Product Roadmap Formats for an Uncertain Future: A Grey Literature Review

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Abstract: Context: Product Roadmaps aim to provide direction, enable consistent development in relation to a product vision and support communication with relevant stakeholders. There are many different formats for product roadmaps, but they are often based on the assumption that the future is highly predictable. However, especially software-intensive businesses are faced with increasing market dynamics, rapidly evolving technologies, and changing user expectations. Consequently, many organizations are wondering what roadmap format is appropriate for them and what components it should have to deal with an unpredictable future. Objective: This paper aims to identify suitable formats for the development and handling of product roadmaps in dynamic and uncertain markets. Method: We performed a grey literature review according to the guidelines according to Garousi et al. Results: First, various components of the roadmap were identified, especially goals, themes, outcomes, and outputs. Second, various product roadmap formats (e.g. theme-based roadmaps) were discovered. The roadmap components were then assigned to the various product roadmap formats. This overview aims at providing decision support for companies to select a suitable product roadmap format and adapt it to their own needs.

Keywords: Product roadmap, product strategy, product management, agile development

1   Introduction

For the success of a company, it is essential to provide a strategic direction in which the product offerings will be developed over time in order to achieve the corporate vision. The basic purpose of a roadmap is to provide essential understanding, proximity, direction, and some degree of certainty regarding the planning of a course [KS01]. In general, there are different types of roadmaps such as science roadmaps, industry roadmaps, technology roadmaps, or product roadmaps [KKL03]. In the context of product management, product

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roadmaps are strategic communications tools that map out the vision and direction of the product offering and the work that is required to get there. It should answer the question of how to serve important markets and capture new markets with the right products at the right time [Lo17, VLR02]. A recent study has shown that product roadmaps of many software-intensive companies consist mainly of specific products, features, or services together with precise release dates for long time horizons [MTL19a]. Such roadmaps can be characterized as feature-based roadmaps [MTL18, MTL19a]. Feature-based roadmaps work well in stable and predictable markets where no frequent changes occur and where a static and temporally precise prediction is possible. However, through the dynamic and high uncertainty in today´s market, such feature-based roadmaps are likely to fail [Lo17, BM18]. As a result, companies are facing the challenge of deciding between breaking promises by constantly adjusting the roadmap or sticking to a plan made months ago that seems increasingly outdated. Therefore, most companies have recognized that there is a mismatch between feature-based roadmaps and dynamic and uncertain market environments. Consequently, most companies are seeking opportunities to improve their product roadmapping practices and strive for new approaches [MTL19b]. The available scientific literature provides only little knowledge about which product roadmap formats (i.e., structure and contents of a product roadmap) are suitable for operating in a dynamic and uncertain market environment. To fill this gap, the aim of this article is to identify such roadmap formats based on the analysis of the so-called "grey literature" (e.g., white papers, articles, blogs, business books, etc.). It should be noted that this article refers to product roadmaps and not to roadmaps in general.

2   Related Work

Roadmapping is a flexible technique that is widely used within the industry to support strategic and long-range planning [PFP04]. Groenveld defines roadmapping as a process that contributes to the integration of business and technology by displaying the interaction between products, and technologies over time, taking into account short- and long-term product and technologies aspects [Gr97]. The output of the roadmapping process is called roadmap [LKK05]. A roadmap provides a structured visualization in order to explore and communicate the relationships between evolving and developing markets, products, and technologies over time. [PFP04]. Roadmaps can be expressed in various forms, types, or with different taxonomies [KKL03]. However, all roadmaps seek to answer the three questions: 1) Where are we going? 2) Where are we now and 3) How can we get there? The most common structure of a roadmap is a multi-layered time-based chart, showing how various functional strategies are aligned [PFP05]. Several studies exist that focus on the structure of roadmaps. Example studies are described in the following.

Phaal et al. [PFP05] generalize a roadmap format along three broad layers (including sub layers) which can be applied to many different situations. The top layer deals with the purpose that the company is striving for together with the factors that influence this purpose (e.g., trends and divers). The middle layer shows the mechanism through which

the purpose should be achieved (e.g., products or services). The bottom layer of the roadmap comprises the resources that must be marshalled and integrated to develop the delivery mechanisms (e.g., technologies). Apart from these studies which provide only high-level information on how roadmaps should be structured, few authors explicitly deal with the structure of a product roadmap. Therefore, two examples are described in the following. One product roadmap structure proposed by Vähäniitty et al. [VLR02], which consists of five layers (on the y axis) and a timeline (on the x axis). The four topmost layers (services, releases, product components, and platforms depicting the development of various parts of the whole product, while the bottom layer (resource requirements) shows the estimation of human resources required at a given moment. The structure of the product roadmap provides information on the product architecture over time as well as the relationships between product releases, components, and platforms. The existing studies present product roadmap structures which essentially consist of features that are mapped onto a timeline. Therefore, the proposed structures can be regarded as traditional approaches that work in a stable market environment where forecasts are possible. The existing literature does not cover sufficiently product roadmap formats that are specifically designed for operating in a dynamic and uncertain market environment. This is the focus of the study presented in this article.

3   Research Approach

Due to the challenges posed by changes in the market environment (from stable and predictable to dynamic and uncertain), the present study was designed as an exploratory study. In order to conduct the study in a systematic and repeatable manner it follows the guidelines according to Garousi [GFM19], which considers three main phases: 1) planning the review, 2) conducting the review, and 3) reporting the review.

3.1   Planning the Review

Identification of the need for a GLR: First we assessed whether a GLR is an appropriate method for our study. For this purpose, the Garousi checklist was used [GFM19]. A recent review of the scientific literature has shown that most scientific articles describe product roadmapping do not address the requirements of an increasingly digital and dynamic environment [MTL19c]. In order to obtain more information about this topic the conduction of a grey literature review is an appropriate approach. Furthermore, an initial review of the grey literature and the conduction of expert interviews in previous research indicate that there is a high level of interest in insights about the topic "product roadmapping in a dynamic and uncertain market environment" [MTL18, MTL19a,]. A grey literature review can therefore contribute to the transfer of practical knowledge.

Research questions and scope of the study: Especially companies that are active in the software-intensive business face the challenge of a dynamic market environment with high

uncertainties. Therefore, our study focuses on identifying suitable formats for the development and handling of product roadmaps in a dynamic and uncertain market environment. Based on this goal, the following research questions were defined:

- **RQ 1:** Which components of a product roadmap are reported in the grey literature to support the creation and handling of product roadmaps in a dynamic and uncertain market environment?

- **RQ 2:** What kinds of roadmapping formats are reported in the grey literature that are suitable for a dynamic and uncertain market environment?

Identification of the search string: The initial set of our search terms was developed in a brainstorming session. In order to obtain sufficient results and to cover our objectives, we evolved the search terms iteratively. Afterward we connected the various search terms with Boolean operators. After evaluating different options, we have defined the following search terms:

A1: Innovation, A2: Product*, A3: Product Management, A4: Agile, A5: Outcome* driven, A6: Outcome*oriented, A7: Goal*oriented, A8: Theme*, A9: Roadmap*

The complete string used in our study was:

(A1 OR A2 OR A3 OR A4 OR A5 OR A6 OR A7 OR A8) AND A9

Definition of the inclusion/ exclusion criteria: In order to filter relevant from irrelevant articles, we defined the inclusion and exclusion criteria as shown in Table 1.

Inclusion	The article discusses the application of product roadmapping in practice.
	The article was published in English or German.
	The URL is working and freely available.
Exclusion	The source is non-text-based.
	The article contains the duplicated content of a previously examined article.

Tab. 1: Inclusion and exclusion criteria

3.2   Conducting the review

Study selection process: The data retrieval process was performed by using the predefined search string and applying it to the Google search engine (google.com). In order to avoid biased results based on past activities, the search was conducted in the incognito mode of the browser. Further, a VPN service was used to anonymize the location from which the search was conducted. Moreover, the relevance ranking was applied, which ranks the results according to the Google PageRank algorithm. To increase the amount of available URL's the Google option to include similar results was activated. The

search was conducted on January 17th, 2020 and yielded 426 hits. In addition to the search process, we conducted snowballing (i.e., considering further articles that are recommended in an article). This led to 53 further articles. After the application of the selection process (see Figure 1) we obtained 170 relevant articles which address the main topic product roadmapping. On this basis, we have categorized the 170 articles according to different subject areas (product roadmap formats, product roadmapping processes, product roadmap prioritization techniques, alignment of different stakeholders around the product roadmap and, challenges and pitfalls regarding product roadmapping). This led to 25 relevant articles that deal with the topic product roadmap formats which are present in this study.
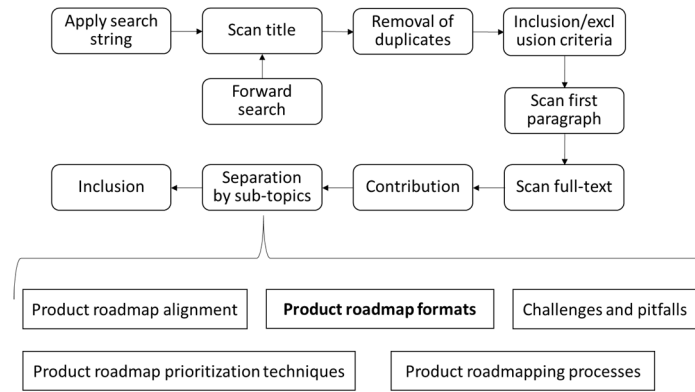

Fig. 1: Study selection process

Quality assessment: The essential criterion for the quality assessment was that the reviewers were able to understand the suggested approach based on their practical experience. All steps of the selection procedure (as shown in Figure 1) were carried out individually by two reviewers. In the event that the individual reviews led to different results, the process was carried out by a third reviewer to make a final inclusion/exclusion decision.

4   Results

To answer RQ1, we analysed the relevant articles and identified roadmap components (i.e., information artifacts) that are used to describe and manage product roadmaps. To create a basis for the description of different roadmap formats, the aspect "timeline" is further discussed afterward. Based on this, we will answer RQ2 by describing the different roadmap formats found in the grey literature.

4.1   Roadmap components

Various components of the roadmap were identified. Often similar components were designated by different names or one name stood for different types of components. We have therefore classified the different types of components and used the most common names as identifiers. Table 2 shows the different classes of components and their definitions. Afterward Figure 2 shows the identified roadmap components, their granularity (level of detail) and the time of their implementation.

Component	Granularity
Product Vision	The vision states the overarching goal, the ultimate reason for creating the product, and the positive change the product will bring about [Pi20a].
	A product vision is a problem that a company is trying to solve or the change a company wants to see in the world [Lo17].
Themes	Themes are high-level customer or system needs [Lo17].
	Themes are global outcomes to be achieved, also traceable to the strategic business objectives. Themes may span over several months and take more than a year to complete [Sv20].
Outcomes	A well-articulated outcome describes the value a team intends to create. [Pe20].
	Outcomes are the change customer behaviour that affects our business success [Go20].
Goals	Goals are time-bound and measurable targets, with defined metrics for determining success. They are included in the roadmap to show the critical milestones which need to be accomplished to make the product vision a reality [Al20].
	Goals and action plans should be specific, measurable, achievable, realistic, and timely (SMART) [AHA20].
Outputs	Outputs are the stuff we produce, be it physical or virtual (e.g., a car seat for babies is an output; in contrast, outcomes describe the difference the stuff makes, e.g., keeping a child safe in the car) [Lo17].
	An output is anything that your team delivers [Mc20].

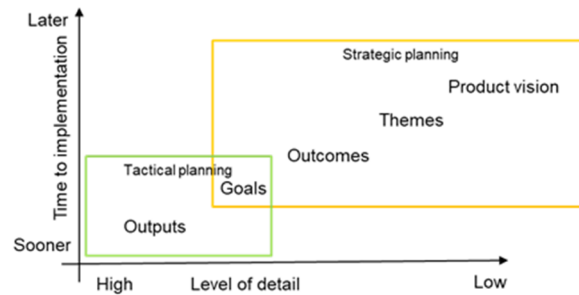Tab. 2: Definition of the identified roadmap components

Fig. 2: Classification of the identified roadmap components based on the
level of detail and timing of implementation

4.2   Timeline

Another important aspect that is discussed in the grey literature is the usage of a timeline.
The main purpose of implementing a timeline on a roadmap is to provide information at
which point in time a specific roadmap component is relevant (e.g., an outcome is reached,
or a feature is implemented). A timeline is an integral element within traditional product
roadmapping approaches [Ri20]. However, the changing market environment demands
new requirements regarding the format of a product roadmap [Lo17]. This raises the
question of whether a concrete timeline and deadlines should be included, and which
audience should be allowed to see these date-related details. The following describes
situations where it makes sense to integrate a timeline into a roadmap:

Important imposed deadlines: In case that the success of a product depends on important
imposed deadlines, a concrete timeline is usually necessary. However, this requires that it
is possible to define a realistic timeline. This is not always possible and depends on the
kind of product. Typical examples for products that depend on deadlines are seasonal
products like games and smartphones, whose main sales take place prior to Christmas. In
this case, it is important to get the products on the market on time, as a delay would have
a significant impact on revenues. [Pi20b]. Another example that a concrete timeline on
roadmaps might be necessary is compliance. If, for instance, a certain law is expected to
come into force that will affect the product development (e.g., GDPR), a concrete timeline
might be necessary. In this case, the implementation of a timeline ensures that all necessary
regulations are carried out on time [Pr20].

Management expects a timeline: Sometimes management expects to structure the
roadmap according to a concrete timeline. This means that management or other
stakeholders want to know exactly when a new feature of a product will be available or
when a product will be launched. However, it is recommended that the management
focuses more on supporting the various teams in achieving the strategic outcomes rather
than urging teams to deliver outputs on time [Pr20].

The following describes reasons why it might not be appropriate to integrate a concrete timetable into a roadmap: Considering dates as commitments: One problem regarding delivery dates on a product roadmap is that people across the company might interpret concrete dates as commitments. This might lead to a shift of the focus from satisfying important customer needs to delivering outputs [Ca18].

Unrealistic expectations: Using and communicating deadlines on product roadmaps can lead to the situation that external stakeholders such as users, customers, or salespeople may regard target dates as a firm promise that must be kept. This might create pressure for the person in charge of the product and the engineering team. Moreover, it can result in a bad working environment (e.g., long working hours and unsustainable pace) that has a negative impact on the product quality. Furthermore, customers can get disappointed whenever a specific feature is not met on the promised release day [Pi20b].

Flexibility: Product roadmaps without a timeline provide more flexibility to frequent adjustments which are a typical characteristic of dynamic and uncertain market environments. Moreover, one task of product management is to find a footing for further development. This requires a high degree of flexibility [Sh20].

4.3   Roadmap formats

In order to answer RQ2, we analysed the relevant articles and identified the following roadmap formats.

Feature-based product roadmap: Typically, a feature-based product roadmap describes specific products or features along with precise release dates that are mapped on a timeline [Pi20c] Figure 3 depicts a typical feature-based product roadmap. The aim of this roadmap format is to communicate what results are planned and what progress should be made [Ro20]. Feature-based roadmaps are suitable in stable markets where predictions are possible [Pi20c]. Such roadmaps are not appropriate for dynamic market environments or only appropriate for the near-term future [Ca18]. One reason is that a dynamic market environment with its rapidly changing customer behaviours and rapid technological changes requires frequent adjustments of the product roadmap. The structure of feature-based roadmaps makes it difficult to make adjustments [ASE20]. This leads to unnecessary replanning and rework efforts. The long-term planning of features on a very detailed level often turns out as a promise the engineering teams cannot deliver on [Fi20]. Another problem with feature-based roadmaps is that they do not provide strategic information about the "why" of the roadmap components. This blurs the product vision and provides therefore low orientation about the long-term direction of the company. It also turns the product roadmap into a backlog, which does not provide strategical direction and orientation [Pi20c].
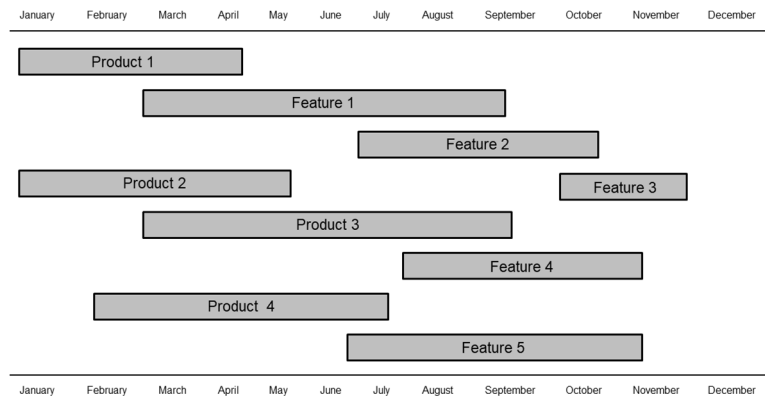
| January | February | March | April | May | June | July | August | September | October | November | December |

Fig. 3: Feature-based product roadmap [MTL18]

Goal-oriented product roadmap: Pichler [Pi20d] describes the goal-oriented product roadmap (short: GO product roadmap, see Figure 4). The GO Roadmap organizes specific product planning information around goals that can be considered the reason for each feature to be developed. In contrast to the feature-based roadmap format, this approach links goals with features and thereby provides some kind of guidance and justification for the development of the features [ASE20].

📅	1st quarter	2nd quarter	3rd quarter	4th quarter
🏷	Version 1	Version 2	Version 3	Version 4
🎯	Acquisition: Free app, limited in app purchase	Activation: Focus on in-app purchase	Retention	Acquisition: New segment
⭐	• Basic game functionality • Multiplayer • FB integration	• Purchase dance moves • Create new dances	• New characters and floors • Enhanced visual design	• Street dance elements • Dance competition
📊	Downloads: top 10 dance app	Activation, downloads	Daily active players, session length	Download

Fig. 4: Goal-oriented product roadmap [Pi20d]

In detail the GO roadmap is organized as follows: The first row presents information about the date or timeframes for the upcoming releases. Pichler recommends using specific dates on internal roadmaps. In case of communicating the roadmap to external participants, this row should be removed or loose timeframes such as in the first six months of 2020 should be used. The second row outlines the name or version of the planned releases. The third row describes the specific goals or the user/business benefit that should be achieved by each major release. Examples are goals for acquisition, activation, retention, or technical

debt reduction. The fourth row lists the features that are expected to achieve the objectives defined in the third row. It is recommended to identify 3 to 5 features for each goal. This should be based on the product capabilities that are necessary to meet the goals. The last row shows the metrics that help to determine whether the goals have been met. It should be noted that the metrics allow identifying whether and to what extent the goals have been achieved [Pi20d].

Outcome-driven product roadmap: Outcome-driven roadmaps are built around customer and business values rather than features that may or may not deliver value to the customers [Ca20]. Within this study, we identified various approaches for outcome-driven roadmaps [Sv20, Pe20, Go20, Ri20, Ba20, Do20]. Two approaches, one proposed by Gothelf [Go20] and one by Doherthy [Do20], are described in detail below.

The approach for an outcome-driven roadmap proposed by Gothelf [Go20] consists of strategic themes, quarterly objectives and key results goals (in short: OKR goals), and product/feature hypotheses (see Figure 5).
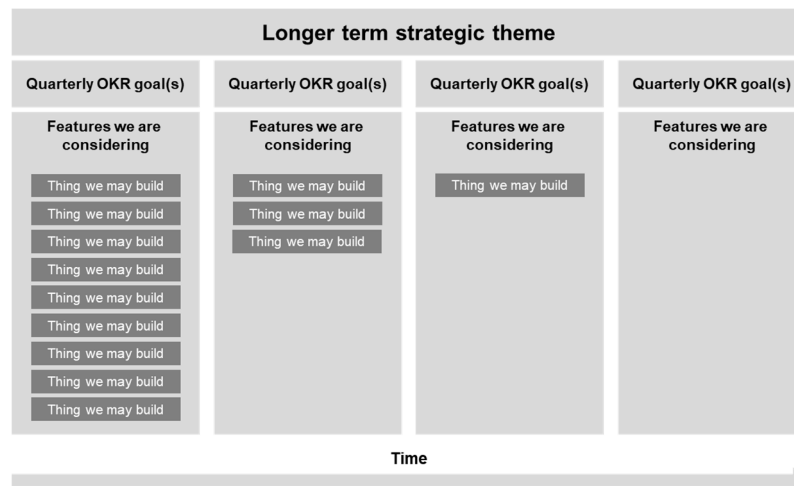

Fig. 5: Outcome-driven roadmap according to Gothelf [Go20]

Strategic themes are the organisational product strategies by the executive's leaders which should point the teams in a specific direction. For example, the expansion of the market share in Europe. OKR goals are the objectives teams strive for in order to achieve the strategic theme. The author stresses that customer behaviour should be used as a metric in the "key results" part of an OKR goal (these are the so-called outcomes in this approach). In addition, Gothelf recommends that the teams independently define the metrics and decide when they are reached. This requires that the product teams work with management to ensure that the defined goals are consistent with the product vision. Feature or product hypotheses are assumptions and guesses about how to achieve the defined OKRs for each quarter. By looking at a quarter in advance, a team can make educated assumptions about

which product or feature is appropriate to meet the quarterly goals. Teams will learn in the following quarter how well their ideas have worked, which ideas have pushed them forward and what their next ideas should be. Therefore, long-term assumptions are created as learnings from the previous quarter [Go20].

Another format for an outcome-driven roadmap was developed by Doherty [Do20]. The author points out that a roadmap facing the challenges of a dynamic and uncertain market environment should answer the following questions: 1) What are the vision and the goals of the company? 2) Which outcomes contribute to achieving the vision? 3) How will success be measured? 4) What is the current focus? Additionally, some indication regarding the timeframe should be given. Putting all information together results in the roadmap as shown in Figure 6.

First, the roadmap outlines the product vision at the top. The vision should be timeless and make clear why the product exists. It should also describe where the company wants to be in the long term. As a result, the product vision provides a "North Star" to ensure that all actions taken by the teams are heading in the same direction. Based on the product vision, two or three objectives should be derived which contribute to the achievement of the product vision. This ensures that the results are linked back to the objectives. Care should be taken to ensure that these objectives are specific, measurable, achievable, realistic and time bound. Within this approach, an outcome is defined as a measurable change in customer behaviour. Consequently, the types of customer behaviour that need to be changed to achieve the defined goals should be identified and listed in the roadmap. Using the OKR format, goals are the Objectives and outcomes are your Key Results. The roadmap shows the time horizon with the three columns "Now", "Next", and "Later". "Now" lists the results for the current quarter, "Next" shows the results for the following quarter, and "Later" shows the long-term results [Do20].

Fig. 6: Outcome-driven roadmap according to Doherthy [Do20]

Theme-based product roadmap: Similar to the outcome-driven roadmaps formats, there are various formats for developing a theme-based roadmap [Lo17, Se19, ASE20, Fi20, Ba20]. One example is the theme-based roadmap approach proposed by Lombardo et al. [Lo17], which is described below (see Figure 7). The content of the roadmap refers to a fictitious garden house company that aims to create garden products.

Product Vision
Perfecting people lawns and landscapes by perfecting water delivery

Timeframes →	Q1 2020	Q2 2020	2021	Future
Themes →	**Indestructible Hose** **Objectives:** • Increase unit sales • Decrease number of returns • Decrease overall defects **Features:** • 20´ & 40´ lengths • No-leak connection • No-kink armor **Stage:** Pre-production	**Delicate Flower Management** **Objectives:** • Double ASP **Stage:** Prototype	**Putting Green Evenness for Lawns** **Stage:** Discovery	**Infinite Extensibility** **Objective:** Pro Market
		Severe Weather Handling **Objective:** • Expansion **Stage:** Materials Testing	**Extended Research** **Stage:** Discovery	**Fertilizer Delivery** **Objective:** Pro Market

Disclaimer ⟶ Updated 04 April 2020, subjected to change without notice.

Fig. 7: Theme-based product roadmap [Lo17]

At the top of the roadmap the product vision is outlined as how a specific sort of customer will benefit from the product when it is fully realized and ubiquitous. Themes can be seen as the backbone of the roadmap as it answering the question: What would need to be true for the product to realize its vision and attain its business objectives? In this context, the authors point out that expressing themes as customer needs or problems is very effective in guiding the development of solutions (i.e., features). The themes are arranged into broad timeframes, e.g., beginning with half-year periods and expanding to a single column for the following years. From each theme, one or more business objectives are derived in order to explain the "why" of the roadmap in concrete terms. This includes getting stakeholders excited about the future and facilitating the release of resources needed to fulfil the theme. Concrete solutions such as features are the specific deliverables that will solve the problems identified by the themes. In this context, it is recommended to vary the details according to the stakeholders involved. This means that, depending on the expectations of the stakeholders, the details may be very thin or contain specifics such as product specifications, architecture diagrams. or prototypes. In addition, each intention on the roadmap is labelled by a status (e.g., discovery, design, prototyping) in order to give stakeholders an orientation of the current stage of product development. Finally, the inclusion of a disclaimer at the end of the roadmap makes it clear that all content in the roadmap is subjected to change without notice. This protects the company from accusations that promises are broken or expectations are not fulfilled. Another important aspect is that the authors consider the product vision, business objectives, timeframes, themes, and the disclaimer as primary components that are essential for an effective

roadmap. All other components are optional but will enhance the product roadmap in important ways for certain stakeholders. For example, planning with detailed features for the first quarter can support the development team. In order to compare the different roadmap formats, Table 3 shows which components are used to create each roadmap format.

Roadmap formats	Product vision	Themes	Outcomes	Goals	Outputs	Specific dates
Feature-based roadmap					X	X
Goal-oriented roadmap				X	X	X
Outcome-Driven roadmap	(X)	(X)	X	X	X	
Theme-based roadmap	X	X	X	X	(X)	

Tab. 3: Comparison of the identified roadmap formats

5   Threats to validity

We use the framework based on Wohlin et al. [Wo00] as the basis for the discussion of the validity of our study. **Construct validity:** The construct validity considers to what extent the operational measures represent what is investigated in the context to the research question [RH09]. First, the construct validity is threatened by the Google search engine regarding the accessibility of search results. After the application of the search string, Google returns 78.300.000 articles, but we have only access to 426 articles. We cannot know whether these 426 articles were representative of the total search result of 78.300.000 articles. Moreover, the search string itself poses a threat to the construct validity. There may be articles that deal with product roadmapping but use terms that were not covered by our search string. Therefore, we may have missed some relevant articles. **Internal validity:** Internal validity concerns the validity of the methods used to examine and analyse the data. In order to mitigate this threat, the quality assessment was conducted by two reviewers independently to limit confirmation bias and interpretation bias. In the case that the individual reviews led to different results, the process was repeated by a third reviewer in order to make a final decision. **External Validity**: External validity considers to what extent it is possible to generalize the findings. The results and conclusion relate to product roadmapping in a dynamic market environment with high uncertainties (e.g., the software-intensive business). Therefore, the results are not directly transferable to other industry sectors. **Conclusion validity:** The validity of conclusions concerns the degree to

which the conclusions of a study are based on the available data. In order to mitigate this risk, we have presented and discussed our findings with practitioners of the software-intensive business. In this context, no major ambiguities or inconsistencies were found [Wo00, RH09].

6   Conclusion

In this study, we conducted a grey literature review in order to identify suitable roadmap formats for the development and handling of product roadmaps in a dynamic and uncertain market environment. Overall, we identified four roadmap formats (feature-driven, goal-oriented, outcome-driven and, theme-based) which differ in their structure and roadmap components. Regarding the suitability of the various roadmap formats for operating in a dynamic and uncertain market environment a feature-driven roadmap can be seen as usually not appropriate. It is too static and makes it difficult to conduct frequent adjustments that are necessary in a dynamic and uncertain market environment. Due to the high uncertainty in a dynamic market environment, a suitable roadmap should contain components of different granularity (i.e., components should be more detailed the closer they are in time). Goal-oriented, outcome-driven, and theme-based roadmap formats are able to contain components of different granularity. A product roadmap should not only describe what will be built but also why it should be built. The goal-oriented approach focuses on the achievement of objectives, from which features are derived at a high level. This leads to a shift of the discussion from debating about features to agreeing on goals. It helps to make strategic product decisions and can thus be seen as a first step in the right direction. However, the goal-oriented roadmap does not necessarily consider the exact value that should be delivered to the customer and the business. The missing value aspect is covered by the outcome-driven roadmap format and the theme-based roadmap format. Theme-based product roadmaps provide an additional level of aggregation compared to pure outcome-oriented roadmaps (i.e., themes are some kind of high-level business or customer outcomes). In general, outcome-driven or theme-based roadmaps support the development of features based on customer and business needs in order to ensure that value is delivered to the customer and the business. Hence these two roadmap formats can be considered as most suitable for the operation in a dynamic and uncertain market environment. However, it should be noted that no single roadmap format exists that will suitable every product and every organization at every product development stage. All formats require careful customizations to the organization and its context.

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