

## CONSIDERATION OF FACTORS INFLUENCING THE TIME OF LAUNCHING NEW PRODUCTS

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*Keywords: innovation, strategic planning, temporal behavior*

### 1. Introduction: Influences on innovations

#### 1.1 Motivation

Due to global markets, rapidly changing technologies and continuously increasing costs for launching innovative products, the competition of manufacturing companies intensified over the past years. Thereby, the improvement of the innovation capability describes an essential lever to enhance the company's profitability and growth [Cooper and Edgett 2005]. Against this background it is particularly of interest to enable and accelerate the innovation process from the stages of determining the demand until the successful launch of the solution. In this context, there is a need for a better ability in anticipating and reacting on market needs to adapt to the dynamic market and customer demands [Chesbrough 2003].

It is crucial for companies to systematically plan which solutions and when these solutions should be carried and launched on the market. To define the right and realistic time of launching new solutions, the company should have a distinctive state of knowledge about company-internal and -external influencing factors on innovations. Therefore, it is essential to understand the market with its customers and competitors, which has already been discussed a lot in the past years. For example, the relevant age group and the technology acceptance by the customer play an important role in defining the launching time. Against this background, previous analyses in this field often focused on the demand and the consumer acceptance, in particular within economic sciences. But also e.g. the products of the competitors on the market may influence whether and when an innovative product idea should be developed and launched by a company.

Nevertheless, to determine an overall optimum of the point of time to launch an innovative solution on the market, also technical and organizational aspects along the whole lifecycle of a solution have to be considered. E.g. the organizational culture within the planning and development department plays an important role whether and at which time innovations can be carried out. But also factors concerning the production (e.g. existing production layout and technologies), factors concerning the stage of utilization (e.g. capabilities in maintaining products), factors concerning the distribution (e.g. the transportation system) or factors concerning the recycling (e.g. the re-usability of the product) may influence the appropriate time to launch new and innovative products.

Thus, there are manifold factors from multiple domains, which influence the point of time to launch products and according services on the market. This paper shows a collection of influencing factors from various existing literature, whereby the identified factors are systematically categorized. Based on the collection of factors, further dimensions of the factors relevant for defining the appropriate time of launching innovations are introduced and arranged in a corresponding framework.

## 1.2 Background and procedure of research

Research presented in this paper is carried out against the background of the collaborative research centre “SFB 768 – Managing cycles in innovation processes”. Within the SFB 768, participants of social, economic and engineering sciences follow the goal of supporting engineers and other stakeholders along the innovation process in dealing with the heterogeneous temporal behavior of artefacts (cycles) within the innovation process and in respect to subsequently following innovation processes. One focus in researching respective cycles is directed on the phase of strategic planning future product-service-systems. A solid basis is needed in order to prioritize which innovation idea shall be realized. Hence, identifying, understanding and describing factors, influencing innovations describes a major goal in respect to steadily perform strategic planning. Based on such factors, the company shall be enabled to systematically decide when to launch new products both taking their innovating capability and the market issues into account. Thereby – in order to prevent from unnecessary lifecycle costs and also in order to launch products the company is able to accompany throughout the whole lifecycle – products should be planned and launched under consideration of all lifecycle stages. For example, there may be an enormous need for an innovation concerning the utilization stage of the product as the customer is no longer satisfied by the current product, but production technologies within the company may not allow producing a certain innovative product idea due to the existing infrastructure and limited financial resources. Then, the company has to decide whether the efforts for the company would be too extensive in relation to the sales based on the market need.

In this context, it is essential to take factors concerning the stages from early planning and development of products until the stage of recycling and product disposal into account. The lifecycle model by Hepperle et al. (2009) for example, which is deduced from various existing lifecycle-relevant literature, provides an appropriate basis for identifying factors throughout the whole lifecycle of a product. The superordinate phases of the lifecycle are shown in Figure 1.

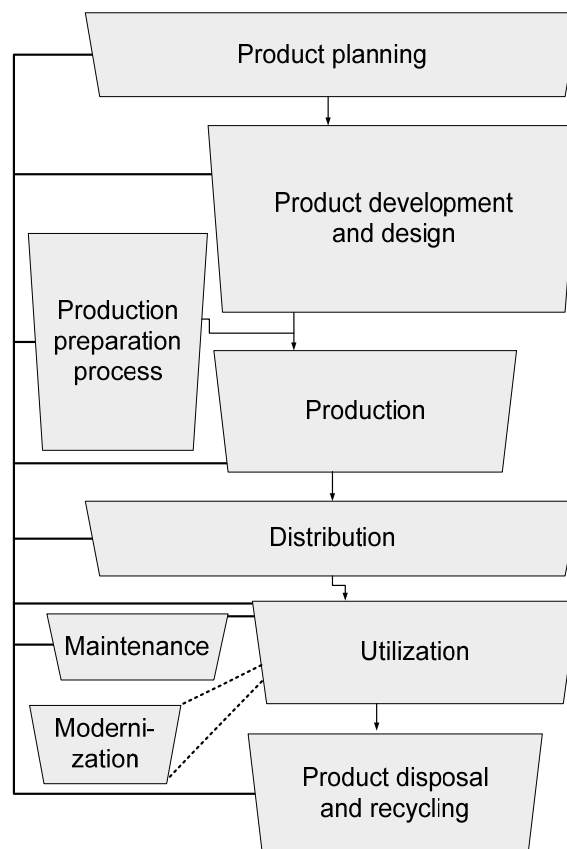
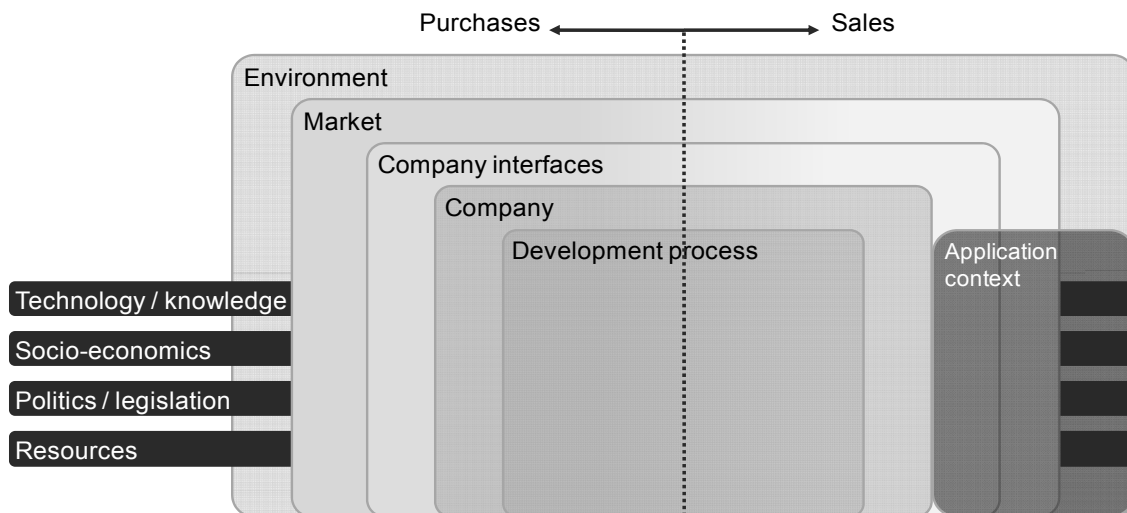


Figure 1. Superordinate lifecycle stages according to Hepperle et al. (2009)

The potentials and restrictions along the lifecycle develop themselves over the temporal axis and thus, factors relevant for deciding which kind of innovations can and should be launched at which time show a temporal behavior themselves. Besides assigning the factors to certain lifecycle stages, another approach to increase the transparency how factors influencing the innovation process can be classified is presented by Langer and Lindemann (2009). They propose a model for classification of external design context factors (see Figure 2). They distinguish whether the product development is influenced by an aspect deriving from the environment, the market, the company interfaces, the company or the development itself. Within each of these areas factors may be related to “Technology / knowledge”, “Socio-economics”, “Politics/Legislation” or “Resources”. The model rather shows which areas are important for developing a product. Still it is a good basis for researching an approach to structure factors influencing the decision when to launch an innovation on the market.



**Figure 2. Model for external design context factors according to Langer and Lindemann (2009)**

Besides structuring factors influencing the innovation process, a lot of work concerning factors inhibiting the company’s ability to innovate as well as factors describing the acceptance of innovations on the market has been carried out. Still, there has no discussion been carried out on how these factors influence the point of time of launching new products and further, the factors have often been looked at and analysed in detail rather than allowing an overview over innovation-relevant factors. Against that background this paper deals with following questions:

- Which kind of factors influencing the point of time to launch innovations do exist?
- Which superordinate categories can these factors be assigned to?
- What are further dimensions of the factors increasing the transparency to define the appropriate point of time to launch innovations?

In order to deal with those questions, section 2 describes the approach of identifying and structuring factors possibly influencing the point of time to launch innovations. Furthermore, section 2 gives an overview of manifold influencing factors deduced from literature, which are systematically structured based on the suggested approach. Section 3 then discusses further dimensions of those factors by dealing with exemplary factors presented in section 2. These further dimensions show that in defining the appropriate point of time to launch innovations, different variables have to be taken into account. Section 3 also summarizes the gathered results within a framework which illustrates the multifaceted basis for finding the appropriate time of launching innovations. Finally, in section 4 conclusions and an outlook about the next steps to be carried out are presented.

## 2. Overview of factors influencing the market launch of innovations

### 2.1 Approach of deducing factors influencing the time of launching innovations on the market

Various scientific disciplines researched in the past which factors influence the development and successful market launch of innovations. Thus, there exist manifold perspectives on this research area. In particular within the research of innovation management, authors discussed inhibiting factors within the innovation process. The conclusion for this paper has been that a lot of these factors may lead to a delay in launching innovations on the market. Some of those factors even lead to none or only little innovation and thus should at least be taken into consideration when planning which future products shall be realized.

In order to limit the high number of factors looked at in this paper but at the same time guarantee to identify the relevant areas of factors which may influence the time of launching new products, in particular three research areas have been looked at in detail. Firstly, as mentioned above factors discussed in innovation management literature against the background of inhibiting innovations have been looked at. Thereby, the factors in the following sections are based on literature by Stern and Jaberg (2007), Bullinger (2006), Walther (2004), Vahs and Burmester (2005) as well as Hauschildt and Salomo (2007). Secondly, in order to get a detailed overview about customer relevant factors, research in the field of modeling technology acceptance has been looked at. Exemplary literature in this field can be assigned to Venkatesh and Davis (2000) as well as Kulviwat et al. (2007). Thirdly, in order to base the decision of launching new products on an integrated lifecycle understanding, possible factors have been deduced from the singular lifecycle stages.

When identifying factors it distinguished itself to assign the factors to superordinate categories. On the one hand, the introduced scheme of Langer and Lindemann (see Figure 2) helped to differentiate between factors which originate from the company context, factors which originate from the market context and factors which originate from the environment context. Furthermore, two superordinate groups of factors have been identified. On the one hand there are factors which lead to an unintentional delay of the market launch of new products (for example the individual resistance of certain decision makers against an innovation within a company). On the other hand there are factors which lead to an intentional (often strategic) delay of an innovative product (e.g. to prevent from cannibalization of products the company currently has on the market).

Thus, the following presented factors are categorized within the categories shown in Figure 3. Although some of these factors may also be assigned to different groups, the following sections allow an overview about factors and corresponding categories influencing the point of time to launch innovations.

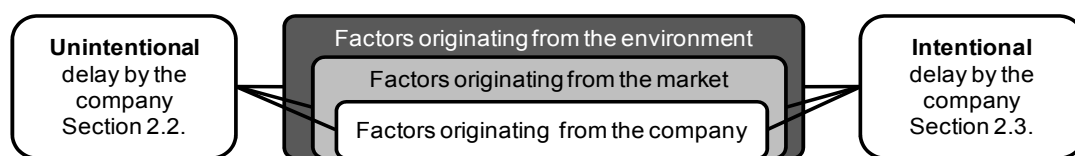


Figure 3. Superordinate categories of factors influencing the time of launching innovations

### 2.2 Factors leading to an unintentional delay of the market launch by the company

This section provides an overview about factors which lead to an unintentional delay of launching an innovation. Some of those factors also cause that innovations do not even evolve within the company. Still, these factors disclose aspects, which can possibly be influenced by the company. Hence, the points of time to which innovations can be launched is also dependent on that factors.

#### 2.2.1 Factors originating from the company context

Within the category of factors, which lead to an unintentional delay of the market launch and which origin from the company context, a lot of innovation-inhibiting factors have been identified. At a first sight many of those factors lead to less innovativeness of a company. Consequently, the link to the point of time to launch products is not always obvious. Still, taking those factors into consideration

when planning the future product roadmap may allow a more substantiated and realistic decision when to launch new products. The factors within that category can in particular be assigned to the following subcategories based on the literature review:

- organizational culture,
- organizational structure,
- available resources.

Concerning the organizational culture it is important how the supervisor deals with his team and corresponding innovative ideas. For example, within a destructive review climate, innovative ideas are often stopped and not further carried out due to lack of motivation. Also persistent pressure on the team and too strong control of the team do not support the innovativeness of people involved in the innovations process. Another problem consists in supervisors who react with ridicule on innovative ideas. Also innovation ideas which derive from lower hierarchical positions are often not taken seriously. Furthermore, the belief to know everything and the declination of responsibility inhibit innovative ideas within a team and are therefore assigned to the organizational culture.

Besides the supervision behavior, the comprehensive corporate behavior may lead to less innovativeness. For example, a too conservative attitude concerning the use of outdated technologies may influence the innovativeness and a too little or too large coordination with the customer leads to less innovations within a company. Also a negative history in launching new products and problems at the beginning of a new innovation process may reduce the motivation to innovate and thus may also cause a deceleration within the innovation process.

Furthermore, there are factors concerning the organizational culture which concern more the individual than the relationship between different people. E.g. if people recognize their own position becoming unnecessary and less qualified by following a certain innovative idea, the person may protect itself and not suggest the idea. Also the expectation of more effort in one's own work may affect a person to not suggest a certain idea.

Besides the organizational culture the kind of organizational structure may decelerate the innovation process. For example, if the information flow between departments is not guaranteed, innovative ideas may get lost or the realization of the ideas may be at least delayed. Too long decision paths or a too extended research at the early phases may slowdown the innovation process.

Another subcategory consists in the available resources throughout the lifecycle. In particular limited financial resources constrain the range of innovativeness of a company. As the development and production in particular of products showing a high degree of innovation is often accompanied by costs which have not been planned, the desired market launch cannot be realized. Further, competences within the company and relevant cooperation partners within the development and design, but also within further phases of the lifecycle may not be available to realize a certain new product in time. Then the market launch has to be delayed.

### *2.2.2 Factors originating from the market context*

Factors deriving from the market and leading to deceleration within the innovation process can in particular be seen within existing standards which are defined within a branch. These may lead to less innovativeness as these standards sometimes act as a barrier to create innovative ideas. Nonetheless, most factors deriving from the market rather lead to an intentional / strategic delay and are therefore presented in section 2.3.2.

### *2.2.3 Factors originating from the environment context*

This superordinate category points at factors that derive from the environment and lead to an unintentional delay of innovations. In particular politics and according legislation (e.g. taxation law, general market regulations) may lead to deceleration within the innovation process and thus also to a delay in launching new products.

## **2.3 Factors leading to an intentional, strategic delay of the market launch by the company**

This section provides an overview about factors which lead to an intentional delay of launching an innovation. The difference to the factors presented in section 2.2 consists in the fact, that the company would be capable of realizing the new product, but may consciously shift or cancel the market launch due to strategic considerations. This kind of factors can in particular be attributed to the customer and further market conditions (e.g. factors concerning competitors). Nonetheless, sharing an integrated perspective on the lifecycle, a lot of factors can also be derived by looking at the own company. Again, the introduced factors do not pursue completeness but rather be seen as examples for the different categories.

### *2.3.1 Factors originating from the company context*

One major aspect, which can be split down to further factors, consists in the insufficient compatibility to current surroundings. On the one hand, the new product may not fit to the image of the company at the current moment. On the other hand, the product may not fit with the current product portfolio or even lead to an inhibiting force for new innovations. Furthermore, an innovation may evoke harmful functions or conflicts within other parts of the product and thus would lead to less success. Therefore, the company may delay the market launch intentionally as it fears a market failure of the product. This fear may be caused by the expectation of higher costs throughout the lifecycle, e.g. concerning the maintenance, the re-usability of products, the recycling or disposal. Also higher efforts concerning the logistics (also in respect to the supply chain), the transport and the initial operation may lead to a delay of launching the new product. Furthermore, the frequency of launching new products may intentionally be decreased in order to prevent from high-frequency changes along the lifecycle. Another factor, influencing the launch of a certain innovation is that by realizing the innovation a too low operation grade within the production would occur. This list of factors can easily be extended, thus the company has to decide under consideration of the respective lifecycle and in respect to the own situation if a strategic delay of a new product distinguishes itself to be promising.

### *2.3.2 Factors originating from the market context*

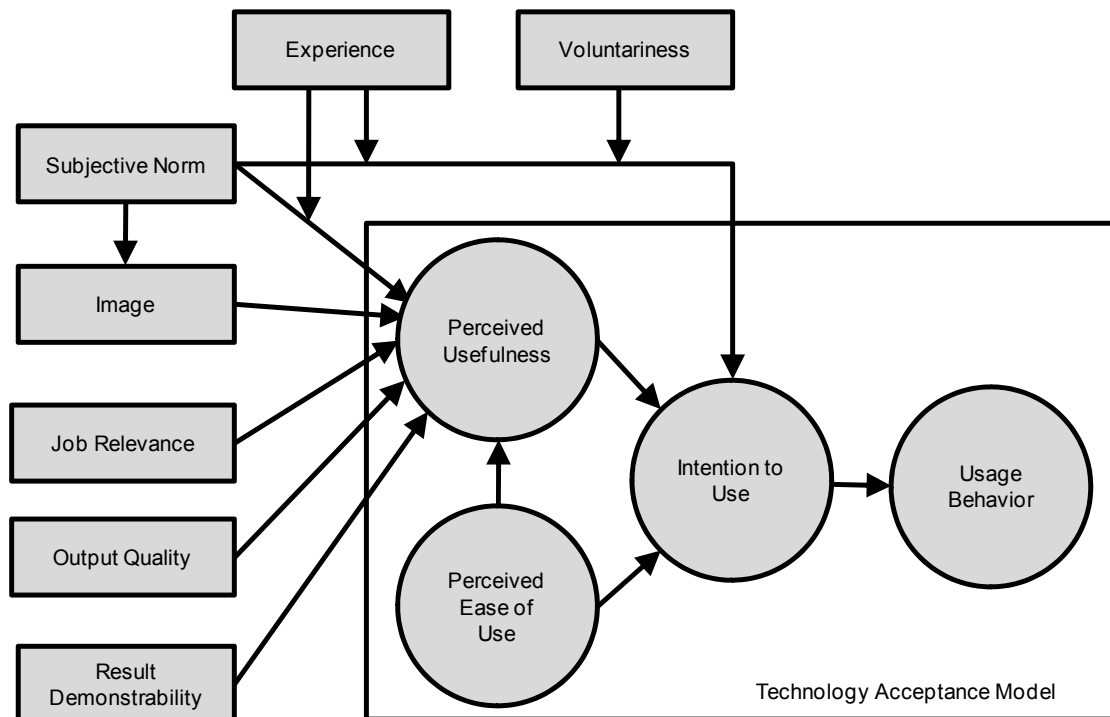
Within that superordinate category in particular two further subcategories have to be defined. On the one hand, a factor influencing the market launch may derive from the competitive environment within the market. On the other hand, a factor can be attributed to the behavior of customers.

Concerning the competitive environment the company has to look if the launch of a new product leads to a cannibalism of products which the company already launched on the market. For example, if a similar product didn't even reach the point of satiation yet, it may be better to wait with launching the new product. In addition, the launch of a new product may influence the so called cash-cows of the company on the market.

Another factor consists in the risk that the competitor copies the technology and thereby outperforms the own company. One cause could be that patents have not been assured yet and thus a too early launch of the innovation would lead to the company's disadvantage. Additionally, the company has to observe how prices would evolve when launching an innovation. In this context, the company has to analyze if there are still similar products on the market or if the market is still saturated by previous products. Also a product which distinguishes itself to be over-engineered at the current status in comparison to competitors' products may lead to an intentional delay of the market launch. If the company is not sure about the competitive situation after launching a certain product (e.g. sudden emerging competitors) it may be better to shift the launch.

Besides the competitive environment it is of interest how the customer's behavior influences the strategic launch of a new product. For example, if the product makes further investments on the customer's side necessary, a delay of the product can be purposeful. Further, if the innovation leads to a loss of tradition or used patterns, the customer may also refuse to buy the product at a certain point of time. In order to understand the customer's behavior, a lot of work has been carried out in particular within economic sciences concerning the research of "Technology Acceptance Modeling" (TAM).

One model which is already based on previous existing models in this context has been researched by Venkatesh and Davis (2000) and is presented in Figure 4.



**Figure 4. Extended technology acceptance model according to Venkatesh and Davis (2000)**

Both areas of “perceived usefulness” and “perceived ease of use” influence the customer’s intention to use a product. Manifold factors influence again the two mentioned areas. In this model, social influences like “subjective norm”, which relates to the pressure evoked by the people in the environment of the customer, are considered. Also the factor “voluntariness” is suggested to be important. This means the customer has the feeling that he made the choice to adopt a certain product on his own. The factor “experience” means that the customer rather tends to buy a technology if he is already experienced with similar technologies. The factor “image” describes how the social status may increase by using a certain innovation and the factor “job relevance” focuses on how useful the innovation is in a certain situation for the customer. The factor “output quality” addresses the performance of the offered solution and finally the factor “result demonstrability” sheds light on how the results of using a certain innovation can be perceived by the customer.

Looking at the presented TAM model helps to identify further factors relevant when strategically planning the point of time to launch a certain innovation. In particular in respect to social and psychological aspects, further research has been carried out in the past years. For example the TAM model by Kulviwat et al. (2007) takes further psychological issues like “pleasure” or “arousal” into account to extend the models step by step. Thus, further models in this research area distinguish themselves to shed light on further factors which lead to a strategic delay of launching a product.

### 2.3.3 Factors originating from the environment context

This last mentioned superordinate category addresses factors that derive from the environment and lead to an intentional delay of innovations. Thereby, larger changes within the society evoked by the innovation may lead to a strategic delay of an innovation. At this point, it is sufficient to mention the category, but due to the multifaceted environment, each company has to define its own system boundary which factors have to be considered and which can be disregarded.

### 3. Further perspectives on factors influencing the time of market launch

After assigning factors to the mentioned categories in section 2, further dimensions of the factors to be taken into consideration in order to systematically plan possible points of time to launch new products are presented.

Firstly, some of the above mentioned factors throughout the different categories can and some cannot be influenced by the company. Thus, even the origin of delaying the market launch may be influenced itself which consequently enables the company to shift the market launch by proactively changing the factor influencing the delay. In this context, the question arises whether the proactive change is realized within a short-, medium- and long-term time window (Temporal changing behavior). Even if the factors cannot be influenced by the company, they show a temporal behavior and thus, the factors have to be monitored from time to time. For example certain laws or standards as well as available technologies throughout the lifecycle change from time to time and thus they show cyclic behavior themselves.

Besides the time it takes to change a factor it is also relevant how fast the change of a certain factor takes effect (Temporal impact behavior). For example some factors may be changed very rapidly, but the effect on the innovation process may take a while, whereas the change of another factor may take years. But as soon as the factor is changed it immediately impacts the innovation process and thus also the possible points of time to launch a new product.

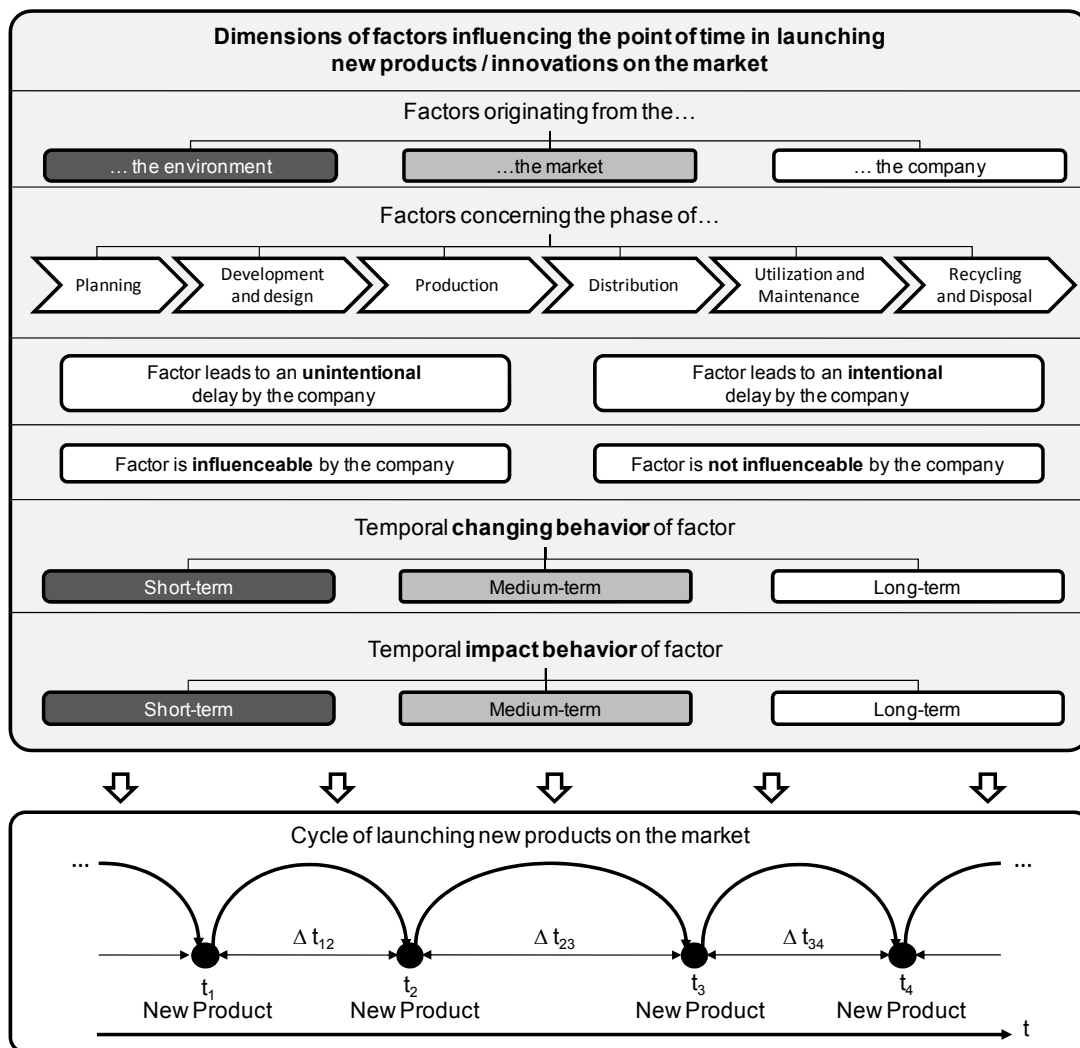


Figure 5. Framework of dimensions influencing the time of launching new products



Based on the findings of section 2 and 3 a framework for factors which should be considered when defining a lifecycle-oriented, realistic point of time to launch a certain innovation is presented in Figure 4. The presented scheme highlights essential dimensions of factors and serves as a basis for further research as well as an overview for industry to detect relevant factors when planning future products and corresponding services.

## **4. Summary**

### **4.1 Conclusions**

Research carried out in this paper is embedded in a larger context of researching cycle management of innovation processes and in particular addressed the cycle of launching new products. The focus was predominantly not directed on the kind of innovation (e.g. incremental or radical innovation/ basic, performance or excitement innovation according to the Kano-model). Instead, the approach of identifying and classifying factors influencing the innovations has been addressed. This paper dealt in particular with the questions which kind of factors possibly influence the time of launching new products on the market and how these factors can be assigned to superordinate categories. In addition, the goal was to identify further perspectives to increase transparency on the factors when systematically planning new products and their time of launch.

Manifold factors – possibly influencing the market launch intentionally or unintentionally – have been identified based on existing literature dealing with innovation management and dealing with the customer's technology acceptance. Also the lifecycle-oriented perspective shed light on factors, which are not obvious at first sight but should be taken into consideration when systematically planning the launch of new products. The presented framework in section 3 gives an overview of the dimensions which should be considered in order to make another step towards a higher planning reliability. Against this background, the results in this paper on the one hand describe a basis for further research presented in section 4.2. Still, this status of research also serves as an extended checklist for factors and corresponding categories a planning department may consider when setting up the roadmap of launching new products.

### **4.2 Outlook**

In a first step, the results will be refined based on further information derived from industry. A currently ongoing series of interviews deals amongst other issues also with the question which lifecycle phases are considered and prioritized within the planning process. Furthermore, the temporal behavior of the identified factors will be focused. In particular temporal interrelations between the factors are analyzed with the goal to identify patterns which allow a systematic shift of launching new products. Another aspect of future work will be to analyze how the achieved results can be implemented within the process of systematically planning future products and according services. Therefore, the results will firstly be assigned to academic models of the innovation process in order to evaluate the usability in industry in the next step. In order to fulfill current challenges dealing with an integrated perspective on product-service-systems, the achieved results will be analyzed if those are also valid for integrated planning and developing products and corresponding services. It is expected that further factors can be identified due to the increased coordination effort when planning and realizing complex, integrated product-service-systems.

### **Acknowledgement**

We thank the German Research Foundation (Deutsche Forschungsgemeinschaft – DFG) for funding this project as part of the collaborative research centre ‘Sonderforschungsbereich 768 – Managing cycles in innovation processes – Integrated development of product-service-systems based on technical products’.

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