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Developing a Product Roadmap for the Case Company

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Abstract

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This thesis focuses on developing a product roadmap for the case company that would visualize different inputs, steps in development, and goals of the product. The thesis was triggered as the case company lack any visualized framework that would function as a planning tool to organize the goals, inputs, and metrics of the product developmental process.

The thesis used applied research approach, identifying the challenges, and selecting the objective for the study, and then developing a research design for the study. The theoretical framework focused on the key concepts, methods, and key elements of creating a product roadmap. The current state analysis focused on gathering the vital information about the existing practices in the product development at the case company, collected from the stakeholders of the organization in the form of interviews, workshop, observation, and internal document analysis. The current state analysis revealed that the existing product development practice does not have a planned vision of short-term and long-term goals.

The inputs from stakeholders and selected ideas from literature and best practices helped in developing the new product roadmap. The product roadmap includes market perspectives, product perspectives and technological perspectives.

As an outcome of the thesis, the company now has a visualized framework which acts as a blueprint for the product development in a scheduled manner. The product roadmap is proposed for implementation in the key department of the company. This product roadmap makes the first step of creating a documented approach and a basis for future product development in the case company.

Keywords: Product Roadmap, Product development, Product Management, Business development.

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Glossary

- SaaS Software as a Service. Offering application services over the internet, which could be accessed without installing and maintaining a software.
- B2C Business-to-Customers. Selling of product and services directly to the customers.
- B2B Business-to-Business. Transaction or offering product and services by one business provider to another business.

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1. Introduction

“Your product roadmap is the prototype for your strategy.” (Lombardo et al. 2017)

A *product* may be referred to as an entity, service or a method that has been developed to satisfy market demand. A *product roadmap* can be presented as an action plan depicting the goals of the product and how they are achieved over a period. The concept of a product roadmap, being quite new, has gained popularity over the last years. Business practitioners believe that the roadmap plays a vital role in communicating the product goals to the team working towards achievable targets (Lombardo et al. 2017). The product roadmap acts as a reference solution to achieve the project success; it also aligns the product vision with product strategy, prioritizing goals, and requirements.

According to Groenveld et al. (2007), the road mapping process integrates business objectives and technology. A product roadmap provides direction, contiguity in the product development process. In a way, a product roadmap defines the product vision, the development process and strategies involved in product development. To create a product roadmap, three major constraints are taken into consideration: predicted market future, marketing strategy, and product limitations.

Based on Suomalainen et al. (2011) research, the business practice shows that having a concrete roadmap helps to align the team around product strategy, define a clear concise understanding of roles, and establish clarity on priorities. Planning a roadmap involves understanding the market, stakeholders demand and business goals (Groenveld, 2007). The key parameters included in a product roadmap are product features aligned with release dates, which gives a vision of product timeline and required sources. According to Groenveld (2007), the roadmap requires a good understanding of market demands and these requirements help to derive product goals and technical product functions.

This study aims to develop a product roadmap by analyzing the market demands and technological requirements and incorporating strategic process planning.

1.1 Business Context

The case company of this thesis is Unfair Advantage Oy. The company provides B2B and B2C online digital services through the Staff Tribes and Sports Network platform to connect people through communities, sport clubs and events. The mission is to promote social interaction and solutions to social isolation by building a place where people can get connected through sport and fun offline activities (sportsnetwork.fi.). The product is specifically designed to make organizing events faster, easier, and more efficient.

Unfair Advantage is a young company structuring its product step by step to cater the needs of the Finnish market. The product undergoes changes based on customer requirements, feedback, and problem-solving scenarios. Existing product needs a concrete structure and goal to mark its presence and reach long-term goals. (Sportsnetwork.fi.)

1.2 Business Challenge, Objective and Outcome

Currently, the company focuses on short-term goals in product development and fulfilling client requirements based on their needs. However, the company needs to be responsive to technological change. The entire product cannot be developed based on customer feedback; hence a constant review and overall view of the product is important to lead the team towards the company's vision and goals. A clear separation of short-term and long-term goals is needed to prevent product being deviated from its goals by repeated requests and suggestions from the stakeholders or clients. The current lack of certainty and structure leads to pitfalls in product development. When the teams have foundational understanding of what matters to the business and to customers, they can more effectively focus on goals and priorities. Hence, building the product road map becomes extremely important to the company.

A Product roadmap would enable the company to keep the product development on track, mapping it with technological developments and market demands. Thus, the other target of the company is to define expectations, establish clear priorities and release timelines by streamlining internal tech processes and systems. This should help in building a reliable product roadmap, too. The product roadmap with long-term goals would emphasize aligning the goals with future market growth and advanced technical capability, ease of customer accessibility and usability.

Accordingly, this study focuses on developing a technology-based product roadmap with the emphasis on strategic developmental process for the coming years.

The objective of this thesis is to develop a product roadmap for the case company focusing on technological improvements and market demands.

The outcome is a product roadmap proposal for the case company focusing on technological improvements and market demand in Finland.

1.3 Thesis Outline

The thesis aims to propose a product roadmap for SaaS companies. It is evident that SaaS companies adapt frequent changes to fit into technological advancements. This roadmap proposal is to be built, updating the roadmap constantly to meet the market demands and technical improvements. It should rely entirely on agile product development methodology.

To develop the roadmap, first, available knowledge will be explored, so that to understand the concepts and methods of product roadmap building before diving into the analysis and development. Second, existing product development in the case company will be revised to identify the existing features, technologies used in the current product as a starting point for further development. Third, the thesis will focus on collecting detail-rich, grounded qualitative data on the future goals of the company for the next few years through internal interviews. Fourth, the thesis will proceed to collecting qualitative data from the customer perspective and b2b perspective on requirements and expectations about the platform. The responses will give a general understanding of the company goals and customer demands, and thus provide a direction on how to develop a roadmap for bridging these elements in a new product roadmap.

2 Method and Material

This section describes the research approach, research design, and data collection and analysis methods used in this Thesis.

2.1 Research Approach

As for *research families*, there exists two types of research families, basic and applied (Saunders et al. 2009). Based on Saunders et al. (2009), basic research offers flexibility to the researcher to determine the context and objective of the research. Basic research seeks to identify principles of the process or phenomena and utilizes flexible timeframe as the results are findings and generalized theories of knowledge or research. (Saunders et al, 2009.) On the contrary, according to Saunders et al. (2009), applied research improves understanding of the business processes and offers solution to existing problems. Applied research unfolds in an existing real-life business setting to contrive a new working method or framework based on the collected data and applying available knowledge (Kananen 2013).

As for *research methods*, research is used to address a problem by analyzing available data via the existing methods to gain domain knowledge. The main classes of research are qualitative, quantitative, and mixed research. Quantitative research aims at quantitative analysis of data, while qualitative research focuses on the analysis of diverse and knowledge-rich specific data. Mixed research integrates both qualitative and quantitative elements to gain a holistic view of the problem and provide deeper conceptual knowledge. (Paul and David 2002.)

As for *research strategy*, in the field of business, Action research and case study are the two most popular strategies of research (Blichfeldt et al. 2006). Both case study and action research aim at providing context-based knowledge, but Action research encourages active participation of the members to resolve a specific issue. According to Paul and David (2002), Action research provides action-oriented solutions to an issue making sure that the members of the system actively participate in the resolution of the problem. Action research focuses on addressing the problem while incorporating knowledge on the relevant domain, thus action research is an ideal research strategy for business studies. At the same time, research strategies are also subject to limitations, depending on the research setting. To address the limitations of time and scope, for

example, applied action research strategy was formulated for thesis research. According to Kananen (2013), applied action research emphasizes practical results of improvements and, as such, applied action research primarily focuses on change implementation rather than mere research.

Finally, regarding *research techniques*, data can be collected using diverse ways. The following are the research techniques most frequently used in the field of business for applied type of studies, using qualitative research methods. First, *observation* which means a research technique collecting data through participant or self-observation. Second, *interviews* which means a research technique collecting data in a dialogue using questions to obtain information about specific problems. Third, a *survey* or a *questionnaire* which means a research technique collecting data via a list of questions and shared with the respondents. Also, *brainstorming/workshops/focus groups and similar techniques* mean data collection from multiple participants for expressing opinions and generating ideas. (Kothari 2004.) Other research methods may include document analysis, systems analysis, etc.

This thesis belongs to the realm of applied research and aims at providing a solution to a specific existing business problem. This study adopts Applied action research as this thesis aims to solve a practical problem. Applied action research is selected for this thesis as it emphasizes on continuous enhancements in product developmental practices and organizational framework (Kananen, 2013, p20). This thesis focuses on offering planned solution for the service that the company offers by analyzing reliable and qualitative data. Applied action research was selected as a research strategy as it suggests an approach for conducting analysis and then co-developing the solution based on inputs from exploring existing knowledge to build a solution to the business problem via conducting thesis research.

The thesis is based on using qualitative research method and focused on obtaining qualitative data via interviews, document analysis, and questionnaires to generate a solution proposal. Qualitative research methods are used as they help to obtain specific insights in planning and developing new products. This thesis adapts inquiry techniques that involve interview and observations. The interviews are conducted among various teams of the company and other stakeholders in the company. To understand the market demands, workshops are conducted within the company.

2.2 Research Design

This study is conducted according to the following research design. It includes five steps to achieve the objective of the thesis. Figure 1 below shows the research design of this study.

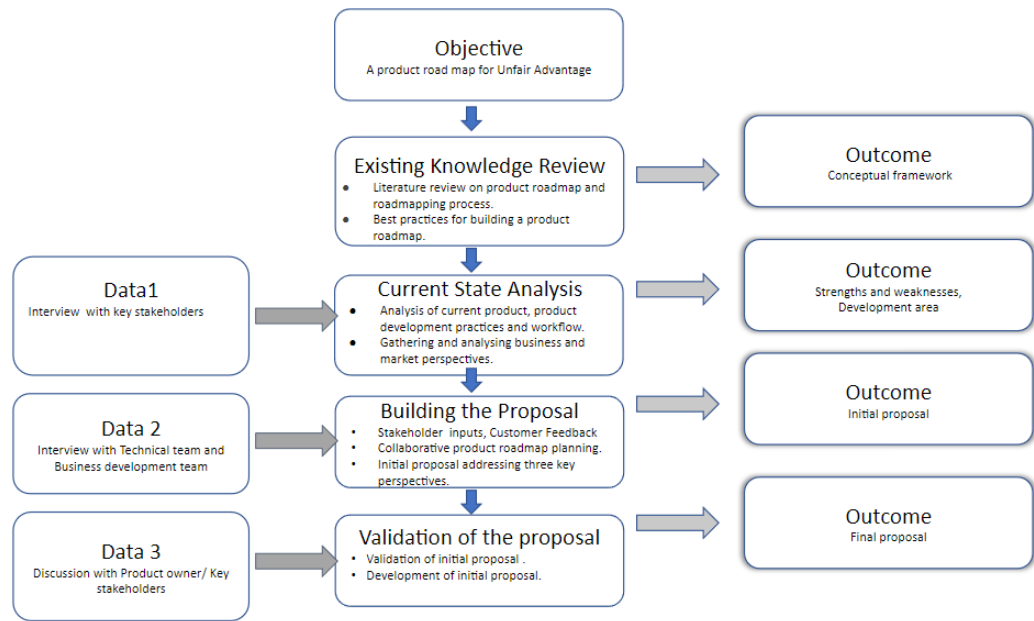


Figure 1. Research Design of this Study

As shown in Figure 1, the objective of this thesis is to develop a product roadmap for the case company. The next phase, Existing knowledge, and best practice, includes exploring available knowledge and best practice on building “product roadmaps.” The thesis researcher searched for and selected relevant knowledge on the product development process, building product roadmaps, and its parameters. Literature and best practice are explored to learn how to build a roadmap for the product.

The next phase, Current state analysis, is carried out to define the product for which the roadmap is developed by analyzing its features, strengths, and weaknesses according to the conceptual framework developed in the previous phase. The current state includes Data 1 that are collected through questionnaire, interviews, and analysis of the internal documents about the current product development process. Data 1 also includes the analyses of the customer feedback both from direct customers and B2B clients. This data helps to understand the customer requirements and market demands which helps

to plan the features of the product. The current state analysis also includes the interviews with the key stakeholders and marketing team to understand the market expectations and predict future demands.

In the next phase, (a) selected best practice and suggestions from existing knowledge, (b) as well as the results from the current state analysis (Data 1) are merged in building the Proposal (c) with the help of another round of data collection (Data 2, from co-creation with the stakeholders). Data 2 include collecting data from the stakeholders for the roadmap development.

The final stage is Validation of the initial proposal with the product owner and business development team. During this phase, Data 3 is gathered via discussions with the key stakeholders to evaluate and adjust the initial proposal and gather final improvements for producing the final product roadmap.

2.3 Data Collection and Analysis

In this thesis, data is collected through interviews, questionnaires, and surveys. Data collection is done in three stages, as shown in Table 1 below.

Table 1. Details of Data collections 1-3 used in this study.

| | Content / Focus | Data type | Participants/ Role | Schedule | Outcome |
|---|--|---|---|--|---|
| DATA 1 Current state analysis | Understanding and analysis of the current development process and identifying pitfalls Identifying customer requirements | 1. Internal documents 2. Interview with business development and marketing team 3. Observation of organizational practices 4. Survey / Questionnaire with existing customers | Business development /Marketing manager Technical team Existing customers and New customers | 18.03.2022 17.03.2022 22.03.2022 21.03.2022 | (Recordings and Field Notes) Summary of current product development process Customer requirements |
| DATA 2 Building the Proposal | Creating product roadmap-considering both technical development and market demands Recommendations based on Data 1 findings | Internal meetings | Business development /Marketing manager Key developers | 11.04.2022 13.04.2022 | (Recordings and Field Notes) Initial roadmap proposal |
| DATA 3 Evaluation of the Proposal (via Validation, testing, piloting etc) | Validation and feedback to seek Improvement ideas to the initial proposal | Interview / Feedback | Company decision maker Business development manager | 03.05.2022 | (Recordings and Field Notes) Final proposal for the product roadmap |

As seen from Table 1, Data 1 collection for the current state analysis involves gathering data through interviews and meetings with different teams within the case company. The current state analysis also includes the investigation of the current product development process and its alignment with the strategy and business plan to reach a desired result. Details such as business goals / needs and organizational strategy are taken into consideration. It also includes obtaining and analyzing data from existing process documents of the case company, which helps to analyze the existing process and understand the pitfalls in the current process.

As seen from Table 1, Data 2 involves collecting data for building the proposal. This stage involves gathering suggestions for developing the product roadmap. It involves gathering suggestions, ideas through internal team meetings / workshops. The objective is to derive priorities and objectives through a series of semi-structured interviews, as well as discussions and meetings, based on predefined questions.

Finally, Data 3 collection - for the evaluation and further development of the product roadmap - includes suggestions and feedback from the key stakeholders and decision makers of the company to seek improvement ideas on initial proposals.

Thus, in this study, the interviews, discussions, and meetings (i.e., oral genres) made the primary method of data collection. They are mostly conducted as semi-structured, with questions created in advance. The interviews, discussions and meetings are recorded when it was allowed and appropriate, and the field notes taken. The sample of questions to direct initial discussions of the interviews is found in Appendix 1.

3 Existing Knowledge and Best Practice on Building a Product Roadmap

This section discusses existing knowledge and available best practice on product roadmaps, overviews the components involved, and key concepts related to it based on existing literature, research and business publications, and best practice.

3.1 Roadmap Concept: Product Roadmap vs. Product Development

“A roadmap is a structured visual chronology of strategic intent.” (Kerr & Phaal, 2022)

According to Kerr & Phaal (2022), a product roadmap is a *strategic* document that outlines the plan of actions to achieve *business objectives* binding them with the company's goals. Road mapping relates to “the process of producing roadmaps” (Kerr & Phaal, 2022.)

Pichler (2016) believes that a product roadmap translates strategic decisions into *actionable plans* that provide direction for the development team and the other stakeholders. According to Lombardo et al. (2017), a product roadmap can steer an entire organization toward delivering on *the company strategy*. Thus, a product roadmap is a major part of product development that acts as a reference to understand *product developmental goals* and how to progress. (Lombardo et al. 2017.) Furthermore, based on Albright & Kappel (2003), the product roadmap presents the *product features* based on their priorities. It also contains *the technologies* that support the product and R&D factors that form a part of *product strategy*.

According to Lombard et al. (2017), a roadmap should focus on delivering value to customers and the organization. Ideally, a roadmap incorporates various elements like a prioritized goal list, bridging metrics between strategic needs and the company's current state, estimating cost and duration in relation to skills and capabilities of staff, etc. According to Kameoka (2003), a roadmap mediates the product vision, stakeholder's expectations, and customer feedback and thus helps to provide strategic insights on how the product progresses. In this sense, the product roadmap should allow ease of reference for the entire team and helps gain buy-ins for the product.

Importantly, according to Kerr & Phaal (2022), a product roadmap also shows the strategic intent of the product emphasizing how the product is established towards reaching its goal of specified time. Thus, a product roadmap is an essential tool for *documenting strategic direction for the product to reach its goal in a defined timeframe*.

This idea of a defined time frame is essential to the product roadmap since it is focused on the technology and it is expected to change flexibly, if needed. Figure 2 illustrates how a product can evolve over a time frame based on prioritized features and product goals.

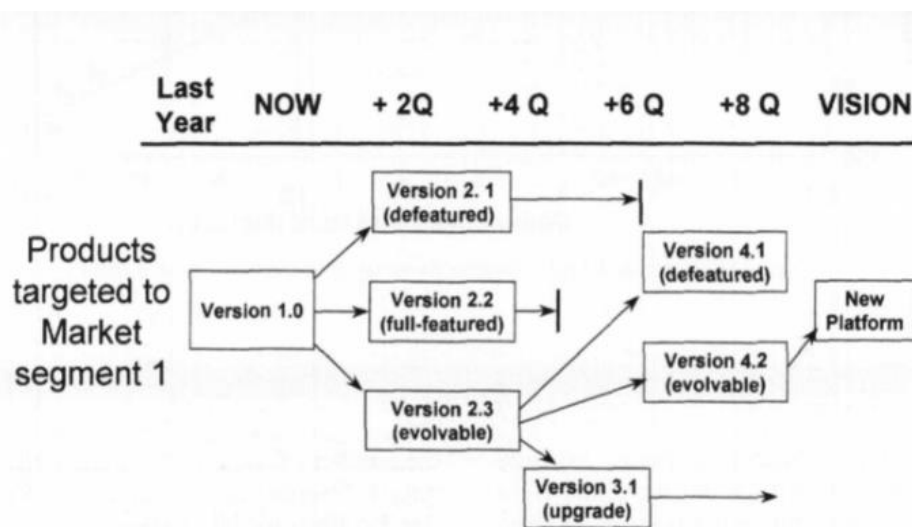


Figure 2. Product roadmap showing evolution of a product over time (Albright, Kappel, 2003, p.36).

Figure 2 shows the evolution of the product over a timeframe based on the sprint planning and release schedules for the feature implementation and product version control. According to Albright & Kappel (2003), the product development process should adhere to a timeframe, setting clear objectives for the improvements, define the changes to be made to the existing product, and maintain the exact release schedule to manage the product development process and offering a cost-effective solution via setting realistic goals on product delivery. Thus, a *product roadmap* ideally presents how the product evolves by mapping it in timeframes (Pichler 2016).

Summing up, based on literature, the roadmaps are specific to companies' goals and business objectives. According to Dastranj (2017), product roadmaps focus on the business objectives and the company's capabilities to develop technologies and services. These roadmaps are based on resource skills and other technical abilities of

the development team. Hence, companies should plan the roadmap based on their *product vision, technical capabilities, market demands* and *future goals*. In other words, the roadmap provides strategic alignment of business objectives for *planning*, and *forecasting* processes based on available resources and stakeholder's expectations (Lee & Park, 2005).

It can be said that a *product roadmap* acts as an effective part for *the product development* process to deliver a strategy on how the product will progress over a given time frame, accomplishing the company's goals. According to Kappel (2001), road mapping is the initial part of the product development process. A roadmap emphasis on implementation and design of products for the product development phase. According to Kynkäänniemi (2007), a product roadmap keeps the development process in line and helps to determine implementation progress. A product roadmap gives clear understanding of development phases and integrates it with release schedules. Moreover, a roadmap helps to prioritize the goals, assess, and summarize the key objectives of the product. Thus, it can be said that a product roadmap presents visualized framework of a product and development processes over a period.

Product development also includes all the goals, stages of a product from ideation state to post market release (Phaal, 2001). While product development incorporates the entire journey of a product even beyond market release, the product roadmap also conveys the strategic direction of how the product must be processed in the development phase before it reaches the market.

According to Suomalainen (2011), product road mapping contains strategic planning and product forecasting, decision making and the entire design process. With a product roadmap, the team can stay in line with strategy during the development process and reacquaint with priorities (Kappel, 2001). In contrast, the product development involves various phases like identifying the product goal, conceptualizing the product, continuous assessment, and development. According to Suomalainen (2011), the roadmap should convey the product development strategy, product vision, set specific time frames, indicate exact goals, and provide feasibility for future enhancements and changes. Additionally, a Roadmap enables improved planning, creating a documented approach of features and evolution of product using technologies (Albright, Kappel, 2003). Thus, the roadmaps help synchronize and align the product plans and focus on the portfolio and business planning process.

According to Wiegers (2003), in road mapping, a product release is specific to various features of the product over a timeframe or along the strategic development. Strategic alignment in the road mapping process is done by grouping similar features based on strategic goals (Albright, 2002). In the road mapping process, strategy alignment depends on shared perspectives, new insights and wide learning covering all the major aspects concerning product development (Phaal, 2001). According to Groenveld (2007), the product roadmap presents the sequence of features that implements the product strategy.

According to Lombardo et al. (2017), strategic alignment of the product acts as a bridge between the product vision and the roadmap specifications. The following guidelines have been given by Lombardo et al. (2017) on the key objectives of road mapping:

1. All the specifications in the roadmap must be tied to at least one of *the product objectives*.
2. Work on limited manageable objectives based on *product priorities*.
3. Focus on *the outcomes* rather than the output. (Lombardo et al. 2017.)

Importantly, according to Phaal (2001), road mapping is a part of strategic planning process that bridges the planning and the implementation processes. The roadmap should incorporate the strategic management practices and address the business objectives in planning, forecasting and management of products. The roadmap also integrates strategic R&D planning, and maintenance of developmental phases.

Figure 3 below shows the strategic alignment of roadmap process, linking market and technology objectives to product objectives.

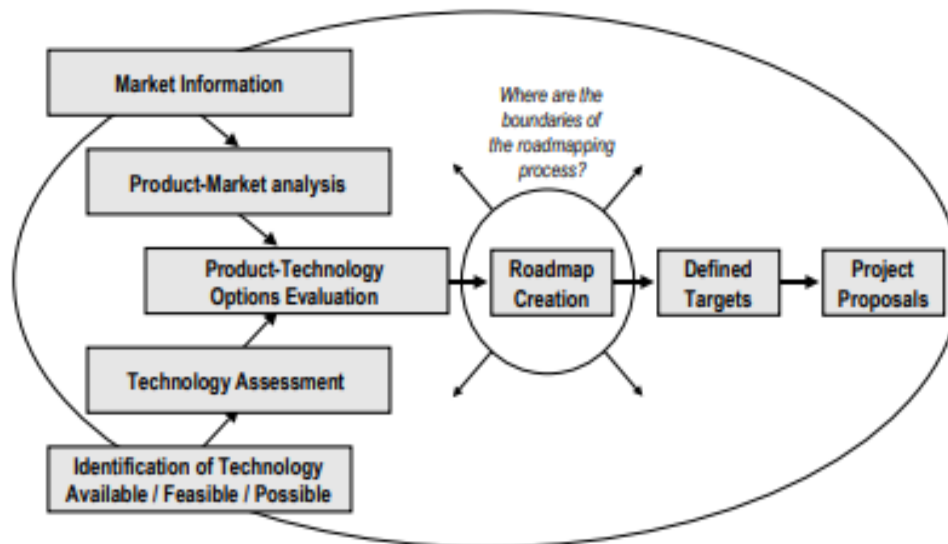


Figure 3. Strategic alignment of Roadmap process - Linking market and technology to business perspectives (Phaal 2001, p.104).

Based on Phaal (2001), the roadmap development is closely aligned with strategic planning. Roadmaps provides focus on integration and overall strategic context of technology resources and business objectives. The above proposed strategic alignment incorporates both market and technology parameters to define the business targets and outlines the goal of the project. The scope of the roadmap relies on two factors, based on Phaal (2001).

First, *Market demand*: Analyzing the market and developing a product that addresses the demand forms the key purpose of developing a product. The product goal must satisfy market requirements.

Second, *Technology*: The chosen technology should support the development of the product that recommends the best usage of available technical resources. Managing the complexity of the processes with the available resources should be well planned to avoid strategic problems.

According to Phaal (2001), the strength of the roadmap depends on the integration of market requirements and the technological assessments that support the business and management of developmental processes. The scalability of roadmap and strategic problems should also be considered when defining the product targets. Moreover, a roadmap can have one specific product or have different products under the company's portfolio based on company goals.

In summary, based on Phaal (2001), the key elements that shape the roadmap is analyzing the customer, market demands and technical requirements to establish a clear product target over a timeframe. A product roadmap must be in line with strategy considering the market demands, customer expectations and technological requirements communicating the outputs of strategic decisions.

3.2 Elements of Roadmap

As discussed above, a product roadmap can be considered an essential and effective part of planning for product development. A product roadmap documents the plans for product strategy, product progress/stages and prioritized product features over a period. Roadmaps are visual representations that could be simple graphical representations, block diagrams, flow-based pictographs, illustrations, and so on (Kerr & Phaal, 2022). Time is the key parameter of any roadmap, as roadmaps plan the releases based on time frames, and it is the essential part of the planning process. It represents how the product is viewed physically and conceptually (Kerr & Phaal, 2022).

According to Lombard et al. (2017), each roadmap differs from one another based on its business goals and organizational capabilities. A roadmap should communicate essential components like strategic alignment, resources, timeframes, and dependencies amongst all the other elements of the roadmap. Lombard et al. (2017), has categorized the elements of a roadmap as primary components and secondary components. Table 2 shows what the primary components that include.

Table 2. Primary elements of a roadmap (Lombardo et al. 2017).

| <i>Primary component of a roadmap</i> | <i>Description</i> |
|---------------------------------------|---|
| 1. Product vision | The product vision creates a specific strategy for the product. It provides a description of why the product is being created and it is linked to the company's goals. By having a clear product vision, it becomes easier to communicate and sell the product to customers. This in turn increases the product buy-ins and meets stakeholder's expectations. |

| | |
|------------------------|--|
| 2. Business objectives | Business objectives emphasis on the product goal providing an overall strategy bridging the product and market demands. Business objectives adopt a time-based approach or the market driven approach depending on the overall business strategy. These are the measurable metrics that determine the success factor of the product based on specified outcomes. |
| 3. Time frames | These are the essential part of the roadmap which drives the product to completion or achievable targets. Time frames are mainly dependent on product tasks, company's resources, schedules, and deadlines. It helps to keep the team members and related resources in a loop, prioritizing and setting goals as the product progresses. |
| 4. Themes/ Metrics | Themes focus on the success factors and are highly goal oriented. They provide a definite metric on what's important to the customer. They provide the actual detail of what problem the specific product could solve in the market. The product features can be changed, included in the timeframe without affecting the product progress. |

In addition, the secondary components provide enhanced specification in the product roadmap. These components help to prioritize the product goals and provides detailed explanation of all the components of the product roadmap.

Table 3. Secondary elements of a roadmap (Lombardo et al. 2017).

| <i>Secondary component of a roadmap</i> | <i>Description</i> |
|---|--|
| 1. Features and solution | These are the primitive deliverables that are aligned with the product goal. Depending on the expectations of the stakeholders and customer, these features are prioritized with specifications and prototypes. The features are validated and undergo continuous checks depending on stakeholder expectation on growing market demands. |
| 2. Stages of development | It provides a visualization of the product progress in accordance with the timeframe. It includes various stages like design, development, testing, pre-production. It acts as an effective |

| | |
|---------------------|---|
| | communication tool with the stakeholders to keep them informed on the developmental progress of the product that in turn increases buy-ins. |
| 3. Target customers | It acts as an important component in analyzing the market needs and the purpose of the product is being created. Stakeholders Expectations and customer demands form the primitive purpose in setting the product vision and identifying business objectives. |
| 4. Confidence | It acts as a driving force to progress in complete product development from initial planning to postproduction keeping the team members aware of their current phase of development and future revision of the product. |

According to Kappel (2001), roadmaps could be based on a product, technology and product-technology based on illustrative methods. The product roadmap focuses on release schedules and product evolution over a time that are communicated with the customers. The technology roadmap is to set product targets and that is achieved by identifying the current trends and predicting future technical improvements. The technology roadmap is dependent on market requirements and customer priorities. The product- technology roadmap combines the product evolution with technology trends and market demands. This helps to differentiate the product from its competitor emphasizing on release schedules and satisfying the target markets.

Importantly, Phaal (2009) identifies and summarizes the elements of the roadmap and sheds some light on the roadmap building process. Figure 4 presents the roadmap framework that enables teams to create a roadmap incorporating timeframes, feature information and other processes. Based on the size of the organizations, the framework could vary depending on how the product vision is being visualized.

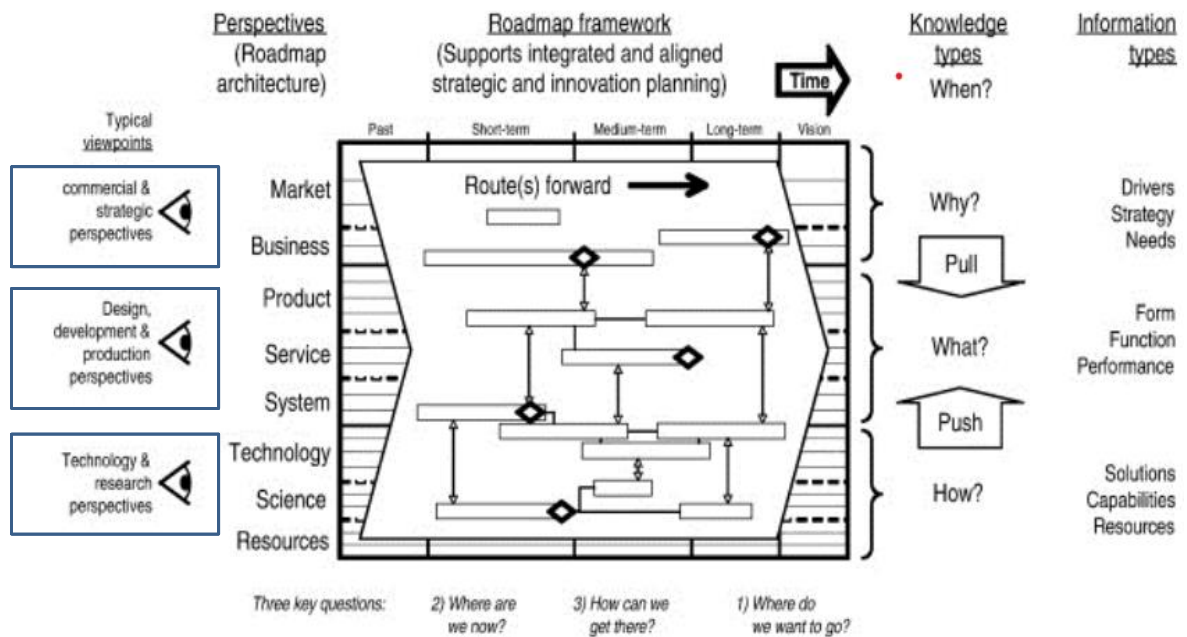


Figure 4. Generic Roadmap framework (Phaal et al. 2009, p.3).

As seen from Figure 4, the roadmap framework adapts a multi-layer generic approach over a time frame. Based on Phaal et al. (2009), The entire schema depends on viewpoints, framework and knowledge, information types. On the left side, it shows the roadmap perspectives. The roadmap architecture includes three viewpoints, namely strategic perspective, product perspective and technology perspective. The strategic viewpoint of the roadmap architecture is based on market and business needs. The production viewpoint deals with product service and system details, that mainly focuses on the strategic vision of the product. It enables us to identify and stay inbound with the product vision and strategy of the product. The third viewpoint is the technology perspective which focuses on the technical, research and developmental aspects of the product. The product development is greatly dependent on strategic, production and technological perspectives.

In the middle, the framework involves integrated and aligned strategic planning. According to Phaal et al. (2009), this visual time-based framework addresses the important phases: where do we want to go? Where are we now? and how can we get there? The planning is done for specified time frames to set defined milestones, providing strategic directions.

On right side, based on Phaal et al. (2007) it shows the outcome of the roadmap framework - the knowledge types: When (*Time*) - When is the expected product release scheduled, to track the timeframe of the product. (Why, What) *Purpose* - Why is the product being developed? and what is the purpose of developing the product. (How) *Process* - How is the strategic planning performed to meet the product goal.

This knowledge is then translated into the information types that helps the alignment of R&D with business goals via articulating the *Drivers, Strategy and Needs* (as continue from the marker and strategy viewpoint), the *Form, Function and Performance*, as continue from the design, development, and production viewpoint; and *Solutions, Capabilities and Resources*, as continue from the technology viewpoint. Thus, this information communicates transparent, strategic needs to the internal team and other stakeholders.

According to Phaal et al. (2001), the same roadmap can be presented in a more concise format, if companies want to stress the business/ market, technological and product/service perspective to communicate the meaning of the roadmap to the stakeholders. Figure 5 shows the essence of a roadmap framework that present the product development on a timeframe with the focus on aligning technology with product and market demands (Phaal et al. 2001, p.4)

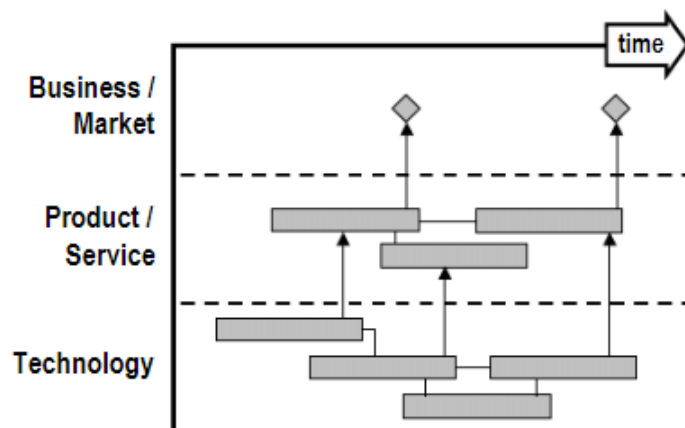


Figure 5. Roadmap: Aligning technology with product and market (Phaal et al.2001, p.4).

As seen in Figure 5, according to Phaal et al. (2001) establishing a link between market demands and technology will help the company to maintain strong product vision and be

competitive in the market. This involves two key approaches - *guiding* the product from its initial stage and *customizing* the roadmap during the implementation phase based on the frequent updating and revision.

In summary, on the example of the roadmap approach by Phaal (2009), the product roadmap can be said to visualize the product planning process on a given timeframe including such vital elements as market demands, technology requirements based on business objectives. The functional perspectives are considered based on the company's vision of the road mapping process.

3.3 Product Roadmap Process

Road mapping can be considered a process that involves *gathering requirements*, *decision making*, and *planning*. The product roadmap can be visually presented in various forms and visual representations based on the company and business context. According to Phaal (2004), every company has its own framework of road mapping process based on its product goals, resource availability, scope of problems, market demands, management methods, etc.

Lehtola (2005) defines three major phases in product road mapping including *roadmap preparation*, *framework approval*, and *communicating* the roadmap to the stakeholders. The various components of the road mapping process are product vision/ goals, features, release schedule /time frames and features, developmental process, and so on. Based on Albright & Kappel (2003), the product evolution begins with gathering the key features for each release. It is then followed by interpretation of features to check if they are the key parameters driving towards product goal. This analysis requires good competitive knowledge on market strategies and competitor's capabilities (Albright & Kappel, 2003)

Kynkäänniemi (2007) has created a framework that explains the processes and best practices involved in product road mapping. The framework provides a good understanding of road mapping processes focusing on identifying the key requirements, aligning them based on business objectives and prioritizing the goals of the product. The product road mapping process consists of five stages, based on Kynkäänniemi (2007) research. The process marks the product planning phases and how proceeds into the development phase. Figure 6 shows the road mapping process as proposed by Kynkäänniemi (2007).

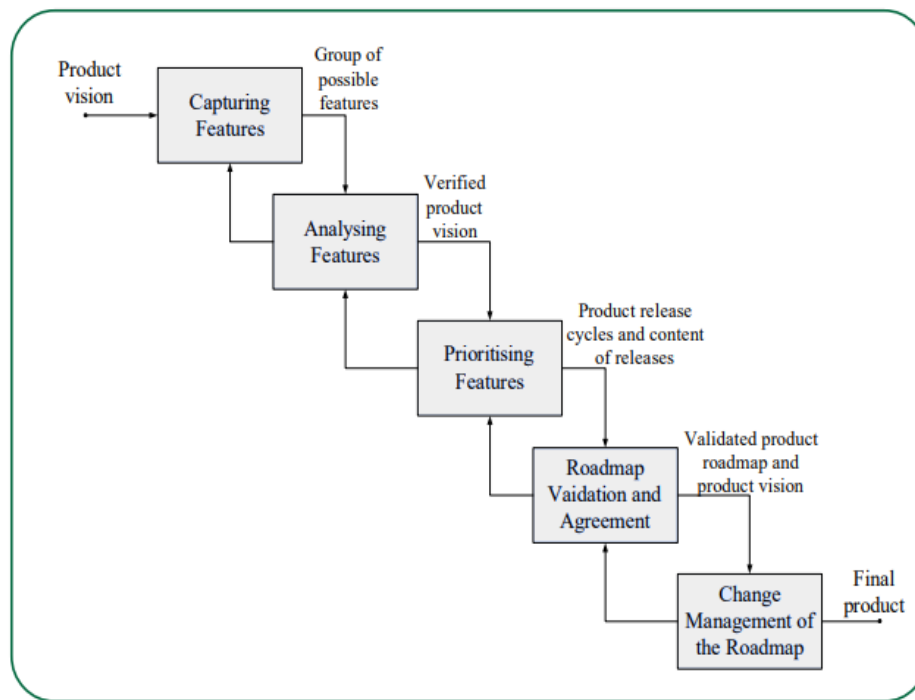


Figure 6. Road mapping process (Kynkäänniemi, 2007, p. 35).

As seen from Figure 6, the road mapping process as proposed by Kynkäänniemi (2007) includes the following steps. First, capturing features for the roadmap; second, analyzing features; third, Prioritizing features; fourth, Validation and agreement, and fifth, Change management. At the same time, the road mapping processes given by Kynkäänniemi (2007) is also company specific and each organization serves a different purpose and for different market. The process of road mapping can be better understood by looking more closely at each step.

First, *Step 1, Capturing Features in the Roadmap*, based on Kynkäänniemi (2007), the feature capturing process involves various methods like initial study, observations, prototyping and scenario building. The key focus is on gathering business requirements, customer requirements and user requirements. In this step, defining the product goals and analyzing strategic vision of the company helps in defining the required features for the product. The initial product features are analyzed and revised based on the stakeholder demands and market expectations. (Kynkäänniemi 2007.)

Second, *Step 2, Analyzing features*. In this step, the business objectives and driving parameters of acquired features are analyzed to build strategic product planning. The features are analyzed based on its dependency with other features and their relation to

product goals. Based on Kynkäänniemi (2007), the features are then analyzed considering internal resources, development technologies. Then, the business strategies are aligned during the feature analysis stage and product goals are revised on a frequent basis.

Third, *Step 3, Prioritizing features*. According to Kynkäänniemi (2007), the product vision is catered by prioritizing the product features. The feature interdependencies are to be analyzed, and their need, purpose is clearly defined to priorities. The high importance feature must be on top of the priority list and the least important feature is placed in the bottom of the priority list. Based on prioritized features, the action plan for the product is created bridging all the features inline, making sure all the feature gaps are closed

Additionally, suggestions from Suomalainen (2011) indicate that features can be prioritized using formal and informal methods. Based on the findings, the feature priority is initially decided by the marketing and road mapping team members and the final decision is made by the product manager making sure all the features are analyzed and categorized based on the product vision. Any problem that arises during prioritization, the team members revise the process to make the prioritization more efficient and define major and minor releases in the roadmap. Using feature prioritization, the product could deliver higher value at lower cost and the team can plan future enhancements based on the documented low priority features.

Fourth, *Step 4, Roadmap Validation, and agreement*. Kynkäänniemi (2007) believes that the key aspects of the roadmap and its objectives are gathered as part of initial validation. The collected information is then validated by the internal experts' team. Roadmap reviews are performed as internal meetings and team discussions, whose findings are carefully assessed and validated making sure goals of the product are met.

In addition, Suomalainen (2011) states that roadmap validation is measured by customer response, stakeholder's feedback, and market research. Based on the feedback received, the roadmap framework could be validated. The validation forms a basis for road mapping as the team and stakeholders make their final decision on strategic issues.

Based on Suomalainen (2011), the feature validation is entirely dependent on the market factors and better understanding of business objectives.

Fifth, *Step 5, Change management of the roadmap*. Based on the study by Kynkäänniemi (2007) The change management involves feature addition or deletion in the roadmap based on maintaining the product development cost and strict timeframes. Any low priority features are planned for future releases and are documented into the roadmap. Change management is a continuous process where the features are accessed, revised, and validated. Road mapping is an ongoing process that involves changes and improvements based on market demands, technical advancements, and customer expectations. Kynkäänniemi (2007) emphasizes that road mapping could be beneficial when it is updated on a regular basis making sure the goal is not deviated from market expectations.

Based on Suomalainen (2011), the change management process involves Change identification, change analysis, change impact, and implementation of the changes. This process is entirely on the road mapping team, and any indicator requiring change in feature list must be carefully analyzed. The change analysis focuses on upgraded features and must resolve potential consequences. As per Suomalainen (2011), the change management should make sure the changed features are interdependent as the features are aligned with the product vision in its initial stages.

3.4 Road mapping process in smaller companies

According to Groenveld (2007), the above concepts could be implemented in smaller companies using available resources. The road mapping process could be initiated by forming a team which includes marketing members, product development members and business development team. Key personnel, preferably the product manager, should be responsible for making key decisions and maintenance of roadmaps (Groenveld, 2007.)

The analysis is made by mapping the technological requirements with the product goals and analyzing discrepancies between the required features and technical capabilities. By conducting a portfolio analysis, the short term and long-term requirements are captured based on research and development investment of the company. The analysis is often done using portfolio analysis, SWOT analysis and innovation matrix methodologies (Groenveld, 2007).

Major changes are often schedule changes, adding or removing features to the roadmap are done by the road mapping team. Figure 7 represents the road mapping process in smaller companies.

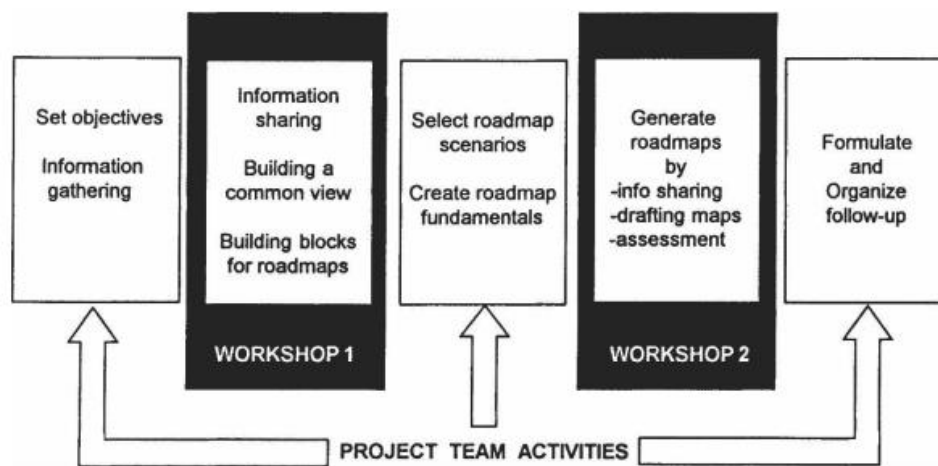


Figure 7. Building a product roadmap for smaller companies (Groenveld, 2007, p. 53).

As seen in Figure 7, Groenveld (2007) adjusts the road mapping process for smaller companies that rely on limited resources. Internal meetings and workshops are primitive sources of feature gathering and decision-making process.

According to Groenveld (2007), the feature collection activities are done by conducting workshops ensuring team involvement and gathering inputs from external market, internal team members and stakeholder expectations. The product team uses the inputs gained to analyze the features and to draft a document incorporating all required features.

Parameters such as product feature, technology and time are considered during the initial stages of feature prioritization (Groenveld 2007). This helps the smaller companies to clarify problems and address the high priority features which focus on technology and resource management. The initial validation is often performed by the road mapping team, and the final decision is done by the product manager based on stakeholders' demands.

Additionally, change management in smaller companies are dependent on business requirements and expected changes over time. A better competitive edge for products

is achieved by improving the time to market and time to money parameters (Groenveld, 2007)

According to Vähäniitty (2015), product development has numerous shortcomings due to poor planning and scheduling. The road mapping must cover a wider aspect of planning and implementation to mitigate the risk factors that arise due to limited resources and financial constraints. Vähäniitty (2015) suggests the following four metrics for smaller organizations while creating a product roadmap.

1. Outline product goal, classify and present clear business objectives
2. Analyze the market parameters, customer requirements and internal resources and technical capabilities
3. Establish release cycles and objectives based on allocated resources.
4. Estimate product life cycle and check developmental process in line with product vision and success metrics. (Vähäniitty 2015.)

In summary, the product road mapping process can be said to structure and visualize the product planning process on a given time frame including vital steps such as setting clear business objectives by capturing, analyzing market requirements, technological requirements and evaluating definite release schedules by mitigating potential risks. The technological requirements and market demands are the key parameters in preparing a roadmap that helps to bridge the gaps between product vision, latest technologies, and market requirements. According to Phaal et al. (2001), parallel management of the planning and process coordination activities helps to speed up the road mapping process without looping the phases. This involves planning, initiation of workshops for obtaining market, product, and technology requirements. The obtained inputs are then brainstormed to set goals, resource management and thus documenting the planning process.

3.5 A Roadmap Case

There are multiple cases of using roadmaps in product development published since the emergence of the roadmap approach to product development in 2000-s. One of the most

famous cases is the roadmaps built by Nokia Siemens Network (Reports from Nokia Siemens Network, 2007).

As a background information to this case, a joint venture between Nokia of Finland and Siemens of Germany started a joint venture called Nokia Siemens Network in 2007 with headquarters in Espoo, Finland. The mission of Nokia Siemens Network (NSN) is to help the network providers build more valuable customers by enhancing service experience to each end user. Their strategy was to drive efficiency and customer experience by focusing on operator network and service layers. (Nokia Networks, 2011) This telecommunication network aimed to offer services that would incorporate future technologies, frequent updates, and innovative product designs. (Nokia Networks, 2011)

According to Tukianen (2011), Nokia Siemens Networks, gathering data for the key elements of the roadmap is taken care of by various departments. The Business team takes care of the product strategies and other product perspectives. The Marketing and sales team gathers and analyses the market demand and customer needs. The technical research team focuses on the future technologically innovative planning, (Tukianen, 2011)

Based on the research by Tukiainen on Nokia Siemens Networks (2011), In addition to the existing team in Nokia Siemens Network, they assigned a Technology Road mapping (TRM) team to ensure planning a perfect product development portfolio in relation to business and technological advancements. The TRM team helped coordinating different NSN teams to ensure alignment of the entire process. The TRM team were focusing on the business challenges like price, product complexity, product to market timeframe, knowledge transfer and collaboration between teams. These challenges are the key driving factors for creating the technology roadmap for Nokia Siemens Network. (Report-Nokia Siemens Network, 2009)

Then, Technology Road mapping team designed a framework for the NSN. The road mapping process started with gathering inputs from various departments. They conducted semi structured pilot interviews with the participants within and outside the organization (Tukiainen, 2011). The conducted semi structured interview facilitated the team to gather input from interviews and the team gathered data through observations and research practices. According to reports from Nokia Siemens Network, the interview

was conducted among the stakeholders to identify the expectations and envision the different perspectives of the same business need.

According to Tukianen (2011), The created roadmap presented the technology integration between Nokia and Siemens, high level business needs and innovative technological trends and issues encountered in network evolution.

The main purpose of creating a roadmap was to identify the previously existing challenges of both the partner companies (Tukianen, 2011). The previous approaches adapted focused on the direct implementation of solutions to the encountered problems. The roadmap framework first adapted extensive analysis of all the metrics and identified the key pain points. It emphasized on the three viewpoints as suggested in the roadmap architecture and provided a step-by-step approach to planning along the timeframe, realizing the potential benefit of the road mapping approach. (Tukianen, 2009)

Based on the reports by Rajeev Suri, CEO (Nokia Siemens Networks, 2009), the roadmap framework had a positive impact in identifying multiple challenges and providing a planned approach of solution. The implication of the roadmap in Nokia Siemens Network brought organizational stability and effective process planning. The roadmap framework improved coordination in solving the challenges encountered, thus serving the main purpose of the roadmap creation.

The reports from Nokia Siemens Networks (2009) stated that an overall challenging and competitive economy increased forecast of future technology had a momentum of decline. The company had a negative impact due to low net sales, price fluctuations and lower-margin market areas and non-profitable products. However, the company had positive insights in expanding high transformational opportunities, expanding wider customer base through competitive offerings. (Nokia Siemens Networks, 2009)

3.6 Conceptual Framework

The roadmaps contain vital information about the product and acts as a database storing all the details of product planning, release schedules and developmental phases. According to Albright and Kappel (2003), the roadmap manages product portfolios and business planning activities. The roadmaps integrate and balance portfolios based on market expectations, competitive strategy, and technological advancements. Roadmaps

provide a visualized framework of information that is utilized based on product requirements (Phaal, 2003). Based on all opinions, a successful roadmap must define clear business objectives.

Based on the discussed literature review and practices, the conceptual framework of roadmap elements and road mapping are presented, especially relying on Lombardo et al. (2017), Kynkäänniemi (2007) and Phaal et al. (2001). Figure 8 presents the conceptual framework for building the roadmap.

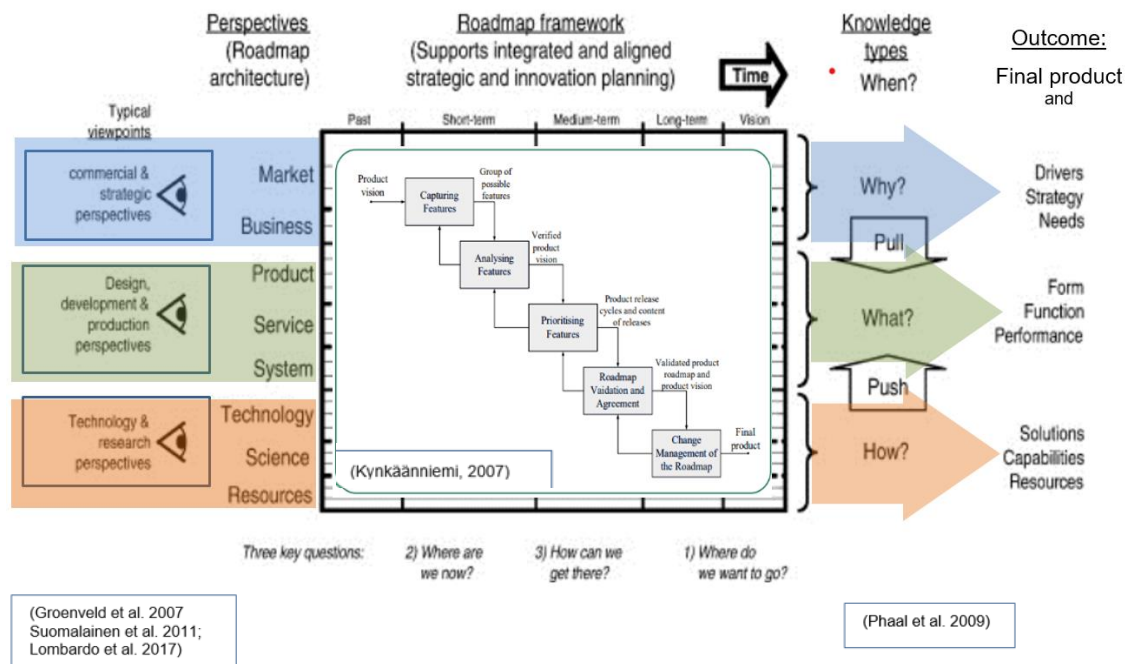


Figure 8. Conceptual framework of road mapping process (based on Kynkäänniemi 2007 and Phaal et al. 2009).

As seen from Figure 8, this conceptual framework consists of roadmap elements and road mapping processes which were selected and interlinked as the roadmap elements form the basis of the entire road mapping process. According to Kynkäänniemi (2007), the road mapping process should incorporate accurate details to ensure that the roadmaps are easily understood, analyzed, revised, and validated.

This construct borrows the basic elements from Phaal et al (2009) roadmap architecture. This framework starts with three viewpoints: strategic perspective, production perspective and technology perspective. According to Phaal et al (2009), *the strategic viewpoint* focuses on capturing market perspectives. *The production viewpoint*

emphasizes product development metrics like vision, goal, and other product perspectives. *The technology viewpoint* relies on the technological advancements being adapted in the process.

Based on Phaal et al. (2009), the three viewpoints are aligned in line with various perspectives. *The market and business perspectives* are derived from the strategic viewpoint. This is done by gathering and analyzing market requirements and business needs. *The design, development & production perspective* relates to product, service, and system elements. The help to keep track of developmental processes in line with the product vision and other goals. *The technology perspective* relates to technology, research, and scientific elements of the gathered data.

As for the road mapping process, it develops on the timeframe and is driven by 3 questions: *Where are we now? Where do we want to go? and how do we get there?* (Phaal et al. 2009). The time frame is divided based on the planned short term and long-term product releases.

On a more detail level, as seen in Figure 7, the road mapping process can be described as starting with defining the *Product vision*. In the next phase, the *Product features* are captured and analyzed based on product goals, timeframes, themes, and other primary elements of the roadmap (Lombardo, 2007). Feature analysis is done to ensure that the business objectives and product vision are inline. Refinement of required features is done in this phase. Next, *Feature prioritization* is performed making sure the strategic requirements for primary elements are met. Features are evaluated and prioritized based on product vision. Secondary components enhance the product strategies making sure the key features are highly prioritized and the other features are documented for future enhancements or revision. Next, *Roadmap validation and agreement* takes place where the team reviews the roadmap and validates if the outcomes meet the product vision on specified time frame. Missing details and inconsistencies in the roadmap are also reviewed before agreeing on the roadmap proposal. Finally, the roadmap can undergo a *Change management* which is a continuous process which indicates that the roadmap has to be revised, changed when needed along the product development phase.

On the right side of the road mapping process, based on Phaal et al. (2007), there are outcomes of the roadmap framework - the knowledge types, namely: the expected product release schedule to track the timeframe, the objective of the product, and the

strategic planning performed to meet the product goals. These key knowledge types provide enlightenment of market pull and technological push for product development. On the furthest right end of the framework, the Final outcome is derived considering the relation in the road mapping processes. According to Phaal et al. (2009), the outcome is a successfully aligned framework of strategic drivers like business needs and R&D, increased performance because of conscious planning process and high-level visual output of the solution capabilities, resource planning process.

To summarize, Phaal et al. (2009) and Kynkäänniemi (2007) believe that every company adapts its own road mapping process based on the internal resources and technical capabilities. The number of phases may vary, but the actual process remains the same. The product roadmap framework explains the entire process and the factors involved in each phase, and it was merged using knowledge from the literature and best practice of road mapping. The conceptualized construct makes the basis for guiding further steps in this thesis.

4 Current State Analysis of the Company's Product Development Process

This section reports on the results from the current state analysis. It starts with the overview about conducting the analysis, and continues to the description, analysis, and the key findings.

4.1 Overview of the Current State Analysis

The current state analysis focuses on analyzing the current practices in product development processes according to the logic and elements included into the Conceptual framework, above. This analysis is aimed to understand *the three perspectives*, Market perspective, Product perspective, and Technology perspective that derive from the Strategic, Production, and Technology viewpoints (i.e., key parts of in the conceptual framework) respectively.

Thus, the key focus of the analysis is placed on examining the current Market perspective, Product perspective and Technological perspective, to identify their roles in the current product development. The purpose of conducting the current state analysis was to acquire deep understanding of the current organizational practices, the existing product, and the current development practices, as well as the team's technological capabilities via the analysis of three key perspectives. This gives an overview of the areas that require changes or improvements and helps in building the product roadmap for the company in the next step of the thesis.

The current state analysis was performed in three steps. The first step concentrated on analyzing *the current product, current developmental practices, and workflow* (it corresponds to *2. Design, development, and production perspective* in the CF). The second step focused on gathering and analyzing *1. Business & market and 3. Technology perspectives*. This order was selected so that to facilitate the talk with and get more inputs from the stakeholders. The final step pulled together the findings into the strengths and weaknesses

In Data 1 collection, (a) the internal document analysis, (b) participant observation of current practices, and (c) three interviews were conducted along with two face-to-face workshops. Interviews were conducted with Business development, Marketing, and

development teams. The results of the current state analysis are summarized into the strength and weakness of the current product development process.

4.2 Description of the Current Product & Product Development Process

Unfair Advantage is a Software as a Service application provider, aiming to provide unique and easy service for community building through sports and events networking (Company's web-site.fi). The company provides cloud-based service for B2B through stafftribes.com and B2C through sportsnetwork.fi. Many businesses and customers utilize the company's services to optimize networking through sports. The service provided by the case company offers a unique approach incorporating all the latest features like easy event management, payment portals, subscription plans, high customer privacy.

The B2B service that the company offers adapts a personalised approach, which adheres to high standards of the client's company's privacy policies. Every B2B customer have a private network that are company specific and not visible to external or other B2B customers. This brings a personalised approach in the company's offerings. The B2C offerings through sports network emphasises enhancing well-being through sports and wellness programmes and creates a networking opportunity for individual customers.

"We believe that sport is social, and we want to help you get there. We know that everyone wants to be happier, healthier, and more connected, and we give you the best tools to do it, all in one place" (Sportsnetwork.fi, 2022)

The company's mission is to offer offline meetups through sports and activities creating a healthier and socially active community.

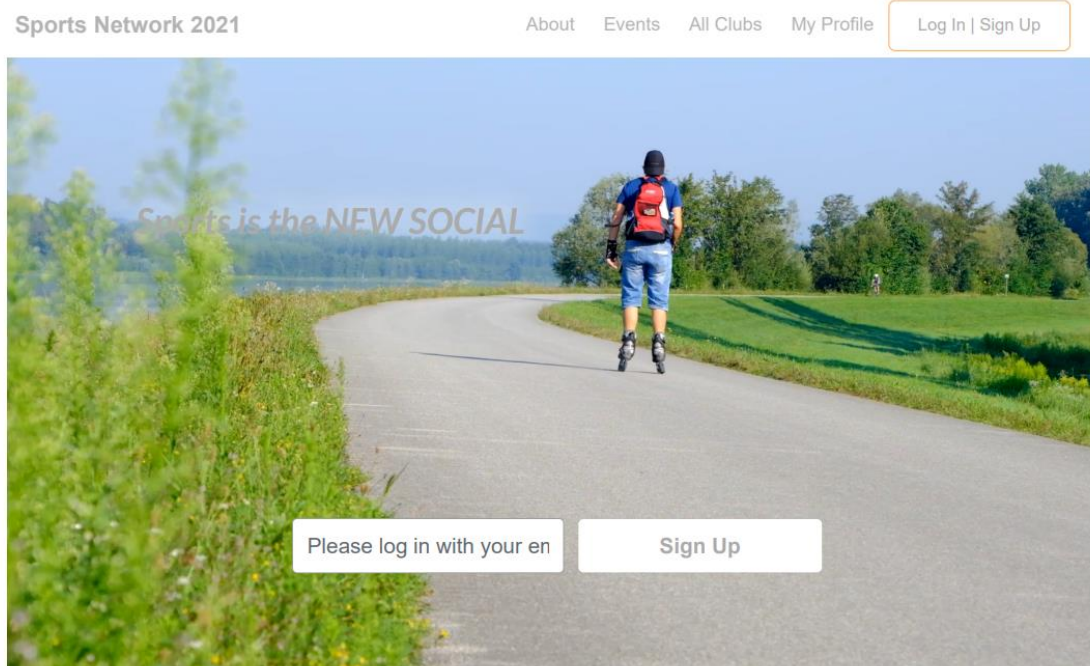


Figure 9. Current product that the product roadmap will be built for.

The product selected for the roadmap is a SaaS application that offers services to customers over the internet. The roadmap will be built for both B2B and B2C service that the unfair advantage offers. Both these application services have same features and common service pattern but serving different purpose. The roadmap will be created addressing generalized features that could be implemented on both stafftribes.com and sportsnetwork.fi platforms.

4.2.1 Current Product development process

The current developmental process incorporates two stages. In stage 1, the requirements identification and analysis as part of market analysis is done. In stage 2, the technical development process is carried out, including developing the user design, sprint planning, testing, and release. Since the company is very small, both stages are very clear and precise. Figure 10 shows the case company's approach in the Product development process involving both Stage 1, requirement identification & analysis, Stage 2, technical development process.

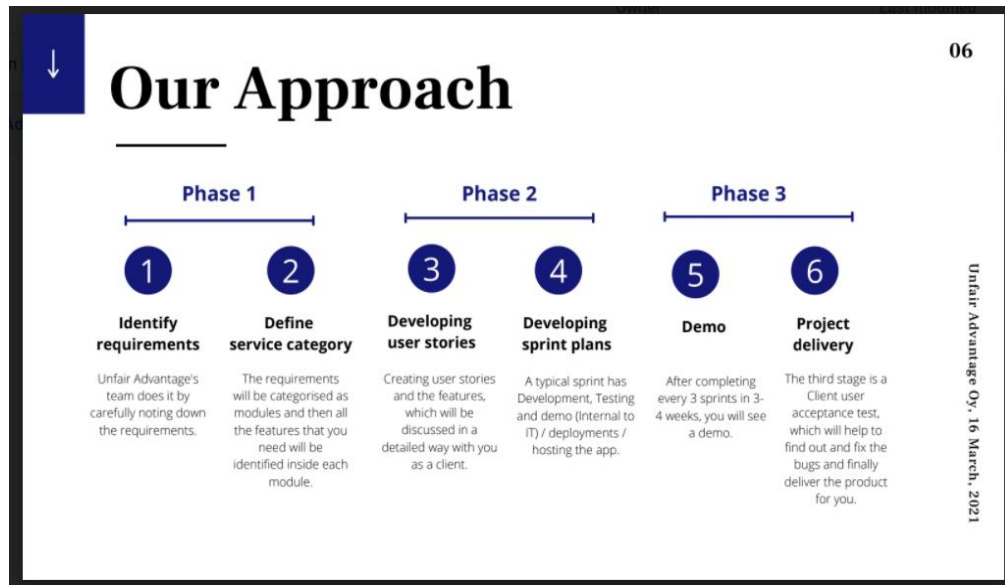


Figure 10. Product /Feature development in the case company (Unfair advantage, 2021).

As seen in Figure 10, the current product development consists of three phases. Phase 1 includes identifying the requirements and defining the service category. This is done by conducting market analysis via the focus group to identify the demand and via feedback from the existing and new customers. The goal of this phase is to identify the features and analyze their importance in capturing market attention.

Phase 2 consists of developing user stories and defining sprint plans. This phase includes identifying and designing the features based on the customer expectation and developing the sprint plans accordingly. This is usually made into shorter duration tasks usually of 3-4 weeks, to help acquire quicker outputs.

Phase 3 consists of demo or the testing of the developed feature and project delivery. In this phase, the testing of the developed feature is performed, and it undergoes client acceptance test, where a demo of the newly developed feature is given to the clients.

This process of feature development and product enhancement is the existing scenario for the current product development in the case company. A more detailed view of each phase is presented below.

4.2.2 Current Market and Product analysis practices

The current market analysis practices of the case company include interviews and a workshop session with the business development and marketing team. They are done with the goal of a direct integration of customer requirements into designing a product feature. Customer feedback and new client's demands are given priority as part of market demand. The marketing team emphasizes gathering testimonials and user experience to measure the success of the existing product. The Business development team also performs research on the latest market trends, and competitor analysis to understand the innovative changes and to stay competitive. Based on these inputs, the Business development team gathers inputs and client requirements to plan a new feature which is then given a demo to the client for their approval.

4.2.3 Current Technical development practices

The Technical team was interviewed to gain understanding of the current product development practices. The Technical team consists of two groups: Design team and Development team. The Design team is responsible for the graphical parts and the visualization of the product. They get instructions about the design requirements and specifications. The Development team works with the product's actual development. They were using Meteor full stack framework to build this product. The programming languages such as Html, CSS, react js are used for the front-end development of the SaaS product. Node js and js ES6 are used for developing the backend functionalities of the product. Mongo DB is used for the database. These are the tools involved in this product development.

Figure 11 shows the current technical product development in the case company.

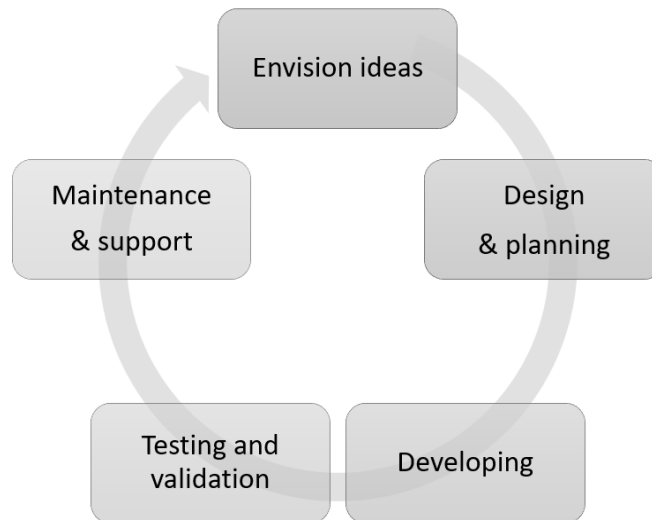


Figure 11. Current Technical product development in the case company.

Figure 11 shows the stages involved in current product development process. The current practices involve obtaining the requirements for platform upgradation based on the market demands (from the previous step). The generated ideas are then conceptualised in the product design phase. These tasks are then assigned to the Development team. The developed feature undergoes testing, and after a demo, the developed feature is validated by the Product owner. At each stage of feature development and implementation, the product undergoes constant maintenance. Any new feature or upgradation could impact another feature. A summary of technical team's roles and responsibility will give insights on overall functioning of the developmental process.

The case company consists of technical team of 7 members involving Product owner, UX designer, Lead developer, Junior developers, and Test engineer. The technical team receives inputs regarding new tasks from the Product owner.

Product owner – The product owner is an experienced developer who plans features and prioritizes work based on stakeholders' expectation. Currently, he keeps a backlog of tasks in Todoist. Being the ultimate decision maker of the company, he foresees all developmental milestones and sets sprint schedules accordingly.

UX designer – The designer visualises the ideas of the features and the entire user interface layout of the application. The company consists of 1 UX designer. The tasks to

the UX designer are allotted by the product owner, and on approval the designs are shared with the development team.

Lead developer – The company has 1 experienced lead developer, who works on part time basis helping the team progress in the developmental process. He is entirely responsible for support operation and deployment activities.

Junior developers – The technical team consists of both front end and back-end developers. There are around 3 developers along with intern students who works on coding the application.

Test engineer – The testing team involves a test engineer, and the product owner also involves in testing occasionally. Testing team will continuously test and support the development team ensuring well designed and developed product. Test engineer's responsibility is to execute tests, defect logging & tracking, plan & manage testing activities, preparing reports etc. The deliverables include test plan, test scripts, defect logs, reports.

The technical team uses JIRA for the task allocation and progress monitoring. The product development adapts Agile methodology, which makes the overall development process easier. Shorter sprint planning helps bug reporting and task planning effectively. However, the team has no vision of the future product goals and features to be implemented.

4.3 Analysis of the Current Product Development Process

The product development and feature update are performed by the Development team which mainly consists of a small number of development specialists. The product is already in its MVP state, which makes it more feasible to undergo feature improvements and other minor changes rather than any major changes. The changes or the features are made depending upon the client's requirements and do not have any long-term planning. In this current set-up, feedback or the input from various sources hinders the strategic planning of the product.

4.3.1 Analysis of the Market perspective in current practices

The Business development and the Marketing team play an important role in product-market launch and acquiring customer acceptance. It is evident that they play a major part in the overall developmental process.

First, for analysing the current market practices, the Business development team along with the Marketing team use social media to gather customer feedback and suggestions. Inputs from the customers are also gathered during face-to-face client meetings. The main results from the Business development and the Marketing teams are then discussed with the product owner. Any modifications or improvements are made based on the product owner's approval. There exists a *delay in feature implementation*, which must be addressed to stay in the current competitive market.

Second, based on the interview results with the stakeholders, the current practices of acquiring market perspectives needs *more focus*.

“We must take a concrete approach in understanding customer needs and improvise our product rather than gathering continuous suggestions from different sources”. (Interviewee 1- B2B Business development team)

At the same time, the company designs and implements product features as per customer demands. Since each customer has different needs and perspectives of the product, it is very *difficult to address all the demands*. It alters the product goal and disrupts the release schedule. Instead, the customer needs and market demand could be first analyzed and prioritized, and then a *common requirement* could be implemented into the service.

“The challenge could be matching the service and customers' expectations. It should be fast and simple.” (Interviewee 2, Marketing)

Third, there exists a *mismatch in understanding the user demand and the company's offering*. Customer expectations are high and fast evolving since many new features appear and evolve in the market. Also, *the time* taken by the company to track new features and implementation is longer than needed. During the interviews, the team stressed that *the current practice in acquiring the customer demands and market perspectives are outdated*. The company needs a concrete and well-planned fast

approach to meet the market demands. The current practices that the company adapts include a robust strategic approach for customer retention by offering subscription plans. The Marketing and Technical team propose that the company should adhere to best practices in satisfying the customer demand, as the customer expectation is varied, and it consumes more time to derive feature dependencies and align it with the main objective.

"We are not very conscious on what feature is being added, rather we could also concentrate on competitor's offering". (Interviewee 2)

Competitor analysis should be made one of the prime foci when identifying and generating ideas. During identification of inputs for market perspective, competitor analysis plays a very important role. On the strategic view, the company should be able to provide unique offerings to stay in competitive market.

Summing up, based on the interview results, observation of current practices, and internal document analysis, the following preliminary findings from the Business and Marketing teams were made regarding deriving Market and Strategy perspectives.

1. The trends and market expectations change rapidly.
2. The demand from the customer is varied and it is highly impossible to develop all the requirements due to limited technical resources.
3. The management of feature dependencies and product vision is unrealistic.
4. Long term planning of the product is not done due to frequent requests from multiple sources.
5. Client acceptance after product demo is uncertain, hence resources are wasted.

Summary of the findings based on the current state analysis in relation to the Market and Strategy perspectives is presented in Table 4 below.

Table 4. Findings on the current practices in relation to the Market and strategy perspectives

| Key points | Findings |
|------------------------|---|
| Features and solutions | Unclear, inputs from multiple sources |
| Target Customers | Customer specific goals, Limited research and the requirements are gathered by product owner. |
| Timeframe | Planning is difficult due to competitive market and highly fluctuating customer needs. |
| Strengths | Workflow management, clear and common goal |
| Pitfalls | Market changes. No clear documentation of market captures, Poor timeframes. |

4.3.2 Analysis of the Product perspective in current practices

The product vision provides a crisp outline of the product outcomes that aligns the business priorities.

“No long-term planning or vision of the existing product is being maintained and the current developmental process sets only short-term goals. We don’t have reference documents to understand previous deployments and feature updates”. (Interviewee 2)

From the interviews, observations and internal document analysis conducted, it was stressed that developmental milestones are short termed and clear vision of the future is unexplained. The team doesn’t have vision of future progresses and works on the tasks allotted in an agile methodology.

One of the vital resources that acts as source of information is the product documentation. The team finds it difficult to gather information on previous updates and deployments and other technical details.

During observations, it was analyzed that the company prioritizes in offering value added services to clients based on customer demand, which deviate from product goals. Though it increases chances of product buy-ins, most of the features goes unimplemented due to client rejections.

*“We have limited resource, and this makes feature implementation slow.”
(Interviewee 3)*

The company functions on limited funding and expanding the development team is unrealistic. This affects the overall functioning of the company and hinders feature implementation and frequent updates. This affects the development timeframe and resource planning.

Summarizing the observation of current practices and product objectives, the following are the key findings that gives an insight on business goals and its orientation towards product developmental practices.

1. Short term goals set clear plans for immediate feature implementations. Product vision is outdated as the product is continuously evolving based on customer requirements.
2. The business objectives emphasis in offering customer priorities and less focused on competitive offerings.
3. The team functioning is limited due to scarce availability of resource. Limited funds affect the overall resource allocation in all the aspects of product development.

Summary of findings in relation to the Product perspective is presented in Table 5 below.

Table 5. Findings on the current practices in relation to the Product perspective.

| Key points | Findings |
|---------------------|--|
| Product vision | Outdated goals, development is based on the short-term needs, |
| Business objectives | Clearly defined objectives, lacks long term planning. |
| Team confidence | Limited planning and scares resource, highly fluctuating customer needs affecting developmental priorities |
| Strengths | Short term goals, utilization of resource. |
| Pitfalls | Outdated vision, Scarce resource, No clear documentation, and project planning tools |

4.3.3 Analysis of the Technical perspective in current practices

Analyzing the results on technological viewpoint, one of the most significant proportions to the case company is the Technical team. The entire SaaS development is highly impacted by the Development team.

First, based on the analysis of the interviews, *the technical team had a clear knowledge on the technical aspects of the product*. The team has good knowledge on stages of product development, roles and responsibilities, process flow and other developmental factors. The programming languages for the product development is as per the current trends, and the team is experienced to implement their skills. The HTML and CSS for front end, and the back-end programming languages are Node JS and JS ES6. JavaScript technology for both front end and back end makes the development process quicker and easier as the team can focus on working on one technology. Node JS offers rich user experience and best for creating Realtime applications. During the interviews, the interviewees gave overall *positive feedback in using JavaScript* as it helps to

implement all the modern features. Moreover, using Java scripts offers cost effective approach for young companies.

For the database, the application uses MongoDB, as it offers most reliable database for higher performance. Mongo DB offers easy working environment for rapid web development. However, during the interviews, the team expressed *problems associated with its usage*. *MongoDB* installation is a bit complicated, and it uses high memory usage.

"I found it difficult to work with MongoDB initially and later got familiarized with its functioning". (Interviewee 3)

As stated by the interviewee, the database adapted for the application requires high storage, and technical team has fewer problems when using MongoDB. Considering the product management strategies, the team lack a reliable resource to lead the team as *the available Lead developer is unavailable fulltime*.

"It would be helpful if we have some senior personnel who is available full time to support and address our queries instead of relying on the product owner for everything". (Interviewee 3)

However, as stated by the interviewee, *the team is very small containing young professionals*. It would benefit the entire development process if there existed a *Senior developer* who could guide the team. The team does the unit testing on feature implementation and does not have any automated testing or dedicated testing team.

Second, the Testing team will continuously test and support the development team ensuring well designed and developed product. The Technical team receives inputs regarding new tasks from the Product owner. However, according to the interviewee, the team could benefit if it had a Team lead or a senior person as part of the Development team, to get their doubts clarified and who could provide extra inputs and support when needed.

"The team needs an organised approach, and the team could work better if team members have clear understanding of the objectives". (Interviewee 4)

As seen from this comment, this would set *clear objectives and goals* for the new tasks assigned.

Third, the inputs from the Lead developer suggest that the team could use *an effective product planning tool* to organize and distribute the tasks among the team members. It is highly preferred that the tasks could be prioritized, so the team could set goals and perform work based on importance.

“Currently team size is around eight people. I have been working at the front end and back end. It is confusing to perform the tasks as there is no clear instructions on the priority of tasks. We started using Todoist recently, but we will need an effective planning and organizing tool”. (Interviewee 3, Lead technical developer)

Summing up, the current technical developmental practices in the case company, the front end and back-end programming technologies used for the development of the product is as per the current trends and the developers have good knowledge on the developmental practices. The current database-Mongo DB offers higher performance but consumes higher data which makes it more complicated for the developers. Based on the interviews, any improvements or changes to the current database will be much appreciated by the team. Most importantly, the team has no vision of the future product goals and features to be developed.

Based on analysis of interview findings, observations of current practices and internal document analysis, the following key points were summarized from the Technical development team as part of deriving the Technical perspectives of the product.

1. The current technology aspects for front end, back-end development and database are very reliable offering higher performance.
2. The team follows shorter sprint planning and Jira software for workflow. Thus, following the agile methodologies of product development.
3. This application consists of a bunch of modules that undergo frequent design and feature enhancements. No proper management tool is employed to keep track of product development.
4. Due to limited resource availability, the team prioritizes the tasks and work on high priority tasks. This enables clear understanding of developmental goals.

5. The product functions on manual testing and due to lack of dedicated resource it affects the deployment schedules.
6. The team doesn't have reference documents to understand previous version updates, deployment details.

Summary of findings in relation to the Technological perspective is presented in Table 6

Table 6. Findings on the current practices in relation to the Technological perspective.

| Key points | Findings |
|-----------------------|--|
| Stages of development | Clear goals, awareness on the developmental process. |
| Current Technology | Highly reliable, cost effective and the high-performance database. |
| Product planning | Planning in shorter sprints to ensure high utilization of scarce resources. |
| Strengths | Front end and back-end technologies as per current practices. |
| Pitfalls | Limited resources, no automated testing, no documentation, no product management tools. Current Database storage. |

4.4 Product Development Process: Strengths and Weaknesses

The current state analysis helped to identify and analyze the strengths and weaknesses of the current product development process with respect to three key focus areas of the conceptual framework - the Market perspective, Product perspective, and Technological perspective.

The following are **the strengths** identified from the analysis of the current practices in product development (in relation to the three perspectives):

Market and strategy perspectives - First, market requirements and customer demand for the product improvement are gathered frequently and the product owner gives high priority to customer demands.

Second, the Marketing and the Business development team have good analytical knowledge on the current market trends.

Third, higher value proposition to customers. Capturing a feature and its prioritization is entirely performed based on customer requirements. This helps to acquire the product buy-ins. Though certain features are client company specific, the features are developed to offer value added services to the customers. The current product developmental practice is customer centric that creates greater trust amongst customers. When the needs and demands of the customers are met, it increases the product reliability.

Product perspectives – First, cost efficiency, the financial estimation of short-term planning offers a precise and cost-effective approach.

Second, the product objective is monitored and constantly revised to fit the customer and market demands.

Technological perspective - First, the technologies used for the front end and backend development are latest technologies which makes the process smoother. The data base offers higher performance and rich data integrity.

Second, the company has a clear idea of its functioning and outcomes of the current developmental practices. The current data available to the team enables them to create product modules more effectively. They receive constant feedback and suggestions from the product owner that helps to keep track of the progress more effectively.

Third, the sprints and release schedules are short, making it more feasible and easier to update the product effectively, rather than spending more time and wasting limited available resources.

Fourth, transparent developmental process. The team has good access to all available data and the communication between the different teams is more efficient. This allows a proactive approach to get the things done.

The following are **the weaknesses** identified from the analysis of the current practices in product development (in relation to the three perspectives):

Market and strategy perspectives - First, Multiple sources hinders product development. A primary concern that has been raised during the current state analysis is the product development based on customer suggestions. Though this sounds positive, it inversely impacts the product strategy setting unrealistic expectations of the product.

Second, Changing landscape of market demands. There are continuous and frequent trends in the market as the product evolves. The product feature priorities that were made will change when the feature is successfully implemented. There are innovative and attractive trends that capture the customer's attention making the future of the product less efficient.

Product perspective – First, additional cost. The current product undergoes changes to satisfy the demands of the corporate customers. There is high uncertainty if the product will be accepted by the client after the demo. This adds extra cost to the product development process.

Second, the project management is too focused on satisfying the customer demands. Less priority is given to the actual product vision and business needs. This makes unrealistic expectations in the long-term vision of the product.

Third, Unclear strategic planning. The product development and maintenance practices are limited due to non-availability of structured tools for the long-term planning and management of the product.

Fourth, Outdated vision. There is no significant documentation or a framework that depicts the long-term vision of the product.

Technological perspective – First, Although the product uses high performance database, it is an outdated technology that makes the database difficult to maintain. The database requires more storage to offer reliable performance.

Second, the current database can undergo upgradation to offer more reliable and high performance and easy to use solution.

Third, Frequently Changing team members. As the case company is young, it employs personnel for short term basis or for trainee roles. This makes it difficult to have a smooth product developmental practice as the team undergoes constant changes of its core members. It is also time consuming to onboard a team member and give training to the new employees. As a result, the process is time consuming due to organizational practices.

Fourth, is sufficient KPI's along the developmental process. Though the product adapts improvements on a regular basis, there are no evident and concrete milestones in the product developmental process.

Table 7 shows the strengths and weaknesses based on the Market, Product, and Technological perspectives from the analysis of the current practices in product development.

Table 7. Strengths and weakness of the current practices based on the Market, Product, and Technological perspectives.

| Strengths | Weakness |
|---|--|
| <p>Market Perspectives</p> <ol style="list-style-type: none"> 1. Frequent market analysis and demand gathering. 2. Knowledge on current market trends. 3. Higher value proposition to customers | <p>Market Perspectives</p> <ol style="list-style-type: none"> 1. Multiple sources hinders product development. 2. Changing landscape of customer demand. |
| <p>Product perspective</p> <ol style="list-style-type: none"> 1. Cost efficiency 2. Continuous revision of strategic goals | <p>Product perspective</p> <ol style="list-style-type: none"> 1. Additional cost in developing features that goes rejected by the clients. 2. Unrealistic expectations in the long-term vision of the product 3. Unclear strategic planning. 4. Outdated vision |
| <p>Technological perspective</p> <ol style="list-style-type: none"> 1. Usage of latest technologies for development. 2. Clear and conscious developmental goals 3. Shorter release schedules following agile methodologies 4. Transparent developmental process. | <p>Technological perspective</p> <ol style="list-style-type: none"> 1. Database requires higher storage memory. 2. Poor product management practices 3. Poor implementation of technologies 3. Frequently changing team members 4. Lack of product management tool 5. Insufficient KPIs to measure the product metrics. |

Summing up, the current state analysis has given an overview of the current product development practices. A detailed analysis of the results forms crucial inputs for selecting the focus areas for development of a product roadmap for the case company. Based on the current state analysis and literature review, the areas of development were analyzed from three perspectives: the Market, Product, and Technological perspectives.

Firstly, it was identified that a clear and concise gathering of inputs from the Market perspective is essential. This helps to gain new insights into the market and customer demands for the effective and competitive product development. When the needed data is gathered and documented, it serves as a more reliable reference for further development.

Secondly, it was identified that a clear Product strategy is needed. It should be made evident and clear for the team; it should have a clear vision of the product and other KPIs. For this end, a product management tool that visualizes the goal and acts as a reference is essential. As for any organization, documentation of important parameters and strategic processes is also essential.

Third, it was also identified that a competent Technical team is the crucial part of the product development process. It would benefit the team members if there were a framework that shows the future activities and tasks that must be performed by the team. This would maintain realistic goals and aims for product development in the longer run.

Thus, the case company needs a strategic, well-documented planning and management approach. In the interviews, it was clearly demanded that the company needs a reliable solution that would act as a guide to involved teams in product development. From the business perspective, a good product framework/roadmap is essential to gain such a holistic view of the product and product development.

The selected areas will be included into developing a structured framework (the product roadmap) that incorporates the Market, Strategic, Product and Technical viewpoints into a planned approach to product planning and development process. Next, the initial proposal for such a product roadmap framework is built based on these current state analysis results and literature and best practice search

5 Building Proposal for the Product Roadmap for the Case Company

This section merges the results of the current state analysis and the conceptual framework towards the building of the Proposal based on internal co-creation and discussions (which makes Data collection 2).

5.1 Overview of the Proposal Building Stage

The primary goal of this step was to develop a clear and concise product roadmap for the case company incorporating different perspectives into the product development process. This section combines the conceptual framework elements for the roadmap and current state analysis findings. The challenges from the initial analysis were addressed and solutions were proposed based on the Data 2 findings generated in the workshops and interviews when building the Proposal.

Based on the literature review and the current state analysis, the key focus areas of the product roadmap were identified as the Market perspectives, Product perspectives and Technology perspectives. The proposal building is structured accordingly, to incorporate the existing key metrics of the current product and newly suggested solutions based on Data 2 findings.

The proposal is based on a timeframe in which each perspective of the roadmap (as defined in the conceptual framework earlier) is addressed based on the case company's available resources. This road mapping process also put emphasis on setting clear strategic objectives driving the product to success. The proposal also ensured measurable objectives that would be easy to implement.

Data collection of Data 2 involved interviews and workshops with the key stakeholders that drove from possible recommendations and application to the roadmap proposal. The key stakeholders were the Technical lead, Business development and Marketing team members. First, the interview with the Marketing team was conducted as one-to-one interview to gather ideas and feedbacks on the market demand and analyses the key performance indicators for the product. Second, the feedbacks from the customers were analyzed in detail to understand the market needs, and the customer and market demands. Third, the feedbacks from the Technical team member were analyzed to understand the technical capabilities and resource availability.

The initial proposal was developed analyzing the interviews and workshops findings. Based on the findings, identified development needs and improvements to the existing process were put forward. The conceptual framework presented an overview of the entire roadmap framework, which initiated the discussions for improvements. The findings were aligned together to build the initial proposal. This proposal was then detailed as an action plan for setting up a product roadmap in the case company.

5.2 Findings from Data 2 (pulling together CSA, CF, and Data 2)

In this section, the inputs from the stakeholders and customer feedbacks were analyzed to derive Data 2 findings.

5.2.1 Stakeholder inputs

The stakeholders have provided valuable insights on the existing practices, pitfalls and came up with proposals that supported developing the product roadmap. Table 8 summarizes the stakeholder suggestions by addressing the weaknesses from the current state analysis and by incorporating the suggestions from the conceptual framework.

Table 8. Key stakeholder suggestions (findings of Data 2) for Proposal building in relation to the CSA results and the CF, Conceptual framework.

| | <i>Key elements from CF (driven by CSA results)</i> | <i>Suggestions from stakeholders for the Proposal, summary (from Data 2)</i> | <i>Description of their suggestion (in detail)</i> |
|---|---|---|--|
| 1 | Market & strategy perspectives | A clear analysis of the market demand and filling gap in current offerings need to be focused to achieve edge over competitors. | Market research must be performed to capture new features and analysis features to offer a competitive edge. This increases the product market fit |
| 2 | Product perspectives | Setting clear goals minimize cost, and makes best utilization of available resources | Strategies to set product vision and planning product development based on inter dependencies of various resources helps to |

| | | | |
|---|-------------------------|---|--|
| | | | achieve product goals and meet business objectives. |
| 3 | Technology perspectives | Database alternatives Improving Product management practices Setting up KPI's | The current database functions effectively for current customer size and plans to look for alternatives in future depending on customer size. The inputs also suggested adapting product management practices in the case company incorporating developmental metrics. |

As seen from Table 8, the inputs from the stakeholders were categorized into three focus areas. The categorization helps to analyze the roadmap elements in detail and propose appropriate developmental measures that form the basis for developing a product roadmap.

First, the stakeholder inputs in relation to the Market and strategy perspectives demanded more focus on analyzing the current market demands and giving higher importance to the market perspectives adhering to timeframes. As identified from the current state analysis, there existed a mismatch in the current offerings and latest market trends. This was discussed in a wider perspective for building the initial proposal.

Second, the stakeholder inputs in relation to the Product perspectives laid anchoring to the product goals. The importance of product vision and business objectives were discussed. An overview of the product emergence helped to better understand and propose recommendations for the key factors that constitutes the Product perspectives.

Third, discussing the Technology perspectives with the stakeholders focused on finding alternatives for the database pros, and cons of implementing the proposed alternatives, and other product management practices. Importantly, the proposal building emphasized adhering to best developmental practices in relation to the timeframe.

5.2.2 Customer feedback

A brief survey was conducted among the existing customers of the SaaS product to understand the Customer perspective on the current product. The main purpose of this questionnaire was to analyze the product's competitive fit in the market and its value to the customer. The following is the purpose, findings, and analysis of the survey questions.

Table 9. Customer feedback questionnaire for the Market perspective.

| <i>Questions</i> | <i>Reasoning</i> |
|---|--|
| 1. How did you hear about us? | <p>The goal of the question was to identify the source of information and check the awareness amongst customers.</p> <p>Based on the result, the product is referred to through social media platform and sport service providers.</p> |
| 2. Is accessing our product / Services easy? | <p>The goal was to know how easy the product usage seems. It also served as a key indicator that the product offers a service in the way it is supposed to offer.</p> <p>Based on the results, understanding the service offered and its real purpose was not well communicated.</p> |
| 3. What features do you like most about our product or service? | <p>The goal of this question was to understand the features that are appealing to the customers and what kind of service the customers are expecting.</p> <p>Based on the result, the customers liked the intended purpose of the product and gave positive impressions on the uniqueness of the product in Finland.</p> |
| 4. How often do you use our product / service? | <p>The purpose of this question was to identify the usage of the product and to understand if it offers a reliable solution for intended usage.</p> <p>Based on the results, it was found that the existing customers used the services widely and new customers are still unaware of the ways in which the product could be used.</p> |
| 5. Are our new products or services sufficiently unique compared with others in the market? | <p>The goal of this question was to understand the uniqueness and learn about the competitor offerings from the customer perspective.</p> <p>Based on the results, the product offers unique features, first of its kind in Finland for events and networking activities.</p> |
| 6. Did we offer what we promised through our services? | <p>The goal of the question was to identify if the product offerings align with the product vision and intended business needs.</p> <p>Based on the results, the customers showed positive impressions.</p> |

| | |
|--|---|
| <p>7. What do you wish our service could offer in future?</p> | <p>The goal of this question was to gather inputs and analyze them for planning future improvements to the product.</p> <p>Based on the results, the customers expect to have mobile applications for faster access, free plans, well-structured product design, quick searches and various other inputs based on current trends.</p> |
| <p>8. Is the subscription plan expensive?</p> | <p>The goal of this question was to identify if the product offers a cost effective and value-added service for the proposed pricing subscription.</p> <p>Based on the results, the customers demanded a less expensive pricing model.</p> |
| <p>9. Any other comments! Please feel free to give feedback and suggestions for our product.</p> | <p>The goal of this question was to gain out-of-the-box inputs from the customers.</p> <p>The result of this question was not as expected, where no informative findings were obtained.</p> |
| <p>10. Overall user experience.</p> | <p>The purpose of this question was to gain an impression of the product.</p> <p>The results showed a positive impact on its offerings.</p> |

The results of the customer questionnaire were used to understand the Market perspective and thus implement its findings into the Proposal.

5.3 Proposal Draft / Initial Proposal

This section involves proposing suggestions based on the stakeholder inputs and knowledge gained through literature review. Figure 12 shows the Product roadmap overview integrating the conceptual framework with the current state analysis findings, and Data 2 gathered from the stakeholders.

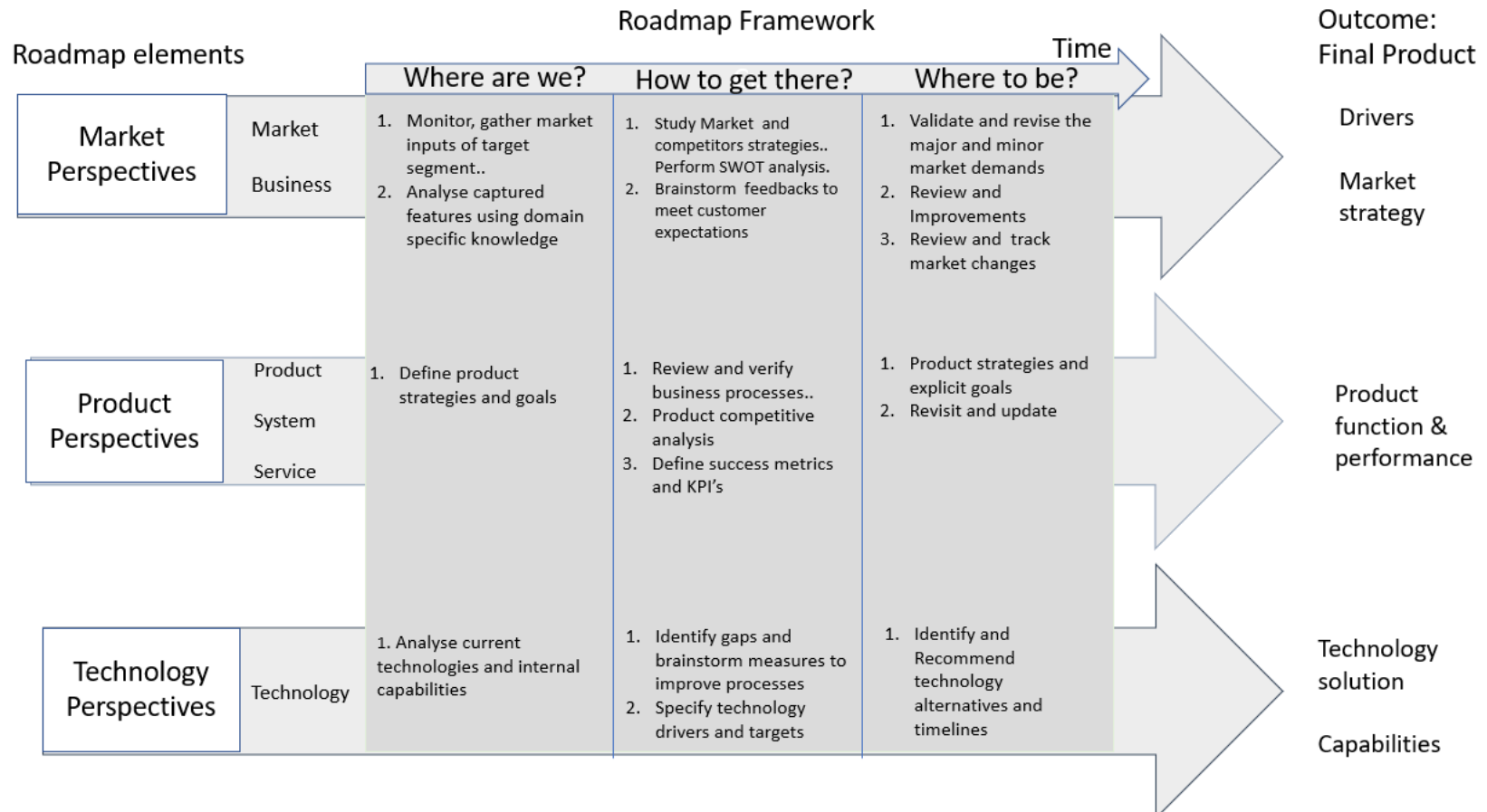


Figure 12. The Product roadmap (Initial proposal).

Thus, the initial proposal for the product roadmap is based on three key perspectives: the Market and strategy perspectives, the Product perspective, and the Technology perspective. The key issues synthesize and impact each other in product development. The focus areas of the roadmap proposal were based on the identified pitfalls in the current state analysis and knowledge from existing literature. This roadmap is developed in relation to timeline of implementation and achieving desired outcomes.

A brief description of three layers of the initial roadmap framework based on the road mapping elements is explained below.

5.3.1 Element 1 of the Initial Proposal: Market and Strategy perspectives

The inputs that were received for analyzing the current market were derived from numerous data sources available on the company, such as customer feedbacks, client comments, B2B customer requirements, and competitor analysis. A documented approach that captured the market and strategy perspectives was set to be implemented based on the stakeholder inputs.

Knowledge gained from literature review and Data 2 findings, indicates that the feature gathering, and analysis should be done based on the potential market size and the end goal of the product. A proposal for consistent benchmarking with the competitors and predicting customer demand forms the niche of feature gathering element. This is achieved by creating a market strategy that addresses the demands of target customers and creates a unique benchmark for the company's offerings.

Changing landscape of customer demand is overcome by understanding the latest trends emerging in the markets. Based on literature, this is done by offering new features to the customer, analyzing competitive offerings, and focusing on removing less preferred features. A dedicated analysis of customers and competitors is agreed to be implemented to analyze the current offering and drive it towards developing a better solution and enhancing product value. Based on the literature, this is done by brainstorming the company's current offerings in relation to the customer expectations. This helps to enhance self-branding and defines how unique is the company.

The customer feedback survey helped to understand the most preferred features in the current product and the current offerings that are less appealing. Keeping a constant

track of customer feedbacks helps to better understand what the customers want next in the product feature line. This will also help to utilize the available resources at its best in line with the proper release schedule. Figure 13 shows the newly initiated Feature idea capturing tool that will be used to record the sorted ideas.

The screenshot shows the 'Idea Prioritization' tool interface. The table displays the following data:

| Priority | Idea Name | Reach | Impact | Confidence | Effort | R.I.C.E. Score |
|----------|----------------------------------|-------|--------|------------|--------|----------------|
| 1 | Email Marketing Integration | 10 | 2 | 50% | 4 | 5 |
| 2 | Log in using SOME | 5 | 3 | 25% | 4 | 3.75 |
| 3 | Public event creation | 50 | 4 | 100% | 1 | 100 |
| 4 | Non Finnish Bank payment gateway | 50 | 4 | 75% | 2 | 50 |
| 5 | Buddy finder Feature | 50 | 2 | 50% | 4 | 16.67 |

Figure 13. Company's newly created Feature idea gathering tool.

As seen in Figure 13, the new Feature idea gathering tool is developed for the case company as part of initial proposal with the help of the company's Marketing and business development department. The idea recording page implements the RICE methodology and Value vs. Effort methodology to rank the features and effectively sort them out based on customer preferences and market demands. This enables a data driven approach for the case company to accurately document market elements and use them in the road mapping process. This tool provides a simplified version for managing the idea backlog and sets the basis for the decision-making process for the *Market and Strategy perspective*. The case company deals with B2B customers, and creates customized services based on the customer's demand. This new tool helps to attach priority to the ideas and provide direct linkage with customer feedback. The proposed tool enables both internal and external stakeholders to have a transparent market analysis and thus help in the decision-making process. It makes one of the planned steps in *the Market and Strategy perspectives*.

5.3.2 Element 2 of the Initial Proposal: Product Perspective

The product vision forms the guiding principles of the product roadmap. The product vision is done by defining the short term and long-term goals and best strategies. Before forming the strategies for product development, an analysis of the vision statement removing all the unwanted goals that wouldn't work is performed. Only the prominent strategy implications are chosen that clearly fit the product vision and offer the desired outcome.

Business objectives is a major part in the roadmap, strengthening the internal and external stakeholder expectations. Aligning the business objectives based on industry patterns, investors, and target customers implements a unique approach for building competitive offering.

Understanding the current competition and predicted competitive offerings helps to strengthen the product and sets the entry barriers high for the competitors. This forms the basis of product goal. Based on the literature review, this is done by creating a competitive matrix around product branding, pricing. Better communication with the customers and sticking to the product goal will ensure providing better solution to customer demands.

The confidence in product development and entire team functionality depends on the confidence of the associated team members. Frequent monitoring and revisal of business processes helps to offer strategic information to the team.

"We will recruit more members if we have sufficient funding." (Product owner)

Due to changing team members, the work amongst the employees is relatively reduced, as every process is repeated, and the further development is slowed down. Efforts to implement a concrete team structure is set to more thoroughly discussed with the Product owner. Depending on the available funding, the process is agreed to be carried out in a phased manner, recruiting professionals based on the workload in concerned department of the company with guidance from product owner.

5.3.3 Element 3 of the Initial Proposal: Technology Perspective

One of the fundamental focus areas for the product development involves the technical team and the product developmental lifecycle. Based on the current state analysis findings, the team functioning is impacted due to the company's scarce resource and low availability of lead developer to support the junior developers. Based on stakeholder's Data 2 inputs, this could be improved by incorporating the measures to train junior developers. This should enhance the team capabilities thus preventing the team barriers and achieving the developmental targets.

Technologies used for the front-end and back-end development are as per current trends. Based on the current state analysis results, the need to find alternatives for the database was discussed with the stakeholders.

"The current database is reliable for the current customers, let's find alternatives if the customer size increases. We should evaluate the alternatives." (Interviewee 3)

The inputs from stakeholders suggested the reasons to continue using the same database and proposed to implement alternatives in the long term based on the target customer size. Mongo DB offers high performance solution, which is good enough to satisfy the current customer base. The proposal to alternate the database should be implemented by evaluating various factors that are involved in its replacement.

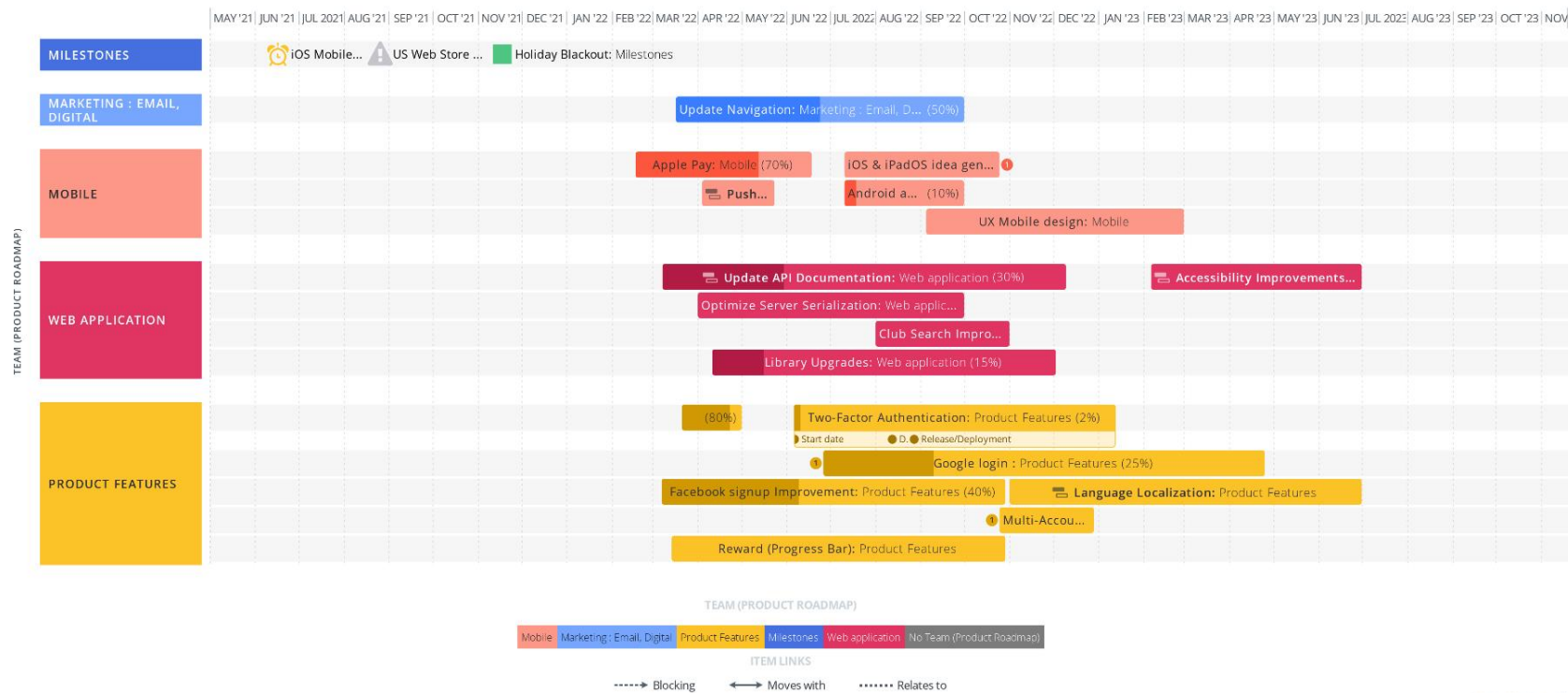
The findings from the current state analysis also demanded a product management tool and documentation practices that would act as a reference. Inputs from Data 2 and literature review emphasized the importance of management practices and product documentation. This could be performed by adapting management practices and creating reference documentation in the case company. The stakeholder's suggestions emphasized implementing a documented approach to keep track of the developmental process.

Figure 14 below shows the initial blueprint of *the technology part* of the product roadmap.



UNFAIR ADVANTAGE PRODUCT ROADMAP 2022 - TIMELINE: BY TEAM

May 1, 2021 - Nov 18, 2023



Designed with roadmunk

Figure 14. Technological part (perspective) of the Product roadmap for the case company.

Figure 14 shows the initial blueprint of the Technological part (perspective) of the product roadmap developed by the technical team members.

The framework of *the Technological perspective* shows the features that are critical in the agile developmental process. These features were initially documented by the Product owner and then the tasks were allocated to the team on completion of backlog features. Using the technical part of the new roadmap proposal, the Technical team documents the vision of the features that are in the developmental pipeline.

As seen in Figure 14, the Technological part (perspective) of the product roadmap is categorised into different sub-layers based on the modules in the technical aspects of the SaaS application. It follows the same approach as suggested by Phaal (2009) in drafting the layers of the product roadmap incorporating the technologies utilized in the product development. This Technological part of the product roadmap proposal is a generalized into a blueprint that helps to import the data from the existing data repository, as there are different options to import existing data and build the product roadmap. The existing tasks in the framework are the previously prioritized features for development and improvement.

The key elements of Figure 14 are presented as follows. The top layer of the product roadmap contains the overall important milestones that the company targets to achieve. The milestones are added to the top layer as the milestones are scheduled for a longer timeframe and acts as key success factor of the product. The second layer of the roadmap is the Marketing and business strategic perspectives, which is planned by the team incorporating marketing and sales metrics of the company. The third layer of the roadmap contains the core technical functionalities of mobile application integration and core application development. The features that are specific to the product like, iOS and android functionality enhancements, application payment gateway, privacy, and security of the application are some of the key features that are presented along with the timeframe and status of completion. Each of the features includes key metrics such as task owner, feature details, key release dates, feature dependencies. The roadmap includes the process flow as it represents feature dependencies, and blockages in improving or developing features. The proposed timeframe in the roadmap is scheduled for the next 1 year, with more features to be included by the technical team.

The initial proposal for the Technological part of the product roadmap contains the key elements of development process that includes the feature name, description, theme, timeframe, and status. It also incorporates the roles and responsibilities of the team along with progress details and challenges. The stakeholders can track the progress status, provide suggestion and feedbacks along the process. The timeframe could be set to a monthly format, or a quarterly format based on the release schedule and the company's preferences.

This Technological part of the product roadmap (although incremental) should allow to enhance the implementation of agile methodology, thus saving cost and time. Changes could be made to any of the roadmap items; milestones could also be altered based on stakeholder demand. The responsibilities of roadmap management are specific to internal stakeholders and can also be fine-tuned, if/when needed.

The roadmap proposal acts as a reference and a guide on the technical aspects of product development. It helps the team to document the entire process without any additional tool or resource. Thus, it makes a vital part of the proposed roadmap success, as the main objective is to create a visualised approach in the product development process.

5.4 Summary of the Initial Proposal

This section summarizes the three key perspectives of the product roadmap as adjusted for the case company based on stakeholder co-creation (Data 2). Table 10 below presents the initial proposal how to form and develop the product roadmap elements over a proposed timeframe to achieve the required outcome in the form of the final product.

Table 10. Summary of the initial proposal (three key elements of the product roadmap and proposed timeline for its implementation).

| Key focus areas | Proposal | Proposed Timeline |
|-------------------------------|--|--|
| Market & strategy perspective | <ol style="list-style-type: none"> 1. Dedicated team for market analysis and documenting customer feedbacks and feature demands. 2. Feature analysis and prioritization using RICE methodology. 3. Competitor analysis | <p>Phase 1</p> <p>Phase 2</p> <p>Phase 1</p> |
| Product perspective | <ol style="list-style-type: none"> 1. Cross disciplinary vision framework setting product strategies 2. Explicit strategies to eliminate unnecessary costs. 3. Creating time, work, and cost estimating | <p>Phase 1</p> <p>Phase 1</p> <p>Phase 1</p> |
| Technology perspective | <ol style="list-style-type: none"> 1. Implementing code library usage, and proposed features 2. Database- Not an immediate requirement. Proposed for future enhancement based on customer size. 3. Mobile application integration 4. Initiating Product developmental documentation 5. Dedicated team members | <p>Phase 1</p> <p>Phase 3</p> <p>Phase 2</p> <p>Phase 2</p> <p>Applicable to all phases based on funding</p> |

As seen in Table 10, it presents the proposal for solving the gaps identified during the current state analysis in the current product development process by developing the key elements of a roadmap (following the suggestions from literature and stakeholder inputs).

As a result, the proposal for developing three perspectives is built by finding suitable solutions in a time phased manner.

The timeframe for the roadmap framework is split into three phases depending on the company strategy and availability of funds and resources:

Phase 1 – Expected implementation time is 1- 2 year.

Phase 2 – Expected implementation time 2-3 years.

Phase 3 – Expected implementation time in 3 years.

The stakeholders agreed that the proposal will be further developed to incorporate all the necessary details, and acts as a single window visualizing the future product developmental process. Moreover, the stakeholders agreed that the roadmap will be built in an incremental mode, based on the inputs received from both the internal and the external stakeholders, for all three perspectives. Presently, only the Technical team was ready to articulate all the necessary details, features, elements, roles etc for forming their part of the product roadmap. As a result, only *the technical part* of the product roadmap was possible to build. But even this limited outcome enhances transparency in the development process and creates a good beginning to building a robust framework in the future.

The proposal helps to understand the needs and goals of the case company and provides vision of planning and implementation based on the following perspectives:

Market and strategy perspectives – The market perspectives of the product roadmap include the proposals to implement a team that brainstorm ideas for the implementation of market analysis process. A proposal to document customer feedbacks on a regular basis is set to be implemented in Phase 2, that also includes capturing and gathering the feature demands. The team also intends to benchmark and track the competitor offerings. This helps to offer a competitive solution to the customer based on the latest trends and industry patterns. Feature analysis and prioritization are to be performed using RICE methodology, this is a cost-effective methodology used to prioritize and implement required features

Product perspective – A cross-disciplinary vision that involves all the teams of the case company is proposed to be implemented in Phase 1 that would help setting the product strategies and offer a documented approach for tracking KPI's of the product development. The proposal to adapt explicit strategies to eliminate unnecessary costs by constantly tracking developmental milestones is carried out in Phase 1. This is to prevent the wastage of the available resources and utilize them for enhancing other functionalities of the product. The proposal is targeted to set a documented approach to create and manage the time, work, and cost estimation of the overall functioning of the company focusing on developmental process.

Technology perspective – The inputs from the stakeholders and recommended suggestion from the literature proposed to utilize available resources and adapt best practices in the product development process. This is achieved by implementing the code library usage in the programming phase that reduces the dependability of the lead resource and offers an efficient approach to smoothen the financial aspects and product development practices. This is set forth to be implemented in Phase 1, and its performance is agreed to be monitored. Based on the stakeholder's inputs, it is less feasible to replace the existing database. The current database offers reliable performance for the current customer traffic. Though the problem associated with the database consuming higher memory storage reduces the efficiency of the current working application management, it doesn't pose an immediate threat to current functioning of the SaaS application. Hence, finding an alternative for the database is not an immediate requirement and it is agreed to be carried out in Phase 2 depending on the customer size and the funds availability. It was proposed for future enhancement based on the customer size. The stakeholders also agreed on recruiting a dedicated development team and offering an effective training on the product to the junior developers. This will provide a deeper insight of the product and other product development practices and should reduce the team dependencies in solving minute problems. This in turn should increase the scope of the developmental pattern in the case company. A proposal to adapt to the product development documentation is agreed to be implemented in Phase 1. This would act as a reference for future needs and would help to locate the feature dependencies in the code and other deployment details to the developers.

Based on the initial proposal, the next section provides the report on the validation results.

6 Validation of the Proposal

This section reports on the results of the validation stage of the roadmap proposal and points to its further development suggestions. The section involves an overview of the proposal implementation and its relation to reaching the intended outcome. At the end of this section, the Final proposal for the product roadmap is presented.

6.1 Overview of the Validation Stage

This section reports on the validation of the initial proposal developed in Section 5. The validation was done by the Product owner and the key stakeholders, and the gathered data is presented as Data 3.

The validation of the proposal involved testing the feasibility of roadmap implementation via a series of in-depth team discussions. The proposed product roadmap contained a planned timeframe for the key elements of the roadmap. The validation mainly concentrated on the three perspectives that form the basis of the roadmap. The final proposal was approved based on the internal stakeholder agreement with some development suggestions (Data 3) discussed below.

Data 3 collection was gathered from the stakeholders during a series of validation sessions. First, the inputs from the Technical lead and the Marketing team were gathered during a discussion session. As an outcome, the proposed roadmap incorporated the list of Marketing and Technology elements discussed in these teams.

Second, the risks involved, and other factors involved with roadmap implementation, suggestions and feedbacks were brainstormed in a workshop and inputs were taken as field notes.

Third, the suggestions from the stakeholders related to the literature inputs were discussed once again, to revise the feedbacks once again, so that to make the most of it and enrich and refine the intended outcome. Based on Data 3 findings, the final proposal was drafted along with the implementation plan.

6.2 Developments to the Proposal (based on Data Collection 3)

During the validation of the roadmap outline, the following suggestions and improvements were discussed.

6.2.1 Developments to the Market perspective of the Initial Proposal

The development suggestion to the Market perspective involved brainstorming the approach to implement the Initial proposal. The feedback focused on the proposed tool that created an approach to record *the Feature ideas*. The development suggestions further refined the proposed tool based on the stakeholder opinions. The developments to the proposal also considered the possibility of implementation. Table 11 summarizes the stakeholder suggestion to the Market perspective of the Initial proposal.

Table 11. Summary of *the inputs* from the key stakeholders (Data 3) collected in validation that summarizes the Market and Strategy perspectives.

| | <i>Elements of the Initial roadmap proposal</i> | <i>Parts commented in Validation</i> | <i>Description of the comment/ feedback by experts (in detail)</i> | <i>Development to the Initial proposal</i> |
|---|--|---|--|---|
| 1 | Market and Strategy perspectives | a) Dedicated team for market analysis and management of roadmap | The experts suggested that implementation of roadmap process must be done from scratch with precision. | The implementation of the feature analysis with complete details is included as separate modules in roadmap |
| | | b) Feature analysis and prioritization using RICE methodology. | The experts suggested to gather all features and priorities them based on stakeholder feedback | RICE framework with all features is included in the roadmap |
| | | c) Competitor Analysis | Suggestion to incorporate as a continuous process. | Tasks assigned and quarterly review is set. |

Table 11 above summarizes the development suggestions from the stakeholders to the initial proposal. The stakeholders agreed that the Initial proposal had clear objectives and its elements were well defined, and thus no major new suggestions appeared.

*“We are happy to see a visualized approach to marketing factors. This will shape our working pattern to organize and prioritize tasks more effectively.”
(Marketing team member)*

The stakeholders stressed the importance of the proposed structuring of the Market and Strategy perspective as no concrete methods for these areas were earlier adapted in the company. The Marketing and business development team proposed frequent workshops for effective implementation and functioning of the proposed roadmap.

The feature analysis and documenting the gathered features were assigned to the relevant team and their members. In addition, the responsibilities for the entire road mapping process were divided among the team members, and it was proposed to structure the document with specific timeframes. The roadmap was agreed to use RICE framework for feature recording and prioritization that includes KPI's such as feature impact, risk, reach, dependencies, and overall feature score for prioritization purpose. This gives more clarity to the defined approach as it added the key metrics. Competitor analysis was agreed to be a continuous process improving the product offering based on regular comparisons against the competitive offerings. The stakeholders emphasized that it had to be implemented as a continuous task instead of an irregular, stand-alone competitor analysis.

6.2.2 Developments to the Product perspective of the Initial Proposal

The Product perspective of the roadmap was agreed to include the existing key performance indicators that monitor and manage the product development practices in the case company presently. Table 12 below suggests the stakeholder's inputs on the Product perspective.

Table 12. Summary of *the inputs* from the key stakeholders (Data 3) collected in validation that summarizes the Product perspective.

| <i>Elements of the Initial roadmap proposal</i> | <i>Parts commented in Validation</i> | <i>Description of the comment/ feedback by experts (in detail)</i> | <i>Development to the Initial proposal</i> |
|--|---|--|---|
| Product perspectives | a) Cross-disciplinary vision framework setting product strategies | The experts suggested to make the report on goals and other metrics before focusing on strategic processes | Assigned to concerned team for further inputs |
| | b) Explicit strategies to eliminate unnecessary costs | The experts suggested to monitor the pitfalls and gaps. | Assigned to team for monitoring and managing the development process. |
| | c) Time, work, and cost estimation | Suggestions to include more metrics to support better monitoring. | Included additional details to the roadmap entities for better product management |

As seen in Table 12, the Product perspective did not receive any new major suggestions, and feedbacks were discussed as this segment is dependent on many various factors. The basic elements that monitor and manage the product development practices were approved in the initial roadmap proposal. The stakeholders suggested that changes to the product goals and targets cannot be implemented immediately and require a comprehensive analysis of all the product metrics and key lessons learnt. The resource allocation and cost factors especially need a thorough evaluation. The stakeholders agreed to initiate this comprehensive analysis based on the roadmap proposal. The items and metrics that determine the cost and time factors were elaborated for each of the product features, which should help to keep track of the KPI's and thus better monitor the overall work and budget for the product.

6.2.3 Developments to the Technology perspective of the Initial Proposal

The Technology perspective forms a major part of this roadmap proposal. The proposed Technology part of the roadmap was presented to the stakeholders, and it was further

developed based on the stakeholders' suggestions and feedback. Table 13 presents the stakeholder inputs to the proposed Technology perspective of the roadmap.

Table 13. Summary of *the inputs* from the key stakeholders (Data 3) collected in validation that summarizes the Technology perspective.

| <i>Elements of the Initial roadmap proposal</i> | <i>Parts commented in Validation</i> | <i>Description of the comment/ feedback by experts (in detail)</i> | <i>Development to the Initial proposal</i> |
|--|---|---|---|
| Technology perspectives | a) Implementing code library usage. | The experts suggested to make risk assessment in using code library | The usage of code library has to be done without altering the source code. And team has to be trained for utilizing code library before implementing it into use. |
| | b) Product Features | Minor fixes with timeframe emphasizing on key dates | The technical team performed the timeframe fixes by brainstorming the risks and dependencies. |
| | c) Database | The experts suggested to incorporate database changes in later part of the proposal. | Added to phase 3 of the roadmap, timeframe could be altered based on need. |
| | d) Mobile application integration | "Elaborate it as a separate item in roadmap. It requires same planning process as that of SaaS application" | Mobile application is included as a separate item in the roadmap |
| | e) Product documentation | The experts suggested to implement documentation as a parallel process | Inbuilt & Separate documentation process implemented |
| | f) Dedicated team members | No proposed suggestions | Recruiting sufficient team members is strictly based on fund availability. |

As seen in Table 13, the Technical perspective of the product roadmap included changes to the Initial proposal due to available resources and other metrics of the case company.

Each of the key entities was assessed and set to be implemented. However, some of the elements were linked to the Product perspective, and thus created a gap in the implementation timeframe.

The stakeholders decided that the technical part of the product roadmap is set to be implemented immediately, and changes to the timeframe should be carefully monitored. The entity in the roadmap is also set to include a detailed description of each item including the name, description, schedule, roles, and responsibilities of team members tagged. Thus, it should provide complete details for each feature and act as a reference document and thus help in managing the product development and product documentation more effectively.

However, the database was agreed to be re-considered in the later part of the timeframe depending on the need and associated risk. This poses a threat in addressing the company's weakness, but it was agreed that it couldn't set it into development immediately due to limited resource availability and non-existing immediate problems. The mobile application improvements are set as a layer in the roadmap creating a separate entity of team members and linking its dependencies with the application.

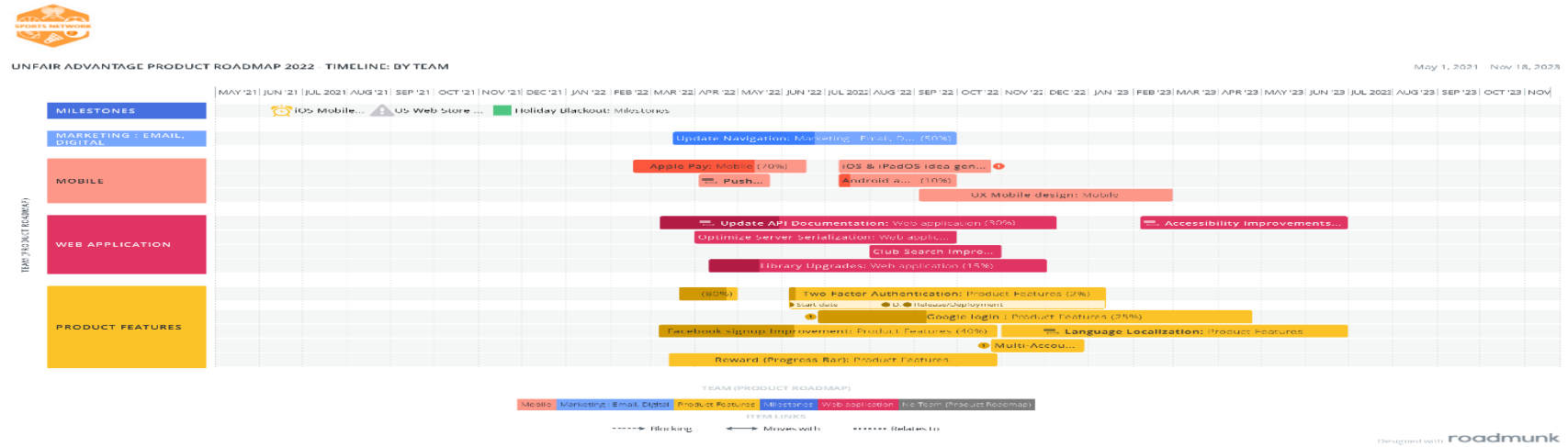
Finally, the documentation of the developmental process was addressed using the in-built feature of the road mapping tool. The roadmap features are provided with extensive details, which helps to document the entire process without any additional resource. The stakeholders stressed that implementing the roadmap should help to make the best use of available resource and delegate tasks evenly among the team. It makes sense only if it fits this critical requirement, which would be clear in the future, after analyzing the metrics results.

Summing up, Data 3 concentrated on identifying the improvements and suggested developments proposed by the stakeholders to the Initial proposal of the product roadmap. Thus, Data 3 primarily focused on improving the proposal contents and put emphasis on the implementation based on the feedbacks received from the stakeholders. Additionally, a major suggestion to the development of initial proposal was focused on the implementation plan and related to metrics. It included assessing the progress of the implementation plan and assigning the roles and responsibilities to the available team members. The insights of development suggestions for each of the key roadmap elements were summarized in separate sections above.

After discussing all the inputs and developments to the Initial proposal, this section ends with the Final proposal presented in one overview.

6.3 Final Proposal

This section presents the final proposal after the validation and developments made into the initial proposal. The changes are implemented based on the stakeholder feedbacks and suggestions. The final proposal for the product roadmap for the case company focuses on the Marketing and Technology perspectives, as these two elements gathered the most concrete imputes and thus were feasible to develop to the implementable level. The Product perspective was agreed to be introduced later after assessing the impact and other product-related factors more carefully. The final proposal is presented in Figure 15 below.



Idea Prioritization

View ideas from product area: Global Ideas

Manage Products and Components

R.I.C.E. Change view: R.I.C.E.

Displaying 4 factors | 5 ideas | Priority Sorted List New Idea

| Priority | Idea Name | Reach + Positive Factor | Impact + Positive Factor | Confidence + Positive Factor | Effort - Negative Factor | R.I.C.E. Score |
|----------|---|----------------------------|-----------------------------|---------------------------------|-----------------------------|----------------|
| 1 | Email Marketing Integration 0 pieces of feedback Global Ideas | 10 | 1 2 3 4 5 | 50% | 1 2 3 4 5 | 5 |
| 2 | Log in using SOME 0 pieces of feedback Global Ideas | 5 | 1 2 3 4 5 | 25% | 1 2 3 4 5 | 3.75 |
| 3 | Public event creation 0 pieces of feedback Global Ideas | 50 | 1 2 3 4 5 | 100% | 1 2 3 4 5 | 100 |
| 4 | Non Finnish Bank payment gateway 0 pieces of feedback Global Ideas | 50 | 1 2 3 4 5 | 75% | 1 2 3 4 5 | 50 |
| 5 | Buddy finder Feature 0 pieces of feedback Global Ideas | 50 | 1 2 3 4 5 | 50% | 1 2 3 4 5 | 16.67 |

Figure 15. Key elements of the Final proposal for the Market and Strategy (No 1), and the Technology (No 3) perspectives of the product roadmap.

As seen from Figure 15, it includes *the key elements* of the proposed the Market and Strategy (No 1), and the Technology (No 3) perspectives of the product roadmap. The developments to these two perspectives were based on the stakeholder's suggestions. The developments primary focused on providing accurate details to the roadmap features and other entities of the developmental process. No major improvements and visualization to the third, Product perspective could be implemented later as these perceptive deals with strategic planning of the product process, and the stakeholders agreed that it needs a more thorough analysis.

Next, the implementation of the proposed roadmap in the case company is planned in the subsequent section.

6.4 Implementation Plan (Outline)

This section gives a practical approach to implementation and usage of the proposed product roadmap. The implementation plan includes the roles, responsibilities for each of the key roadmap elements. It also includes the outline for initial tasks that prepares the team for the early stage of implementation.

Table 14. Implementation plan for the final proposal (outline of the initial stage).

| Roadmap elements | Role /Team involved | Responsibilities /Initial tasks to be performed | Preparation includes | Dates | A sign/indicator that it gets completed |
|-------------------------|---|---|--|---|---|
| 1. Market & Strategy | Marketing and business development team | Increase accuracy in data collection. Adapt a clear approach to manage the data | Research and gather required tools and create a holistic approach for implementation | Start: June 2022 | The team has proposed planned ideas to gather market inputs and started working in drafting ideas and assigning tasks amongst team members. |
| 2. Product | Product owner | Will be implemented later | Future proposal | TBD, the proposal still needs development | Future proposal |
| 3. Technology | Technical development team | Curate feature details and other key metrics and feed them into the roadmap tool. Implement consistent reference and standard practices. | Update Todoist list and shortlist required data to be added to the roadmap. | Start: June or August 2022 | The technical team has instructions from the product owner to implement the roadmap. The product owner is focused to have a visualized approach to avoid future discrepancies in product development. |

Table 14 above presents the implementation recommendations by the thesis researcher for successful and smooth implementation of roadmap framework into use.

Each entity of *the Market and Strategy perspectives* should be developed in a scheduled timeframe after careful analysis of all the marketing practices. This helps in increasing data accuracy and better understanding of the customer demands. The results of the ongoing market analysis should be linked to the product roadmap, thus utilizing previous data sources.

The Product perspective couldn't be specified and thus implemented at this stage, due to limited resources and other internal factors. But the stakeholders committed to start the implementation of the Product perspective in future depending upon the availability of resource.

The Technology perspective of the roadmap could be successfully implemented by importing the existing data source. It is recommended that the technical team would import the data with more accuracy and relevancy without altering the roadmap framework and roadmap's intended purpose of creation. Suggestions to update the existing list features to be developed before importing to new roadmap tool, will facilitate simplified management of proposed roadmap framework.

The proposed roadmap has plans for effective implementation of the Market and Technological perspective. The product perspective is influenced by major external parameters that hindered implementing the product perspective in the proposed roadmap. The existing resource are best utilized for implementing 2 out of 3 key elements of the product roadmap. This affects in successful creation of an effective framework for the case company. Though the key challenges are addressed along the process of roadmap creation, the product perspective holds some of the important decision-making elements that shapes the product goal and key business objectives.

It is recommended that the above suggestions are taken into action to ensure simple and effective implementation of roadmap tool into practice.

7 Conclusion

This section contains the summary of key findings and challenges in development of the proposal. Thesis evaluation is presented based on the evaluation criteria.

7.1 Executive Summary

The main objective for this thesis was to offer a structured approach for more effective functioning of product development in the case company. The objective was to develop a product roadmap that would act as a reference tool for the entire team. This aimed to offer an effective visualization of processes in product development for a specific timeframe into the future. Such a product roadmap should visualize the key factors that help in product development with a defined timeframe and processes involved in achieving the set milestones. This is vital for the case company in order to manage the overall functioning of the team and offering customers their intended outcomes.

This thesis was conducted using Applied action research (Design research) and qualitative research methods. The aim of using the applied action research is to solve a practical challenge with emphasis on continuous enhancements. The thesis process started by defining the challenge that the case company was facing, and analysis of the current product development practices before defining the outcome of the thesis. The data collection involved qualitative research methods mainly through interviews, observation, analysis of core internal documents, a customer questionnaire, and a workshop.

After defining the business challenge and objective, literature review and best practice were explored for identifying the tools for developing a product roadmap and other key elements that structure a roadmap. Existing detailed and relevant techniques of roadmap creation were found which gave a strong foundation for moving on along the thesis process. Literature review helped in understanding the processes for roadmap creation and necessary inputs as elements of a product roadmap. As a result of literature review, the conceptual framework was created, that acted a tool for the current state analysis.

The current state analysis resulted in deeper understanding of the entire product development phases of the case company (gathered from analyzing Data 1). It helped

to examine both the internal and external elements that impacts management practices and product success, such as metrics, for example. As a part of analysis, the strengths and weaknesses of the current product development practices were identified in relation to three perspectives (i.e., key elements of the product roadmap) - Market & Strategy perspective, Product perspective, and Technology perspective.

Based on the findings of current state analysis and the literature review, the initial proposal for the roadmap was created and discussed with the team. The initial proposal presented a structured outlook that comprised three key perspectives, implementation proposal, and its timeframe. The development of the proposal was based on the suggestions and feedbacks of the stakeholders (Data 2) and then carried out in one area (in the next stage, validation), where the team was ready to act, in the Technology perspective. The improvements involved assessing the implementation impacts and methods for smooth transition from the current practices.

The initial proposal was then analyzed and validated by the stakeholders. Suggestions and feedbacks for each of the key perspective of the roadmap were brainstormed in a workshop and the inputs were collected as Data 3 findings. Based on the feedback, improvements were made, and the final proposal was developed. The implementation plan for the proposal was also discussed and its feasibility of implementation analyzed with the stakeholders. It was also agreed that the proposal will be implemented effectively and monitored for effective functioning. Though the implementation of roadmap for the Market and Product perspective seemed a little out of scope in the beginning, it eventually gained a wider recognition and understanding, and it was emphasized by the stakeholders as it helped them visualize the positive impacts that the product roadmap would offer to the entire working pattern in the case company. The Technical team assessed the impact and risk factors and brainstormed the implementation processes. Initial tasks that are to be performed before the implementation of the roadmap were also analyzed, and the key points were drafted beforehand.

Though the initial thesis outcome was to propose a product roadmap for the case company for next three years, the outcome was influenced by various internal factors that posed a challenge to the effective implementation of the roadmap for such a long period of time. So, the timeframe was reduced to a more realistic 1-year plan. It has also been

acknowledged by the Product owner that the proposal will be implemented incrementally, and a dedicated monitoring will be utilized to adhere to the roadmap metrics.

This implementation of the product roadmap helped the case company to better address the planning process and developmental procedure in a more concrete way considering all the key perspectives and the performance metrics that should influence the effective functioning of the entire product developmental process.

7.2 Next Steps and Recommendations for the Product Roadmap

The proposed roadmap framework was immediately implemented (in one area, Technological respective, by the Technology team), and the initial process to key in the essential data from the existing source repository was initiated. The main recommendation involved careful transition from existing methodologies and keeping to structuring the roadmap based on core perspectives.

First, the Product owner can set goals to the concerned team that handle the Market & Strategy elements and Technical elements. The Product perspective elements are handled in the case company by the Product owner himself, hence an elaborate approach for implementation was not needed. The Product owner initiated the process by requesting reports from the team members that would be analyzed and further considered for drafting the key elements in setting product goals and planning strategic activities.

Second, to fully utilize the roadmap proposal, the Team leaders from the Marketing and Business development and the Technical development team should be aware the roadmap and its functioning. Effective participation of the team members in this regard is critical, as it creates a concrete approach to effective usage.

Third, the task information used as a reference by the individual team members along with the Product owner inputs were fed into the roadmap framework. The details of each of the roadmap entity is then carefully monitored based on the key dates and developmental milestones. This proposal would best address the intended challenges based on the contribution of the team members and consistent monitoring of its

functioning, as it offers a visualized framework for key focus areas of the company's overall development

7.3 Thesis Evaluation

The main purpose of creating the product roadmap was to offer the case company a visualized framework where the team members can have a repository of the tasks that have to be implemented in future. It would act as a planning tool that incorporates essential key elements with respect to timeframe and milestones in product development.

It should be admitted that the thesis researcher faced significant challenges in acquiring the inputs from the key stakeholders and had to modify the proposal that it would best fit the case company's current level of decision making and vision about the product. The research design helped to clearly stay on the stages of the entire process, which helped in achieving the desired goal of the thesis, even with the current level of detail and depth (which was not possible to make deeper, due to the above limitations). The Data collection plan facilitated analyzing the current working procedure of the company, which helped to clearly understand the existing problem and derive the outcomes as close as possible to the initial plans. The current state analysis gave a deep view into the working practices, the adopted techniques and overall functioning of the developmental process. It helped to better understand the needs of the team members, stakeholder and customer expectations, and the product owner's goal towards the product development.

The literature review helped in understanding and acquiring a deeper knowledge of the entire road mapping process, the elements involved and conceptualizing the framework to acquire the desired outcomes. The thesis researcher got a clear understanding of the elements and the processes in creating a roadmap for a company from scratch with the help of available resources.

The entire process helped to gain insights on the product development process, and the factors that would affect the developmental procedure, and better understand the requirements of the team members involved.

Proposals to implement the Market (No 1) and Technological (No 3) perspectives were initiated and the required planning process is already underway. However, these proposals encountered a few challenges in implementing the Product (No 2) perspective in the proposed roadmap. The deeper discussion around and implementation of the Product perspective were affected by various factors like funding, resources, target groups, and so on. Suggestions and recommendations for incorporating the Product perspective by adapting necessary changes in the company's functioning were discussed and set to be implemented based on further inputs from the relevant (top level) stakeholders that will be gathered in the future.

7.4 Closing Words

The thesis was conducted in a startup and an agile environment. The proposed roadmap was drafted based on the requirements of the case company and addressing its existing challenges. Even though the outcomes were not fully up to the level of desired outcomes, efforts were taken that they would address the key perspectives in the best possible way. The identified steps were agreed with the team of the company that would help in achieving a more specific outcome, in a step by step, incremental manner. Some of the items in roadmap requires more specific information in relation to the roles and responsibilities of the individual team members.

The proposal cannot be articulated with general ideas and individual decision. It was with ultimate teamwork and constant revision of challenges encountered that the roadmap has been developed to the present level and partly implemented. The future should bring more results, as it found a general support in the team.

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Nokia Siemens Network website Available from: <https://www.nokia.com/networks/>

Appendix 1:**Initial Interview Questions to direct the interview****Interview 1:**

1. Brief description of your role in Unfair advantage?
2. Does the current product offer an intended service our customers?
3. What are the current challenges in our product?
4. How do we identify new target customers?
5. How do we serve new customers and what unique ways we adapt to capture customer demand?
6. How are the market demands and customer requirements obtained, categorized, and prioritized?
7. What are the key features in the current product that need an improvement?
8. What are the features that could be enhanced to stay in line with competitors?
9. What are the challenges that your team encounter in obtaining and prioritizing customer demand? (In detail)
10. What improvements you would suggest easing the challenges faced by the marketing and business development team? (In detail)

Interview 2:

1. What is the current role in the company, can you explain your responsibilities?
2. Are our business goals and objectives clear and well communicated to all the team members?
3. How are we measuring our product developmental process, do we have any reference repository?
4. What is the current phase of the product, do we have any assigned timeframes for releases?
5. Does the product vision match the current developmental practices? Are we leading towards meeting the intended product goal?
6. What are the existing challenges that we face as a whole?
7. Are we functioning with sufficient resources?
8. Do we have any challenges in attaining futuristic goals or targets? (In Detail)

9. Do we adapt any strategic planning methodology, how is the product management performed?
10. On your perspective, what are the developmental needs of the product? (In detail)

Interview 3:

1. Brief description of your role in technical team?
2. What is the team size, and can you explain the team member responsibilities?
3. What are scripting languages that you use?
4. What are other tools that you currently use?
5. Are the current programming languages well suited for product development?
6. Who supports the team members when in need?
7. Do the team members have clear idea of product objectives, can they choose the next feature in pipeline for development?
8. How and by whom the tasks are assigned to team members?
9. Do you use any product planning tool?
10. Are the tasks assigned for next few months or can you explain the future developmental targets?
11. Do we follow agile or waterfall approach of development?
12. Any setbacks or challenges existing in current developmental practice? (In detail)
13. What possible improvements you would suggest easing the challenges faced by the technical team? (In detail)

Appendix 2:**Summary of key points from Interview 1****March 21, 2022**

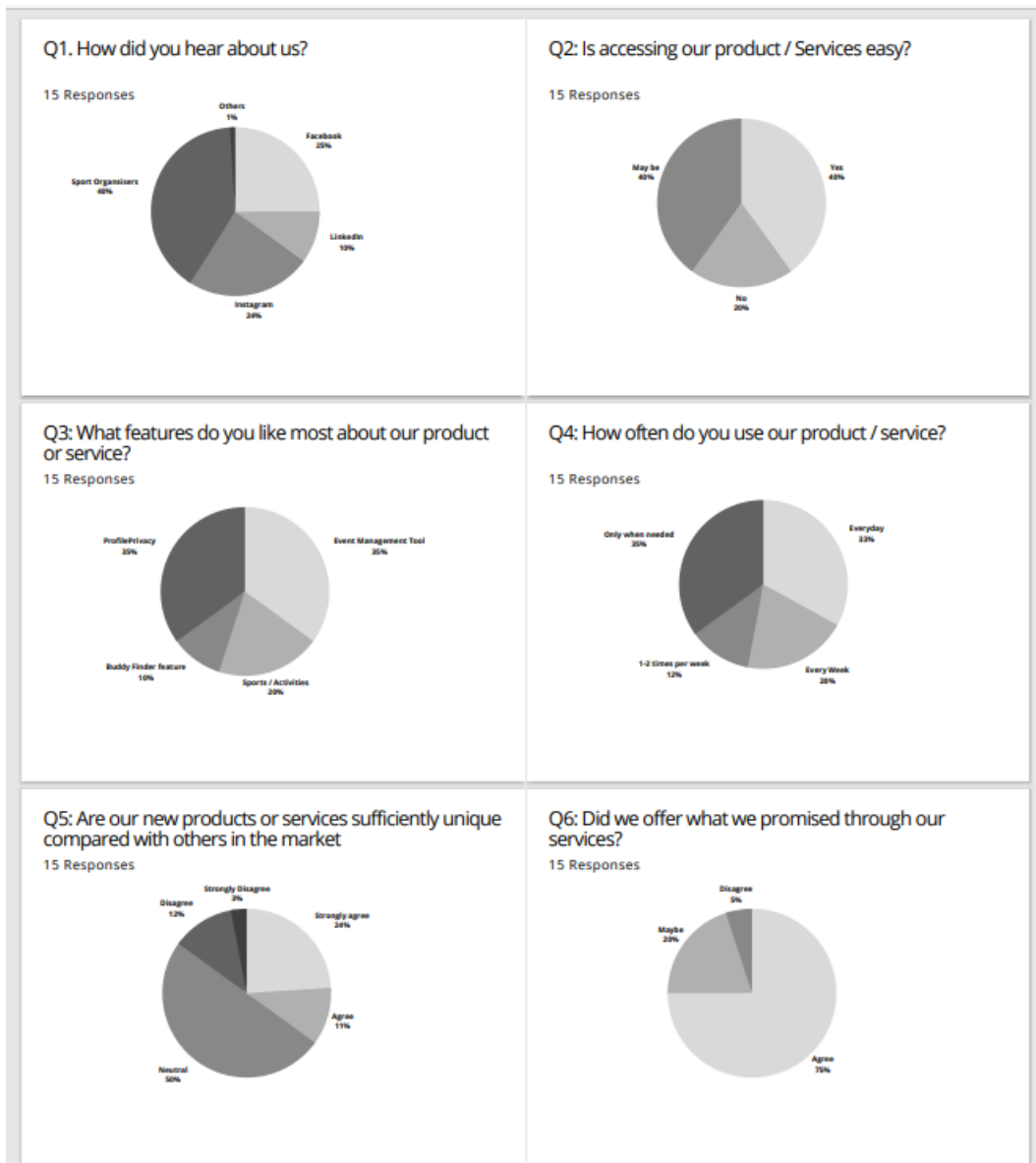
- The marketing and the business development team have direct relation with the customers.
- The client requests and market demands are monitored, all the customer interactions are carried out by the specific member X of the team.
- The feedbacks and testimonials from application's social media channels are used for monitoring direct customer demand.
- The current trends and competitive offerings are unique, hence careful analysis and refinement of feature is a must.
Client expectations change rapidly, each B2B customer demand customized offerings
- The demand from the customer is varied, and every client meeting ends up with acquiring features to be improved or modified.
- The status of demanded features is discussed with X and later communicated with the clients.
- The team does not have information about further processing of required features, X communicates and takes the proceedings further. due to limited technical resources.
- The management of feature dependencies and product vision is unrealistic.
- Long term planning of the product is not done due to frequent requests from multiple client sources.
- The current challenges include, work management, no documented approach.
- The team has limitations to perform the market research and statistical analysis., since those tasks have not been assigned earlier.
- The team has clear work tasks assigned and are aware of the current practices and their role in developmental process.

Summary of key points from Interview 2**April 7, 2022**

- The team includes product owner, lead developer, junior developers, test engineer, UX designer
- The responsibilities and tasks are assigned by the product owner.
- No documented or an effective planning tool adapted, the team uses JIRA sometimes and the features are listed in Taoist.
- Follow agile methodology, planning sprint for shorter time.
- No long-term planning or clear futuristic goals.
- The HTML and CSS are used for front end, and the back-end programming languages are Node JS and JS ES6, the application uses MongoDB.
- No technical documentation or product management practices adapted
- Difficult to work with MongoDB, takes higher memory space. Its installation requires expert guidance.
- The team does not have lead developer supporting full time.
- The team performs and relies on product owner guidance.
- The team prioritizes the tasks and work on high priority tasks, other feature improvements are assigned during low work period.
- Limited resources make it increases workload and uncertainty to team members
- Frequently changing team hinders product development schedules and deployment practices.
- The deployment is performed only by the lead developer.
- The team relies on open sources as a source of reference.
- No automated testing, the current testing is performed by a single person, which increases the test and bug reporting duration.
- No documentation of previous developmental practices, release schedules, deployments, feature dependencies.
- The team doesn't not have any product management tool.
- Current Database storage is higher which affects the overall functioning.
- The database must be upgraded based on increase in application usage.

Appendix 3:

Survey Response



Survey Response (Continued)

