

Article

Best Business Models for the Fast-Moving Consumer Goods Sector: Patterns for Innovation

Sebastian Schroedel 

Faculty of Business and Economics, Mendel University in Brno, 61300 Brno, Czech Republic;
sebastian.schroedel@alice.de

Abstract: Mankind's consumption exceeds our natural resources, so among other things, the development of new business models at the company level is needed. This paper aims to generate systematic business model innovations in the field of fast-moving consumer goods using business model patterns to foster sustainability. Based on a literature search, the most relevant patterns for the industry are identified as part of a multi-stage selection process that is based on the value generated by the patterns. Expert surveys are the central instrument for data collection. Here, the connection of the patterns to the strategy is central. The result is a list of relevant patterns, which includes patterns from completely external industries. This is the first evaluation of its kind, which shows that patterns focusing only on the circular economy are not enough to succeed and, therefore, break the scientific paradigm.

Keywords: sustainability; business model patterns; sustainable innovation; business model innovation; strategy; sustainable innovation; fast-moving consumer goods

1. Introduction

Changing customer expectations and business model innovations are directly linked. A producer's business model shows how the business can create services that elicit a willingness to pay from its customers by fulfilling their needs. No matter how innovative and sophisticated a business model is, it will fail if it is not possible for market players on every step of the value chain to make profits from it.

One sector that is increasingly becoming the focus of public and academic attention is fast-moving consumer goods. These are present in every household and cover the basic needs of people worldwide. They are nondurable and sell quickly at relatively low costs. In the transition to a circular economy, the fast-moving consumer goods sector is central [1].

This can be explained by two developments. On the one hand, the industry is growing strongly, for example, through the rise of the Chinese market [2], and the amount of plastic packaging waste that arises is correlated to living standards [3]. According to forecasts by the World Bank, solid waste will increase to 3.40 billion tonnes by 2050 [4]. In 2016, the consumer electronics sector alone produced 44.7 million tonnes of e-waste in Europe [1]. Using virgin resources that are turned directly into trash is under public critique [5,6]; nevertheless, single-use disposable fast-moving consumer goods that are deposited into landfills or incinerated after use are still the norm [7]. Low prices, a short utilization period [8], and low customer involvement in the buying process [9] are the defining characteristics of the sector.

On the other hand, customers are demanding a change toward more sustainability [10] and are also prepared to pay more for sustainable products under the right conditions. The cumulative effect is that the pressure on the manufacturers of fast-moving consumer goods to develop sustainable business models is increasing [11,12].

In a nutshell, the business model of producers of fast-moving consumer goods needs to be innovated to meet market and legislative demands. Those companies that manage to



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reduce plastic waste or strengthen sustainability in other ways will be able to improve their competitive position.

The focus here is on the initial producers, as they determine most of the CO₂ footprint and the increase in sustainability in general. Markets in developing economies are considered, as these are regarded as leading markets due to the possibility of realizing a higher willingness to pay.

The core question is, therefore, Which business model patterns can be usefully applied to the context of fast-moving consumer goods?

The results enable companies to develop innovative business models quickly and cost-effectively, thereby creating both practical value and contributing to greater environmental protection.

This field of research is enjoying increasing academic popularity and is being thought of in terms of products. Results are, therefore, primarily related to more sustainable services, such as replacing plastic packaging with paper [13] or selling food without any packaging at all [14]. At the other end of the value chain, the focus is on issues such as recycling in order to recover resources once they have been used [15]. The “take–make–dispose” linear economy could be broken by the circular economy [16]. Examples of this are the startup COFFEE RESURRECT, which upcycles coffee waste into natural ingredients for nutraceutical, functional food, and personal care products [17], and Sykell. The German startup manufactures bisphenol A (BPA)-free reusable containers for packaging [18]. These activities are already in use, such as “cradle-to-cradle” [19], where products are not understood by the manufacturer as a one-time transaction but are viewed in a holistic framework of use and recycling; recycling, where resources from used or no longer functional products are used as raw material for new services [20]; and rematerialization [21], where new products are created so that waste can be a relevant resource pool. Research directly related to fast-moving consumer goods and sustainable business model innovations is rarer. Exemplary representatives are Bocken, Harsch, Weissbrod [10], Bashir, Jørgensen, Pedersen, Skard [22], and BMI Lab AG [23]. It turns out that there is no list with the content of the most useful patterns in the area of fast-moving consumer goods. The research objective, thus, suffers from a research gap. To close this gap, a combination of literature research and multi-stage expert interviews is used as a method of preference formation. This is due to the comprehensive state of research, which, however, must be checked for its fit with the industry. The focus of this examination is the determination and subsequent comparison of the value of the patterns in order to exclude social desirability, which does not justify a business case.

This publication, therefore, is on the frontier of knowledge, providing the first holistic list of patterns for the fast-moving consumer goods sector. In addition, the topic of sustainable business model patterns is not considered in isolation but as an implementation of corporate strategy. This is a central innovation in the context of integrating the value inherent in the pattern as a selection feature. Thus, the new development of the valuation approach and the idea of valuation in relation to strategy is new. Finally, questioning the paradigm that sustainability in the area of fast-moving consumer goods is closely linked to the circular economy is a relevant contribution. This broad focus opens up the field of research for a holistic view.

2. Definition of Core Constructs

2.1. Definition of Fast-Moving Consumer Goods

The industry covers food and nonfood products [24], with examples like personal care products, beverages, food, household products, and pet supplies [25]. Fast-moving consumer goods are mass-produced products for everyday use that are frequently purchased, comparatively inexpensive, and have a short utilization period [26]. This is consumption aimed at satisfying short-term needs [24], meaning that the decision-making process is carried out with little or no effort [9]. This is problematic, as virgin resources are used once and then turned into trash [5]. This one-time use and disposal [27] can, in combi-

nation with ineffective waste recovery systems, be an environmental problem [10] that demands a solution. Holistic solution paths include the 9R framework of Kirchherr, Reike, and Hekkert [28], which gives nine distinct strategies for sustainability ranging from the incineration of material to recover heat all the way up to refuse, as a way to make products redundant. However, this also illustrates the problem of applying holistic concepts to an industry with special framework conditions. Topics such as Repair (strategy number 4) or Refurbish, the refurbishment of once-used products (strategy number 5) are a problematic business model for low-value goods with a short lifespan. This shows that the fast-moving consumer goods sector requires a more differentiated approach than other sectors that takes its special features into account. For this publication, it can, therefore, be deduced that the value that arises from a measure is of central importance and not its relative position in a frame work. In the 9R framework, for example, measures that are less sustainable are potential candidates for implementation, as recycling and recovery address the problem of packaging waste.

The value chain trinity between manufacturer, retailer, and customer is relevant here. Traditionally, consumers cover the largest part of the value chain, and, therefore, they have the most leverage on the topic of sustainability. Customers shape the market, with their needs and preferences converted into buying behavior. Retailers play an intermediary role and communicate preferences for marketable products at a favorable price. The change toward more sustainability can encompass all activities, as shown by the example of Greenwood, Walker, Baird, Parsons, Mehl, Webb, Slark, Ryan, and Rothman [29]. If packaging is collected from homes, all players must change their behavior and business models. The customer must allow access, allow time, and accept additional costs. Retailers need new infrastructure for collection and monetization. Manufacturers must design their products accordingly so that multiple uses are possible, participate in the collection system, and at the same time, defend their core competences.

It is, therefore, of central importance to understand the motives and behaviors of the actors.

2.2. Definition of Business Model and Business Model Innovation

A business model is the embodiment of the organizational and financial architecture of a company [30]. The business model is seen as a derivative of the strategy and, therefore, subordinate to it. Decisions are based on the direction of the scientific discourse as well as on relevant individual opinions. Seddon, Freeman [31] presents five different options, beginning with two overlapping degrees, two concepts being the same, a strategy with business models as a subdimension, and the other way around. Osterwalder and Pigneur have written that business models are a “sketch” of a strategy that is planned to be implemented [32]. This orchestration function of business models [33] shows that there needs to be a blueprint that the strategy gives. It defines how companies create and deliver value to customers and how they monetize this [34]. Combining value creation and value capture business models represents a simplified representation of the corporate reality and, therefore, a reality that describes as well as shapes constructs [35,36].

The business model is one of the most important competitive advantages, especially in rapidly changing markets with intense competition [37]. The relevance and breadth of application are reasons why there is no harmonized definition of the term [38].

Based on Csik [35], Nemeth [39], or Boehnke [40], the following Table 1 emerged, giving definitions of patterns.

Table 1. Presentation of business model components.

Title 1	Components
[41]	Core Business Process, Value Chain, Culture, Mental Models, Corporate Structure, Management Style
[42]	Transaction Content, Transaction Structure, Transaction Governance
[43]	Actor, Value Object, Value Offering, Value Interface, Value Exchange, Market Segment
[44]	Consumers, Customers, Allies, Suppliers, Flow of Product, Information, and Money
[30]	Value Proposition, Market Segment, Value Chain, Cost Structure and Profit Potential, Value Network and Competitive Strategy
[45]	Value Proposition, Products or Services, Value Architecture, Revenue Model
[46]	Customers, Competitors, Offering, Activities and Organization, Resources, Supply, Longitudinal Process Components
[47]	Offering, Market Factors, Internal Capability Factors, Competitive Strategy, Economic Factors, Investors Factors
[48]	Customer Value Proposition, Value Network Configuration, Sustainable Returns, Satisfaction of Relevant Stakeholders
[49]	Value Proposition, Customer Segments, Channels, Customer Relationship, Key Activities, Key Resources, Partner Network, Cost Structure and Revenue Stream

Looking at the similarities between the definitions, it becomes clear that there are four core dimensions that define a business model. The value proposition combines all offerings to the customer [49]. Second, there is the value capture dimension. These are measures to monetize the created value and deduct this from the costs of running the company. Thirdly, the customer segments are relevant. Defining target groups of products and services offers insights into customer needs and willingness to pay [49,50]. Using the metaphor of the blueprint, it is not the individual components but the resulting value network that is relevant [51]. This provides competitive advantages that are more difficult to imitate, either for product or process innovations [52–54]. This is exemplified by the fact that, according to a survey by IBM, outperformers in an industry innovate their business model twice as often as underperformers [55].

Based on the fact that the initial structure of the business model does not have a commonly accepted definition, this is also the situation in this case [56]. Definitions are, therefore, again considered according to the recombination school. These were analyzed for their core components in Table 2.

Table 2. Definitions of the construct business model innovation.

Source	Content
[57]	New revenue model
[58]	New combination of blocks
[59]	New revenue model, new value proposition, and new combination of blocks
[60]	New revenue model, new cost structure, new value proposition
[61]	New revenue model, new value proposition, and new combination of blocks
[62]	New value proposition, new revenue model, and new key activities

Based on the working definition of the business model construct, its innovation is defined in two parts. The first dimension is the scope of the innovation, i.e., the number of business model components that are adapted. To be called an innovation, two or more parts of the business model canvas have to be innovated. Thus, if only one component

of the business model is changed and the others remain unchanged, one can assume that it is a process or product innovation [63,64]. If, for example, only the benefit promise is innovated but not the basic value creation logic, a product or service innovation exists [35]. The same could happen with a process innovation, which, for example, changes the value chain in which other processes and activities now take place while the rest of the business model remains unaffected. [65]. This follows the scientific consensus which is expressed by the definitions of Lindgardt, Reeves, Stalk Jr., and Deimler [66], "Innovation becomes BMI when two or more elements of a business model are reinvented to deliver value in a new way" and Mahadevan [67], "(...) we define business model innovation as a strategic initiative to configure or reconfigure various elements pertaining to the (...) dimensions of the business model". The second step is the planned momentum of the change. This results in a deviation from the innovation itself, which is seen as an unprecedented combination of factors with market success. General innovation can, thus, also be brought about by chance, which has led to innovations such as penicillin, Viagra, or the vulcanization of rubber, which made rubber possible. In the latter, Charles Goodyear, who is the founder of the tire manufacturer of the same name, dropped a sulfur–rubber compound onto a hot stove, and the result was a dry and permanently elastic substance. The reason for this was that the rubber mixed with sulphur transformed into a new substance under heat, namely rubber. This was how Goodyear discovered vulcanization.

In combination, business model innovation is, therefore, a deliberate and controlled adaptation of two or more business model components with the aim of achieving entrepreneurial success.

2.3. Business Model Patterns and Visualization

The topic of patterns is closely linked to the visualization of business models. Patterns as simplified representations of reality always need a framework of visualization. The underlying problem is that a business idea initially only exists in the mind of the innovator and, therefore, needs to be translated into a business model [68]. The same applies to business model patterns, which reflect generalized sub-entrepreneurial activity. Many different models exist for the visualization of business models, so a selection has to be made. Options include the STOF model [69], the e 3-value methodology [43], the REA ontology by Geerts and McCarthy [70], the component model by Labes, Hahn, Ereik, and Zarnekow [71], and the business model poster by Rusnjak [72]. The most famous visualization option is the business model canvas by Osterwalder, Pigneur, and Clark [49,73]. The business model canvas was, therefore, chosen. It consists of nine fields and thus offers the advantage of a high level of detail compared to other models [74] while at the same time integrating all relevant building blocks of the business model definition [75]. This makes it a common language for describing, visualizing, changing, and assessing business models [49]. It is very well-established in the visualization of business models [76], as it is also highly regarded in research [74] and frequently used in practice [77].

The issue of visualization is closely linked to the topic of business model patterns. Also known as business model archetypes [27], patterns are a fixed way of conducting a business as a problem solution that has been successful in practice [78]. These define a specific business practice and abstract it from its context of origin so that it can be used as a standardized blueprint for innovation. Echterfeld, Amshoff, and Gausemeier [79] focus on patterns being a combination of configuration options that are the same in different successful companies. Three main topics are mentioned directly. First, patterns as business model components that are widely similar. This is supported by the definition of Osterwalder and Pigneur [32], also adding similar behaviors. The framework within which this similarity operates is the business model canvas. Therefore, we are talking about similarities in the way that the building blocks of the canvas are filled. Second, patterns need to emerge from success [77]. Third, is applicability [80]. Based on the understanding of the recombination school, it is, therefore, a fixed type of business model that is characterised by fixed compo-

nents and has arisen in the context of successful problem solving in practice. Patterns must be transferable and accessible.

2.4. Innovation through Patterns

The aim of this work is to enable innovation in order to strengthen sustainability. The business model as a unit of analysis offers special features that support this and, thus, make business model patterns possible.

The first is the recipe function of the business model, “business models as recipes”, according to Baden-Fuller, Morgan [81]. Following the concept of cooking, the business model components are considered ingredients, whereas the implementation activities are assigned to terms of preparation, such as cooking, baking, or frying [62]. Therefore, the business model of an existing company is simplified and used as a blueprint for innovation by showing coherence, description, and classification of business models [65]. This means that the current business model of a company is a tool of innovation for other companies [62,82]. Second, the structuring function is relevant. The idea is about business models showcasing similarities and differences between two or more companies [81]. This makes it possible to make comparisons and to communicate based on them. This is further developed in the third dimension, the communication function. The business model is seen as a narrative representation [50,83] of the company’s business practice, with a focus on value creation [84]. The fourth dimension is the analysis function [39,84]. The object is to identify success factors in the business model [82,85] so that decision-makers can be supported with regard to business model innovation [46,51,86]. The last function is about identification. Seeing all the above-mentioned dimensions, people feel a belonging toward a business model with their company [36]. This creates internal identification and external identification.

3. Materials and Methods

This review is based on the recommendations of Easterby-Smith, Thorpe, and Jackson [87]. The aim is to capture all business model patterns relevant to the fast-moving consumer industry. However, this is complex, as publications with direct references are limited. However, there is a broad body of literature on the topic of sustainable business model patterns. Transferring innovations from other sectors is a central idea of pattern-based innovation, and therefore, both topics must be integrated.

In order to address such a broad population, different databases were addressed, including EconBiz, Business Source Complete, ABI INFORM Complete, Google Scholar, and Google Search. The aim was to capture the full bandwidth, whereby patterns from practice also find their way into science via working papers or other university-related literature, which is not reproduced in the databases, which requires the integration of Google.

The search terms were derived from the underlying constructs in connection with the research interest. A key factor is the proximity of content, so terms were also used that did not directly match the search scheme. To compensate for this, a more extensive selection of search results was undertaken based on human judgment as the gold standard in the evaluation [88]. The search terms used for “article title, abstract, keywords and if possible, for the research body”.

The search queries resulted from the combination of the first and second text modules in all possible options. The methodology is based on Schroedel [89]. Text module one includes the following components: business model pattern, operating business models [90], atomic business models [44], and business model analogies [88]. The second text module consists of fast-moving consumer goods, sustainability, and circular economy [10]. The application is based on the concept of “Boolean Search” to avoid irrelevant hits in database searches. To achieve this, keywords are combined or optimized with search operators. In the practical application, this means, for example, that the keywords “business model pattern” and “sustainability” are combined with the operator “and”. The operators used

here were “and”, “and” or “asterisk” to include neologisms and inverted commas to emphasize the coherent nature of the keywords.

Based on the search hits generated, their citations were searched to see whether further relevant publications could be found. All searches were conducted between 1 January 2023 and 7 March 2023. The publications found offer a sufficiently high coverage of the topic if compared with literature reviews on business model patterns with regard to sustainability, like Schroedel [89].

No publication was found that completely fulfills the research interest. No publication sheds light on which patterns are most suitable for the industry, but the consideration always comes via a different variable, such as the circular economy, whereby the idea of selecting the best is lost. Rather, there are gradations of relevance. These are listed in descending order.

The fast-moving consumer goods sector, together with business model patterns, is only addressed in a fractional minority of publications. Bocken, Harsch, and Weissbrod [10] focus on reusable packaging and offer two main directions: in-store reusable packaging and e-commerce reusable packaging. Muranko, Tassell, van der Zeeuw Laan, and Aurisicchio [25] see four patterns: exclusive reuse models, exclusively reused products, exclusively reused products with reuse-enabling infrastructure, and reuse-enabling infrastructure for exclusively reused products as relevant patterns. They all are centered around the idea of enlarging the product lifespan and saving valuable resources. Greenwood, Walker, Baird, Parsons, Mehl, Webb, Slark, Ryan, and Rothman [29] offer a larger collection of patterns, ranging from single-use, repurpose, refill models, return models, and renting models. Central to this are decisions about what to do with packaging, from collecting it at the end user’s home, to focal points, to doing everything themselves at home. The same topic is also covered by Tassell and Aurisicchio [7], who focus on additional services and the cooperation between customers and wholesalers or producers in order to foster sustainability. They describe five patterns: the consumer replenishes/reconditions, the consumer replenishes at home via service, the consumer replenishes on-the-go via a service, the consumer brings and company replenishes/reconditions via a service, and company replenishes for consumer via a service. Mansour, Ceschin, Harrison, and Long [91] offer the most sophisticated presentation in terms of theory with fifteen differentiation levels. Here, the topic itself is broken down further so that, for example, a distinction is made between a manual and automatic filling system in the shop. What is new here is the topic of zero-waste systems in the shop and at the customer’s premises. Lofthouse, Bhamra, and Trimingham [92] and Bashir, Jørgensen, Pedersen, and Skard [22] deal with structurally similar topics, so that the results are not presented in a structured manner.

Cumulatively, there is a rich body of research on business model patterns that deal with breaking the “take–make–dispose” paradigm of the linear economy through the application of the circular economy [16]. This is primarily about packaging, less about products, and only marginally about the underlying value-creation processes. This imbalance shows where patterns are possible. In addition, the representation as a pattern is hardly widespread, although the characteristics of this simplified representation are often emphasized via competitive advantages or customer benefits. In the strategic context of the R strategies or 9R Framework, the methodology of Kirchherr, Reike, and Hekkert [28] is categorized in such a way that R strategies R3 to R8 are covered. Reuse (R3), Remanufacture (R6), Repurpose (R7), and Recycle (R8) are the focus here and are addressed most frequently.

Without a direct link to the fast-moving consumer goods sector, there are other publications that address the topic of sustainability across sectors. An example of this is Kiørboe, Sramkova, and Krarup [93], who also take up the topic of the circular economy, but at the same time also discuss product design, collaborative consumption, repair, waste management, as well as service and the function-based economy. This addresses a broader portfolio of solutions that also includes the value chain and moves away from focusing on the product. This is being driven forward by Clinton and Whisnant [21]. In total, 20 pat-

terns were described, offering insights into topics such as financing, social value through charity, or digitalization. This achieved the broadest coverage of sustainable business model patterns and, at the same time, addressed all pillars of sustainability and not just ecology. At the same time, the scope was extended along the entire value chain. Henriksen, Bjerre, Øster, and Bisgaard [19] also form a holistic picture of relevant patterns in the context of sustainability but expand the topic to include barriers to implementation and possible remedies. In the following, we will look at publications that deal with topics with a specific focus in the context of sustainability. Dohrmann, Raith, and Siebold [94] have a previously undisclosed main focus on social with regard to patterns. The list described in each sample aims to promote a social mission and, thus, above all, to help disadvantaged groups. Zufall, Norris, Schaltegger, Revellio, and Hansen [95] use smartphones and their corresponding lifecycles to develop new patterns. Abdelkafi, Makhotin, and Posselt [96] ask which pattern suits e-mobility best. This publication is the only one that has been found, following the idea of selecting the best-fitting patterns for a branch. Compared to the first block of literature, the picture here is diametrically opposed. There is hardly any reference to the fast-moving consumer goods industry, but the patterns are broadly based and, thus, also enable R strategies such as Refuse (R0) or Rethink (R1) to be addressed. Social issues are also addressed. Cumulatively, these patterns can be relevant but do not necessarily have to be. In addition, the aggregation level is higher compared to the first block, so the patterns differ more from each other structurally.

The last category consists of patterns that are not related to sustainability or fast-moving consumer goods. These are generally cross-sector lists. The largest representation of that, with 182 patterns, comes from Remane, Hanelt, Tesch, and Kolbe [97]. However, only 5 of these are directly relevant to the topic of sustainability [89]. Gassmann, Frankenberger [77], and Csik [97] presented “The St. Gallen Business Model Navigator”, which is the best-known list. These publications have the weakest connection to the topic but nevertheless cannot be excluded, as the transfer of patterns between industries is a central element of pattern-based innovation. A reference to the R strategies is only given in parts, if at all, whereby the entire portfolio is addressed.

3.1. Research Method

The first step in addressing the research interest is to better understand the actors and their behavioral patterns. The aim here is to primarily select patterns for the producer level, as this is where the majority of resource consumption is determined. Nevertheless, knowledge of customers, i.e., retailers and end users, is also required, as their behavior plays a key role in determining whether innovations are successful. An example of this is a recycling system for packaging, which depends on the customer handing over the packaging components to the correct resource utilization system. Rational choice theory is the basis of understanding behavior so that all actors tend toward utility-maximizing. Fast-moving consumer goods offer low engagement on the customer side, meaning that the decision-making process is conducted with little or no effort and rapid consumption [9]. Purchasing decisions are habit-based; therefore, the cumulative benefit must be clearly recognizable and relevant for the customer. This is backed by the concept of the resourceful-restricted-evaluating-expecting-maximising-Man, according to Lindenberg [98]. Meaning that a decision will only be allocated as much resources, based on a limited pool, as the subjective value of the outcome is. Meaning that habitual consumption, as well as traditions, are relevant guidelines. This means that, for example, the end user will pay little attention to fast-moving consumer goods, given their low value, short decision cycle, and habitual use. In practice, this can be seen from the fact that concerns regarding utilitarian benefits are one of the most important factors in sustainability choices [99]. Consumers expect sustainable benefits but are only prepared to spend limited resources on them. Producers and retailers must include this in their business model considerations.

In the following, a six-step approach is chosen to pursue the research interest. This is orientated toward the requirements of the scientific pathways of the topic, as well as the

goal of generating practice-oriented results that offer direct added value. The first field of action is to standardize the patterns, as these differ in terms of aggregation level but, at the same time, transpose structurally identical content. This is followed by the creation of an evaluation scheme to analyze the samples to make the best selection. This is then evaluated for suitability and applied. The result is a list of the most relevant patterns, which can be seen in Table 3.

Table 3. Research design overview.

Research Steps	Goals	Procedure	Results
Unification of patterns	Creation of a standardized database	Conversion of all patterns into a predefined scheme	List with structurally identical patterns
Comparison of the patterns	Generation of an overlap-free and same aggregation level database	Compare the contents of the samples to recognize and merge duplicates	List with comparable and non-overlapping patterns
Exclusion of non-relevant patterns	Simplification of the evaluation through pre-selection	Pre-selection based on three criteria	List of patterns relevant to fast-moving consumer goods
Development of an evaluation scheme	Realisation of a valuation scheme	Implementation of benefit maximization in a valuation scheme	Decision scheme for the evaluation of patterns
Evaluation of the evaluation scheme and improvement	Validated evaluation scheme	Expert survey on quality and potential for improvement	Applicable version of the decision scheme
Assessment of the pattern	Short list of the most relevant patterns	Expert survey based on the evaluation scheme	List with the most relevant patterns

The approach is carried out below, but the respective work steps are presented in a defined manner.

3.2. Unification of Patterns

It can be seen that patterns exist in different levels of aggregation in terms of content and presentation. The business model canvas was introduced at the beginning as a method of visualization. However, this only covers part of the visualization, as topics such as the name of the model, reference company, or its origin (as a source reference) are missing.

Building on existing sources that have gained academic attention, such as Remane, Hanelt, Tesch, Kolbe [97], or Curtis [100], the dimensions should be: “Name of the Pattern” as a verbal representation of the title of the design. This should summarize the content in a generally understandable way so that an audience without particular knowledge can get a first impression of the topic. The item “Description” is the representation of the content of the pattern based on the business model canvas. The aim is to emphasize its uniqueness in absolute terms but also to differentiate it from similar models. Patterns define a successful problem solution, and “Case Study Companies” serve to illustrate this success. They are, therefore, typical examples of the respective business activity. “Source” means the source from which the design originates. The aim is to make the authorship clear and, at the same time, to enable the reader to immerse themselves more deeply in the topic.

All samples found in the literature research were converted into this format based on the underlying data material. If no case study company is available, this is labeled accordingly.

3.3. Comparison of the Patterns

Patterns with great structural similarity in relation to the business model were merged. These arise when samples on a topic such as recycling are collected from several sources.

In addition, samples with only marginal differences in terms of service provision were merged. The exemplary Mansour, Ceschin, Harrison, and Long [91] provided the pattern “store manual refill system” and “store manual refill system rental”. The patterns only differ with regard to the ownership of the container that is going to be refilled. Based on the idea that two innovations to the status quo are required for a business model innovation, patterns must also differ in at least two aspects. A pattern that only differs in terms of key resources must, therefore, be merged.

The result of this activity is a list of 68 non-direct fast-moving consumer goods-related and 12 related patterns. On the one hand, these patterns have proven to be fundamentally relevant to the area of fast-moving consumer goods. This includes patterns that have emerged from publications on this topic and primarily relate to the area of the circular economy and the avoidance of resource consumption. On the other hand, some patterns could potentially be relevant. However, this still needs to be proven. Patterns with a direct connection can be seen in Table 4.

Table 4. Pattern list with direct connection.

Name of the Pattern	Description	Case Study Company	Source
Refillable home Dispenser	Use, fill, and deliver a provider-owned container at home through a dispenser owned by the provider.	EcoPure	[91]
Door-to-Door delivery	Fill and deliver a provider-owned container in the user’s home through human distribution managed by the provider.	Milk and More	[91]
Dispensed returnable store refill	Use and fill a provider-owned container at the store through automated machines owned and managed by the provider.	Algramo	[91]
Catered refill service	Fill a provider-owned container in closed public environments through human distribution.	Swordplay	[91]
On-the-go container subscription	Use and fill a provider-owned container in an open public environment through human distribution.	GoBox	[91]
Create your own drink	Own, fill, and deliver a container at home through a manual dispenser owned by the consumer.	SodaStream	[91]
Zero waste	Fill a self-owned container at the store through manual dispensers owned and managed by the provider.	Unpackaged	[91]
Deliver your container	Deliver the consumer’s self-owned container in closed public environments through human distribution managed by the provider.	Dabbawalas	[91]
On-the-go refill station	Fill the consumer’s self-owned container in open public environments through automated machines owned and operated by the provider.	Water ATM	[91]
Abandon reuse for a disposable product	Consumer breaks away from refill entirely and switches to a single-use offering.	No case study, but categories like nappies	[7]
Home refill bundled with service	The offering is a bundle of home refill service and a cleaning service, optionally provided by a third party.	Orkla	[22]
Bulk purchase	Customer buys in bulk and refills a sampler package at home.	Amazon	[92]

The references always refer to the main source with which there is the greatest overlap in wording and which one was first. However, there are large overlaps between the publications, exemplified by Mansour, Ceschin, Harrison, and Long [91] and Bashir, Jørgensen, Pedersen, and Skard [22].

3.4. Exclusion of Non-Relevant Patterns

In the following, the aim is to reduce the enormous range of patterns in the first step so that an in-depth analysis is possible while at the same time ensuring the fit with the topic of fast-moving consumer goods so that, ultimately, only relevant patterns are analyzed.

The topic of sustainability is associated with strong social pressure and expectations, which can result in strong distortions. In the area of fast-moving consumer goods, there is also the fact that customers' information-seeking behavior is limited. This means that the goods are of low value with the same problem of information procurement, which explains why purchases are partly habitual. Therefore, an approach is needed that is clearly orientated toward value as a measurement for the fit to the branch.

Echterfeld, Amshoff, and Gausemeier [79] proposed, building on Köster [101], three dimensions:

- Conformity with strategy;
- Competitiveness;
- Future robustness of how to determine the attractiveness of a business model pattern.

This publication is not linked to the topic of sustainability. Nevertheless, the model is suitable as a selection parameter. The initial aim is to exclude inappropriate samples for the fast-moving consumer goods sector and to make a rudimentary pre-selection within the suitable ones. For this purpose, it is necessary to consider both the present and the future and at the same time, which can be seen as an example in the field of value determination regarding customers (e.g., customer lifetime value). Furthermore, this is an initial analysis, so a simple model is advisable. This means that a large number of patterns have to be evaluated, so the effort per evaluation should be minimized.

The model fulfills these requirements and is further based on a sound theoretical foundation, incorporating existing literature on business model development. Three dimensions are sufficiently few in number and specific enough. Furthermore, future robustness also covers the future perspective. Finally, it shares basic components with the value-based approach central to the later model without being redundant.

The division of labor between the analysis stages is that the relevance for the fast-moving consumer goods area is surveyed first, and then the primary relevance survey takes place.

The first is the cascading of strategy and, therefore, the extent a business model alternative adapts to the needs of company strategy. The subject of the publication is the topic of sustainability, so conformity regarding the R strategies in the context of fast-moving consumer goods should be assessed. It is important to bear in mind that there is an internal hierarchy whereby an ascending order tends to mean a lower ecological impact. In addition to the imitation dimension, a social benefit is also considered, following the triple bottom line. It is, therefore, not about finding the overall most sustainable business model with the best fit but rather relating this specifically to the area of application.

Competitiveness measures a business model's potential to create long-lasting competitive advantages. The question here is to what extent the business model sets the implementing company apart from the competition and whether this is of value to the customer. The basic idea is that innovations only arise when an innovation is accepted by the market. A competitive advantage, therefore, only arises through the customer's willingness to pay for the new service or through savings in input factors. Therefore, the combination of long-term value and a competitive advantage that is relevant to the customer and can be monetized is central. The question is, therefore, whether the business model creates a long-lasting competitive advantage that can be transferred into value for the company. Long-term is described here as three or more years.

The last dimension is future robustness, answering the question of how vulnerable a business model is to changes in the external environment [79]. The corresponding scientific term is "BM stress testing" [102], and one of the most used approaches is the one by Haaker, Bouwman, Janssen, and Reuver [102] with six steps. The six-step process is simplified in the following publication to take account of the large size of the samples. In the first step, the

business model has already been described, based on the business model canvas. The tool is also recommended by Haaker, Bouwman, Janssen, and Reuver [102] so that the second step, identification and select stress factors, is the starting point. Scenario planning is one of the most relevant ways of doing this [102]. However, a shortened implementation is used so that four starting points are developed from existing scenarios, which are the same for all patterns. The close proximity of the business models enables this adaptation, whereby the aspects of legal, technological, societal, and political perspectives are covered. The future under consideration is five years, as the amortization periods planned in the economy are correspondingly long. The basis is formed by relevant scenarios on the subject of sustainability (e.g., Cox, Jackson-Moore, Johnson, Moussa [103]) and fast-moving consumer goods (e.g., Kuzmina, Prendeville, Walker, Charnley [104]), which are merged with one another. The changes in the individual areas are as follows.

Legal: Statutory regulations, such as the European Sustainability Reporting Standards, such as the Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 [105] Supplementing Directive 2013/34/EU [106] of the European Parliament and of the Council, which with sustainability reporting standards, require a relevant amount of additional work for the companies subject to them, the number of which will increase in the future. The extension of the so-called materiality analysis to “double materiality” is central to this. (1) Inside-out perspective (impact materiality): the company’s impact on society and sustainability; (2) outside-in perspective (financial materiality): opportunities and risks to the company from developments outside the company in the context of sustainability, for example, bans on fossil fuels. These extended reporting obligations can also be found in other regions of the world. Cumulatively, these tie up scarce sustainability expertise so that business models with simple calculations are favored, as these fit better into the reporting frameworks and can be prepared more easily for external third parties.

Technological: In the area of technology, there is no clear pattern of development but rather a progressive openness to technology. The CO₂ price becomes the central instrument of transformation, which, together with energy savings, favors those solutions that make it possible to realize savings here. Cumulatively, less use is preferable, which directly results in a benefit in terms of CO₂ or energy in general.

Societal: As a social value, sustainability is intrinsically motivated by people. Multiple crises, such as wars, energy price rises, inflation, and ideological differences, can cause preferences to shift. This is exemplified by the declining relevance of the issue of sustainability and the rising awareness of problems relating to topics such as migration in Germany [107]. As a result, the topic of sustainability is becoming less important, with the focus shifting more toward the business case as a financially monetizable factor.

Political: The rise of reactionary forces in upcoming elections could represent a key tipping point in international efforts to protect the climate. Key players here include Donald Trump in America, Marine Le Pen in France, and Jair Bolsonaro in Brazil. If they win elections and minimize climate protection efforts and state incentive systems, this will have a negative impact on the countries directly, but also on the political system worldwide. This could lead to a race to the bottom in terms of climate standards, which would remove the basis for business models.

The next step is to expose the business model patterns to the stress factors and assess the impact on the business model and its components. The key is not to obtain a general indication but to establish a link to fast-moving consumer goods so that the experts’ statements are specifically relevant to them. Building on step two, direct and indirect causalities are evaluated. The strength of the change and its result are evaluated. This can be both positive and negative. Based on this development, a point value is assigned for each pattern per dimension of the evaluation. One means a relevant deterioration, and five, a relevant improvement. The average of the values indicates the adaptation. The fourth step, the creation of a heat map, is skipped due to the large number of patterns. Otherwise, it would become too large or confusing, so the effect is missed. Instead, the negative outcomes are

collected and aggregated into a qualitative assessment. All these topics were converted into answerable questions, which can be found below.

- Strategy fit: Does the pattern make it possible to significantly advance sustainability for the fast-moving consumer goods sector?
- Competitiveness: Does the pattern create a competitive advantage for at least three years that is relevant for the customer in the area of fast-moving consumer goods?
- Future robustness/legal: Does the pattern contribute to the fulfillment of the publication obligations or the requirements laid down therein for the sector of fast-moving consumer goods?
- Future robustness/technological: Can greenhouse gases be saved within a technically justifiable framework through the pattern in the sector of fast-moving consumer goods?
- Future robustness/societal: Are goals achieved that are relevant to the target group through the pattern in the sector of fast-moving consumer goods?
- Future robustness/political: Is the pattern economically viable even without political support?

Analyzing the results and compiling a list of patterns that should not be considered further is the next step. This primarily concerns patterns that depict a business largely depending on indirect sustainability effects that are not clear to the consumer or business models that are disproportionately negatively affected by the attitude–behavior gap. A sustainable change in behavior can be expected in this context, especially if the promises and, thus, the value propositions are clear and trustworthy [108] and other people around them share their beliefs in ethical consumption [109]. The last step is the formulation of improvements and actions. In a deviation from the original model, no recommendations are made for how to improve unfavorable business model components or improve consistency across them. Instead, the exclusion list is presented. The principle of sound reasoning is kept. A deeper understanding is created through the next passages.

Firstly, samples that focused on the topic of financing, such as innovative product financing or microfinance, were canceled. Fast-moving consumer goods are such a low-value product that it does not make sense to implement further financial instruments whose realization significantly exceeds the initial product value. Models with the aim of refurbishing existing services were also canceled insofar as they related to the product. The refurbishing and WEEE service provider is an example of this. The reason is the same. The low value of the initial product makes refurbishment appear uneconomical, as transaction costs alone make the business case unprofitable. In addition, monetization models with elaborate structures that are designed to comprehensively skim off the consumer's willingness to pay, such as freemium or reverse auction, are ruled out. Due to their structure, which goes beyond a simple transaction, these require a separate service landscape, and this is associated with high costs in the context of physical products. Furthermore, issues relating to the lowering of ownership barriers, such as fractionalization, are largely excluded. These pursue the goal of enabling access to high-quality and, therefore, expensive services by decoupling ownership and use. Finally, in the area of communities, there have been some changes that also focus on the topic of sharing.

This model also forms the basis of the later in-depth design and, thus, the verification so that the optimizations on the more elaborate model are reflected back to the initial selection. This means that patterns selected for the first time were considered again under the new premises and, if necessary, added to the canon of patterns. This was the case twice.

3.5. Development of an Evaluation Scheme

The basis of goal-oriented construction of organizations are models (Carley, 2002) that show a development path to the desired end state [110–112] because they induce a gradual and systematic improvement in skills, processes, or structures [113]. In the present context, the aim is to use the model as a catalyst for adapting existing companies to the topic of

sustainability. The implied recommendation character and the general validity within the scope of the study area imply that a reference model is available [114].

This is an evaluation scheme for analyzing the quality of business models. This can be seen as a subgroup of the maturity models. Structural similarities are the aim of the status quo analysis, a decision-making process based on different parameters but converging on an overall score and, thus, a central statement. This recourse is necessary, but the literature on the subject of evaluating business models for their viability offers little content. Maturity models, on the other hand, offer a more sound methodology.

The comparison of development models for maturity assessments like that of van Steenbergen, Bos, Brinkkemper, van de Weerd, and Bekkers [115], Salviano, Zoucas, da Silva, and Thiry [116], or Becker, Knackstedt, and Pöppelbuß [117] on which the publication of Schumacher, Erol, and Sihh [118] is based, shows some common ground. According to García-Mireles, Ángeles Moraga, and García [119], the dimensions include inception, elaboration, construction, deployment, and maintenance. Differently worded but largely consistent in substance, these processing steps are also used by Mettler [120] and De Bruin, Freeze, Kaulkarni, and Rosemann [121]. These steps are also the basis for the modeling used in this publication.

The inception phase deals with problem identification, process planning, goals, and the target group [119]. The first step toward a survey model is the definition of the target population, the range of characteristics, and its operationalization [122,123]. It must, therefore, first be stated who is to be interviewed. Experts are the subject of the survey. Thanks to their experience, they have the best knowledge to be able to assess the relevance of samples and give well-founded opinions on survey instruments. At the same time, however, they are also end-consumers and can, therefore, contribute both perspectives, users and process participants. Schulz, Basler, and Strauß [124] describe an expert as "(...) a person (usually a scientist) who has outstanding expertise or skills in a particular field". This skill set is developed and can be operationalized by the ten-year rule of intensive engagement with a topic [125]. Expert knowledge is nowadays produced in all areas of society [126] so that, in the context of work, companies should be considered as a space of experience. Experts on the topic of sustainability are, therefore, mainly found in relevant roles with direct job perspectives. It is, thus, an individual who "is in some way responsible for the design, implementation or control of a problem solution" [127]. The functional context is weighted higher than the characteristics of the person himself [128], so professional use is considered a priority. The initial problem to be solved with the help of experts is that the number of patterns is too high to be used properly. Consequently, a selection is required, which should be as objective as possible. The aim is, therefore, to determine the most relevant patterns for the fast-moving consumer goods sector.

The elaboration phase includes the development of the strategy and design of the model [119]. As part of the present publication, this is merged with the construction and deployment phase so that the model creation is combined with implementation and use. De Bruin, Freeze, Kaulkarni, and Rosemann [121] advise focusing on the target group and their needs with regard to the model. This modeling strategy is based on the application framework. This means that a large number of samples have to be assessed, while the experts' time is limited. This requires a model that fulfills the two goals of brevity and comprehensiveness. This is the guiding principle. In addition, these are all assessments that relate to the future. It is, therefore, not possible to achieve complete objectivity. A qualitative approach, therefore, makes sense. It is clear that the two issues must be assessed separately. Firstly, an evaluation model must be created, which must be applied in a second step. The objective here is the same, but the process steps build on each other, so they will be treated separately from now on.

4. Evaluation Model

There are two options for the realization of the evaluation model. The first is a completely new construction, whereas the second builds on existing constructs. The

approach of using existing models as a starting point is scientifically accepted and is used, for example, by Schumacher, Erol, and Sihh [118] or Mettler [120]. This is beneficial as it allows us to partially avoid the effort of compilation and validation as existing models. Negative aspects, such as a potentially low degree of novelty or the adoption of aspects that are not at the core of the current publication, are relevant. However, the selection of published components guarantees scientific relevance.

However, the area of sustainability is heavily loaded with social expectations and wishes and, therefore, requires a focussing and selection element that supports objectivity in the decision-making process. This publication builds on the idea of a value-based strategy, as used by Abdelkafi, Makhotin, and Posselt [96] for the same purpose of selecting patterns. The dedicated focus on the value created by the utilization is used here as a means of reducing distortions and also increases the comparability between the heterogeneous samples. The core idea is that strategy is a way to create sustainable value, and business models, as manifestations of strategy, should embody this pursuit. A relevant sustainable business model innovation is, therefore, about creating value for the company and customers within the triple bottom line. Innovative business models focus on value instead of profit and are more successful [129]. Compared with concepts like “capability-based view” or “resource-based view”, which could also be options, a value-based strategy enables a broader perspective, including customers and suppliers. Moreover, the outcomes and not the process steps are the focus, which is better able to recognize innovations with a high degree of novelty. At the same time, value also embodies non-monetary components, which is suitable for sustainability. Finally, an easy-to-understand framework fits the goals of this publication, which is the enablement of a scientific and practical audience. There are four relevant points in value creation, which could serve as the evaluation dimensions. The first is the willingness to pay, which is the highest price a customer would pay for your product or service [130]. For this publication, this means that an increase in sustainability or social impact represents a direct value. The second factor is price, as the actual value a company charges for the transfer of goods or services. With reference to the business model, this is understood to mean the price that can be achieved in relation to the advertising for the bottom line. Relevant considerations include building brand loyalty and turning single purchases into repeat ones to boost sales volumes and gain market share [130]. Cost, as the third dimension, refers to the amount of money, resources and, viewed in the context of sustainability, external damage, to the extent that it can be internalized. The last dimension is the willingness to sell or the willingness to accept. This is the lowest price a supplier is willing to trade for his goods [129]. Higher sustainability demands will raise this bar.

The evaluation model, therefore, consists of four equal pillars as it can be seen in Figure 1.

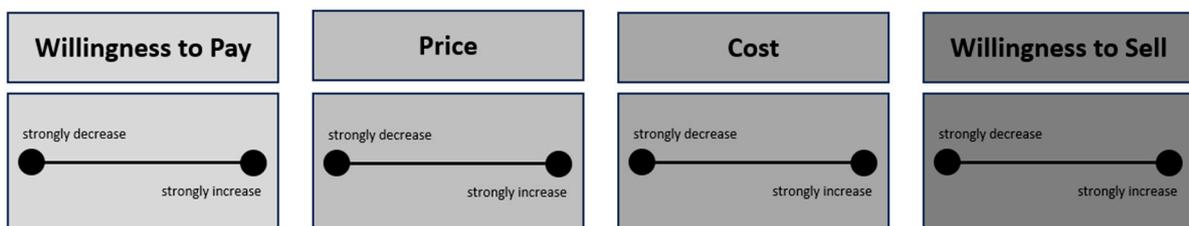


Figure 1. Model for pattern assessment.

For the work presented here, this means that the approach of value-based evaluation already mentioned in the first round of evaluation comes even more into focus here.

This is justifiable to the extent that short-term value generation is central to an investment decision between relatively comparable options. This is particularly relevant, for example, for capital market companies that report on a quarterly basis. The above dimensions are detailed as assessment criteria and form the basis of the evaluation.

The premise here is that the patterns are implemented appropriately and are subject to comparable capital expenditure. The implementation window is set at two years, with market penetration being supported by appropriate marketing measures. This requires that the customer is aware of the sustainable output or can find out about it with little effort.

The first dimension deals with the willingness to pay, as the maximum price a customer is willing to pay for a product or service. Assessed by formats like real purchase data, open-ended question format, or choice-based conjoint analysis [131], the willingness to pay is influenced by different factors, sustainability being one of them [132]. In the field of sustainability, things like age also matter [133]. The cumulative effect is, therefore, a multifactorial mechanism, which is ideally evaluated holistically. The experts are asked to assess the change in the maximum willingness to pay after the introduction of the pattern. This is not based on a customer group but on the change in willingness to pay as an average value. However, it is also possible to speak of a drop in willingness to pay, so an influence on the response is excluded.

The second dimension, price, centers around price elasticity as a change in sales volume due to price alteration. Sustainability has an impact in this regard [134]. Together with the price, the sales volume forms the turnover, and therefore, this dimension is also relevant. The result is determined as the changes in quantity because of the introduction of the sustainable pattern, while all other parameters remain equal. This is the key relevant question here.

The third dimension is the cost of production. In the majority of cases, the internalization of negative externalities, e.g., through the purchase of pollution rights or compensation payments, is more expensive than the production of products that focus purely on the economically necessary output. An increase in energy prices, which can also be caused by greater sustainability, has a negative impact on the profitability of companies [135]. Therefore, a business model pattern that influences production costs by making input factors more expensive can be viewed negatively. The question is, how do the costs of the producing company change as a result of the introduction of the sustainable business model?

The last dimension is the willingness to sell. The key point here is that samples that support sustainable sourcing require higher verification costs, e.g., certification or proof of origin, and are therefore more expensive for the supplier. The supplier will pass on the costs in the form of price increases. However, the opposite effect is also possible. For example, the “industrial symbiosis” pattern could also save costs along the value chain by streamlining processes. The central question is, therefore, how will supplier costs change as a result of the introduction of the sustainable business model pattern in the company? This is relevant for the producing company, as negative consequences can be, for example, the disappearance of suppliers and, thus, a reduction in choice, as well as passing on price increases.

The scales to answer these questions are polytomic nominal scales. The guiding idea is that respondents “assume, in accordance with the rules of cooperative communication (...) that the scale presented to them makes sense, and the sense can actually only be that the scale represents distributions that are real or assumed to be real (why else would the researcher use it in this way and not otherwise?)” [136]. To realize this, a five-level Likert scale is used, which does not anticipate the direction of change and allows for open-ended answers. This evaluation model is presented to the experts, together with supplementary questions regarding the relevance of the framework conditions of the samples. In the course of a semi-structured interview, their opinions on three core components are elaborated. Firstly, the explanatory content of the model for the success and, thus, the relevance of business model innovations is discussed, followed by a discussion of potential improvements and then the application of the method in general. Two test interviews were conducted to calibrate and test the approach, as well as seven further expert interviews. The results are in broad agreement with changes in the explanation of the individual questions.

5. Evaluation of the Patterns

Once the evaluation model has been validated, it is applied. The focus here is also on experts, but in order to increase validity, the aim is to survey around 50 people. The linguistic realization is based on cognitive psychology research. According to recent literature such as Jacob, Eirmbter [137] or Schnell, Hill, and Esser [138], it is decisive for the success of the questionnaire, in addition to the individual skills of the creator, to use implementation advice (for example in the form of checklists) [139]. This is realized by observing the process steps postulated by Kallus [140], as these make it possible to develop a questionnaire that, on the one hand, draws a complete picture of the area under investigation and, on the other hand, realizes a psychometrically tested survey instrument with defined quality, for example, realized in the standard systems (e.g., ISO 10075 or DIN 33430) (Kallus, 2010 [140]). The formulation of items was also supported by the procedure laid down by Helfferich [141] as described in the principle of collect, check, sort, and subsume. First, the largest possible number of questions was created using brainstorming and mind mapping. The basis for this was the results of the literature research, which were formulated taking into account the comments made so far, primarily the formulation references and the bias tendencies. Additively, the author's existing experiences with regard to a survey of changes in the business model, which were collected in the context of the master thesis, were used. The underlying theory is the generalizability theory, which is based on Eisend [142] and is appropriate in general economics and in this thesis in particular, which, with sufficiently clearly operationalized characteristics [122] as the business model innovation is. Here, "an item is regarded as an example of one of many possible items and, as such, represents a sample of the characteristic to be measured. According to the generalizability theory, test developers should have a picture of the possible items for each subtest and select a few "favorable" items from the "possible" items" [140]. For questions that have only been translated, this step is shortened accordingly.

The method of data collection is an online questionnaire. It was created as part of an online tool and sent to the participants as a link together with the cover letter. This is because as many potential participants as possible should be addressed. This is achieved through a combination of an online survey and database-based target group definition. The survey population is defined as experts whose work is directly related to sustainability, business model innovation, or strategy. The working environment must be a company based in Europe. A direct relationship to the field of fast-moving consumer goods is not a prerequisite, as patterns from other industries can be transferred, and it can also be an advantage to know them in the original industry context.

There is a basic questionnaire from which three sub-questionnaires are derived. The item blocks themselves are not randomized as they have a consistency in content. Based on the paradigm of task switching, as described by Allport, Styles, and Hsieh [143], Mayr and Keele [144], or Jong [145], there is a loss of productivity each time you switch between different tasks [146]. However, the more similar the tasks are, the smaller this is. Applied to the present work, this means that the arrangement of similar constructs, since they are related in content, opens up the possibility of repetition. This can be reflected in a shorter processing time (increases the probability that the survey will be filled out completely) and also higher quality results.

6. Results

A total of 48 questionnaires were successfully completed. The survey population is completely academically educated and has at least a Bachelor's degree. Furthermore, the majority of them work in the mechanical engineering, consulting, and fast-moving consumer goods sectors. The age pyramid is above average young, relative to the overall population. The following patterns, as seen in Table 5 were assessed as relevant, with the cut-off edge based on a selection by the experts.

Table 5. Assessment of the pattern.

Name of the Pattern	Description	Case Study Company	Source
Catered refill service	Fill provider-owned containers in closed public environments through human distribution.	Swordplay	[91]
Robin Hood	Charge wealthy customers more than poorer customers for the same product or service so that the rich subsidize the poor.	Museums, Aravind, and Eye Care	[97]
Organic Feedstock Business Models	Use of waste from food production and preparation as an energy source for processes with an exogenous energy demand.	KLM	[147]
Unique partnerships	Selling an attitude to life associated with a bundle of services to fill them.	LMVH	[96]
Substitute with renewables and natural processes	Replacing non-renewable resources with renewable ones and artificial processes with ones that mimic or use processes in nature.	Thyssenkrupp	[148]
Greener product/process	Sustainable design of the production process.	Dassault Systèmes	[20]
Rematerialization	New products are created so that waste can be a relevant resource pool.	Waste Management and Lehigh Technologies	[21]
Industrial symbiosis	Linking of different stages of the value chain or of companies with similar needs for the resource-efficient implementation of production processes.	Cleantech Östergötland	[20]
Buy One, Give One	Every service sold is priced in such a way that an equivalent service can be given away to those in need.	2 Degrees and TOMS Shoes	[21]
Inclusive Sourcing	Only suppliers that meet the highest standards of sustainability and human rights are used.	Walmart, Sylva, and Foods	[21]
Micro-Franchise	Adaption of the traditional franchising concept to the poor in order to own and manage their own businesses.	Fan Milk Limited and Hapinoy	[21]
Bottom-of-the-pyramid solutions	Producing goods and services for customers at the bottom of the income pyramid.	Xiaomi	[148]

A total of 12 samples were considered relevant. The cut in this number was based on the opinion of the survey participants. In the following, first, the individual patterns and, then, the overall view of the results are discussed.

The maintenance phase is the last step and relates to the quality assurance of the results. This was realized through a pre-test, as well as the possibility of pointing out errors within the surveys in a free field. The only suggestion for improvement concerned wording which was implemented during the process but had no influence on the results as it was of a semantic nature. Based on comparable publications such as Abdelkafi, Makhotin, and Posselt [96], this number seems appropriate.

The first pattern is catered refill service, which was postulated with a direct connection to the topic of fast-moving consumer goods. At its core, it is about replacing disposable packaging with containers that are used more than once, as these are filled with the product at the original point of sale. The deviation from the industry standard is that a reusable container is used instead of disposable packaging. With regard to the business model canvas, it is about the replacement of packaging with a solid container, which creates a lock-in effect. Once purchased, the container will invite the customer to buy again and again from the same supplier with the right refill structure. For the revenue stream, this means a steady and, in sum, larger sales volume, although with initially higher costs. The sustainability benefit lies in the avoidance of packaging waste.

None of the other patterns are directly related to the intended industry. Robin Hood, for example, has the core idea of harvesting consumer surplus from wealthier customers through a pricing policy adapted to solvency. However, this extra profit is redistributed to poorer customer groups by subsidizing them. The cumulative advantage is that the

customer base is significantly broadened, which contains both a social component and enables competitive advantages through economies of scale. The target group is, therefore, broadened, as well as a new value proposition and cost structure, the subsidies for the poorer customers. This deviates from the industry standard in that price differentiation is generally based on the performance characteristics of the product and not on the customer's ability to pay. This is not a sustainability benefit in the sense of ecology but rather the pursuit of a social mission, namely to provide disadvantaged customer groups with equal access to services.

The third pattern is the organic feedstock business model. The production of fast-moving consumer goods generates a large amount of organic waste, and the central idea is to reintroduce it into the cycle. The waste is used as an energy source for a process with exogenous energy requirements. The business model is innovative because a new revenue stream of cost savings is combined with a change in key resources. An example of this can be the substitution of crude oil with bulking oils and fats, which also shows the departure from the industry standard, in which used production resources are disposed of as waste. In this way, costs can be saved, or new revenue streams generated, and former waste has become a key resource. This is also the sustainability benefit.

Unique partnerships describe a pattern that is about selling a lifestyle rather than a dedicated solution to a problem. Therefore, sustainability could be the core value proposition and the products and solutions are just an instrument to transport this attitude to life. It is important to integrate it into the reality of consumers' lives and thus into the canon of values of the reference population. It is, therefore, crucial to adapt to the customer's behavior in such a way that sustainable consumption becomes clear to the buyer and their environment. At the same time, this requires an adaptation of the value proposition. The cumulative effect of deviating from the industry standard is that feelings are sold instead of services, which enables higher margins and greater brand loyalty. The sustainability benefit, therefore, lies in the fact that it is not the consumption but the feeling that is decisive, which, on the one hand, can cause a reduction in consumption and, on the other hand, encourages more sustainable consumption through the pressure of the peer group.

The next pattern is substitution with renewables and natural processes. The core meaning is to replace non-renewable resources with renewable ones or to use processes that mimic processes that occur in nature. The keyword here is bionics. The deviation from the standard is the adaptation of existing processes, which are not only filled with sustainable resources, but the adaptation of the process layout to these as a design premise. This far-reaching adaptation makes it possible to make deeper sustainability inclusions, which leads to stronger results and, thus, competitive advantages. With regard to the business model canvas, the key activities as processes change, as well as key resources. The sustainability outcome is clear: less process input of finite raw materials is required, thus protecting nature.

Greener products or processes as patterns center around the idea of designing the company's internal production process in a way that negative external output is minimized. Meaning that every pollution is captured or offset within the process regardless of whether it is CO₂, noise, waste water, or similar. For example, the aim is to achieve a closed cycle. The sustainability benefits are, therefore, largely clear and also the deviation from industry standard, as the focus is on efficiency and lowest costs. There is less damage to the environment or stakeholders. This can be relevant for betting, as it protects the license to operate, just as it reduces fines and reputational risks in general. An example of this would be the internal processing of wastewater so that it does not end up in the environment but remains in a closed cycle. This affects the areas of key activities, as production must be adapted accordingly, as well as key resources, as the necessary changes in construction fall into this area.

Rematerialization means that products are designed and produced so that they are suitable for further use at the end of their life cycle. This can mean that particularly long-lived components are removed directly and installed in a new item or that measures

that prevent further use, such as bonding, are dispensed with. This deviates from the industry standard in that the focus of the design was previously on intimate use or ease of production. The advantage of this type of service provision lies in the secondary usability, so that it is possible to trade in spare parts or to outsource the repair of the company's own machinery. For the business model, this means initial higher costs but an adjustment of key resources as existing machines become spare parts dispensers and, thus, assets beyond the end of their useful life. The sustainability benefit results from this extension of the service life and the reduced need for spare parts.

The pattern industrial symbiosis offers a different approach toward efficiency. All previous samples have focused on the exporting company and suggested optimizations within it. This focus on themselves is also the industry standard. The current pattern, on the other hand, is that value chains should be seen as symbiotic systems. Efficiency improvements should, therefore, no longer be thought of in company-specific terms but rather across boundaries so that core competencies and resources can be optimally utilized. A practical example would be fully integrated manufacturing in which a product is processed across several companies in very close proximity so that transportation costs are eliminated and process heat is optimally utilized. For the business model, this means that key partners are becoming increasingly central to value creation, and the key activity of joint production and finishing is being added. The benefit for the environment results from the elimination of emissions from transportation, process energy, storage, and other transaction costs that cause emissions.

The next pattern is buy one, give one. This focuses on a social mission of providing free access to products and services to people in need. The idea is that a donation is made with every purchase of a product. In most cases, this is a copy of the purchased product that is given away for free to people in need. The industry standard is that the value proposition encompasses the benefits of the product. However, obligatory donations of a relevant amount, over and above a symbolic contribution, are not industry standard. The entrepreneurial advantage is that the sales volume can be significantly expanded. Based on that, economies of scale and scope are relevant contributions. The business model is expanding to the extent that the target group is shrinking, as only affluent customers are being addressed. In addition, the value proposition and the theme of the large donation are expanded.

Inclusive sourcing means that the key selection parameters in the supplier selection process are not price or performance but, first and foremost, compliance with the highest standards in terms of sustainability and social issues. In the fast-moving consumer goods sector, for example, this is an established practice in the chocolate sector and among cocoa farmers. This deviation from the industry standard can result in differentiating factors such as a premium image. For the business model, it means a change in the cost structure, as new suppliers with higher requirements are generally more expensive. It also means new key partners, as compliance with standards must be monitored by impartial third-party providers. The benefit is that this protects human rights along the entire value chain and also reduces harmful emissions, i.e., CO₂ emitted by suppliers.

Micro-franchise is the penultimate pattern. The focus here is on social benefits through enabling people with little to no money to start a franchising business, with no intention of growing but simply to earn a living from subsistence economics. In contrast, the industry-standard sees franchises as a way of setting up a business primarily for larger customers or to benefit from upfront payments. The core process is to prepare franchising in such a way that it becomes a lucrative source of income for target groups without previous education, money, or a store and, at the same time, represents a business case. This requires adaptations to the business model with regard to key activities, as these now have to be converted to supplying very small quantities, for example. At the same time, customer interaction is changing, as personal contact is coming to the fore, as are the channels.

The last pattern concerns the target group to which services are sold. Bottom-of-the-pyramid solutions focus on goods and services for customers at the bottom of the income

pyramid. Therefore, in contrast to the industry standard, which sees the high purchasing power of a target group or its size as a feature of attractiveness, it is aimed directly at the lowest social classes. However, this has the advantage of serving an underserved target group, in which competition can be less intense. Consequently, products are needed that are designed in such a way that they can be purchased with a low purchasing power and at the same time meet requirements such as a long shelf life. For the business model, this means adapting the target group as well as the value proposition. The sustainability benefit lies in the fact that disadvantaged target groups receive services tailored to their needs.

7. Discussion

The first point of discussion is the question of whether patterns in themselves are a suitable means of introducing business model innovations. This is relevant because business models, as representations of the core business logic, are particularly affected by the dominant logic, i.e., the resistance to change that arises from past success [68,149–151].

Experience from everyday business life shows that business model patterns can play an important role, as demonstrated by the success of tools such as the St. Gallen Business Model Navigator or the use of patterns in management consultancy practice. From the conceptual viewpoint, this work achieved this objective. This practical observation is shared by publications such as Csik [35]. These are symbolic of the growing academic interest in the topic.

After it has been clarified that it is possible at the high aggregation level, the question arises as to whether the application of the patterns can really increase sustainability in the company. The argument against this is that sustainability is a multifactorial entity, so it not only requires a business model as a theoretical consideration, but the focus should also be significantly on implementation. The work presented here can, therefore, only provide a first step. However, it supports adoption by naming suitable tools and reference companies and directly addressing the recipe and communication function. In addition, sustainable business models can be implemented relative to the existing business model, some of which are environmentally friendly, so that there is no arbitrariness but rather greenwashing. This was countered by selecting samples with a particularly high utility value, which also represent a business case. It is, therefore, more valuable for the executing company to implement the patterns, making pure communication less likely.

The methodology must also be scrutinized. Central to this is the selection of the most suitable samples, which is also the core of this work. Firstly, the question arises as to whether the target population of experts was appropriate to provide information about the usefulness of the model and the samples or whether end users and a larger number of them would have been better to obtain valid results. For consumers, income, high education, and gender have a positive impact on sustainable consumption habits and expectations [99,109]. However, these demographics significantly determine the expert sample, as 100 percent of them have an academic background and an above-average salary as a result. This means that sustainability and social inclusion issues may have been overweighted. However, the fact that consumption and opinion diverge speaks against this. This is known under the term attitude–behavior gap, where even people without direct sustainable consumption patterns categorize sustainability as central. In addition, the experts are also consumers, so no significant deterioration is to be expected overall. The advantage, on the other hand, is that experts have a broader basis of understanding and a wealth of experience of what could be successful and can, therefore, evaluate the matter more holistically and objectively. A value-based selection logic is applied here, as with Abdelkafi, Makhotin, and Posselt [96]. In contrast to the authors mentioned, however, this publication uses a development that is directly based on recognized and well-known concepts of business administration. The methodology is, therefore, more valid and better integrated into the research context.

Secondly, the question of whether the model itself is sufficient. The central question here is whether the model is appropriate for assessing the attractiveness of a business model. At the outset, reference should be made to the area of tension in which the topic

finds itself: a model must offer sufficient explanatory content for the success of a business model, but on the other hand, it must also be assessable and applicable by the experts. According to Bocken, Harsch, and Weissbrod [10], derived success factors form barriers to implementation. The first factor is the customer benefit perceived by the customer, also in relation to existing non-sustainable solutions. The second major block is costs and the associated efficiency potential. The third block is cooperation and partners and the integration into a larger value-creation network. A relevant customer benefit and, therefore, a strong enough incentive to change well-known behavior is queried by the strategy cascading block regarding sustainability strategy cascading. Costs are, on the one hand, addressed in the second part of the model, but the model also tackles the subject of willingness to pay as a second dimension of Bocken, Harsch, and Weissbrod [10]. The issue of partnerships is not addressed in this model, which instead focuses on sustainability. However, this difference is of secondary importance, as partnerships can be a means to the end of achieving the factors mentioned, whereas sustainability adds another facet.

The next relevant question that arises is whether all patterns are properly differentiated from one another or whether there is too much proximity. This is particularly important in the context of the patterns buy one, give one and Robin Hood. Both patterns describe a subsidization of people with low incomes by target groups with higher incomes. The relevant difference, however, is that buy one, give one denotes a donation that is handed out to those in need separately from the initial product, and Robin Hood enables a shared consumption experience for all, as a lower price is charged, all other things being equal. The second questionable patterns are organic feedstock business models and substitute with renewables and natural processes. Both patterns are aimed at the sustainable optimization of the product creation process through the use of sustainable input factors. The relevant difference, however, is that the patterns follow a differentiated implementation logic. Organic feedstock business models are based on the R strategies Recycle and Recover and aim to return waste to the cycle and create the necessary basis for this. Substitute with renewables and natural processes, on the other hand, refers to Rethink and Reduce and, thus, to a process design that prioritizes the sustainability aspect internally. This, therefore, involves process linking and process optimization.

Finally, the number of samples selected should be discussed. This raises the question of whether this is appropriate or whether there should have been more or fewer samples. This is a subjective assessment based on the will of the experts. However, this can be validated on the basis of comparable publications such as Abdelkafi, Makhotin, and Posselt [96]. The context of use must also be considered. Creativity methods such as the morphological matrix or pattern combination matrix need a few patterns to function, but no more.

7.1. Limitation

This publication is subject to limitations. Firstly, the basic mechanics of pattern-based innovation must be mentioned as a limitation. Patterns enable and enrich creativity but also limit the possibilities [35]. Consequently, innovations are only new to the branch and, therefore, have a low level of innovation, which makes it more difficult to achieve competitive advantages. To counter this, other creativity techniques have been mentioned that could enable a more differentiated by developing patterns.

In relation to the work, there are further limitations. Following on from the above, innovativeness could be limited by focusing on a few well-known patterns, leaving the broad majority neglected. Certain patterns are associated with success, for example, through media attention or the mentioned case study companies, which can lead to distortion. Distortions of perception like “selective perception” can lead to biases, and therefore, unsuitable patterns could have been chosen.

Furthermore, the latest and most innovative patterns may not have been available for selection, meaning that the result of the work does not realize its full potential. The issue of sustainability is strongly driven by regulations, customers, and the capital markets. This high level of pressure means that new patterns are constantly emerging [12]. If we now

consider the status of the case study companies as mostly large and old existing companies, it becomes clear that there is a blind spot in relation to start-ups. The patterns that form the data basis are, therefore, not congruent with the potential pattern pool, which has a negative impact on quality. This is also reflected scientifically in the fact that business model patterns tend to omit important and new patterns [152].

There are also limitations with regard to the methodology. Firstly, the initial selection was carried out by one person with the aim of making more than 108 patterns assessable for a panel of experts. This was counteracted by objectifying the selection mechanism and also by using the results from the validation of the mechanism of the expert survey, but it is still a limitation. The selection mechanism itself must also be scrutinized. A model is postulated that undergoes validation. However, this is a simplified view of a complex reality, which means that important selection dimensions may not have been taken into account. This would be, for example, the application context and, thus, a stronger integration of the customers. Experts are also bound by their specialized and social context.

The last limitation concerns the thematic block of the patterns that are displayed. These are primarily considered under the premise of the business model, whereby framework conditions such as the age of the pattern, dependence on legal framework conditions, or cultural backgrounds are not addressed. This is illustrated by the example of cloud and big data applications, which meant resource savings by shifting data processing to a scalable infrastructure [153,154]. However, data protection laws differ and a pattern suitable in China could be prohibited in Europe. Therefore, even if different consumer preferences are taken into account, the samples provided may not be suitable because the wrong choice has been made.

Finally, there is a limitation in that the patterns only trace direct causal relationships toward greater sustainability or social justice. Indirect performance interdependencies, for example, through the inclusion of digitalization, are not addressed.

7.2. Direction for Future Studies & Implications

This publication provides both academic and practical contributions. For readers with a practical background, three focal points are central. Firstly, it is about stimulating business model innovations that lead to greater sustainability or social justice while at the same time making a business case. Secondly, a clear set of relevant patterns is provided, offering a starting point for innovation. They are easier to implement while requiring fewer creations of breakthrough business models. This makes it possible to drive innovations in-house, which can save costs for consultants and, at the same time, prevent rejection within the company. Finally, business model innovation can be seen as a manageable process rather than an art [34].

The most important scientific contribution is to open up the field of patterns for the area of fast-moving consumer goods in a holistic way and to analyze the broad spectrum of patterns with regard to attractivity. Therefore, not a list of patterns that are somehow all useful is the result, but a clear list of relevant patterns. Furthermore, the scientific paradigm that sustainability in the area of fast-moving consumer goods is closely linked to the area of circular economy is broken. So the “take–make–dispose” paradigm of the linear economy could not only be replaced by the application of the circular economy [16] and, therefore, a focus on product design and recycling but also through a broader understanding involving the whole value chain, as well as social aspects. Patterns ranging from “inclusive sourcing” at the start of the production cycle over “greener product/process” as a manifestation of the value creation, up to “catered refill service” span the whole value chain. In addition, we describe a new methodology for analyzing the relevance of business models, enabling new research. Compared to Abdelkafi, Makhotin, and Posselt [96], a different approach was chosen, which emphasizes the topic of strategy and sustainability more strongly. This adds a new aspect to research into the attractiveness of patterns. It is also relevant here that more and more patterns are being described as research progresses. This leads to lists of over 100 entries, such as Remane, Hanelt, Tesch, and Kolbe [97]. These detailed lists require

advanced methods to search for relevant patterns. Finally, the topic is placed in a wider context by linking it to the topic of strategy so that interdisciplinarity is promoted and the limitation of the topic of business models to a pure innovation case is broken.

The previous work offers starting points for future publications in the context of dealing with limitations and results.

The first field of action for future research concerns the topic of patterns. These emerge continuously and are described scientifically with a time delay. Therefore, renewed implementation with an expanded database would be relevant. Also, a broader and more diverse selection of experts could bring new insights, including new hierarchies or insights regarding the model used. However, it is even more important to pay attention to the framework conditions of the patterns and to identify new patterns that do not come from the existing structures of large companies but from start-ups. These represent the latest state of practice and enable better adaptability due to the lack of a dominant logic. An ideal starting point would be start-ups, with a focus on the entire value chain. In addition, more innovative patterns offer a greater competitive advantage, as diffusion is not yet as advanced.

The second topic area picks up on implementation. The results of pattern-based innovation need to be evaluated. This can be done via long-term studies that show how implementation can be optimized. In addition, implementation must not only be seen as a process, but also from the human side. For example, it is largely assumed that users have a positive or neutral attitude toward business model innovations. Against the background of path-dependent investments and the practical realization that innovation projects often fail, this is an inaccurate premise in some respects. One explanation for this is the concept of user resistance behavior (defined according to Kim, Kankanhalli [155]) as a function of “perceived ease of use” and “perceived usefulness” (defined according to Davis [156] and Venkatesh, Morris, Davis [157]) and “resistance to change” (defined according to Oreg [158]). All in all, this means that interdisciplinary research is needed, with intersections on the topics of behavioral research and corporate development, in order to clarify the internal causal relationships. The starting points here are the aforementioned characteristics and their perception by employees.

The last topic is about the integration of results into the strategy cascade. This could be achieved, for example, through the use of the 9R Framework of Kirchherr, Reike, and Hekkert [28] by outlining the strategic fields of action; these provide a framework within which the patterns can be directly addressed as manifestations of strategic choice. However, the exact allocation of patterns to strategies has not yet been clarified, so there is a need for action here. This is representative of the even deeper integration of the patterns into the area of strategy that needs to be a future research direction.

8. Conclusions

The publication enables business model innovation in the field of fast-moving consumer goods through a systematic approach. Building on already established patterns, the selection of the most suitable patterns has been conducted based on a valid rating of attractiveness.

Before drawing a conclusion, a brief recap of consumer behavior in the context of fast-moving consumer goods should highlight the core elements so that the patterns become clearer against this background. These are consumer products that are of low value, are consumed frequently, and therefore, do not trigger any in-depth engagement on the part of the consumer but are instead habitual consumption.

Against this backdrop, it becomes clear why the business model patterns that are largely dealt with in science have received little attention from the experts. The patterns center around the idea of replacing one-time-use packaging with more sustainable alternatives, mainly reusable containers, or replacing packaging with unpackaged consumption. This shows that the behavior is desirable. However, the utility perspective of the consumer is hardly considered. However, the “zero waste” or “on-the-go container subscription”

patterns and others [91] require the active support of consumers in order to function. However, these investments run counter to the idea of fast-moving consumer goods, meaning that they fail outside target groups with a high level of emotional involvement. This can be seen in the example of unpackaged shops in Germany, which became 20% insolvent within one year [159]. This can be explained by theories such as the attitude–behavior gap. This shows that a fundamentally positive attitude toward sustainability does not imply such consumer behavior, especially if it is associated with additional costs. The gap narrows for people with a high level of education, high income, and women. However, this target group only makes up a small proportion of the overall population. However, it is disproportionately represented in the research. Cumulatively, the end customer perspective is, therefore, important.

In addition, the patterns recognized as relevant affect all parts of the value chain. From initial sourcing (e.g., inclusive sourcing) to distribution (e.g., micro-franchising) and interactions with the customer that go beyond this (e.g., catered refill service). It also shows that sustainability patterns must be considered as a holistic construct in relation to the triple bottom line and should not be narrowed down unilaterally to the topic of ecology. Patterns with distinct sustainability benefits as well as social value creation are favored, but these also represent an economic business case. Cumulatively, it is important for samples to have a holistic perspective through broad coverage of different value-creation steps.

The R strategies are also targeted and selective. Refuse (R0), Rethink (R1), Reduce (R2), as well as Recycle (R8) and Recover (R9), are clearly focused on because fast-moving consumer goods tend to be cheap and focused on one-time use; the topic of lifetime linkage is of secondary relevance. These results are a dichotomy between high and low sustainability impact.

It also shows that patterns are of international origin and come from different sectors. However, these are already widely adopted by large companies such as Thyssenkrupp, Walmart, Xiaomi, or LVMH, so the degree of novelty is at most new for the industry. On the other hand, start-ups do not occur as a source of patterns, which could be due to the experience requirement of the pattern definition or the age of the pattern. However, this will be a topic for future discussion. Overall, it should be noted that patterns show relevance through their application in large companies.

Patterns that are relevant for the fast-moving consumer goods sector are characterized by a focus on the end customer, are widespread across the value chain, and have a clear relevance due to their application in widely known companies. However, issues such as age or restrictions on implementation, such as dominant logic, are not considered.

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