creates value and uses defined strategies. They present a logical structure and link between the formulated strategy and its implementation. There are four primary elements in relationship with business models: the value proposition and market segments; the structure of the value chain; the mechanism used by the firm to appropriate value provided; and the relationships among these elements and management system aims to generate added value for stakeholders, achieve the company's

strategic objectives, support sustainability performance, manage operating risks and en-hance company performance through the continuous improvement process. Case com-pany's processes are developed in the businesses, the business lines, and the functions. Development projects are governed by the group control development meetings, operational development portfolio management team, presidents' quality reviews, and functional man-agement teams.

According to ISO 9001:2015 standards (2022), the organization shall decide external and internal issues shown in Figure 17 that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended result(s) of its quality management system. The organization shall check and review information about these external and internal is-sues. The business environment is ever fast changing and facing technology driven devel-opments.

Figure 17. Operational environment of the case company (the case company communication, 2022).

A board of management is responsible for defining the company's main strategies, principles, and policies. Responsibilities are distributed to the line organization at all levels of the company. The corporate manual gives a brief description of the way of working and consists of the core policies, guidelines, and instructions that apply to the entire group. The following work groups in Table 1 coordinate the development of the product and operational issues:

Table 4. Coordination of development (the case company, 2022).

Work group	Focus	Main tasks
President's quality review	Quality	Overall responsibility for quality, quality process

		improvement and achievement of strategic quality goals.
Group control development meeting	Strategic operational development	Overall responsibility for operational development and the operational development plans and governing the work of Information Management (IM) and process owners
Business line quality reviews	Quality	Support and oversee quality development based on customer perception of our quality and full end-to-end lifecycle view. Platform for focusing on the key improvement areas with the biggest impact of our customers. Cross-functional decision making to increase efficiency and shorten resolution lead time.
Companywide OD portfolio management team	Operational development	Operational development road map, targets, and guidelines based on business strategies and targets, and overall operational development process responsibility for the approval of the company controller's team. Cross-divisional operational development alignment and harmonization.
Company QEHS management team	Quality, Environmental, health and safety and security (QEHS)	Overall responsibility for company QEHS, QEHS management system development, corporate level QEHS measuring and target setting, and monitoring of legislation developments.

According to Worley et al. (2016, p. 80), a good management process support strategy and capability execution; agile management processes in Figure 18 will help to change capabilities and other organizational features quickly when change is necessary. An important part of agile management processes is flexibility.
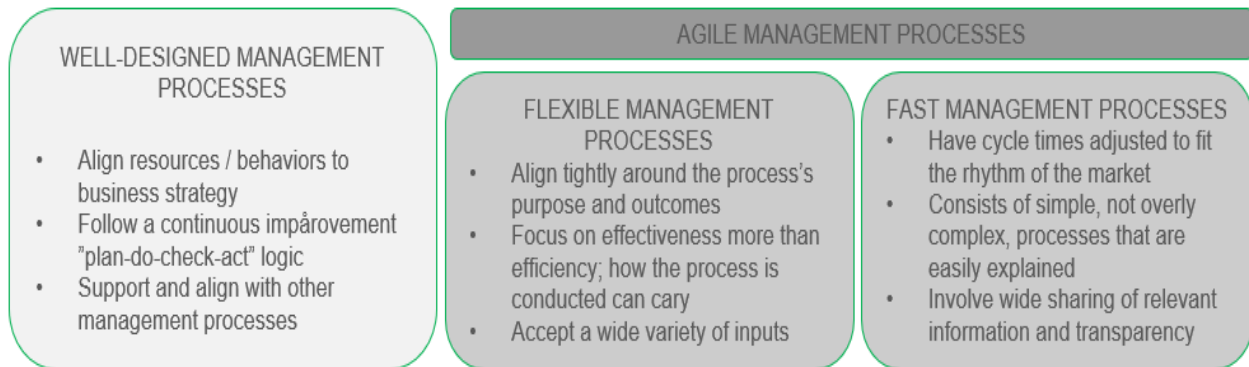
Figure 18. Agile management processes (Worley et al., 2016, p. 80).

2.5 Development governance

Operational development (OD) projects are (according to case company's internal communication channel, 2022) split into quality, process and tools, capacity adjustment, and business development subcategories. These are related to the internal management projects, where efficiency and improvements are in the key focus. Operational development portfolio is kept as part of business line dashboard and developments are linked to the strategic capabilities that are combined and prioritized by the joint engagement forum on quarterly basis. The data architecture team works with the capability teams to find interdependencies and synergies in order to build interconnected roadmaps. The engagement forum is the forum where developments are prioritized and the commitment and focus for the business & information management partner is supporting the case company's strategy. This model, in Figure 19 has been developed by using the business line's existing process & ownership model as a baseline. Dividing business and areas around the digital development is enabling

companywide collaboration on digital developments and to get the business understanding from the top management, capability owners, subject matter experts, and transfer that knowledge into data, processes, people, and tools.
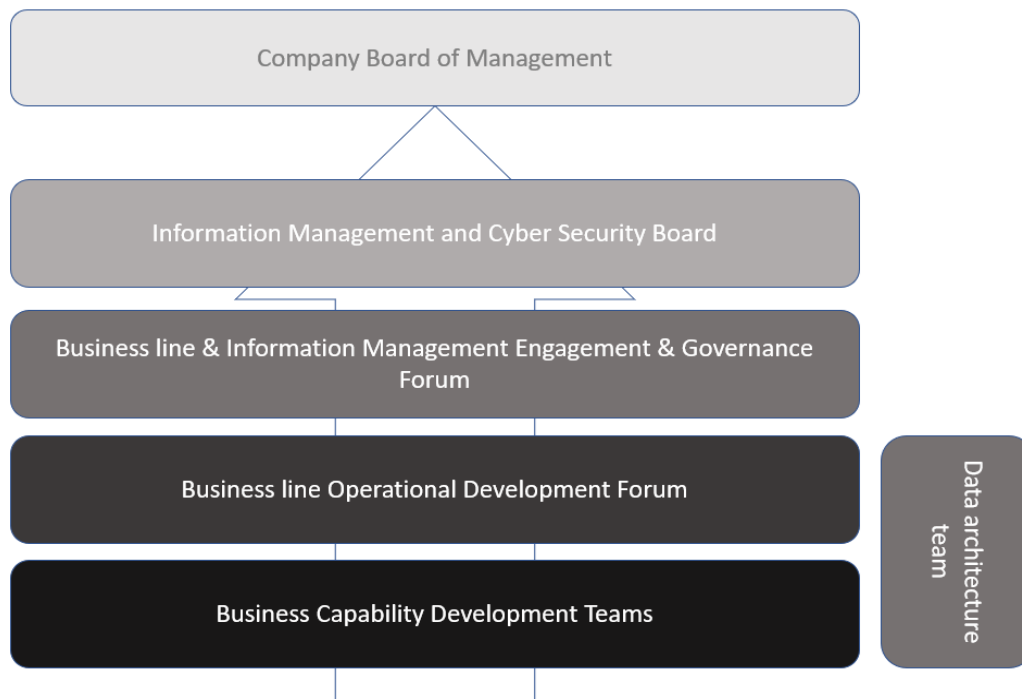
Figure 19. Development governance hierarchy (the case company internal communication material, 2022).

According to the case company's internal communication (2022), the purpose of the company wide information management partner is to develop and manage leading ICT services globally and respecting the differences in the businesses to ensure that case company gets the strategic value from the use of technology and information. Business unit's information management business engagement team supported by business unit's operational development representatives started to plan how to set up a common cross business view over the future needs in the digital capabilities. For this common view, at the same time companywide strategy update process supplied a natural alignment platform.

2.6 Performance measurements

Case company's business line is focused to the customer delivery projects and is heavily a project-based organisation, that justify usage of Kerzner pyramid in below illustration.

By Kerzner (2013, p. 106) the business metrics enable monitoring of certain parameters or to assess a performance status against targets as set, in Figure 20. This way a business metric is any type of measurement used to scale some reckonable component of a company's performance. Business control functions support the businesses in decision-making and analyses to ensure the achievement of the financial targets. In the case company, operational development portfolio management team has overall operational development process responsibility for the approval of the company controller's team. Business control keeps and develops the company's performance management processes, so that the management at various levels of the organization can receive prompt, reliable, and adequate information about the achievement of the organization's objectives.
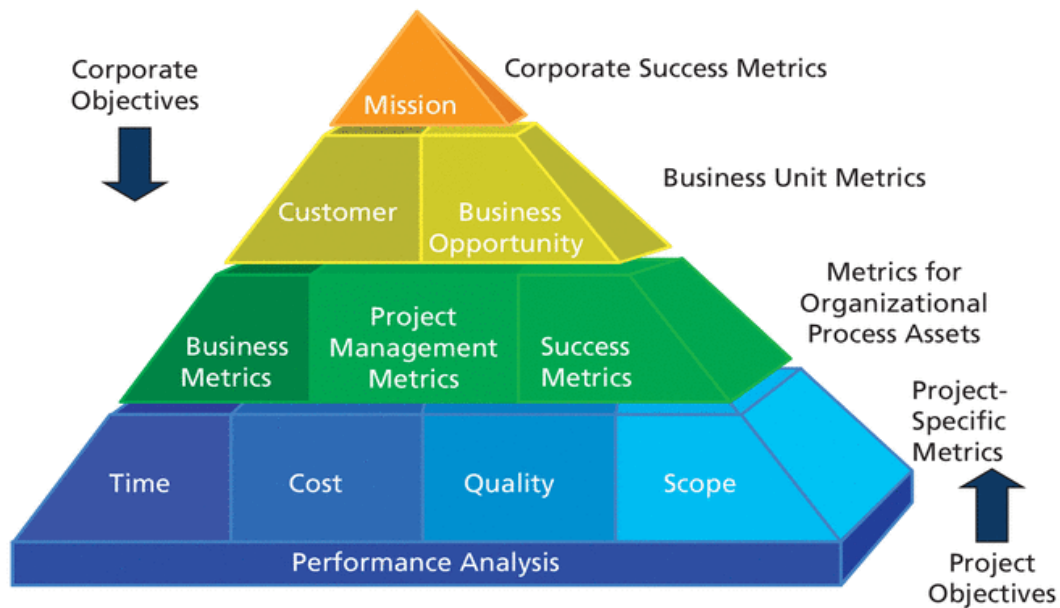
Figure 20. The postmortem pyramid (Kerzner, 2013. p. 106).

Parmenter (2007, p. 2) divides the performance measures into three types of result indicators (RIs). A common characteristic of these measures is that they result from many actions–RIs and will supply clear information of which direction the business is going to. These are long–term indicators, reviewed on monthly/quarterly basis. Examples of RIs are for example customer satisfaction, a net profit before tax, profitability of customers, an employee satisfaction rate, or a return on capital. Performance indicators (PIs) tell what should be done to increase or to meet performance targets and key performance indicators (KPIs) show what are the critical performance indicators dramatically increasing performance or accomplishment of the objectives.

Case company's management determined the business environment's current state in the early communications of the roadmap process with its internal stakeholders. It was emphasized that business needs to be agile in the turbulent environment, and decisions where a company is aiming to position itself in the future require decisions today for enabling long– and short-term capability developments and budgeting. This requirement laid a purpose for

start harvesting common vision and strategy for the developments, enabling digital transition. This was to be given outcome of the Roadmapping process work. It was also highlighted by the management (in internal meetings, 2021) that the development forecasting accuracy needs to be at the same level as business forecasting and therefore the resource assessment for budgeting needs is essential. This was agreed as part of the scope in roadmap process, and at the same time included in this thesis as part of research environment. These identified actions also provided possible performance measurements and KPI's of budget of investments or achieved target developments.

3   Research methods and process

In this chapter, research methods; action research and case study are presented in more details, being used by practicing professionals, as in this thesis; the researcher was working in the case company and taking part in the working group that provided observation and interview possibilities for the data gathering. The role was both an operative in operative level and researching aspects of social setting and focusing on context of practice. Lewin (1940), who developed the action research, believed that the motivation to change was strongly related to the action, if people are active in the decision affecting them, they are more likely to adopt new ways. This chapter will tie together how participating in action research while the case company created roadmap by involvement of three strategic levels, would improve practice and quality of understanding and like Lewin describe, action research involves solving the problem and case study will follow the evidence.

3.1   Action research

Stated by Munn-Giddings and Winter (2002, p. 8), action research is the study of a social situation carried out by those involved in that situation in order to improve both their practice and the quality of their understanding. In this thesis the research method was chosen as an action research and research question was defined, therefore focus of data coding was more inductive with data labeling and actual terms used by participants. McNiff and Whitehead (2001, p. 11) state on action research that it generates practical theory with people who want to improve understanding of their work, and to improve it within social situations. The process involves collecting data that is seen as evidence, that can then be audited and claimed, that improvements are genuine. Costello (2003, p. 6) states that practitioners are the most important people in the research process, their participation is active, not passive.

In the late 1940s Lewin, the founder of social psychology, developed the idea of action research as a more democratic way of improving professional practice than traditional

research methods. He highlights 'social practice' as a sociocultural process, not an individual process. According to Willis (2014, p. 11) Lewin wanted a research model that emphasized making a real difference in real life, to study of a context or setting to develop knowledge that leads directly to the action. Like Lewin says, the ones using action research methods are practicing professionals rather than research professionals, and reasons for doing is typically practical rather than theoretical. An action researcher can act as participant of the research like in this thesis, who was part of the working group. As illustrated in Figure 21 action research is an action oriented and analyses data and plan actions, while a case study research analyses data and action research define context and purpose.

Figure 21. Kurt Lewin's original plan for action research (1940).

Like earlier, both Motorola (1987) and EIRMA (1997) clarified in their respected statements about Roadmapping method, that value of roadmap is the process that must be put in place

to create it, that roadmap is not something that a company can buy from a consultant, or it can't be created by one individual, but it must be output of authorized team activity supported and committed by the senior management. The concept of roadmap is a living document that continually evolves as circumstances change, like the turbulent business environment. Lewin emphasized that the goal of an action research is the social engineering and to be successful action research must involve one or more groups rather than one or more individuals. He believed that the motivation to change was strongly related to action, if people are active in decision affecting them, they are more likely to adopt new ways. Action research is illustrated in Figure 22 as a form of systematic investigation that typically involves trying to solve practical problems in real world settings through the involvement of stakeholders who work or live in those settings.
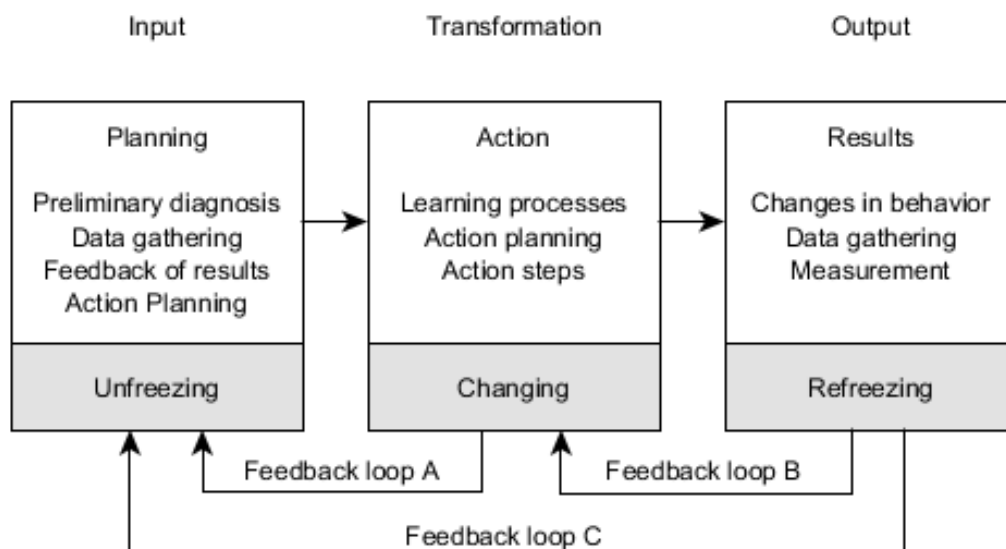
Figure 22. Systems model of action research process (Lewin, 1940).

According to Lewin (1940), the ones doing the action research are practicing professionals rather than research professionals, and reasons for doing is typically practical rather than theoretical. Both action research and case study methods are in the division of applied research, that focuses on context of practice, look for problems in practice and try to

understand the origins and causes of the problem. Action research involves solving the problem where the case study observes and analyses the situation and doesn't supply a solution to a problem. Action researchers can act as participants of the research, case study research doesn't take part in the research study. Methods used in collecting data in action research are observing individuals or groups, using audio and videotape recording, using structured or semi-structured interviews, taking field notes, conducting surveys or question-naires.

Observation of individuals or groups. Observation is a systematic data collection approach. Researchers use all senses to examine people in natural settings or naturally occurring situations.

Structured or semi-structured interviews and videotape recordings. Like mentioned earlier, according to Kappel (2001) the major benefits of Roadmapping for an organization are integration of processes and policies and development links between different business units and to the external environments. According to Garcia and Bray (1997) Roadmapping facilitates a structured discussion essential to the process of reaching a consensus, enabling different views, priorities, and concerns to be compared, discussed, combined, and summarized into common set of outcomes and according to Kostoff and Schaller (2001) questions of a map's scope should be figured out by a working group supported by senior management, which should select the final inputs for the roadmap from many suggestions.

3.2 Case study

A case study is a dept analysis of an event or a case over an extended period of time and action research is more action oriented. Action research analyses the data and plan actions, where case study research analyses the data and action research defines context and purpose, while a case study defines the theoretical conceptual structure.

According to Gillham (2000, p. 2), a case study investigates finding a specific answer from wide range of various kinds of evidence. Use of multiple sources of evidence with strengths and weaknesses is the key characteristics of a case study. Evidence can be of various kinds, like documents, records, interviews, detached observation, participant observation and physical artefacts.

Evidence and a log book. Evidence according to Gillham (2000, p. 23–24) can be discussion heard at the office, or observed comments made and a log book is a storage for the research records and can be opened for inspection, for audit proof of process of investigation. It would show a change of the evidence and reasoning and is part of the ethical stance. A log book is also part of database and is treated as evidence. In this thesis evidence and records for the actual process of creating *strategy driven digital development roadmap* are to be found in this document, as illustrations and written text.

3.3   Combination of action research and case study

In this thesis, data was collected by using primary and secondary sources. Thesis writer was part of a planning and working group creating *the strategy driven digital development roadmap*. Role was both operative in operative level and researching aspects of social setting and focusing on context of practice, observation and following the evidence trail. In this thesis, researcher recorded the observations during the whole process, and agreement of utilizing primarily data was given by the management (written document by Line Manager). Secondary sources include (with agreement by Line Manager) corporate websites and internal documentation of the management manuals, standards, business process, organization structure and governance models. Both the theoretical literature and articles supplied a picture of roadmap and strategic process creation and agreed frameworks, including roadmap outcome as document. This roadmap was created during 2021 and data for this research was collected and analyzed between 2021-2022. All collaboration work was done in virtual working environment.

3.4 Research process

A research process is a set of actions necessary to carry out research and the sequence of these steps. Action research is also known as participatory action research. In this thesis the researcher was an acting participant in **the** working group and would have otherwise been subject to the research. The working group started planning a scope, schedule and resources needed in the relation to business level strategy release schedule. For having strategy driven development roadmap, alignment with schedule is important like Accenture (2021), state that *"*a digital strategy looks at the activities and processes that need to be transformed to provide better services for customers, and when this move has been made together with company strategy, digital leaders have found opportunities and advantages for growth". Alignment and scheduling are essential for both to the process as for its implementation success.

3.5 Framing the research and development question

Planning work for development of the roadmap was done among a specific working group with the representatives from both information management partner and business' operational development team. In the case company, the company information management partner provides service design services for business lines. For this *strategy driven digital development roadmap* work, was resourced a dedicated service designer. Dedicated service designer supplied subject matter expertise to virtual collaboration platforms and tools, supported and coached facilitation work and planned detailed requirements for the interviews and workshops that supported planning and execution work of Roadmapping work.

For facilitation of Roadmapping canvas and for making sure the development of the roadmap was innovative and holistic with eagle eye view in virtual environment, service design process was chosen, used in the case company since 2016. Service Design, according to company's internal training material (2021), foster discussion on the processes, way of working, visions from people's perspective, it brings weak links into light and enables

companies and organizations to collaborate and find cross-functional solutions and gaps for continuous improvement. Service design is an iterative process with short cycles where ideas are developed based on actual users. Feedback is collected during the entire process. Service design offers an easy support method for use in interviews and workshops. Service design brings people from diverse backgrounds together to work on a common subject with simple tools and a common language. Service design can be used in the development of new internal services, processes, and tools.

The double diamond (evolved) in the Figure 23 can be used to illustrate the process from finding a problem, following sequence of development sprints for the outcome. These diverse ways of solving real-life challenges combine and support any development process of product, tools, services, or a foreseen roadmap. Use of modern virtual office tools in this workshop process are shown and usage and relevancy to it are shortly described in the relation to the process. In this thesis the question to research is how to plan, formulate, create, and keep a strategic driven (digital) development roadmap, from realizing of a business need through strategic alignment, planning, scheduling, and analysis of the roadmap results in the relation of business level strategic key focus areas and must win battles. This thesis object is to analyze if Roadmapping method is suitable for the planning of said transformation journey, and if the outcome (a roadmap) in global, multi-national and gross-functional engineering company with the frame of a well-established management and governance structure is feasible.

According to Design Council (2004), in double diamond the first diamond helps people to discover, and understand, not just only assume what the problem is. It involves speaking to and spending time with the people who are affected by the issues. The insight gathered from the discovery phase can help to define the challenge in a unique way. The second diamond encourages people to give different answers to the clearly defined problem, seeking inspiration from elsewhere and co-designing with a range of different people. The delivery involves testing out different solutions on a small-scale, rejecting those that will not work and

improving the ones that will. Work according to Nick Durrant quoted by Dan Nessler (2019) design frameworks supply a structure to justify the process and build a trust and confidence among stakeholders. Statement supports social engineering and roadmap method for creating a common language and commitment among stakeholders.
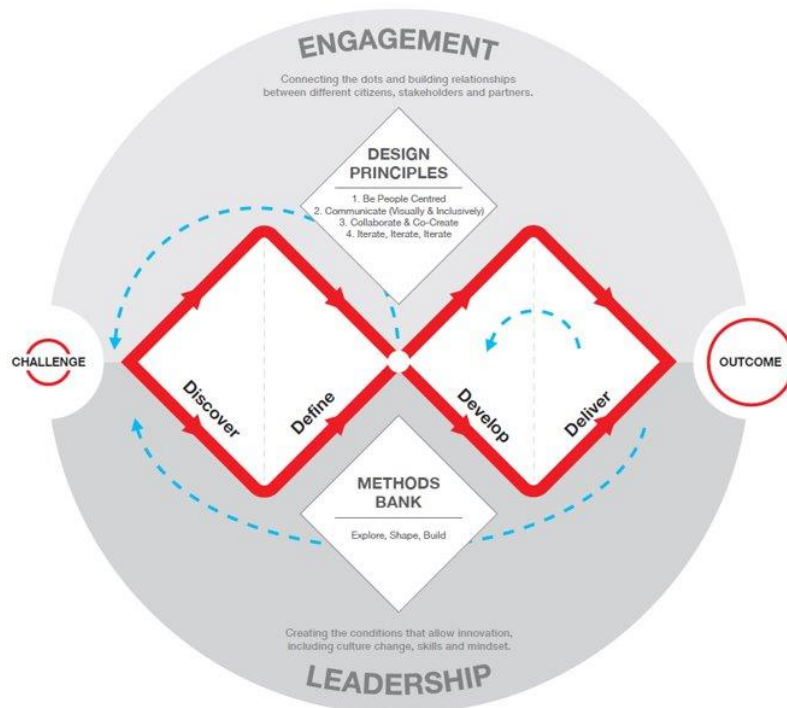
Figure 23. Double diamond (Design Council, 2004).

Like Groenveld (2007) state that the original description "product-technology Roadmapping" has been replaced by "business Roadmapping" to highlight the goal of this type of Roadmapping, i.e., developing 5-7 years vision of how the business is likely to develop. He also emphases that Roadmapping must be an ongoing process and that it is a part of business cycle. The framework of a Roadmapping process is based on a double workshop sequence; the first workshop is to share information and set up a common view between participants and the second workshop will generate the actual outcome, the roadmap. This supports the double diamond process of service design method.

3.6   Research design & process

According to Lewin (1940), the goal of action research is the social engineering with stake-holders that are working in that environment. In this thesis service design method was chosen to support the roadmap creation process by bringing the visual aspect of working in co-creation mindset. In this thesis a service design method supports action research providing engagement of the participants in social setting for process observation. Objective is to gain a mutual understanding. This support both collaboration aspect of workshops with framework of Roadmapping process. Like Roadmapping, special differentiating features the structured visual representation, underpinned by the 'why-what-how-when' framework, which is used to enable dialogue and consensus building and for ongoing synchronization across the relevant stakeholders.

Brown and Isaacs (2005, p. 38) determined in book the World Café that it's "*a simple yet powerful conversational process for fostering constructive dialogue for particularly in groups that are larger than most traditional dialogue approached.*" Purpose will clarify why we all come together around this topic. Diversity of thoughts and experiences are the most important criterion for getting new insights. It is important also to look outside the box for other participants to join than those who are defined from the outset. Parameters will help to figure out the focus and common set of expectations and the sense of positive anticipation about the purpose and process. Resources needed and setup are also part of parameters. In the case company the virtual environment laid the foundation for the place.

Like working group of EIRMA (1997) published in its guidance document on the technology Roadmapping states that time is the primary parameter of technology Roadmapping (TRM)–if there is no time, then it is not a roadmap. Planning in any project include time, scope, and requirements, so does the wide development roadmap planning. Scope will lay the commonly agreed foundation for enabling consistency and cooperation between strategy formulation by Roadmapping technique and implementation of roadmap

outcome in (digital) developments. Scope in this thesis was defined based on company's strategic formulation process in relation of time, participation of roadmap creation process defined the resources, and this thesis did not require case company investments.

In early 2020 the company's business unit management required an assessment to find interdependencies, enablers, and future capability requirements & technology opportunities. Consideration of resource needs and conflicts for prioritized developments enabling digital transformation. It was also emphasized that business needs to be agile in the turbulent environment, and decisions where the company is aiming to position itself in the future require decisions today for enabling a long– and a short-term capability developments and budgeting.

This thesis is an observation work of a creation process of the case company's strategy driving (digital) development roadmap, use of roadmap method together with a service design and the World Café methodologies during a global COVID-19 pandemic, in a virtual environment.

4 Research result

This thesis is a combination of action research and a case study done by taking part in interviews, collaboration, co-creation workshops and meetings. Data was gathered by observation, reading, collecting, and mapping of the interview and workshop outputs. Evidence traits were gathered though the whole development journey and participation of the roadmap working group supplied the access to the case company's records, interviews and notes. A set of interviews were first organized for getting the top management and key strategy formulation participants to supply areas for focusing, so called high-level scope for the digital roadmap. This also framed this thesis' area of focus, the parameters.

Like Vishnevskiy et al. (2015) noted earlier, roadmap helps in the communication between different functions, and it improves mutual understanding, and like Albright and Kappel (2003), states integration of a roadmap process into ongoing business operations will increase resource efficiency. Case company involved all the stakeholders; business, management, subject matter experts and other individuals, together with the area representatives to create a commonly agreed (digital development) requirements, sequence and prioritization schedules enabling the data driven value streams. For the efficient implementation, it was said that stakeholders need to understand and relate to the companywide strategic target position in the future, before foreseen visioning can be created. Business needs to first agree together a creative, yet bold vision and look at current situation as is to open issues and challenges laying obstacles in decisions, and then to decide what are the activities needed to and their prioritization to reach the targets, remembering agile ways to execute them in the changing business environment. Agile or continuous improvement way of developing will support efficiency in resource management. Roadmapping with multi-layered, system–based framework become reference point for the practice of Roadmapping method by connected dots and between gaps are analyzed and updated in terms of "what needs to be done" providing the input into roadmap development road. In Roadmapping concept of "windows" is used of technology push and market pull against time dimension. Like earlier

mentioned about time dimension by EIRMA (1997) was that if there is no time, it's not a roadmap. This could be also seen currently in the case company against the time window of current strategy and strategy actions accordingly, in certain strategy period. Therefore, the outcome of Roadmapping is not a plan but a road **MAP**, a dynamic tool standing for the best technical development path-plan that needs to be revisited periodically to make sure the accuracy is correct. If the strategy is updated, the digital development roadmap must be revisited. Case company top management's high-level requirements highlighted the suitability of Roadmapping method, that was chosen for case company's **way forward determination** method. The stakeholder map was agreed with the top management and the business process, and the capability owners were primary stakeholders, according to the case company governance model. Main stakeholders could add subject matter experts according to the strategy priority focus topics along the process.

According to Randall (2005, p. 38), it is essential to develop an atmosphere for creativity and innovation within the company and with partners by placing people and ideas in the centre of the management ideology, giving people tools to create growth and innovation without fear of mistakes, build a community of openness and trust and facilitate internal mobility and talent. An ecosystem is an increasingly common concept in management and business. According to Abrantes and Figueiredo (2013) a mindset of shared understanding, that the key to the new value and growth are most likely found beyond the current boundaries, as well to solve problems, new connections and collaboration are needed. Innovation does not happen in isolation; people, collaboration, and continuous sharing of insight are the driving force of innovating. Project-based organisations, like the case company is, needs to be able to adapt, be reliable, effective, efficient, correct, and to have context and cultural connectivity.

Like earlier statement made by Mithas & Lucas (2010) that IT strategy should be an integrated part of the business strategy. Porter (1985) argue that there are three principal ways to gain a competitive edge by using IT. First is by changing the industry structure. Second is to outperform competition by using IT. Third is to create new business by using

IT. Companies today need to align both business and IT strategies, and make sure the digital strategy is part of governance processes with performance measurement indicators.

The creation of the case company's *strategy driven (digital) development roadmap* was a process that needed commitment and participation from across the company, from top management to individual subject matter experts. Internal operational and digital developments need to be agile in changing business environment providing added value and digital enablers to the company. ISO 9001 standards guide organizations to check and review information about these external and internal issues. Digitalization requires understanding of the business environment, data, technology, and other needs, like employees as resources to make it all happen. For enabling digitalization transformation in the company, there is a need to provide a vision and strategy with execution plan that will enable alignment of future digital development demands. Digital capabilities are more strategically important than ever, since data race is the only race that matters.

The organization's performance in a competitive business environment is most likely affected by internal competition and external challenges. Internal competition around knowledge, skills and resources with right capabilities is demanding in a digital environment. That is why long-term strategy driven development roadmap will guide and support purpose and alignment with the company resources, capabilities, and competences. According to All Answers Ltd. (2018), Sun Tzu's Art of War, quote "win without fighting" state that greatest of virtues is to be **prepared beforehand** for any contingency. Key wordings here are synergies and cross business commitment from all stakeholders. It is essential for planning sustainable solutions to understand the business and evolving business environment and the company strategy. Things are changing fast and today business need to change in agile ways as well. All this, together with the virtual working environment, requires a vision, structure and planned change management. Planning is the key for success. No matter what the

subject matter is, all these are essential elements in current business environment foreseen planning.

Digital development and transformation require internal developments. What is needed to be in place for future visions to happen, what are the enables and capabilities that needs to be ready on time? For these questions case company roadmap was created for. According to the case company's internal documentation (2020) roadmap creates a platform for formulating:

> Common and committed understanding on how working together to better understand, support and respond to (digital) development needs and building a robust strategic development portfolio supporting transparency enabling companywide collaboration on (digital) developments.

With forward looking visibility the case company would better support needed and skilled resourcing across the needed (digital) initiatives by focusing on building a strategy driven development roadmap and together agree targets, priorities and formulate dedicated teams with knowledge and capability area resources to make the execution plan and drive the development initiatives, in an agile manner.

Strategies are long term goals, and sometimes the global business environment and market situations with challenges need urgent measures to address, like a global COVID-19 pandemic. However, all procedures made during COVID-19 are most likely to stay post-COVID business world, and changes and ability to adjust according to the ever-changing business environment will make the difference in any development.

The case company's business strategy process started from the analyzing business environment scenarios that will be the basis for the strategy formulation, which was then taken forward by finding strategic priorities and objectives. An annual execution plan with actions and defined business metrics include periodical must win battle projects together with programs and strategic actions with the area plans. The fast growing and changing business

environment with the growth of digital technologies and enormous amount of data to be handled and mastered drive towards transformation of the business architecture and towards adopting strategies where data will create the business value. It is especially important to connect the company strategy creation with the strategy implementation in a digital journey. According to Phaal (2005) digital strategy will not only enhance competitive advantage, but also it will create a need to revisit and change business models and business strategy.

> Roadmapping is widely used to great affect by companies and government agencies in the context of strategy, innovation and (policy) foresight, despite the method having a lack of theoretical underpinning. Technology Roadmapping is recognized at the highest levels. For example, from an institutional perspective, the United Nations endorses Roadmapping and considers it an enabling tool for setting directions and determining associated actions in a goal-oriented manner.

Case company roadmap creation and observation work was done in a virtual environment, Microsoft Teams (called Teams in this thesis) since it has been confirmed as the main communication platform in the case company and for that reason, no other tools were considered. The reason for confirming virtual collaboration tools was that a global COVID–19 pandemic created special restrictions for face-to-face meetings. Teams were used in this roadmap process for the interviews, meetings, and workshops, and it supported the original plan to have co-creation engagement forced collaboration. According to Microsoft (2021) Teams is a virtual collaboration environment used globally and it

> is developed by Microsoft and Teams is part of Microsoft 365 family of products. It is a collaboration platform for hybrid work enabling teams to stay informed, organized and connected in one place.

The working group meets once or twice per week to follow up the material preparations. Material was created in *shared leadership*–way in the Teams environment by sharing the content for everyone's access and follow up. The schedule was informed and

deadlines strict to make the progress to follow the strategy alignment schedule. When thinking of scheduling the roadmap work, sequencing is essential and all needed meetings must be booked to calendars for time reservations as soon as possible in large companies, to secure the most valuable stakeholders' participation and preparation.

According to McKeown and Durkin (2016), knowing yourself is more than just having access to company data that tell you the current state, it's understanding the capabilities in relation to the customer and the environment and setting realistic goals that will guide where is wished to go. In the case company example, the need to use the best technology choices in alignment with the highlighted items related to strategy statements, related to development capabilities and knowledge area and other generic information.

In the case company roadmap process, the World Café method, in Figure 24 supplied determination in an interactive format of stakeholders to talk together across traditional boundaries. The framing of the context, following the World Café method, was the very first thing the working group did. Framing was flexible enough to allow collaboration but clear enough to help shape co-creation way forward without controlling.
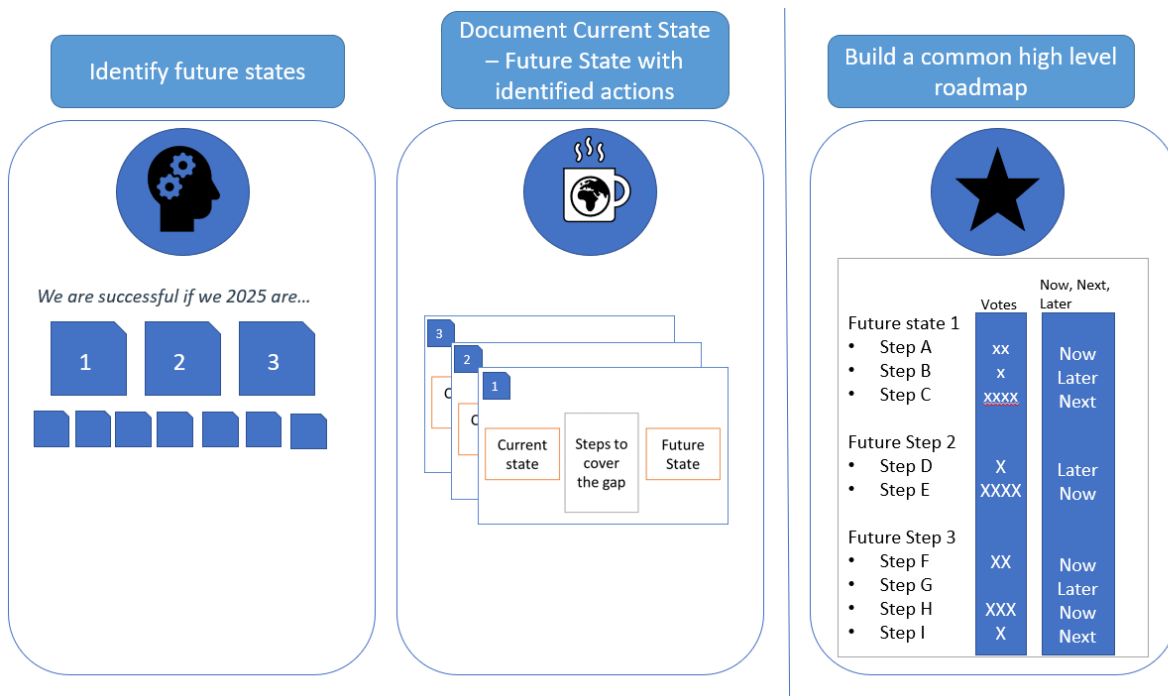
Figure 24. Case company plan for knowledge harvesting by following the World Café methodology (the case company internal preparation material, 2021).

All strategies need to set up a starting point before the future. According to Brown and Isaacs (2005, p. 49–59) in the World Café method has three key elements to pay attention to: purpose, participants and parameters. In the case company business process and the capability owners were mapped for the key management to interview for developing **purpose statement** for the workshops. **Purpose** of the workshops were determined to be a creation of **mutual understanding of the vision** for the next five years, when it comes to (digital) developments, using the digital collaboration techniques and finding and making a first evaluation on the main steps needed to take forward to reach that agreed vision. The starting point was to start with mutual understanding for the current state and create a base for building a (digital) development roadmap for long term, illustrated in Figure 25.
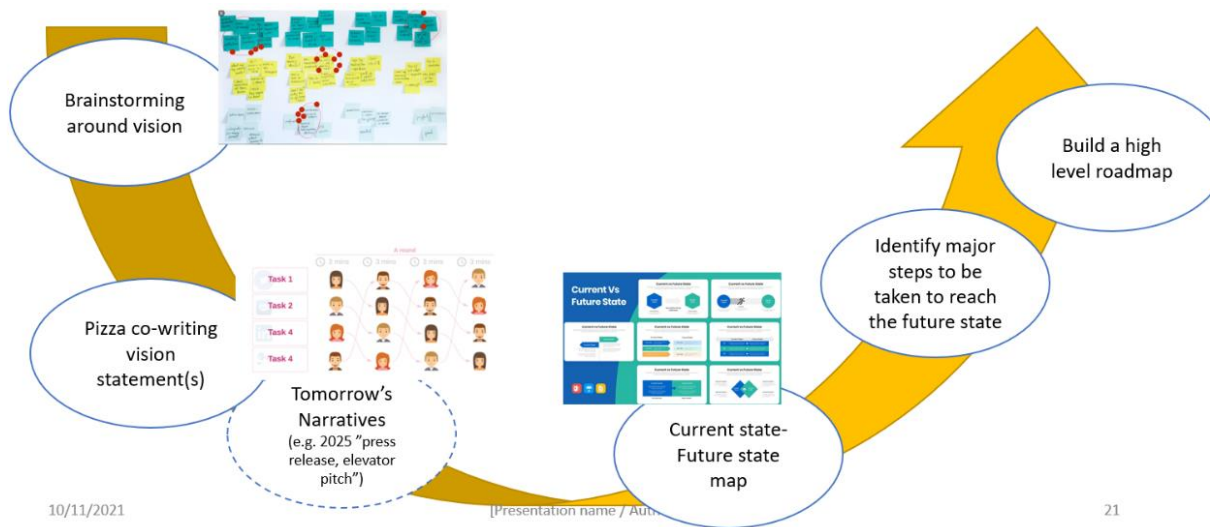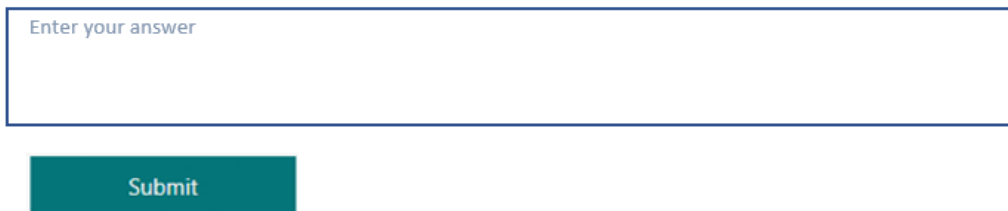
Figure 25. Planned structure of roadmap process (the case company internal preparation material, 2021).

For the collaboration and harmonization of views, the management of the case company also supplied their list of suitable workshop participants to represent said area of expertise. For making sure all viewpoints were gathered a Microsoft Forms (called Forms in this thesis)–questionnaire, illustrated in Figure 26 was created and send prior to the attendances of the future workshops, to get any hidden items, since not all workshop participants were interviewed. Questions were related to the vision statement drafts created based on the top management interviews. According to the Microsoft (2022):

> Forms is an online survey creator, part of Office 365 family that allows users to create surveys and quizzes with automatic marking. Data can be exported to Microsoft Excel.

9. Is there something you would like to see in a shared vision statement for next 5 years for (digital) development for your department, which is currently missing from the above statement?

Enter your answer

Submit

Figure 26. Example of forms question (the case company internal preparation material, 2021).

The working group were collaborating and experimenting with various kinds of methods and tools for the best possible solution for innovative collaboration, and both Miro board and Microsoft Teams breakout rooms were selected. The reason for selecting these were the usability of Miro board for the roadmap canvas and breakout rooms supply team working ability supporting the World Café and service design ideologies. Miro board also had a usable functionality, **voting,** illustrated in Figure 27 that can be used for common and joint view on opinions or ideas that participants prefer. In this thesis roadmap workshops voting was used for prioritization of actions. This created a high visual result of the participants focus topics for prioritization, enabling common and a committed view on the results. According to the Miro.com (2022):

> A Miro board is an online whiteboard for visualization of ideas for productive, engaged, online remote meetings and workshopping platform for cross-functional teams.

Figure 27. Example of Miro board voting (the case company internal preparation material, 2021).

The working group made extensive plans for workshops and tested setup once with some co-workers to get feedback on the usability and functionalities of said tools. When working in a digital environment it is important to facilitate meetings and therefore a specific role of facilitator should be agreed in prior. One very practical way to make everyone feel at ease in the virtual environment is to **warm up** in the Miro board that in Figure 28 below illustrates as an example of the practice area. Miro board has ready-made warm up exercises for everyone to use and utilize. This five-minute is valuable for people to get to know each other, and for practicing usage of the Miro board techniques, like picking up a sticky note and printing a name into it. Participants were planned to take an active part in the workshops by talking, writing, changing prior written statements etc., so for that reason it was also important for the facilitators to make sure functionality of canvas was working and participants knew how to use it.

In more traditional face-to-face workshopping, paper versions of sticky notes would have been used and as per traditional workshopping, connections with contents would have been captured by drawing arrows. All this can be done in a virtual environment in the Miro board.

Figure 28. Example of warm up task in workshop (the case company internal preparation material, 2021).

According to Brown and Isaacs (2005), the World Café method enables groups to take part together in rounds of dialogues and intimate conversations build on each other as participants move from group to another talking about issues in their work and community. When new connections rise the knowledge-sharing grows.

Following the case company's end to end business process (2021), there were four interview sessions held with the business process and the capability owners, each interview lasts three hours and they were conducted with a similar set up. Interviews were based on structured list of "topic for discussion 1-2-3" in an open virtual atmosphere designed to supply a clear understanding of the future ambition level and strategic positioning related to digital

transformation process. For understand where the (digital) development needs are in the future state digital transition, the case company's top management was to supply base for future vision statement. Following the statement made by Accenture (2021), digital innovation will supply diverse ways to make business, and change user expectations. New business models will challenge companies and organizations that are not maybe ready for that, or context will restrict. And to see constraints is essential to understand that,

> digital strategy looks at the activities and processes that need to be transformed to provide better services for customers.

In the light of above, the case company's top management interviews were open discussions around revised company strategy and its relativeness to interviewees and their represented departments.

Following topics were used and could be used as an example for open discussion in order to get clear and common understanding of future ambitions in relation to company strategy. These questions would lay foundation for the Roadmapping **purpose**.

Topic for discussion 1 "Considering new business strategy, what are the main topics your department should contribute to?"

Topic for discussion 2 "Your vision for 5 years from today, where your department shall be in?"

Topic for discussion 3" What are the key development areas (e.g., process, data, tools) to focus on, evolve considering renewed strategy and your vision`"

All interviews were recorded with participant's consent and recordings were scripted. For one-hour meeting script making will take three (3) hours of working, so 4x3h interview scripts took from the working group 36-hour work to make joint and clustered outcome for the further

base for the workshops planning. Actual terms used by the interviewees were used in coding results, and interview comments were gathered, clustered around topics from one to three, illustrated in Figure 29 and in this thesis work more inductive approach was chosen for data driven analysis.

Figure 29. Data gathered and clustered in Miro board (the case company's internal preparation material, 2021).

Consolidation work was made by the working group and a combined one pager per interview was sent back to the interviewees for validation of correct interpretation of the working group. Interviewees (management) could also check that items confirmed were the ones that they would like workshop participants to focus on in roadmap process as illustrated in Figure 30.

Official documents, (four) vision statements were stored and shared from the company's official document management system for audit and revision handling purposes, with correct access profile. Once the vision statements were gathered back with approval, with list of workshop participants, the working team started to plan workshop series including investigating and testing of suitable digital office tools' functionalities for providing the participants innovative atmosphere with easy and understandable platform to follow workshop process and outcome.
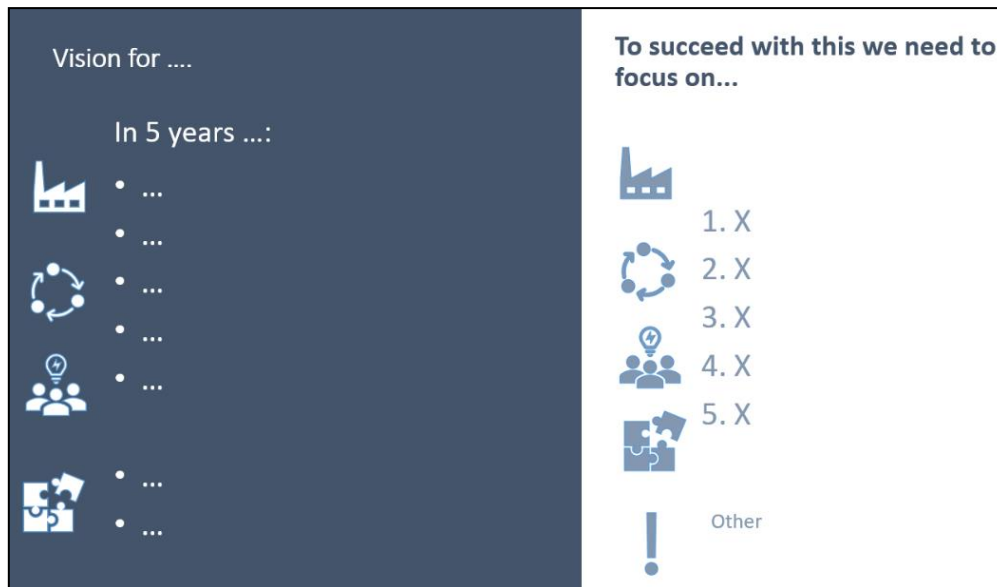
Figure 30. An example of vision statement based on management interview (the case company's internal preparation material, 2021).

In this roadmap process, Miro board was used for the framework canvas to capture the roadmap work evidence. Like Barker and Smith (1995, p. 12) recognizes the benefits of a visual nature of the Roadmapping in terms of communication of outcomes and in obtaining a structured discussion and constructive debate facilitation. Several different Miro boards were created during the roadmap planning for different purposes, based on information for the working group or to be shared with stakeholders.

4.1 Workshops' structure

In the case company workshops, the main idea and ideology was that everybody brainstorms around the vision statements provided by the top management. Workshop presentation in the beginning started with a short recap of kick-off material shared earlier in separate kick-off meeting, focusing on the strategic alignment, schedule, interview result from the top management laying the foundation and direction of future vision. Following with the

target setting (**the purpose)** for the day's workshop with practicalities, including schedule, tasks, and next steps in the roadmap.

Workshop series were done in a virtual meeting environment and therefore all participants were invited into the so called "main meeting room" (teams meeting link in the invitation). Time for the opening of the workshop was planned for fifteen minutes. Next ten to fifteen minutes were used for the publishing a link to the Miro board with password (both through meeting and meeting chat). Once everyone was visible in the Miro board (supporting IT team made sure participants would show with their real names in the Miro board), presentation mode was changed only to the Miro board (no longer shared through the Teams meeting). This ensured engagement of all participants, since cursors were visible with the name of the participant. After a short (five minutes) warm up session, the main facilitator sent out additional Teams meeting links as per color coded teams, illustrated in Figure 31. Participants were urged to follow an additional meeting link. Following service design method, the working group had chosen a facilitator to each team to supply a guidance and support to make sure the team can be as productive as possible and that all needed arguments were documented in the Miro board (roadmap canvas) for the visual evidence.
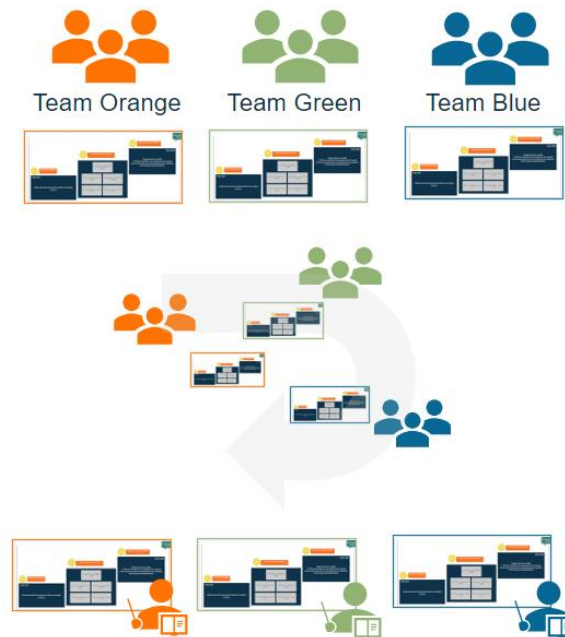
Figure 31. An example of an approach for the workshops with color coded teams (the case company's internal preparation material, 2021).

The structure and main idea of the workshops were to present a management-agreed vision statements around the business process and the capability area of focus, and if forms-questionnaire should have supplied any additional comments, they were added to the Miro board for evaluation. In case there were any multiple additions, the audience would have voted to include only one additional vision statement. The Miro board was continuously changed according to the items raised during the workshops, from other collaboration meetings and from lessons learned after each workshop. The working group had divided roles accordingly.

Following the World Café method, in the workshop there was one breakout team per vision statement. Teams got the list of ideas with priorities/scores, but they get the freedom to build a draft roadmap (including changing the vision statement). Each team would spend limited time to work on with their own topic. According to the World Café method framing should be flexible enough to allow collaboration but clear enough to help shape to way towards without

controlling After certain time, teams moved forward to next team as visitors to challenge the analysis and representing team can add valuable feedback to their own work.

After every team had done a draft roadmap for that vision statement it was presented and discussed with all the teams to get feedback on it. As mentioned earlier, EIRMA (1997) published the "**backwards" and "forwards"** methods, where backwards in time-targets were defined at the beginning of the work and the Roadmapping involves finding out how to reach the given targets. Backcasting method was chosen for the case company way to facilitate discussion and build the structure of the workshops, as illustrated below in Figure 32. Steps need to be taken from the current state to the future state will decide the tactical and operational actions that must be executed.
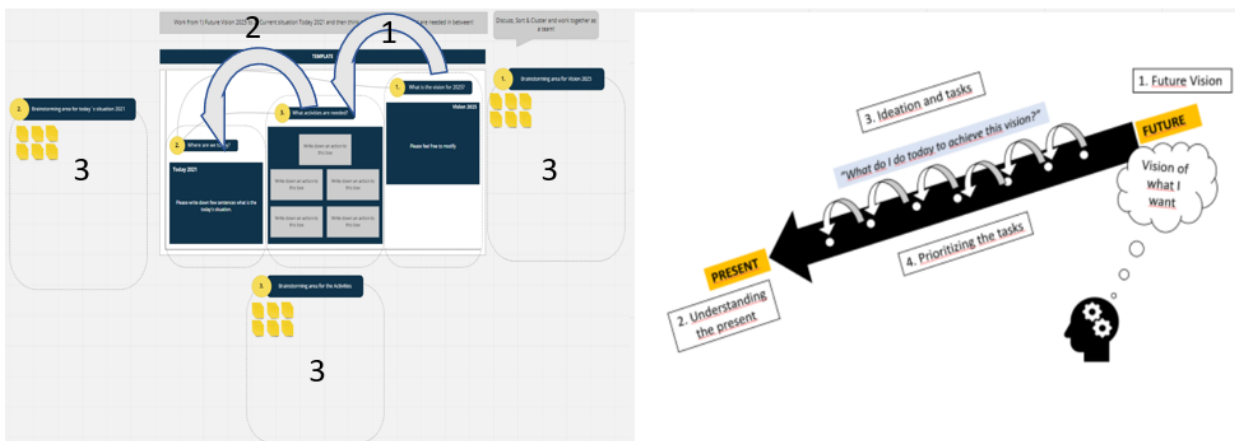

Figure 32. Back casting method illustration in case company workshop (the case company's internal preparation material, 2021).

An example with back casting method was shown for workshop audience for reference.

Premium burgers – home delivery

Vision statement (future state)

"In 2025 our ordering app is popular and well recognized, and 75% of our home delivery orders are coming through our app. 95% of the orders are packaged and completed within 10 minutes.

As-is situation (current state)

- We have an app, but only 10% of our orders come through that and the usage has declined since the launch of the app.

- On average we can deliver 25% of our orders within 10 minutes. Usually there are parts of the order that takes longer time to complete, but we do not really know what and why some things take longer time.

Actions:" how to get there"

- Project to investigate reasons for poor customer acceptance of the app
- Establishment of continuous development process for the ordering app to keep it attractive for customers to use.
- Introduce processes and tools to gather data and follow-up what part of the order is usually late to be able analyze and take corrective actions.

All breakout teams were color labeled, each team getting from one to two vision statements to work with in respected template area in the Miro board. The breakout team was given the task to; "*fine tune the to-be vision statement, create a mutual understanding of as-is,*

brainstorm steps to take to reach the vision and group & prioritize ideas to take forward".
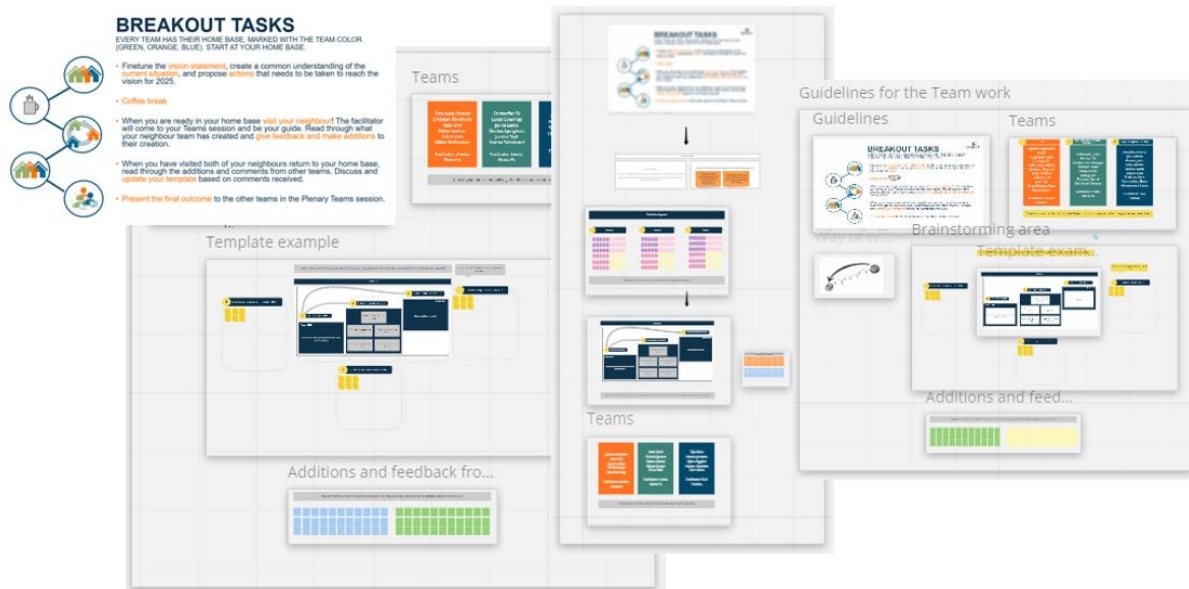Figure 33 below illustrates instructions and working areas.

Figure 33. An example of instruction for breakout rooms (the case company's internal preparation material, 2021).

Methods used for the workshops support co-creation by the World Café method arguing that people already have within the wisdom and creativity to confront even the most difficult challenges and the Roadmapping facilitates more interdisciplinary networking and teamed pursuit. The sense of the whole becomes stronger.

Teams get the change to study the work of the other teams and give feedback and proposals. Co-facilitator stays at the home-base Teams meeting to guide the visiting teams and take the role of a "translator" of work done by home team. Visiting team had own color post-it notes to document their views and comments about work of the home team. Below, Figure 34 is an example of the Blue Team's template area, where both green and orange teams

have been left some own comments. Fifteen minutes time was reserved for visiting each team.

Figure 34. Visiting comments from other teams with own color post-it notes (the case company's internal preparation material, 2021).

High density of the comments in some areas might show that there is a need to further investigate it. Visiting was done by the facilitator (only) taking another meeting link and taking that team in the Miro board to his/her respected template area (home-team). This then was repeated as many times as there were teams. In this exercise there were three teams, so only two times was needed to "jump". Once the team returns to its own working meeting (named as per team color), they would review the feedback received by the visitors and fine tune their template and future vision statement if needed. Once all that was done, teams presented the outcome to the full team. When all teams had presented their outcome and

actions for enabling digital transition in the future, it was time to vote on the urgency and importance among all proposed actions.

Like mentioned earlier by doing workshops like this it facilitates a structured discussion essential to the process of reaching a consensus, enabling different vies, priorities and concerns to be compared, combined, and synthesized into common set of outcomes. Very structured guidance helped participants to start at once and any questions raised during the workshop, there were instructions and questions were answered. Teams chat functionality was also used for informing and answering simultaneously.

Practical approach for the workshops is the parameters, that shall help to decide the focus and common set of expectations and sense of positive anticipation about the purpose and the process, included main meeting link, agenda, timing, facilitator's plan; so, called "Game Plan", additional team links for the breakout rooms, additional (Teams) chat facilitators, role planning of each working team member in the workshop etc. Following, Figure 35 is an example of detailed planning of the workshop for the working group including facilitators.

Figure 35. An example of both "game plan" and back up structure file for facilitators (the case company's internal preparation material, 2021).

4.2 Workshop outcome and prioritization

After 40-50 minutes of team working time, the main facilitator called participants back to the main meeting link to present each team's outcome. Instructions to both presenting team and audience were shared again for reminder, illustrated in Figure 36. Each team chose the participant most suitable to represent team's outcome, to start with vision statement, that could have been changed due to the team after visiting teams' comments.

PRESENTATIONS

Presenting team:

- One from the team presents the result of your teamwork (the template) and provide time for follow-up questions from the audience.

- Take note of any feedback to be added after the workshop.

Audience:

- Listen actively! Afterwards everyone will pick 3 actions out of all presented, that you would like to focus on before 2025.

- Focus on identifying actions you think has most potential to provide real business value (considering the strategy and vision).

Figure 36. The presentation instructions (the case company's internal preparation material, 2021).

Once all presentations were done and an open discussion ready, it was time to move towards to voting area in the Miro board. The main facilitator had changed the vision statements, the current state as-is analysis together with team suggested activities. Every participant was given three votes to vote for the action that **has the most business value based on presentations** given by the respected teams. Any of the activities could be voted and even multiple votes for one activity was allowed, to highlight the value and importance. Five minutes for voting time was reserved with music-functionality provided by the Miro board. Voting result examples shared in Figure 37.
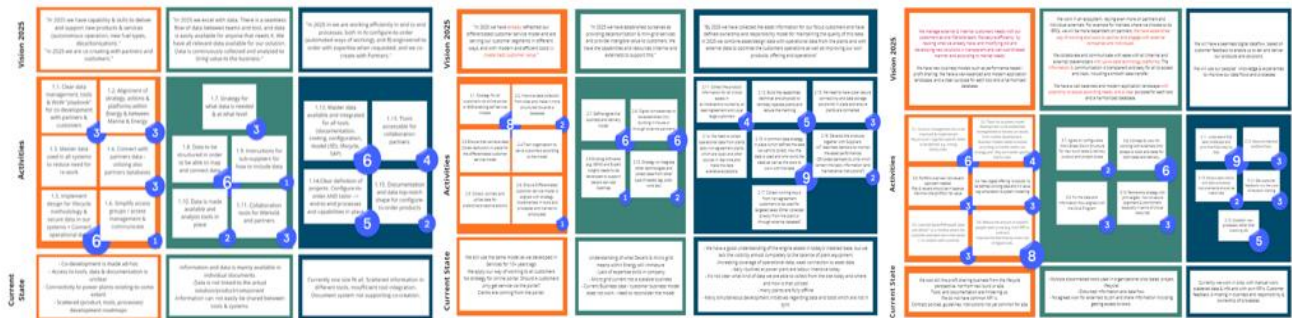
Figure 37. An example of voting of business value per activity (the case company's internal preparation material, 2021).

The voting result was shared with the participants in the Miro board and in the main meeting team's chat. At the end of each meeting a Poll was released in main (teams) meeting chat, to have immediate feedback of the workshop for continuous learning purposes, example in Figure 38.
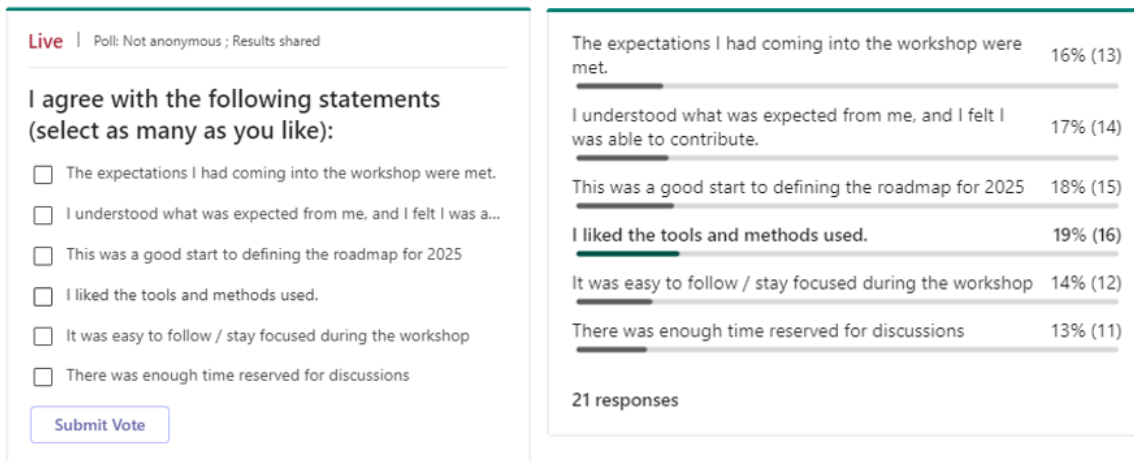
Figure 38. An example of breakout team working areas in Miro board (the case company's internal workshop material, 2021).

4.3   Consolidation of outcome for governance

The working group met once or twice per week to follow up the consolidation work of the workshop outcomes. Consolidation work included clustering of the results from the workshops with importance voted. When high volume of commenting was visible, like in Figure 39 it was evident that some results needed more expertise knowledge to analyses, and involvement of other teams were needed.

Figure 39. An example of breakout team working areas in Miro board (the case company's internal workshop material, 2021).

Clustering of the outcome evidence were made in information management team with the knowledge area experts, and traits of evidence was created like illustrated in Figure 40 in a relationship with company's strategic focus areas and periodical must win battles.
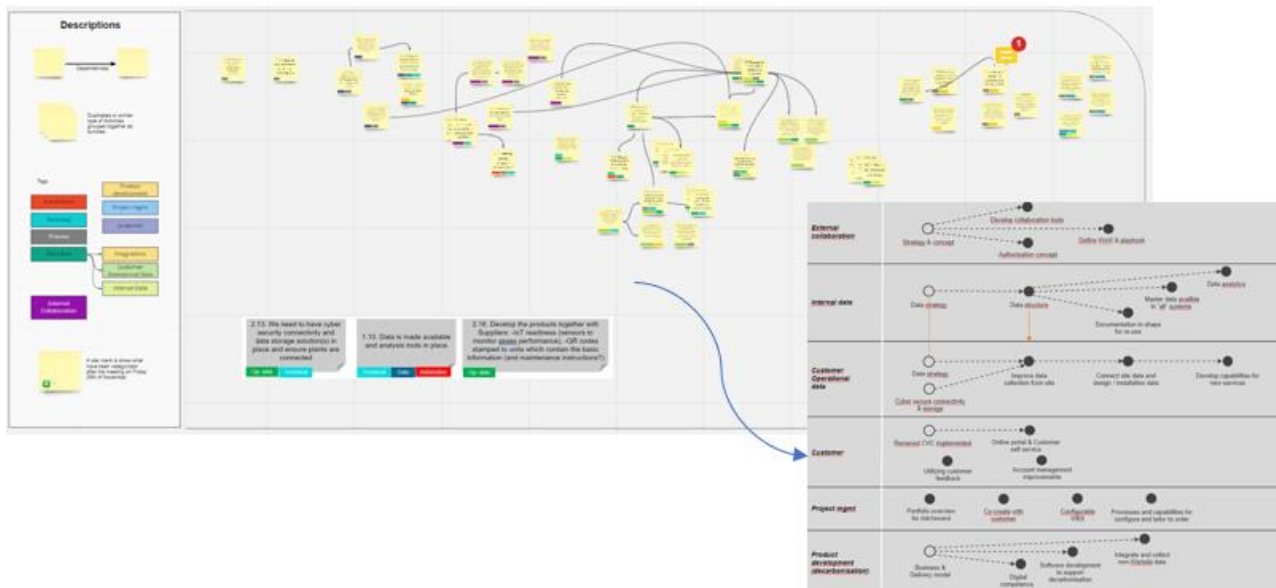
Figure 40. An example of clustering of workshop outcome evidence (the case company's internal workshop material, 2021).

Consolidated outcome summary with a sequencing draft of actions, illustrated in Figure 41 was created, and official documentation stored in the company's document management system, where from it was shared to all the participants and the management team and several forums for further discussion and decision making of alignment and focused development areas according to the company's governance structure.

Figure 41. An example of consolidated action with sequencing draft (the case company's internal workshop material, 2021).

Like Porter (1985) present the Five Forces that effect and influence competition; competitor's rivalry, supplier's power of negotiation, buyers' power of negotiation, threat of new entrants, and threat of substitutes, should organizations adapt to the demand and specially in the internal competition and make sure they have the necessary resources and capabilities to achieve company's strategic goals. To be able to secure the right capabilities in the team is not easy in the changing environment and therefore a long-term forecasting and strategic planning is essential. Summary also communicated following steps for creating strategic development portfolio to support strategy execution with agreed focus areas including transparency, monetary reservations, resource availability planning and execution of developments and companywide opportunity optimization.

Swan and Newell (2000) suggest that knowledge is a resource, whereas knowledge management is a key method to harvest an output or innovation. That is why knowledge management becomes an important managerial duty for capturing, analyzing, and converting information or data into organizational knowledge for generating new idea, promoting innovation and increasing organizational competence.

5   Conclusion – the significance of the research study

Strategic planning and planning of an execution plan based on a roadmap outcome by using the Roadmapping canvas (e.g., the MIRO board) in a virtual setting, highlights potential streams of development roadmap to focus for the company management. Some topics made more discussion among participants than others, which was a clear sign of focus areas. Some topics show where further evidence and investigation may be needed to gather, or where more triangulation of found stakeholders', perspective may be needed. Material, the evidence or outcome of the roadmap work and action items need further investigation with re-scoping, focusing or revisiting efforts or resources.

Planning and the actual process of creating a roadmap took over 80 working hours (Appendix 1) which is a lot of work to be planned. As mentioned earlier a (digital) strategy implementation needs to be created, a concrete plan and actions for ensuring objectives formulated are to be implemented by actions, yet that are followed and checked. It is important to plan the digital transformation by taking time to find critical resources, stakeholders, capabilities, and activities, so good planning is essential in all stages from planning of a roadmap to planning of actual work.

Challenges were faced when alignment with the strategic key focus areas needed to be drawn and find synergies with the business lines must win battles, mapping illustrated in Figure 42. Governance in the several forums and ownership of multiple must win battles did not supply a clear support for alignment. As mentioned earlier, a clear scope, ownership, stakeholders, and objectives will support the roadmap creation process.
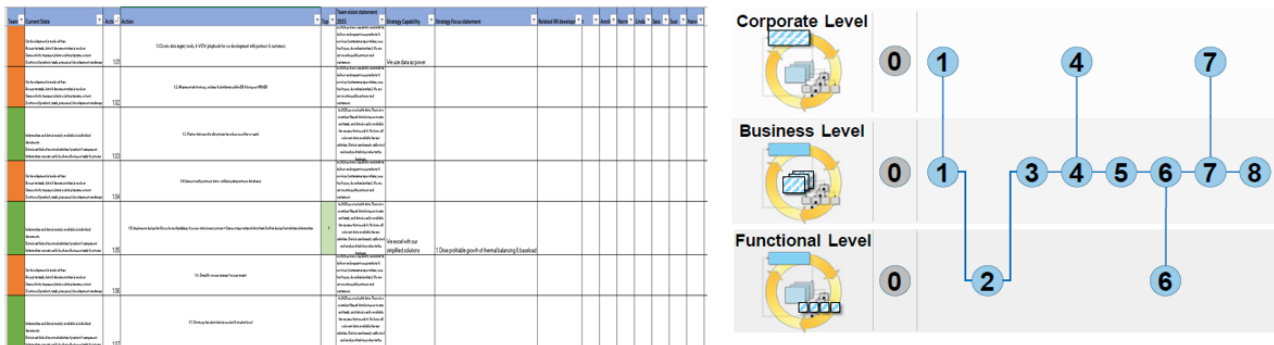
Figure 42. An example of mapping of corporate, business and functional level strategic actions (the case company internal consolidation material, 2021, and Lipsmeier et al., 2020, p. 176).

Importance of the creation of an annual revisit, strategic key initiatives points, quality alignment with the company policies under the management manual umbrella, through several forums, validation processes and agile commitment to the strategy for sustainable solution as for implementation plan and actions draft. Case company used the roadmap outcome to create a business line strategic IT development portfolio, illustrated in Figure 43 together with strategy action owners. Portfolio would supply identification of the resources, budget and prioritization needs. Following the case company's governance model, the operational development portfolio is kept as part of the business line dashboard and visible to all with details for each item. Developments are linked to strategic capabilities and operational development forum is combining the portfolio and the prioritization is done in joint engagement forum on quarterly basis. The data architecture team works with capability teams to find interdependencies and synergies to build a interconnected roadmaps. The engagement forum is the forum where developments are prioritized and the commitment and a focus for the business & information management partner secured to support the case company's strategy.

Figure 43. A strategic IT development portfolio (the case company's internal communication, 2022).

The case company developed its development forecasting accuracy to the level of the business forecasting, and digital roadmap outcome supplied evidence to the planning, in Figure 44. According to Mithas & Lucas (2010) companies today need to align both the business and the IT strategies, and to make sure digital strategy is part of the governance processes. Governance includes five steps. First it needs to be agreed what are the key IT decisions, who should make them and how. Second is how IT function should be organized (cost or profit center). The third step is to agree how much to invest in IT and into what kind of projects. Fourth is the prioritization and justification of different IT projects that will support the company's key strategic focus areas. The fifth step is to agree what projects are done in-house and what are to be outsourced or rented. These decisions

vary based on the company processes that stress revenue growth or cost reduction in digital business strategy.

Long range plans define the high level plans for the next 4 years, including the development spend frames

Annual budgets are set in the target setting, they are aligned with the rolling -5 forecasts, and include the development budget frames per unit

Rolling -5 forecasts the next 5 quarters including the development costs

Project and continuous development forecasts are rolled up to a IT development level forecasts for IT external spend and IM resource usage forecasts per unit

Project manager and Continuous Development Product managers forecasts their costs for the next months

Long range planning

Target setting

Rolling 5

Development forecast

Project forecast

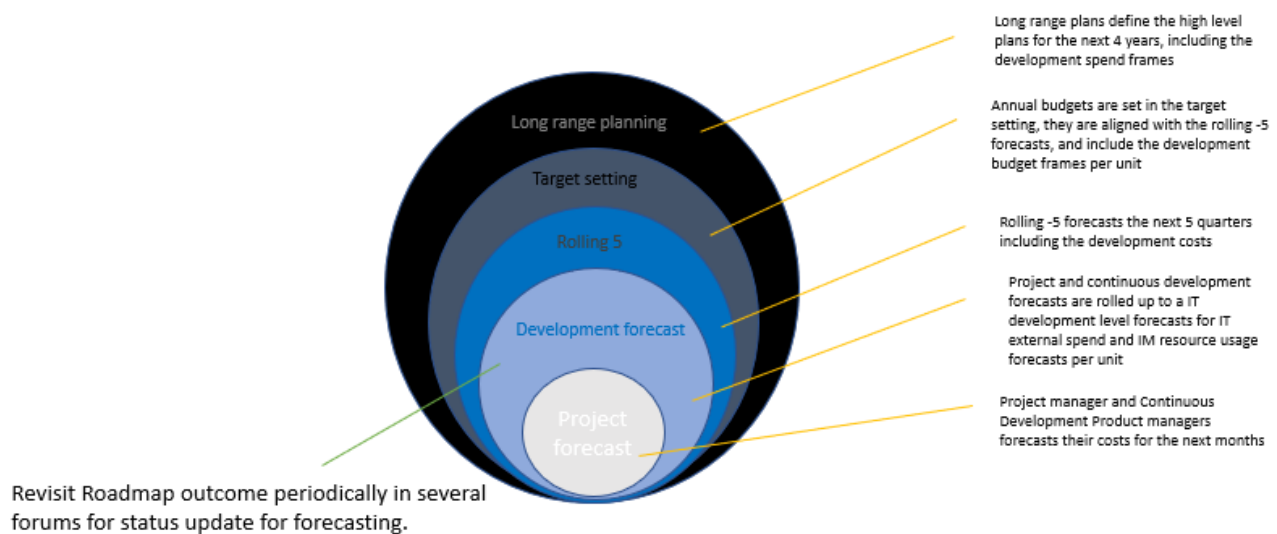Revisit Roadmap outcome periodically in several forums for status update for forecasting.

Figure 44. An example of companywide investments management cycle (the case company's internal communication, 2022).

Sun Tzu's Art of War's probably most important quote is "win without fighting", combined with Porter's (1985), strategy statement of choosing a separate set of activities to deliver a unique mix of values can be perceived that when internal consensus and level of alignment is there, company don't need to pay too much effort to fight internally about focus areas, where resources are invested. Martins and Terblanche (2003) state about strategy sub-dimensions that by creating a strategic roadmap management will align the organizational development activities by matching the desirable targets with the recommended activities in each period and utilize resources efficiently. All these align the case company's purpose of digital roadmap, a foreseen plan for enabling digital transformation in innovative company

atmosphere structured and aligned with ever changing business environment, where data race is the only race.

5.1 Lessons learned

Before the company can become a digital company and can supply innovative and unique mix of values, it needs to create an innovative strategy as part of the company strategy, integrated part of the company's vision and goal. Case company **innovation strategy** encourage actively employees to suggest internal startups and is interested in the incubator method. MIT Sloan management review (2016) states that companies need to develop a digital mindset to foster digital maturity, use data in decision making, create a distributed leadership and embrace risk taking. Only after companies are digitally mature, digital strategy can be formulated for enabling future data functionalities. This requires fundamental change in the companies and requires special kinds of leadership styles. Future leases should emphasize creativity, collaboration, venturing, and ecosystem thinking. There are also other important skills for future executives, like.

1. A holistic point of view (intrapreneurial skills)
2. An ability to constructively handle conflict
3. Optimism, passion and drive
4. Curiosity and believe in change
5. Tolerance for and an ability to deal with uncertainty
6. Being an adaptive, fast learner with a sense of urgency
7. A talent for networking and/or strategic influencing

It has been researched that **shared leadership** output has potential to be more beneficial to the team management comparing to traditional leadership style.

Future digital companies need to align both business and IT strategies and make sure digital strategy is part of the governance process, including key focus areas, who should pay, how much and to what kind of projects, how to justify different projects that will support the company's strategic focus areas and finally what projects are done in-house and what are to be outsourced.

Accenture (2021) argue that common tools for working inspire employees to collaborate and would bring diverse perspectives to the table enabling addressing those strategic priorities. Prior COVID-19 organizational cultures were deep in silos, delay's ability and collaboration resulting experiment pace failure to match rate of change in the business environment. Actions made during COVID-19 are most likely to stick.

The business strategy provides a company with the priority to invest in technology leadership in order ensure the competitiveness of its portfolio and for securing leading position in innovation areas. The case company manages the activities and strategy with an innovative culture, diversity, and high standards, that will be the base of the high performing organization. Case company's strategic aim is to strengthen its leading position in its market and to endure continued growth by an integrated equipment and service portfolio, that matches customers' needs globally. Follow up and discipline is a key in the strategy execution. The case company's strategy execution plan is in place with owners, key objectives, KPI's and road map. Development road map initiatives are linked to the company strategy execution plan with periodical must win battles and development focus topics agreed in engagement forum, governance model illustrated in Figure 45.
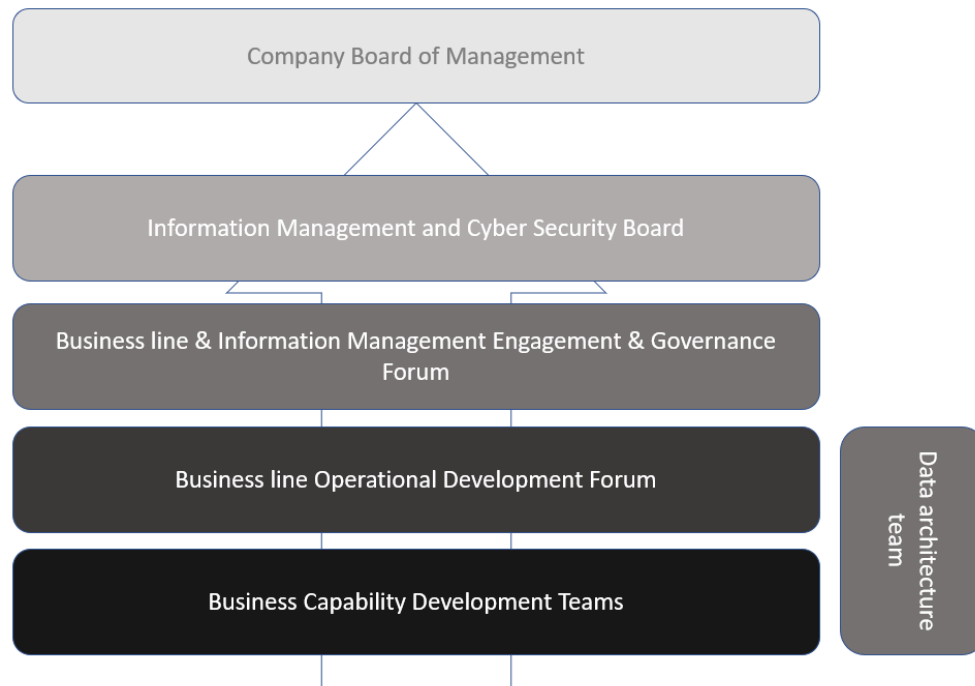
Figure 45. The case company's governance model for developments (the case company's internal communication, 2021).

Strategies are long term goals, and sometimes a global business environment and market situations with challenges need urgent measures to address, like the Covid-19, a global pandemic. Case company needed to make agile developments and there is no room for internal competition in the operational environment. The right kind of balance in resourcing, focus areas with needed capability knowledge and strong vision for future developments will support robust change management.

The planning and the implementation phase and actions are essential for successful **execution of roadmap outcomes.** Outcome might suggest several simultaneous streams to revising processes, operations or even a need for new roles may be suggested. There might be a need to find employees that have specific skills and capabilities to fully seize the possibilities of a roadmap outcome implementation, or the company needs to support in developing new competences. This change in way of working, the processes or tools needs

change management skills and planning the change management lead is an important part of planning for sustainable solutions.

Like Galvin (1998) states for best process to collect and evaluate content of roadmaps is to include as many professionals as possible in regular workshops for all suggestions to be considered and to openly evaluate the harmonies that will appear and that everyone should have given equal rights for opinion, from minority views and other. This thesis observation outcome supports this hypothesis. Case company involved all top management, strategy creation, business process owners and subject matter experts together co-create foreseen digital development plan. Outcome of the creation process was determined to highlight mutually agreed cross business initiative, that would create a forward looking (virtual) map and would support management in leading the needed change. **A virtual map has timeline and actions are sequenced and outcomes will evolve in portfolio's and will support overall planning of case company's right time digital development enablers and resources in evolving business environment.** To the creation of an annual revisit process, strategic key initiatives point and, the quality alignment with the company policies under a management manual umbrella, life-cycle maintenance and monitoring through several forums and portfolios.

Based on this action research I can recommend that a Roadmap framework enable involvement and alignment of cross business views on future requirements and supply steppingstones for creation process of the future looking action plan. This thesis outcome can be used to any business initiative that requires a holistic cross business, development co-creation process.

According to Groenveld (2007), who state that the original description "product – technology Roadmapping" has been replaced by "business Roadmapping" to highlight the goal of this type of Roadmapping, i.e., developing five to seven years vision of how the business is likely to develop. He also emphases that the Roadmapping must be an ongoing process and that it is a part of business cycle.

Processes and procedures should be agile for any company to adjust changes and seize the opportunities when implementing the roadmap outcome. Agile way of working in implementation phase with iterative development of minimum viable products will support to achieve desirable and smart outcomes. Must win battles is one method used in the case company for implementing cross functional development initiatives in fast changing environments with an agile method. In this measurement and follow up is essential for implementing sustainable solution, according to the alignment to company strategy and/or strategic focus areas.

Change management of employees and customers require leadership, since there might be change of way of working involved and it needs to be managed with a plan and implementation. Engagement of people early on the process and start with why. To understand why a change initiative is mandatory and support everyone to find their own process and drivers. Following earlier mentioned Donald Rumsfeld's (2002) future "unknown unknowns" is always a fact, but strategy would provide some order and structure for future. Communication in change management and leading change is essential, like Martins and Terblanche (2003) states, that

> when organization has a clear company vision and strategy and communication is effective to all, it has impact towards innovativeness and performance.

5.2   Future study suggestions

Drucker (1988) expected new, information–based organizations and in 1993 argued that the world is moving to a society whose primary resource is knowledge. Bray and Garcia (1997) instructed that enough time and effort must be given to the Roadmapping, with clear leadership and sponsorship roles defined.

This means that it could be difficult to update a roadmap on a prompt or continuous basis in big corporations and according to Phaal et al. (2004) and Lee and Park (2005) and it could be difficult to keep a roadmap, so therefore companies should develop or investigate software for supporting the start, storage and upkeeping of the roadmap.

EIRMA (1997) highlight that if there is no time, then it is not a roadmap. Actions need a **time frame,** and they need monitoring with a clear owner and sponsorship. Future study would be beneficial for finding out how the upkeeping process should be done and would there be any technical solutions for monitoring roadmap outcome and action plans.

– Objectives to be set per each strategic priority

– Periodical roadmap revisit for next year to support the execution of annual objectives

– Follow-up in business and functional review meetings

– Each business will follow similar logic and templates in case company

– Follow up done in group level through business reviews

An action sheet / KPI template examples in Table 3 illustrate possibilities for further study and how these templates could be utilized in digital format to support digitalization.

Table 5. Action sheet/KPI suggestion 1.

Theme	Person responsi-ble	Resource needed	Cost	Time frame

Table 6. Action sheet/KPI suggestion 2.

KPI	YTD	Next Q	Target 202x	Actions to close the gap	Status

6 Bibliography

Abrantes, R., Figueiredo, J. (2021). *Information systems and change in project based organizations* (*181*), p.367–376,https://doi.org/10.1016/j.procs.2021.01.184.

Acccenture (n.d.). https://www.accenture.com/us-en/blogs/blogs-digital-what-is-digital-strategy.

Accenture (2021). https://www.accenture.com/us-en/insights/consulting/_acnmedia/Thought-Leadership-Assets/PDF-4/Accenture-Signals-Of-Change-Business-Futures-2021-Report.pdf

Albright, R. E., & Kappel, T. A. (2003). Technology roadmapping: Roadmapping the corporation. *Research technology management, 46*(2), 31.

All Answers Ltd. (November 2018). *The Art of War to Business Strategy*. https://ukdiss.com/examples/business-strategy-art-of-war.php?vref=1

Anastasiu, L., Gavriş, O.,& Maier, D. (2020). Is Human Capital Ready for Change? A Strategic Approach Adapting Porter's Five Forces to Human Resources. *Sustainability*, 12(6), 2300. https://doi.org/10.3390/su12062300

Annual Report. (9 February 2021).https://mb.cision.com/Main/15003/3501688/1532017.pdf

Art of War (n.d.). https://ukdiss.com/examples/business-strategy-art-of-war.php#citethis

Barker, D., & Smith, D.J.H. (1995). Technology foresight using roadmaps. *Long Range Planning, 28*(2), 21–28.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital Business Strategy: Toward a Next Generation of Insights. *MIS quarterly*, *37*(2), 471-482. https://doi.org/10.25300/MISQ/2013/37:2.3

Bois, H. (1986). Stephen P. ROBBINS: Organizational Behavior. Concepts, Controversies and Applications. 3rd ed., Englewood Cliffs, Prentice-Hall, 1986, 554 pp., ISBN 0-13-641549-0-01. *Relations industrielles (Québec, Québec), 41*(4), 879. https://doi.org/10.7202/050272arBrand, A. (1998). Knowledge Management and Innovation at 3M. *Journal of knowledge management, 2(*1), 17–22. https://doi.org/10.1108/EUM0000000004605

Bray, O.H., & Garcia, M.L. (1997). Technology roadmapping: the integration of strategic and technology planning for competitiveness. Innovation in Technology Management – The Key to Global Leadership. *PICMET' 97: Portland International Conference on Management and Technology*, 25–28.

Brown, J., & Isaacs, D. (2005). *The world café: Shaping our futures through conversations that matter.*

Building organisational culture that stimulates creativity and innovation. *European Journal of Innovation Management, 6(*1), 64-74. http://dx.doi.org/10.1108/14601060310456337

Cascade Strategy Execution Platform. (n.d.). www.cascade.app

Chalmers, J. (2012). Evidence (3rd ed.). Dundee University Press.

Chutivongse, N. & Gerdsri, N. (2019). Creating an innovative organization: Analytical approach to develop a strategic roadmap guiding organizational development. *Journal of modelling in management, 15*(1), 50-88. https://doi.org/10.1108/JM2-05-2018-0067

Cohen, W. A. (2014). *The practical Drucker: Applying the wisdom of the world's greatest management thinker.* AMACOM.

Costello, P. J. M. (2003). Action research. Bloomsbury Publishing Plc.

Cummings, T. G., & Cummings, C. (2014). Appreciating Organization Development: A Comparative Essay on Divergent Perspectives. *Human resource development quarterly, 25*(2), 141–154. https://doi.org/10.1002/hrdq.21186

Dobbs, M. E. (2014). Guidelines for applying Porter's five forces framework: a set of industry analysis templates. *Competitiveness Review, 24*(1), 32-45. https://doi-org.libts.seamk.fi/10.1108/CR-06-2013-0059

European Industrial Research Management Association. (1997). *Technology roadmapping: Delivering business vision.* EIRMA.

Favaro, K. (2016). *Don't draft a digital strategy just because everyone else is.* https://hbr.org/2016/03/dont-draft-a-digital-strategy-just-because-everyone-else-is

Frada, A. (2022). *Accelerating the energy transition by scaling impactful innovation.* https://www.wartsila.com/insights/article/accelerating-the-energy-transition-by-scaling-impactful-innovation

Garcia, M.L.., & Bray, O.H. (1997). Fundamentals of Technology Roadmapping. *Sandia Report.*

Gillham, B. (2000). *Case study research methods.* Continuum.

Groenveld, P. (2007). Roadmapping Integrates Business and Technology. *Research technology management, 50*(6), 49-58. https://doi.org/10.1080/08956308.2007.11657472

Guido Stein. (2010). *Managing People and Organizations: Peter Drucker's Legacy.* Emerald Group Publishing Limited.

Jeyarathmm, M. (2007). *Strategic management.* Global Media.

Kappel, T. A. (2001). Perspectives on roadmaps: How organizations talk about the future. *The Journal of product innovation management, 18*(1), 39-50. https://doi.org/10.1016/S0737-6782(00)00066-7

Kerr, C., & Phaal, R. (2020). *Technology roadmapping: Industrial roots, forgotten history and unknown origins.* https://doi.org/10.17863/CAM.49778

Kerzner, H. (2017). *Project Management Metrics, KPIs, and Dashboards: A Guide to Measuring and Monitoring Project Performance.*

Kiron, D., Kane, G. C., Palmer, D., Phillips, A. N., & Buckley, N. (2016). Aligning the Organization for its Digital Future. *MIT Sloan management review, 58*(1).

Kostoff, R. N., & Schaller, R. R. (2001). *Science and technology roadmaps, in IEEE transactions on engineering management*, *48*(2), 132–143. https://doi: 10.1109/17.922473.

Leading in the Digital World. (2020): How to Foster Creativity, Collaboration, and Inclusivity. *Publishers Weekly, 267*(8), 63.

Leavy, B. (2020). Amit Mukherjee: Seven principles shaping digital strategy and leadership. *Strategy & leadership, 48*(3), 33–38. https://doi.org/10.1108/SL-02-2020-0030

Lee, J. H., Phaal, R., & Lee, C. (2011). An empirical analysis of the determinants of technology roadmap utilization. *R & D management, 41(*5), 485–508. https://doi.org/10.1111/j.1467-9310.2011.00657.x

Lipsmeier, A., Kühn, A., Joppen, R., & Dumitrescu, R. (2020). *Process for the development of a digital strategy.* https://doi.org/10.1016/j.procir.2020.05.031

Marina, d. P. (2007). The role of knowledge management in innovation. *Journal of Knowledge Management, 11*(4), 20-29. http://dx.doi.org/10.1108/13673270710762684

Martins, E.C., & Terblanche, F. (2003), Building organisational culture that stimulates creativity and innovation. *European Journal of Innovation Management*, 6(1), 64–74. https://doi.org/10.1108/14601060310456337

McKeown, N., & Durkin, M. (2017). *The seven principles of digital business strategy.*

McNiff, J., & Whitehead, J. (2000). Action research in organisations. Routledge.

Mithas, S., & Lucas, H. C. (2010). What is Your Digital Business Strategy? *IT professional, 12*(6), 4-6. https://doi.org/10.1109/MITP.2010.154

Mithas, S., Tafti, A., & Mitchell, W. (2013). How a Firm's Competitive Environment and Digital Strategic Posture Influence Digital Business Strategy. *MIS quarterly, 37(*2), 511-536. https://doi.org/10.25300/MISQ/2013/37.2.09

Mintzberg, H. (1979). Patterns in Strategy Formation. *International Studies of Management and Organization, 9(*3), 67–86. https://doi.org/10.1080/00208825.1979.11656272

Okada, Y., Kishita, Y., Nomaguchi, Y., Yano, T., & Ohtomi, K. (2022). Backcasting-Based Method for Designing Roadmaps to Achieve a Sustainable Future. *IEEE transactions on engineering management, 69*(1), 168–178. https://doi.org/10.1109/TEM.2020.3008444

Ordenes, P. (2 December 2021). *Strategy levels and How to Apply them in your Business.* https://www.cascade.app/blog/strategy-levels

Osland, J., E. Mendenhall, M., & Li, M. (2018). *Advances in Global Leadership.*

O'Sullivan, E., Phaal, R., & Featherston, C. (2021). Agile Roadmapping: An Adaptive Approach to Technology Foresight. *Foresight and STI governance, 15*(2), 65–81. https://doi.org/10.17323/2500-2597.2021.2.65.81

Parmenter, D. (2007). *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs.*

Project Management Institute, Inc. (PMI). (2017). *Standard for Portfolio Management (4th Edition) - 1.6 Relationships among Portfolio Management, Program Management, and Project Management.*

Randall, R. (2005). *Innovation.* Emerald Group Publishing.

Robins, S.P. (1996) *Organizational Behavior: Concepts, Controversies, Applications* (7th ed.). Prentice-Hall.

Shahzad, K., Bajwa, S. U., & Zia, S. A. (2013). Competitive Strategy: Techniques for Analyzing Industries & Competitors. *South Asian Journal of Management, 20*(3), 194.

Sheetz-Runkle, B. (2014). *The art of war for small business: Defeat the competition and dominate the market with the masterful strategies of Sun Tzu.* AMACOM.

Stonehouse, G. & Snowdon, B. (2007). Competitive Advantage Revisited: Michael Porter on Strategy and Competitiveness. *Journal of management inquiry, 16*(3), 256–273. https://doi.org/10.1177/1056492607306333

Sun Tzu. (1971). *The Art of War.* Oxford University Press,

Swaim, R. W. (2011). *The Strategic Drucker: Growth Strategies and Marketing Insights from the Works of Peter Drucker.*

Teece, D. J. (2010). Alfred Chandler and "capabilities" theories of strategy and management. *Industrial and corporate change, 19*(2), 297–316. https://doi.org/10.1093/icc/dtq008

Technology foresight using roadmaps- (1995). Long range planning vol. 28, No. 2. *research technology management, 38*(5), 63.

The double diamond. (2019). https://www.designcouncil.org.uk/news-opinion/double-diamond-universally-accepted-depiction-design-process

The double diamond framework for innovation (2019).
https://www.designcouncil.org.uk/news-opinion/double-diamond-15-years

Vishnevskiy, K., Meissner, D., & Karasev, O. (2015). Strategic foresight: State-of-the-art
and prospects for Russian corporations. *Foresight (Cambridge), 17*(5), 460–474.
https://doi.org/10.1108/FS-11-2014-0075

WHO (2022). https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---4-may-2022

Willis, J. W., & Edwards, C. (2014). *Action Research: Models, Methods, and Examples*.

Willyard, C. H., & McClees, C. W. (1987). Motorola's Technology Roadmap
Process. *Research technology management, 30*(5), 13.

Winter, R., & Munn-Giddings, C. (2002). *A Handbook for Action Research in Health and
Social Care*. Routledge.

Worley, C. G., Williams, T., & Lawler, E. E., III. (2016). Creating management processes
built for change. *MIT Sloan management review, 58*(1), 77.

7   Appendix

Appendix 1. Working group hours

1. Working group hours

	Location	Start	End	Duration
2022 Roadmap update and Action Plan workshop, Second session	Microsoft Teams Meeting	Thu 10/02/2022 9.00	Thu 10/02/2022 11.00	2,0
Roadmap 2/2 planning session	Microsoft Teams Meeting	Wed 09/02/2022 9.00	Wed 09/02/2022 11.00	2,0
Roadmap 2/2 planning session	Microsoft Teams Meeting	Mon 07/02/2022 11.30	Mon 07/02/2022 12.30	1,0
Strategic Priorities - Strategy talk with M	Microsoft Teams Meeting	Thu 03/02/2022 13.30	Thu 03/02/2022 14.00	0,5
Roadmap 2/2 planning session	Microsoft Teams Meeting	Wed 02/02/2022 11.00	Wed 02/02/2022 12.00	1,0
Strategic Priorities - Strategy talk with A	Microsoft Teams Meeting	Tue 01/02/2022 10.30	Tue 01/02/2022 11.15	1,5
Roadmap 2/2 planning session	Microsoft Teams Meeting	Mon 31/01/2022 14.00	Mon 31/01/2022 15.00	1,0
2022 Roadmap update and Action Plan workshop, first session	Microsoft Teams Meeting	Thu 20/01/2022 8.45	Thu 20/01/2022 10.20	2,0
Roadmap check	Microsoft Teams Meeting	Wed 19/01/2022 12.15	Wed 19/01/2022 12.45	0,5
Roadmap Structure and agenda planning	Microsoft Teams Meeting	Mon 17/01/2022 8.15	Mon 17/01/2022 8.45	0,5
vision for Digital Development Roadmap 2025 - finalization of summary	Microsoft Teams Meeting	Fri 07/01/2022 9.00	Fri 07/01/2022 10.00	1,0
vision for Digital Development Roadmap 2025 - summary	Microsoft Teams Meeting	Fri 31/12/2021 9.00	Fri 31/12/2021 9.30	0,5
vision for Digital Development Roadmap 2025 - summary	Microsoft Teams Meeting	Wed 22/12/2021 9.00	Wed 22/12/2021 10.00	1,0
vision for digital development roadmap 2025 - summary and prioritization proposal workshop	Microsoft Teams Meeting	Wed 08/12/2021 15.00	Wed 08/12/2021 16.30	1,5

Final prep for the Consolidation WS	Microsoft Teams Meeting	Tue 07/12/2021 14.00	Tue 07/12/2021 15.00	1,0
Consolidation workshop preparations	Microsoft Teams Meeting	Wed 01/12/2021 15.30	Wed 01/12/2021 16.30	1,0
Planning / Working meeting for the Digital Consolidation WS	Microsoft Teams Meeting	Tue 30/11/2021 14.00	Tue 30/11/2021 14.30	0,5
Consolidation of digital development roadmap - planning	Microsoft Teams Meeting	Wed 24/11/2021 14.00	Wed 24/11/2021 15.00	1,0
Summary of workshop outcome - Focus area X	Microsoft Teams Meeting	Tue 23/11/2021 14.30	Tue 23/11/2021 15.00	0,5
X Workshop	Microsoft Teams Meeting	Thu 18/11/2021 15.00	Thu 18/11/2021 18.00	3,0
vision for digital development roadmap 2025 - X	Microsoft Teams Meeting	Thu 18/11/2021 15.00	Thu 18/11/2021 17.55	3,0
Final check-up before the workshop	Microsoft Teams Meeting	Thu 18/11/2021 10.00	Thu 18/11/2021 11.00	1,0
Planning X workshop follow-up	Microsoft Teams Meeting	Tue 16/11/2021 9.30	Tue 16/11/2021 10.00	0,5
Preparations for X Workshop	Microsoft Teams Meeting	Thu 11/11/2021 14.30	Thu 11/11/2021 15.30	1,0
Planning for roadmap next steps	Microsoft Teams Meeting	Tue 09/11/2021 13.00	Tue 09/11/2021 14.00	1,0
Workshop 3. lessons learned	Microsoft Teams Meeting	Tue 09/11/2021 9.00	Tue 09/11/2021 9.55	1,0
Z Workshop	Microsoft Teams Meeting	Mon 08/11/2021 12.00	Mon 08/11/2021 16.00	4,0
vision for digital development roadmap 2025 - Z	Microsoft Teams Meeting	Mon 08/11/2021 12.00	Mon 08/11/2021 16.00	4,0
Final check-up before the workshop	Microsoft Teams Meeting	Mon 08/11/2021 9.30	Mon 08/11/2021 10.30	1,5
Summarizing the digital development roadmap workshops	Microsoft Teams Meeting	Fri 05/11/2021 14.15	Fri 05/11/2021 15.00	1,0
Preparation for Z	Microsoft Teams Meeting	Wed 03/11/2021 12.00	Wed 03/11/2021 13.30	1,5
WS prep work and planning	Microsoft Teams Meeting	Wed 03/11/2021 9.00	Wed 03/11/2021 15.00	8,0
Lessons learned and insights from the 2nd WS	Microsoft Teams Meeting	Tue 02/11/2021 9.30	Tue 02/11/2021 10.15	1,5
Y Workshop	Microsoft Teams Meeting	Mon 01/11/2021 13.00	Mon 01/11/2021 16.00	3,0

vision for digital development roadmap 2025 - Y	Microsoft Teams Meeting	Mon 01/11/2021 13.00	Mon 01/11/2021 16.05	3,0
Workshop 1. Lessons learned - Go trough of the outcomes & how to improve for the next round	Microsoft Teams Meeting	Tue 26/10/2021 9.00	Tue 26/10/2021 10.00	1,0
work to workshop	Microsoft Teams Meeting	Mon 25/10/2021 13.00	Mon 25/10/2021 16.00	3,0
vision for digital development roadmap 2025 - W	Microsoft Teams Meeting	Mon 25/10/2021 13.00	Mon 25/10/2021 16.00	3,0
Walkthrough of workshop plan	Microsoft Teams Meeting	Wed 20/10/2021 11.30	Wed 20/10/2021 13.00	2,5
Placeholder for workshop planning	Microsoft Teams Meeting	Mon 18/10/2021 10.30	Mon 18/10/2021 12.00	1,5
vision for digital development roadmap 2025 - kick-off meeting	Microsoft Teams Meeting	Thu 14/10/2021 15.00	Thu 14/10/2021 16.00	1,0
Plan the workshop	Microsoft Teams Meeting	Thu 14/10/2021 10.00	Thu 14/10/2021 12.00	2,0
Interview summary X	Microsoft Teams Meeting	Wed 13/10/2021 16.00	Wed 13/10/2021 16.30	0,5
Next steps for workshop planning	Microsoft Teams Meeting	Wed 13/10/2021 11.00	Wed 13/10/2021 11.30	0,5
Roadmap 2025 workshop planning - full team	Microsoft Teams Meeting	Tue 12/10/2021 14.00	Tue 12/10/2021 15.00	1,0
Workshop planning meeting	Microsoft Teams Meeting	Tue 12/10/2021 11.30	Tue 12/10/2021 12.30	1,0
Interview analysis / Roadmap 2025	Microsoft Teams Meeting	Tue 05/10/2021 10.00	Tue 05/10/2021 11.00	1,0
global townhall - strategy	Live event	Mon 04/10/2021 14.30	Mon 04/10/2021 15.30	1,0
Meet smarter with Microsoft Teams	Microsoft Teams Meeting	Tue 08/06/2021 9.00	Tue 08/06/2021 9.50	1,0
Plan of Roadmap II	Microsoft Teams Meeting	Thu 11/02/2021 15.00	Thu 11/02/2021 15.30	0,5
Roadmap Virtual Workshop	Microsoft Teams Meeting	Tue 26/01/2021 8.30	Tue 26/01/2021 11.30	3,0
Planning for Roadmap (Virtual) session next week	Microsoft Teams Meeting	Tue 19/01/2021 12.00	Tue 19/01/2021 12.30	0,5
Strategy session team with A	Microsoft Teams Meeting	Tue 19/01/2021 11.00	Tue 19/01/2021 12.00	1,0
Roadmap	Microsoft Teams Meeting	Mon 18/01/2021 15.00	Mon 18/01/2021 15.30	0,5
actions 2021 and vision 2025	Microsoft Teams Meeting	Wed 13/01/2021 13.30	Wed 13/01/2021 15.30	2,0

85,5