ITONICS

Whitepaper

End2End Innovation –

from Environmental Scanning to the Innovation Roadmap

Content

Abstract

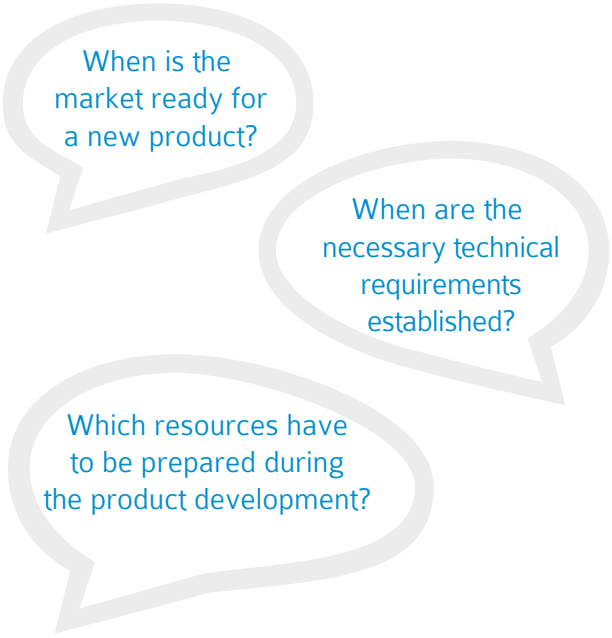
An organization which does not consider the future does not have a future. Of course the future can only be understood and planned to a certain extent. Targeted innovation management however, helps companies to identify and pick up on trends and technologies and channel them to create targeted innovations. This article outlines the processes required to do this, from the environmental analysis, to ideation, through to the planning of the market launch. In particular, the early stage of the innovation process has to date been neglected in innovation management.

This article presents a holistic, IT-supported innovative approach from environmental scanning through to the innovation roadmap and deals with the challenges faced in its implementation.

1 Increasing Complexity in the Business Environment

Product lifecycles are becoming shorter, technological development is advancing at a rapid pace, customer requirements are changing and the digital transformation enables the creation of new business models. Given this situation, merely responding to changes in the business environment is not sufficient. To remain competitive in the long term, companies must be proactive and develop the ability to respond promptly to weak signals and implement the corresponding strategies, changes and adjustments at an early stage.

The key tasks of strategic innovation management are to identify opportunities and risks at an early stage, classify, assess and interpret them and simultaneously make swift and sound decisions based on those opportunities and risks (Gerpott 2005). The innovation process therefore does not begin with collecting and developing ideas but instead begins with defining innovation fields in which innovations can and should be created. A strategic innovation field is described by company and customer-relevant trends, technologies and requirements and is the starting point for the development of ideas for products, services and business models. If strategic innovation fields are not elaborated, ideas are often sought after and developed within the marketplace, without taking the actual challenges into account. Just like the phase preceding idea generation, the subsequent phase is often only dealt with rudimentarily in the established models. At first glance, it seems logical to convert promising ideas into products and services and to market them. In reality however this approach falls short of the mark, particularly with regard to complex products. Questions such as



are relevant to developing a successful and sustainable innovation strategy. The integrated innovation management approach presented here examines innovation management holistically through to the implementation of the developed concepts using the innovation roadmap. End-to-end IT support accompanies the entire process and ensures resources are used efficiently.

2 Integrated Innovation Management

The questions which are of importance for a company's success such as "Where to play?" and "How to win?" must be considered as parts of one holistic strategy. For this reason, the integrated innovation management approach presented here is more comprehensive than the conventional stage-gate process (see Cooper (2008), for example) which begins with idea generation and ends with the product launch. As with the three-phase front-end model (Khurana and Rosenthal, (1997) and (1998)), trend and market information as well as available and future technologies play a key role in the preliminary stages in defining innovation fields, also called opportunity spaces (Mootee, 2011). An opportunity space (= field of action) defines the "Where to play?": which market developments are relevant for a company and which trends influence market activity? Which technologies are these trends linked to and/or which technologies could be used for product and service innovations in an opportunity space? If the opportunity space has been defined, ideas are then developed in a focused and targeted way. Not all ideas developed and selected in the stage gate process can be incorporated into the implementation phase immediately. Therefore, innovation roadmapping starts after the last gate to schedule the implementation of an idea and to place it in relation to all other implementation projects (Abele, 2006). Dependencies on trends, technologies and resources are also modelled and presented in innovation roadmapping. This helps to process new products, services and business models in a structured manner with regard to creating a portfolio plan. In the innovation roadmap, we call the process which starts with the idea and ends in the implementation project "How to win?" in contrast to the upstream "Where to play?" (See Figure 1).

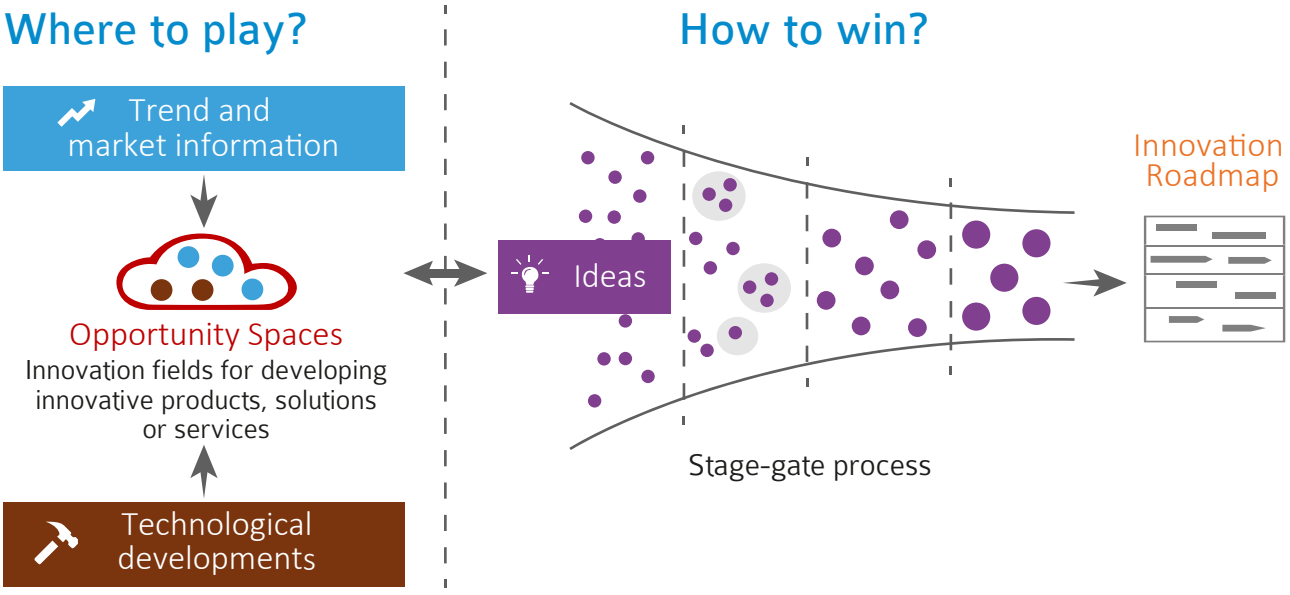


Figure 1: Method of the integrated innovation management approach

2.1 Entities in the Innovation Process

During the integrated innovation process, six basic entities (or results) are created which are linked to each other and represent the central objects in the integrated innovation management approach (see Figure 2):

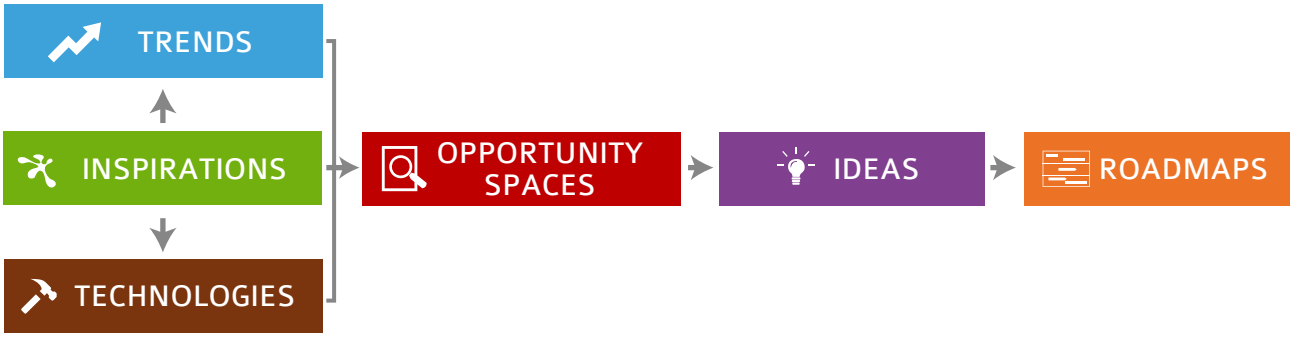


Figure 2: Entities of the integrated innnovation management approach

Trends

In general, a trend is understood to be a general tendency of a series of data points to move in a certain direction over time. Trends as defined in integrated innovation management are medium to long-term developments in the socio-economic business environment. In comparison with fads or hypes, trends have an effect for at least five years and have a significant impact on the socio-economic business environment (Durst et al., 2010).

Technologies

In the approach presented here, technologies refer to scientifically based knowledge, which can be used to solve companies' practical problems. This is why numerous technologies and/or technology combinations are usually incorporated in a product or manufacturing procedure. Scientific publications or patent databases in particular are used as a source for identifying new technologies.

Inspirations

Inspirations are spontaneous ideas, market surveillance activities, discoveries on the Internet or ideas gleaned from trade fairs or industry sector events. An inspiration can be assigned to specific trends and/or technologies to enhance their content. Thus applications in additive manufacturing are relevant in a variety industry sectors and can aid in understanding the maturity of 3D printing technology and to be able to generate proprietary ideas which can be implemented. Inspirations promote the in-depth understanding of the various

ways a technology or a trend can be utilized. Ideally an inspiration encourages people to think and ignites – particularly in controversial topics – the necessary creativity to develop a product or service from one or more inspirations in the context of trends and technologies. Inspirations do not follow a structured process and can be generated on an ongoing basis and within the framework of targeted campaigns.

Opportunity Spaces

Relevant trends in conjunction with suitable future technologies help define potential opportunity spaces. This construct, which is also referred to as an innovation field, defines an over-arching area in which new and innovative products, services or business models can be created. Opportunity spaces are developed cyclically and are stable over a specified time frame. They define the innovation strategy (Mootee, 2011).

Ideas

An idea is a sudden cognitive occurrence, a creative thought or a notion on the basis of which action can be taken (Wahren, 2004). Ideally an idea leads to a new product, a new service or a new business model. Ideas are generated in a targeted manner within an opportunity space and are linked to the relevant trends, technologies and/or inspirations. Ideas can of course also be developed outside the defined opportunity spaces. Suggestions for improvements and complaints are not considered to be ideas in the innovation context and are therefore handled within the company suggestion system process.

Roadmaps

Roadmaps enable the analysis of critical paths, opportunities and risks and support decision makers in predicting and planning technological developments (Abele, 2006). As a visual communication medium roadmaps show the development of an element over time – usually a product, business model, or technology – and links the resources required to create the element with the intended markets. This allows the identification of gaps in the resource planning or supports decision-making for long term technology investments, for instance.

2.2 IT-Supported Implementation of the Innovation Process

The ITONICS software solution Innovation-Suite provides a singular, holistic approach for IT-supported integrated innovation management. The application supports the creation, enhancement and linking of the specified entities from environmental scanning to innovation roadmapping. Here, the following module combination is used: TechScannr (software-supported environmental scanning), Trend-Radar, Technology-Radar, Idea-Manager and the Roadmapping-Engine. Figure 3 shows how the individual modules interrelate.

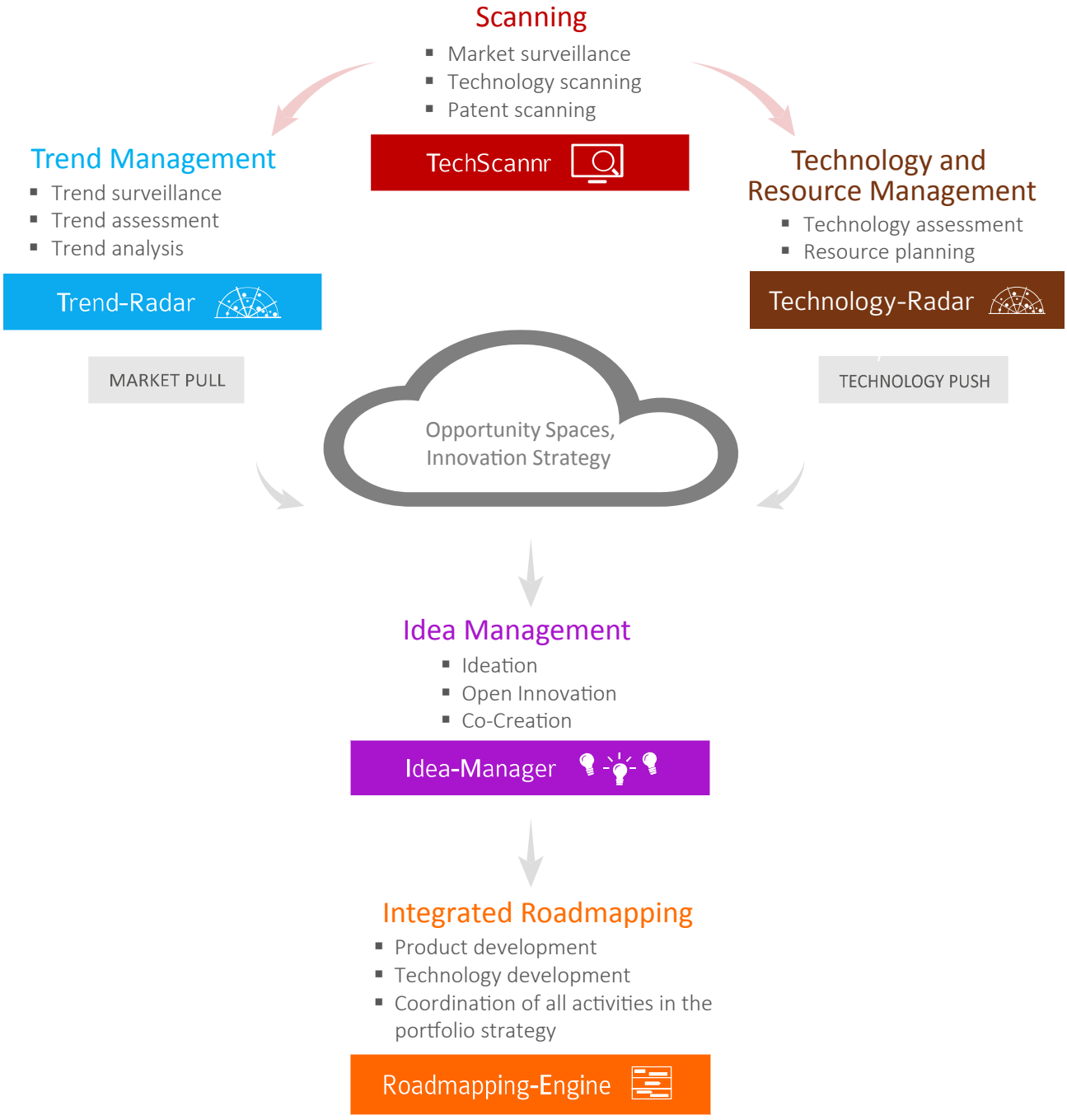


Figure 3: ITONICS Innovation-Suite – from environmental scanning through to roadmapping

2.2.1 Environmental Scanning - Identification, Enhancement and Assessment of Trends and Technologies

Extensive environmental scanning is carried out initially to analyze which trends and technologies have an impact on a company. For this purpose, IT-supported and automated data collection methods are used and assigned to the entities trends, technologies and inspirations.

IT-Supported

The Innovation-Suite provides numerous options for identifying trends, inspirations and technologies and processing them further using IT tools. While doing your daily work at your PC, you can use a browser plugin (also known as a Webclipper) to save information about new technologies or trends you come across directly in the Trend- or Technology-Radar. You can also record inspirations using a smartphone app. In addition, the Innovation-Suite provides numerous interfaces to trend, patent and technology database providers. This allows you to fill the Trend- and Technology-Radar quickly with content you wish to process further.

Automated

You can use the TechScannr module to carry out automated environmental scanning. This module is query-based and accesses patent and technology databases as well as scientific publications. Further relevant databases or RSS feeds and websites can be connected via standardized interfaces. You can discover and monitor new trends and technologies using this module. It allows technology field experts, for example, to release up-to-date reports on specific queries on a weekly basis. The information gathered from the automated environmental scanning is stored in a structured manner within the Trend- or Technology-Radar.

In the next step, the Trend-Radar and Technology-Radar modules aid in categorization, discussions and assessments of the business environment in a systematic way. These modules provide collaboration components which allow the joint assessment, discussion and continued development of content enabling cooperation in teams distributed throughout an organization. Furthermore, the processes in technology and innovation management are supported by workflows which map a stage gate process and are configured depending on the industry sector and customer requirements. Trends and technologies are created by dedicated user groups in the Trend- or Technology-Radar. They are processed, enhanced, evaluated and then discussed as part of a stage gate process. Among other methods, the evaluated trends and technologies are visualized in the system in the form of a radar (see Figure 4).

Figure 4: Visualization of trends and technologies on the radar

The dimensions of the radar (distance from the center point, placement in a segment, size, color and shape of the data points) can be freely configured. Every data point in the radar stands for a trend or a technology. Numerous filter options enable the existing data to be analyzed quickly.

To simplify and globalize the search processes, inspirations can be recorded in the form of text, audio, video or images using a smartphone app. Here, inspirations are to be regarded either as confirmation/support of a trend or as an additional source of a trend/technology.

Depending on requirements, the user can also compile a collection of trends and technologies to analyze them in more detail using different criteria (e.g. degree of maturity, relevance, need for action). For this reason, you can set filters for strategic fields of action, regions/-countries and /or the type of trend (micro/-macro/mega trend). This means that even an inexperienced user can quickly access relevant data records which can be used as the basis of strategy development, for example.

2.2.2 Ideation – Development of Opportunity Spaces, Ideas and Innovation Portfolios

The idea management process can be divided roughly into four general steps (see Figure 5).

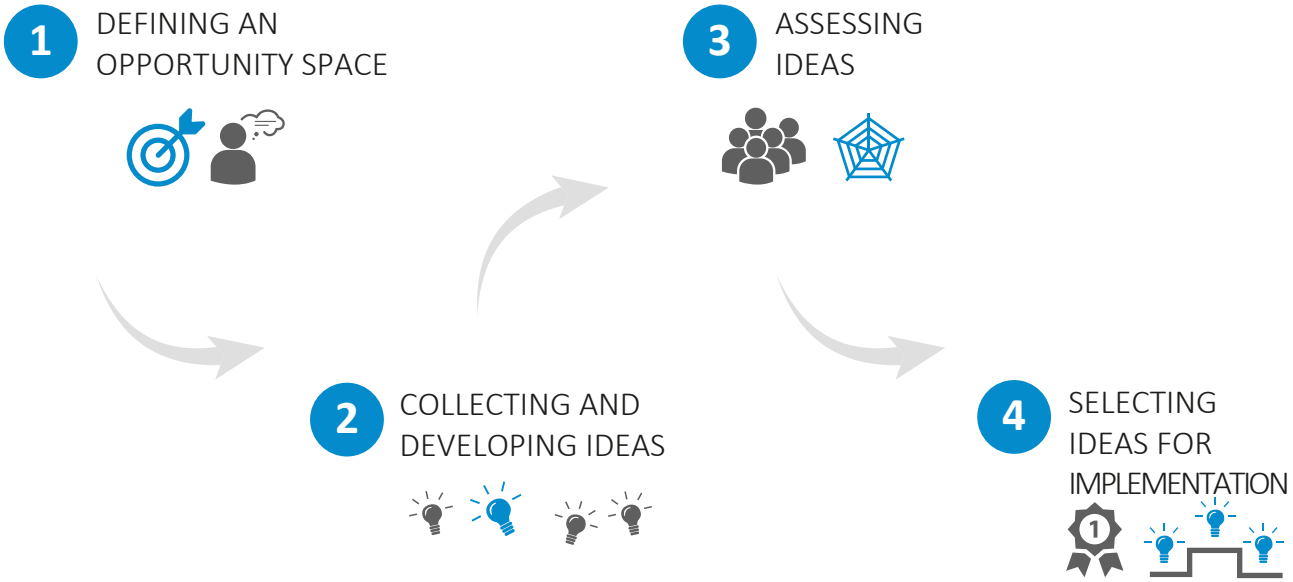


Figure 5: Four steps in the idea management process

The Idea Manager module supports all specified process steps from opportunity spaces, to the submission and development of ideas, to concepts which are ready to be implemented, and finally to the assessment of these concepts in innovation portfolios.

Defining an Opportunity Space

Prioritized trends and technologies are assigned to an opportunity space in the Idea Manager. The opportunity space is described in detail and each of the individual linked trends, technologies and inspirations can be researched intuitively by the user. Associated audio files, videos or publications help the users to familiarize themselves comprehensively with the opportunity space. Based on the opportunity space, innovation managers can create dedicated innovation campaigns for generating ideas and selectively invite internal or external experts to join.

Collecting and Developing Ideas

All authorized users can create ideas within the framework of an innovation campaign. Trends, technologies and inspirations are used in the campaign as the basis for familiarizing the users with the conceptual formulation of the campaign and encourage the creativity of the users. Users can comment on, discuss and assess (in accordance with simple criteria) existing campaign ideas. This first feedback loop supports the development and materialization of ideas through to the elaboration of concepts for products, services or business models.

Assessing Ideas

The assessment of ideas is a critical point in the innovation management process. Sound decisions regarding the further pursuit or implementation of ideas cannot be made until strategically relevant assessment criteria are defined and applied. In addition, a variety of role players with different tasks are involved in this step. Varying quality in idea management systems can be attributed, among other factors, to the quality of the assessment and the idea selection process (Douglas et al 2006; Blair and Mumford 2007).

Ideas are assessed within the framework of innovation campaigns in a defined cycle. Ideas conceived outside campaigns (flashes of inspiration) are also assessed by experts at periodic intervals. The standard idea assessment process is shown in Figure 6.

A shortlist of ideas forms the input to the assessment process. This list shows all of the ideas which are relevant for a specific assessment stage.

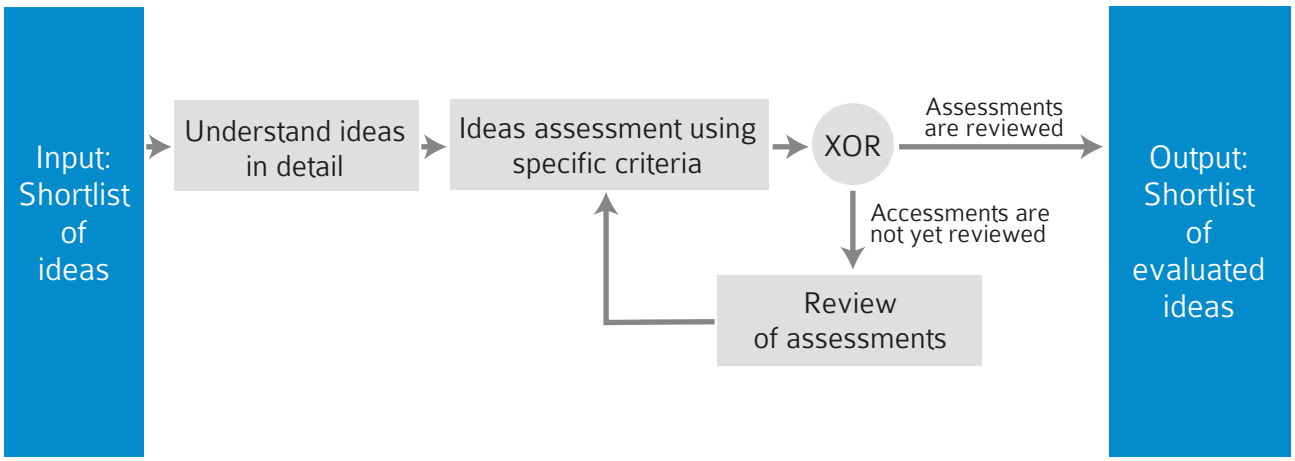


Figure 6: Oveview of idea assessment process

This can constitute all the ideas of a specific campaign, ideas with specific keywords or ideas based on a dedicated technology. Ideas can also be prioritized in advance by experts or an innovation community.

Each expert involved in the assessment process must examine all the ideas in detail in the first step. To this end the Idea Manager provides detailed information on each idea: a detailed description, source information, patents, Web links, videos, inspirations from other industries, previous assessments, discussions, etc.

In the next step the ideas are assessed using specific criteria. These criteria can be customized for every assessment stage. For example, the criteria can be weighted as such - 30% expected feasibility, 30% strategic relevance and 40% expected additional turnover. Usually companies prefer to host workshops to assess ideas, particularly for ideas with high strategic significance and/or substantial risks. The Idea Manager also provides the option of carrying out assessment stages 100% virtually (as part of a collaborative online assessment with a discussion function).

In the next step, the submitted assessments are reviewed by one or, if possible, more independent experts. Here, ideas for which the submitted assessments vary greatly are reviewed in particular. These ideas are discussed again more thoroughly in a second stage with a particular focus on why the opinions of the experts differ so greatly when assessing the ideas.

Depending on the companies preferences, multiple feedback sessions can be held. Typically at least one feedback session is conducted.

The final result of the assessment phase is a portfolio of ideas which have been methodically assessed.

Selecting Ideas for Implementation

Depending on the assessment result and objective of the respective innovation campaign, any number of ideas can be selected and transferred to the innovation roadmap.

To encourage a consistent, high level of participation in the innovation process, the Idea Manager implements several measures: gamification components, intuitive and visual access to the system and an incentive system among other measures. The incentive system can be configured in a variety of ways; the focus can be on intrinsic motivation and less on financial incentives:

- Points can be assigned for the respective user by submitting or assessing an idea, for example.
- Points can lapse over time to encourage consistent usage.
- Users can redeem the collected points on an ongoing basis in an internal points shop (possible bonus' could include further education and training or an informal discussion with a member of the executive board).

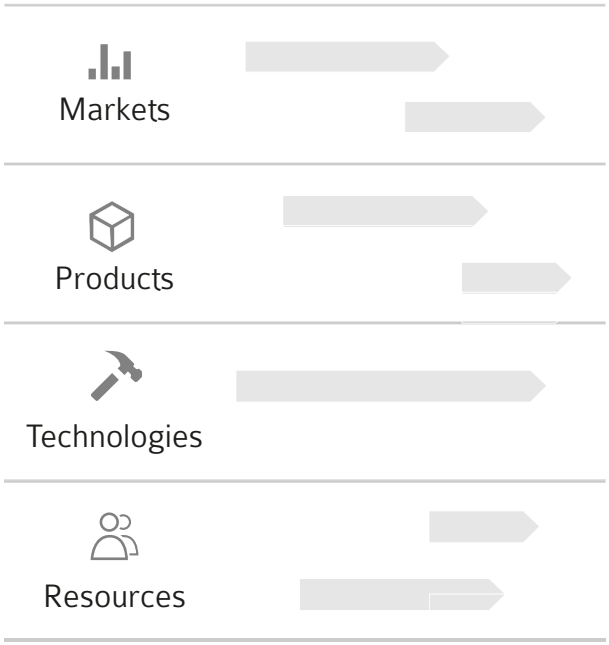
2.2.3 Roadmapping – Integrated Planning of the Innovation Portfolio

A solid method of planning and control is required to integrate the ideas which are selected for implementation in the overall planning model. By the time an implementation decision is being made, the idea should have the character of a product, service or business model concept. However, not all ideas can move forward to the implementation phase at the time of the implementation decision as budget and resource restrictions may impose a strict limit. Furthermore, it is not always wise to implement an idea immediately. Perhaps the necessary technology may not yet be available or maybe customers only pick up on a gradually after the ideas' emergence.

The aim of strategic innovation planning is to create the potential for medium- and long-term success and to anchor this potential in the company. For this purpose, the use of technologies must be planned and controlled, whereby dependencies and synergies between new products (services and new business models also fall under this category), markets and resources must be taken into account. This task is supported by the innovation roadmap.

Each idea that is selected for implementation is transferred to the innovation roadmap and scheduled. Dependencies to other projects are also mapped in the same way that the dependencies of technologies and resources are mapped. The relationship with trend management is re-established by making assignments to markets: which markets will be addressed by the product, service or business model and when?

The innovation roadmap therefore encompasses four levels or layers: markets, products, technologies and resources. The individual layers are first prepared separately by the departments responsible for implementing the innovation and are then linked to each other to create an all-encompassing view of the company. The four layers are explained briefly below:



Markets

In the markets layer, current and intended target markets are defined in greater detail and stored with planning data. When do specific new business fields, customer groups, competitor offers and social trends become relevant? How much turnover can be expected and when? How high is the estimated market appeal over the course of time? New products, services, and business models can only be planned holistically with a schedule including target figures from a market perspective.

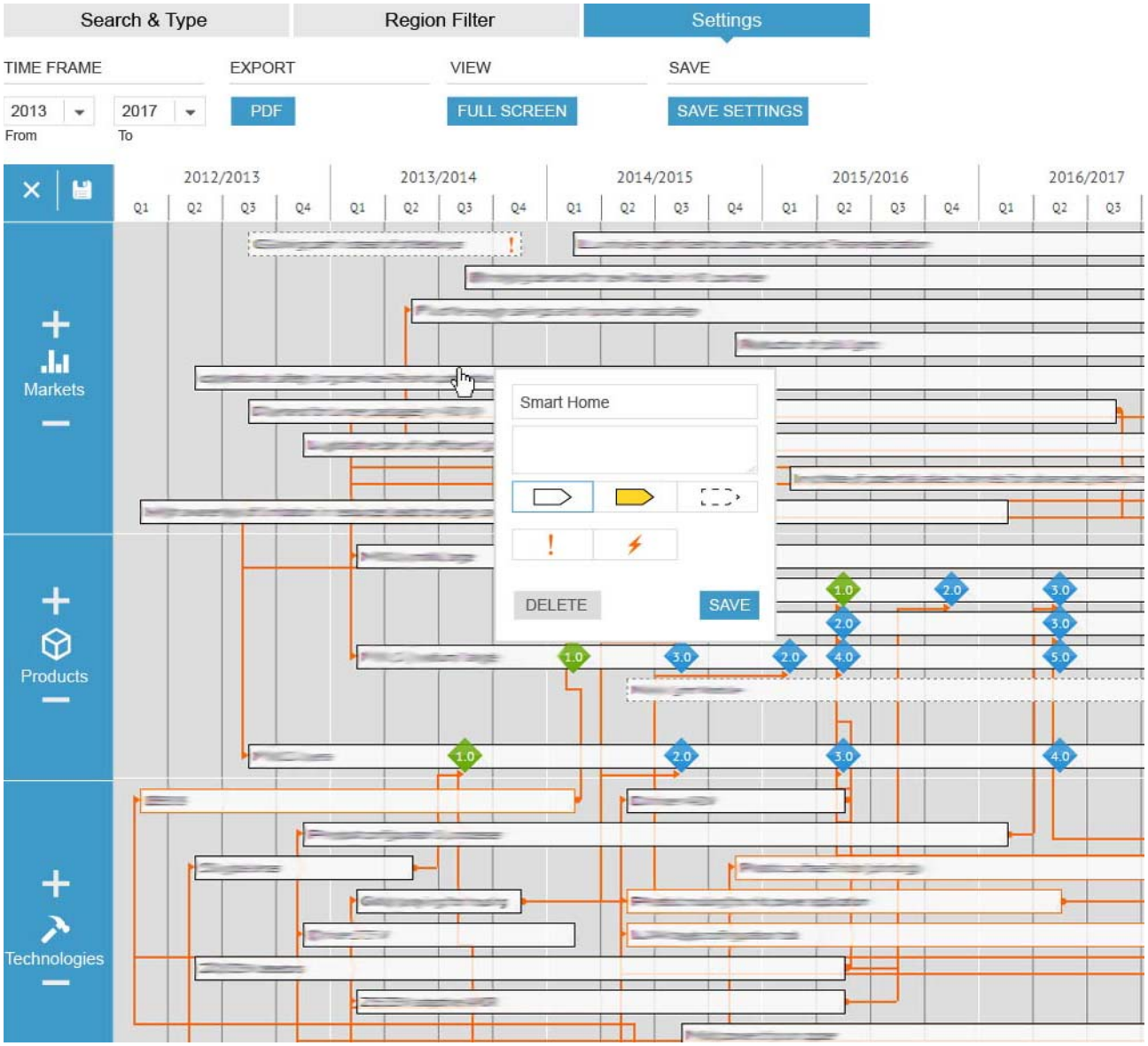


Figure 7: Visualization of WYSIWYG editing in the Roadmap

Products

All current and future products are captured, planned, and controlled in product management. In this context, the term products comprise also services and business models. This layer comprises all the products of a specific region, business unit, or department and displays each product with a specific implementation timetable. Each product is linked to the related markets, technologies, and resources.

Technologies

The technologies layer establishes the time line for future technologies. When is a specific technology anticipated to be available for use in new products, services, and business models? Which costs must be taken into account? Are proprietary developments or external technologies involved? All data from technology management is collected here and serves to provide an integrated view in technology planning, implementation and control.

Resources

The resources which are relevant for the implementation of development projects comprise the fourth layer in the integrated roadmap. Here it is possible to create links to all other elements within the layer as well as across layers. Similar to the other layers in the roadmap, resources are described using a standard set of attributes, links and type-specific information. Resources can include employee skills, development environments, research co-operations or public funding projects, for example.

All four layers, their elements and links are visualized in an innovation roadmap.

Using filter options, you can display the critical paths and/or critical elements of the individual layers and how they correlate so that the connections can be analyzed on a cross-division basis. Filters also help to reduce the complexity of the innovation roadmap allowing you to focus on specific strategic issues.

In addition, the innovation roadmap provides an archive function. Using this function, you can track the development of the different divisions and long-term quality of the innovation roadmap can be guaranteed. To this end, you can call up and visualize the different snapshots in the roadmap (see Figure 8).

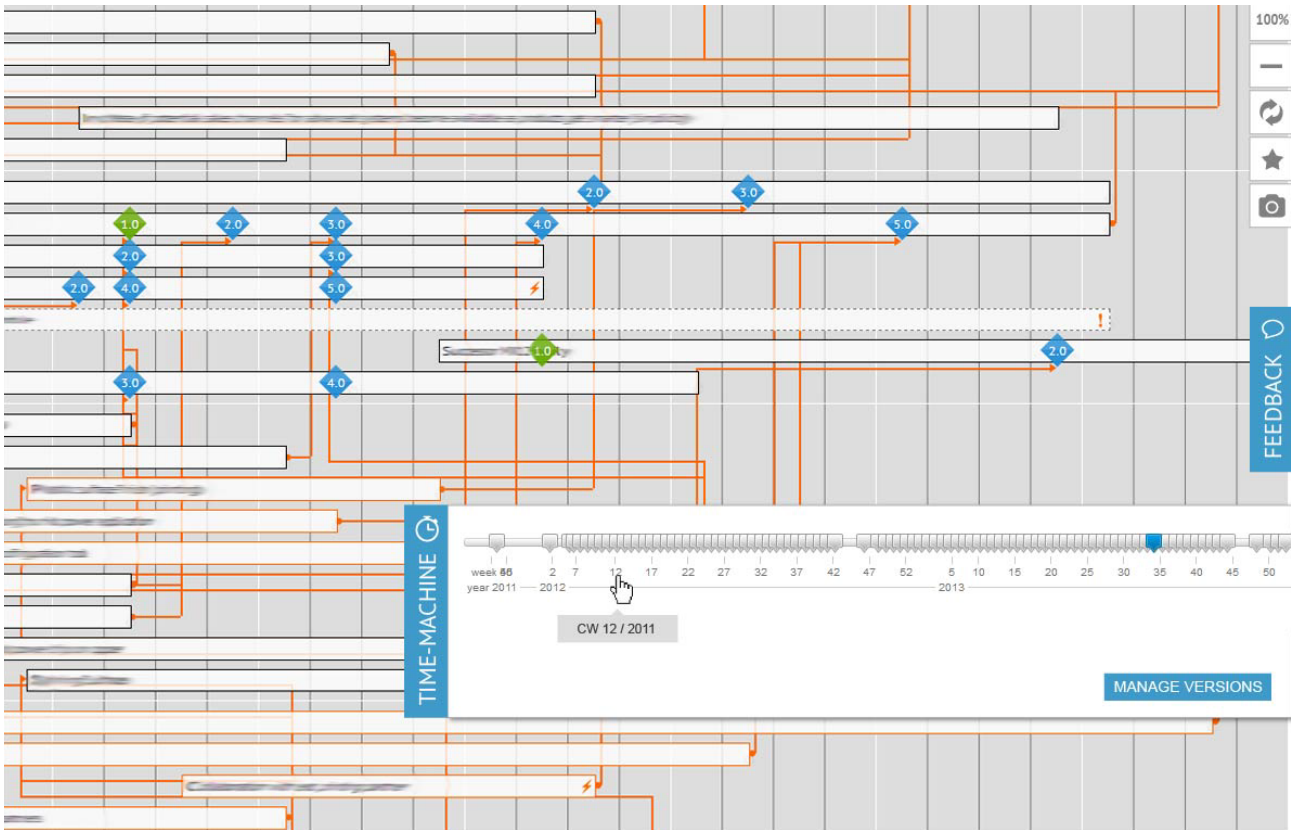


Figure 8: Visualization of the roadmap and archive function

3 Summary

The presented ITONICS Innovation-Suite extends the concept of idea management, which is often relatively isolated, to include the preceding trend, the technology component and the downstream innovation roadmapping thereby providing a holistic approach for the first time:

> The presented ITONICS Innovation-Suite makes it possible to drive innovation in a targeted and sustainable way and to create quality ideas"relying less on chance.

Firstly, in the early phases strategic opportunities for future growth are identified in attractive markets by using new technologies. Furthermore, thanks to the innovation roadmap, attractive ideas and concepts can be examined within the overall context of innovation and implemented in a targeted manner.

The ITONICS Innovation-Suite is used to control processes, integrate everyone involved on a global scale (internally and externally), highlight complex circumstances in the innovation process and integrate all information objects across the entire innovation process end-to-end.

To date the specified activities in innovation management have often been examined independently: trends are investigated in market research, technologies are identified and assessed in technology management phase, ideas are collected and assessed in innovation management and innovation roadmaps are, if at all, created and updated in strategic management department. As a result, synergies remain unused and an integrated view with the option of structuring and planning the future in a transparent manner is usually not feasible.

Thanks to collaborative components in integrated innovation management, the creative and planning potential in a company can be leveraged considerably more efficient than is the case today. Focal points in innovation can be identified precisely and ideas can be generated and assessed in a targeted manner. Technologies are integrated in the innovation process as pioneers and then this information is synthesized again in the innovation roadmap.

All the specified components already exist in companies today – the challenge lies in integrating each of these aspects in a holistic manner. The integrated end-to-end innovation management approach presented in this whitepaper achieves this concept beautifully.

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About ITONICS

Since 2009 ITONICS has been the only provider in the area of innovation management to offer an end-to-end integrated approach: from environmental scanning to trend and technology management right through to innovation portfolios and roadmaps. Our company offers you methodology, best practices, consultancy and software as a one-stop shop – we look forward to talking to you!

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