Design Principles for Route Optimization Business Models: A Grounded Theory Study of User Feedback

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Abstract. The article generates design principles for business models offering route optimization software. Route optimization is a widely relevant activity in logistics, as it is its purpose to optimize the amount of time and the associated cost that a vehicle needs to reach its intended destination. The article presents a Grounded Theory study of user reviews drawn from the comparison portal *Capterra* to uncover possible design principles for these business models. User reviews are suitable data for that purpose as they are a rich source to derive basic requirements for a product. The data are analyzed qualitatively, adhering to established coding guidelines, and aligned with established business model components to achieve a link between empirical research and the underlying knowledge base. The synthesis of the data to design principles enables practitioners to adequately process and instantiate them into real-life design decisions that enhance the possibility of designing a successful business model.

Keywords: Design Principles, Route Optimization, Logistics, Digital Business Models, Grounded Theory

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1 Introduction

The notion of how to deliver a product from its source to its destination utilizing vehicles in the most time and cost-efficient manner is a central problem in logistics. Usually, adding various constraints, for example, delivery orders, requires complex algorithms that are unsolvable without computer assistance [1–3]. In the past decade, a sizeable amount of start-ups has emerged, focusing (mostly) exclusively on providing said services for route optimization [4]. As of now, there is little research into how these business models work and what they need to do to stay successful.

The goal of this study is to provide prescriptive knowledge about how to design a successful business model around route-optimization software products. The authors draw from design theory, as that design principles are the most suitable medium for that goal. The purpose of design principles is to codify and formalize knowledge about design and to make it available via prescriptive statements [5, 6]. Furthermore, as design principles are formulated prescriptively, they are a suitable tool to communicate design actions to practitioners and managers [7, 8].

Past research has shown that user reviews of products are a rich source for, mostly anecdotal, feedback, that can serve as the basis to distill fundamental requirements for the success of a product or service [9–11]. In order to grasp the relevancy of the analyzed data, the study uses the business model as an analytical lens to align the emerging concepts. Business models are an important analytical unit in Information Systems [12] and enable the researcher to grasp the *"blueprint how a company does business"* [13 p. 2]. The business model concept was chosen above more specialized frameworks, for example, stemming from product design or service science theory, as it is the author's clear view, that a comprehensive look spanning across all relevant business elements, is the most purposeful [14, 15].

In principle, when analyzing textual data such as user reviews, research might take one of two possible roads. Firstly, analyzing the data qualitatively, using *coding* procedures to enrich the data with interpretative meaning [16]. Secondly, the data might be analyzed quantitatively through computer-assisted means such as *text-mining* or *topic-modeling* [17]. The authors chose to conduct the text analysis qualitatively through *manual coding* based on *Grounded Theory (GT)* principles [18] and a corresponding procedural model [19]. The manual coding approach strives to generate findings based on the interpretative analysis of the data. The coding procedure uses established business model components as a conceptual lens, and, thus, does not employ pure *open coding* but *template coding* [20]. That is done, to achieve entanglement of the data with the underlying knowledge base of business model theory. For the reasons above, the research question for this paper reads as follows:

Research Question (RQ): What design principles for route-optimization business models can be derived from user reviews?

The paper continues by outlining the theoretical foundations for business model conceptualizations and design principle formulation and structure. Following, Section 3 details the research design, more specifically, the mode of data collection, data

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selection, and the coding procedure. Section 4 and 5 present the results of the study in the shape of requirements and the respective design principles. Lastly, Section 6 provides a discussion and highlights contributions, as well as limitations.

2 Theoretical Foundations

2.1 Business Models

The notion of what makes a business tick, i.e., how it generates value, delivers it to its customers, and, ultimately, makes money from it, is critical in business model research [13]. As every business has some *modus operandi*, subsequently, every business, be it consciously or unconsciously, has a business model [21–23]. The literature has produced various approaches to defining the term more concisely, for example, by giving textual definitions or listing of components [24]. Up to this date, there is a consensus that there is no standard definition, but rather an array of more or less deviating conceptualizations [25].

More recently, various streams of literature have emerged aiming to identify what makes business models "digital". As such, researchers thematize digital business models (e.g., [4, 26, 27]), data-driven business models (e.g., [28, 29]), or platform business models (e.g., [30, 31]). The study at hand draws from the conceptual framework of [32], who propose five components that represent the ontological elements of digital business models. The model subsumes the basic characteristics of digital business models, for example, the mandatory use of platforms and corresponding interfaces for customer interaction. Thus, it delivers a focus generally associated with digital business models, in that they, fundamentally, consider, in their very structure, the use of digital technologies [33–35]. Also, the framework has been applied in prior studies thematizing digital business models (e.g., see [36]). Thus, it provides a dedicated look at digital elements of business models, which the reason the following elements were chosen:

- **Value Proposition:** Consists of the bundle of products and services
- **Organizing Model:** Consists of the organizational logic
- **Interface:** Summarizes all elements related to customer interfaces
- **Service Platform:** Consists of critical resources and core technologies
- **Revenue Model:** Consists of all elements that refer to financial aspects

2.2 Design Principle Structure and Formulation

In terms of theory, design principles rank in category five of [6]'s taxonomy of theory, termed *theory of design and action.* The remaining four theory types are *analytic theory, theory for explaining, theory for prediction,* and *theory for explaining and predicting*. As they are a part of design theory, it is their explicit purpose to provide instantiable prescriptive statements consisting of codified design knowledge that brings about an intended design [37]. Design principles may be seen as useful tools to assist possible resulting designs but, as they are formulated textually by

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researchers, are open to interpretation. Thus, their instantiation is not a guarantee for success, but rather a support mechanism for the targeted reproduction and dissemination of design knowledge [38]. [39 p. 357], for example, defines design principles as *"(...) a recommendation or suggestion for a course of action (...)"*, and [40 p. 2] defines them as *"A fundamental rule or law, derived inductively from extensive experience and/or empirical evidence, which provides design process guidance to increase the chance of reaching a successful solution."*

In formulating design principles, [41] point to various linguistic templates, for example, those of [42] and [5]. The design principles formulated in this article adhere loosely to the linguistic template of [41 p. 4045], which is as follows:

Provide the system with **[material property – in terms of form and function]** in order for users to **[activity of user/group of users – in terms of action],** given that **[boundary conditions – user group's characteristics or implementation settings].**

Boundary conditions provide the room for contextualization, as design principles are not instantiable in any given situation but are restricted to be acted upon under explicit boundaries. The **material property** details how the artifact should be designed as well as the components it should include. Lastly, the **activity** outlines what the user should be able to accomplish through the design principle [40].

3 Research Design

The data were analyzed using *GT*, which was first introduced by [18] as a set of procedures designed to generate theory from all forms of data [43]. However, even though *GT* has since been established over fifty years, there is no standardized method, but rather a host of various procedures and guidelines [44]. As discussed in Section 2.2, design principles are a part of design theory [6] and *"can be extracted from observation and inference from already instantiated artifacts"* [45 p. 321]. Thus, the authors see the *GT* approach as sensible to derive design principles.

The present work draws from the procedural model outlined in [19 p. 88]. The first step is to define the research question **(Step 1)**, which in the present study is covered by **RQ1** in the introduction section.

Next, *theoretical sampling* **(Step 2)** refers to the type of data used to answer the research question. In the case of the present study, the data chosen are *user reviews*. A *user review*, in this article, is understood as *"peer-generated product evaluations posted on company or third party web-sites"* [46 p. 186], which provides rich anecdotal data that can be used to derive product features, requirements [47] or assess service quality [9]. Prior research has identified that user reviews are a rich source for identifying requirements, as users may provide information on *shortcomings, bugs,* and *requests for improvements, features,* and *content* both implicitly and explicitly [10, 11].

Third, *data collection* follows the guidelines outlined in [48] **(Step 3).** Data were collected from *Capterra* [49], which provides a comparison of software products and enables users to write reviews. The sample consists of 500 user reviews drawn from the category *route planning*. Users may rate software products in two different ways.

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Firstly, by assigning stars in various categories on a one to five rating systems. Secondly, by writing textual feedback that is structured in three categories, namely *comments*, *positives,* and *negatives.* Thus, the first conclusions about the free texts can be drawn based on their initial classification. With the goal of instance-independent validity, the reviews were randomized independently of their association with a specific product. The reviews were listed in *Microsoft Excel*, equipped with a randomized number, and ultimately ranked. The *random sampling* procedure guarantees that each review has the same probability of being included [50].

The coding procedure **(Step 4)** in this article relies on the basic definition that *code* is a *"(...) researcher-generated construct that symbolizes and thus attributes interpreted meaning to each datum for (...) theory building, and other analytic processes"* [16 p. 47], which elevates raw data into a generalized and theoretical domain [51]. The coding approach combines both *open-coding* (first 100 iterations) and *template coding* (all subsequent iterations), which, the authors argue, is more goal-oriented than each approach on its own [20, 43]. Before the next iteration, the codes were aggregated to concepts and classified alongside the business model elements of [32] to give the coding procedure structure and to achieve a straightforward path to distill fitting concepts. Thus following [20 p.17], *template coding* acts as a conceptual lens, in that it is a *"(...) tool for framing the data into a coherent construct through the application of an established 'language'"*. Therefore, the approach chosen is not an impairment of the GT approach but instead ranges in acceptable limits of the use of existing knowledge [52]. Secondly, in line with the recommendations for design principle development of [53], the coding approach explicitly and selectively seeks to identify requirements for designable business model elements. The nature of the study means that only those business model elements can be considered that can be identified through user reviews (see Section 5). The qualitative research part consists of the manual coding of, initially 100 user reviews, and, subsequently, the stepwise inclusion of further samples up to the point of *theoretical saturation,* i.e., the point at which no more new findings are generated [54, 55]. That point was reached with 500 reviews. Additionally, a stepwise increase of samples offers a higher likelihood of achieving a sounder base for generalization [56]. **Table 1** gives exemplified codes done with *MaxQDA*.

Table 1. Exemplified user reviews drawn from *Capterra* and corresponding codes.

Datum	*Codes*
"Flat rate pricing vs per delivery. Very simple and fraught forward. Ease of making routes. App for drivers"	Pricing options, Routing Convenience, Driver App
"Like being able to put in unlimited locations"	Unlimited data upload
"I feel like there could be a lot of other features they could provide. I wish you could track customer experiences and make notes on each delivery"	Taking Notes
"I like the tracking and note functions. I like that I can easily add customers and they uploaded a spreadsheet for me. I like the map feature to create a route."	Taking Notes, Tracking Capabilities, Spreadsheet Import, Map Interaction

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As the research goal is to develop design principles, user reviews are seen as a sensible source for data, as users both positively and negatively comment on relevant elements belonging to a company's business model. Next, the coding procedure produces detailed categories, which, through *constant comparison* **(Step 5)**, are aggregated to higher-level categories. *Constant comparison* means that the research constantly compares emerging concepts with the present data and validates whether they fit with existing categories [57]. The process is finished once the categories are saturated. Lastly, based on the findings, one needs to develop a theoretical artifact, i.e., in the present study, design principles.

In line with the requirements of design principles, in that they are general by nature and applicable to a class of problems rather than a specific instance, the emerging concepts were modeled **(Step 6)** into generalized and aggregated categories and ultimately translated into *meta-requirements* [58–60]. Following [45, 59], under meta-requirement, we understand requirement addressing a class of artifacts, rather than a specific instance. The *meta-requirements* were generalized into key requirements using *logical content aggregation* [53] and lastly translated into design principles [61] (see **Figure 1**). Starting with the third iteration (sample n = 201), the coding is restricted to the more highly aggregated terms and does not include small detail codes.

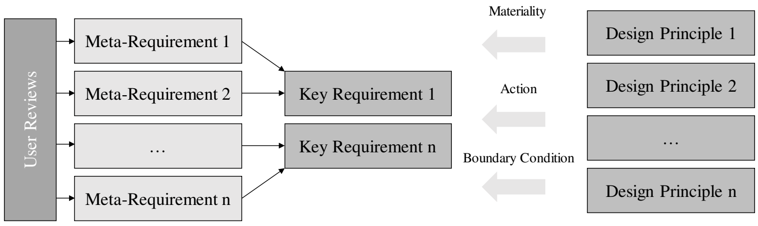

Figure 1. Process of design principle development based on [41, 53, 59, 61].

4 Requirements

The analysis shows a twofold high-level categorization of the data. Firstly, users address general issues that are not specific to routing software, but to software and customer relationship in general. For example, a large number of users either praise or condemn the customer support or the ease of use for the respective product. That result is understandable, as these categories resemble general service quality across every domain and strongly resemble those of [9], who report on general online service quality categories, for example, *ease of use*, *reliability of the system*, or *quality of the customer support* (see [9 p. 313-314]).

Table 2 shows the resulting categorization alongside the digital business model framework of [32]. The framework was chosen above others, such as the business model canvas, as it is explicitly designed for digital business models [36]. The design principles presented in the following refer to designable business model elements specific to route planning software. Thus, the authors exclude general points of user reviews referring to *Usability, Software quality (stability, performance),* or *Customer Support*. For a more in-depth analysis of these issues, the authors refer to existing studies, such as [9].

Table 2. Synthesized Key Requirements structured alongside the Business Model elements. OM = Organizing Model, RM = Revenue Model.

	Key Requirements (KR)	Short Description
Value Proposition	Dynamic Routing **(KR 1)**	Refers to the requirement of routes being editable before or during the job execution and considering multiple constraints
	Routing Accuracy **(KR 2)**	Refers to the accuracy with which the routing engine produces the most optimal and accurate route
	Multi-Routing **(KR 3)**	Refers to the routing engine being able to include multiple drivers, stops, and jobs over multiple days
	Real-Time Vehicle Tracking **(KR 4)**	Refers to the software being able to provide accurate real-time tracking of vehicles/drivers position, condition date (speed), idle-time, and alerting
	Complementary services **(KR 5)**	Refers to complementary services such as reporting, documentation, or monitoring
Service Platform	Data Import **(KR6)**	Refers to the option to import data (addresses) conveniently in bulk, with few limitations, and in standard formats (spreadsheets, CSV)
	Data Export **(KR7)**	Refers to the option to export data with few limitations, customizable, and in standard data formats (spreadsheets, CSV)
	Data Quality **(KR8)**	Refers to the underlying data (locations, addresses) being accurate and validated (input corrections)
	Data Resources **(KR9)**	Refers to additional data, such as traffic, temperature or tolls being integrated into the routing process
Interface	Map Visualization **(KR10)**	Refers to interactive maps used to both visualize and delimit the routing process (lasso feature)
	Application Design **(KR11)**	Refers to the application being well-designed both in GUI (clean, customizable, up to date), and usability (intuitive, ergonomics, app and web functionalities, independent from the device) with roles for respective users (e.g., drivers, dispatchers)
OM	Technical Integrability **(KR12)**	Refers to the software being able to integrate with third-party programs (E-Mail, Calendars, Customer-Relationship, Google Maps), and the provision of APIs (Application Programming Interface)

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RM	Modular Pricing Models **(KR13)**	Refers to the pricing models being tailored towards respective customer groups based on the size of the enterprise or the usage frequency of the service

5 Design Principles

The design principles presented in the sections to come represent prescriptive guidelines for action based on requirements empirically derived from user reviews. Thus, they are limited to an exclusively external (customer) perspective and cannot cover essential business model elements such as the cost structure. The design principles will be presented alongside their alignment with the business model elements outlined in Section 2.1 and supplemented by a rational argument based on the findings in the user reviews. The formulation draws from the template of [41] outlined in Section 2.2.

The formulation of each design principle adopts and adapts the template presented in Section 2.2. The boundary condition for each design principle is the design of business models for route planning software in the respective business model element. **Table 3** gives an overview of each design principle and how it relates to the Key Requirements outlined in **Table 2**.

Table 3. Summary of the design principles and Key Requirements they address.

Short title of Design Principles (DP)	Key Requirements (KR)
DP 1: Dynamic multi-routing	KR 1, KR 2, KR 3
DP 2: Accurate and reliable tracking	KR 4
DP 3: Customized complementary services	KR 5
DP 4: Convenient Data Export and Data Import	KR 6, KR 7
DP 5: Data Resources and Data validity	KR 8, KR 9
DP 6: Interactive visual map design	KR 10, KR 11
DP 7: Technical Integrability	KR 12
DP 8: Flexible Pricing Options	KR 13

5.1 Value Proposition

Design Principle 1: Provide the software with dynamic multi-routing capabilities in order for users to efficiently and conveniently generate accurate routes under multiple constraints, given the design of the value proposition in route optimization business models.

Rationale: Routes need to be editable once created, sometimes due to inaccuracies of the initial generated route, other times to make *ex-post* changes and tweaks **(KR1)**. Routes need to be optimal under the best possible availability of information, which means that live-traffic data should be included so that the route chosen is the most timesaving and not merely the shortest. Mainly that requirement refers to the quality of the routing engine and its ability to calculate the most efficient route based on dynamic parameters. Issues that arise are, for example, that the routing algorithm

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could not handle multiple stops at the same location and would make the vehicle make an additional roundtrip **(KR2)**. Routing capabilities need to cover multiple drivers, multiple stops per route, and the planning of routes multiple days in advance. More generally, routing capabilities need to account for multiple constraints given by the customer **(KR 3)**. Requirements that were not aggregated to key requirements, but still valid are general points of convenience in routing, for example, through being able to print routes, high calculation speed of routes, the availability of both web and mobile interfaces, having little limitations (for example, the number of routes allowed in the pricing plan), set routing constraints, and mobile routing.

Design Principle 2: Provide the software with accurate and reliable tracking capabilities in order for users to track their vehicles in real-time, given the design of the value proposition in route optimization business models.

Rationale: Tracking vehicles is fundamental in logistics. The business model needs to offer real-time tracking of vehicles, i.e., drivers. Tracking exceeds mere recording of the location, but also refers to monitoring condition data of the vehicle, for example, speed or idle time. To be useful, tracking needs to be accurate, i.e., correctly provide information on the exact location of the vehicle in real-time with minimal service disruptions. Knowledge of the position of the driver is the basis for derivative information, such as arrival times at different destinations, the efficiency, controlling, and, lastly, to identify violations against speed limits **(KR4)**. More general points include the general quality of the hardware devices used to gather the data and the corresponding installation, which, naturally, must be of high quality.

Design Principle 3: Provide the software with customized Complementary Services, such as Reporting and Documentation, in order for users to receive additional situational value in operations, given the design of the value proposition in route optimization business models.

Rationale: The data show a mostly heterogeneous picture in complimentary services that users require. Only a few explicitly mention that they would wish that the software would have additional analytics capabilities. By far, the most requested complementary services either belong to the category *documentation* or *reporting. Documentation* refers to the users being able to take notes in different situations across the usage of the service. For example, that would include the functionality to tag customers that were already visited, enriching their data with manually input information, or, generally, taking notes of any kind. *Reporting* in that regard refers to users being able to pull customizable reports in standard data formats. These may include reports on safety issues or idle times. Besides being able to pull these reports, it also refers to them being sent regularly to each customer for further use. Additional complimentary services included proof of delivery, fuel calculation, or communication features **(KR5)**.

5.2 Service Platform

Design Principle 4: Provide the software with convenient data import and export functionalities such as bulk address uploads or customizable reports in order for users to upload/export data in standard data formats, customizable to their particular needs, given the design of the service platform in route optimization business models.

Rationale: The user reviews indicate that the import or export of data is a vital issue in designing software products for route planning. Data need to be importable in standard data formats, usually CSV documents or Excel-spreadsheets, and be as convenient as possible. For example, data import should refrain from requiring too many and too detailed parameters to be input, but rather have smart functionalities such as auto-completion or address suggestions. Also, data import can include bulk import of addresses or voice input capabilities **(KR6)**. Vice versa, data export also needs to be done in standard data formats and, besides, be customizable. If the user would want to export a report, it should be customizable which information it includes and how it is structured, for example, the order of the columns in a spreadsheet **(KR7)**.

Design Principle 5: Provide the software with multiple data sources and ensure data validity in order for the users to gain additional value from data and reduce redundancies and incorrect data, given the design of the service platform in route optimization business models.

Rationale: To prevent errors and inefficiency, the underlying data need to be correct and validated. That refers to data input being checked and, if necessary, corrected and validated. Data must reflect real-life physical conditions, e.g., they must match addresses with the data congruently, and, e.g., it must accurately assign cities to the correct countries and identify differences in altitudes (for example, bridges) on maps. Even if multiple routes target the same addresses with different customers, the routing algorithm needs to able to make a clear distinction or provide the functionality to merge the jobs sensibly **(KR8)**. Also, external data resources need to be included in the routing process, such as live-traffic data or temperature data. Live-traffic data enables the customers to take the optimal route even if it is not the shortest. That might occur if, e.g., the shortest route would guide the driver across a highly busy intersection while a side road may be free and, therefore, not shorter but faster to drive on. Other data to be integrated are information on roads that require tolls to be paid and resulting in options to bypass them **(KR9)**.

5.3 Interface

Design Principle 6: Provide the Software with an interactive map in order for users to get a comprehensive overview of jobs and to delimit areas of interest dynamically, given the design of interfaces in route-optimization business models.

Rationale: Given the nature of transportation services, the visualization of these routes on a map is a prominent feature. Two significant aspects influence mapping functionalities. Firstly, the provision of an interactive map allowing the users to zoom in and out and to manipulate their routes graphically. Secondly, maps are used to delimit specific areas of interest, for example, through a lasso feature that enables users to draw around these areas. That, in turn, enables the concentration on specific locations, e.g., when displaying customer data or generating and prioritizing routes (**KR10)**. In addition to an interactive map functionality, the app design itself should

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be tailored towards representing core logistics functionalities that give a comprehensive information overview without being too full. Users highlight the necessity for the interface to be clean, up-to-date, and user-friendly in general, and to provide filtering options **(KR11)**.

5.4 Organizing Model

Design Principle 7: Design the software so that it is targeted towards specific user groups in terms of integrability of third-party software through suitable interfaces or APIs in order for users to get a comprehensive tool for data processing across software products given the design of the organizing model in route optimization business models.

Rationale: The design principle addresses the need for the software product to be integrable with adjacent tools that users might use in their day-to-day business. For example, the data suggest that the integration of route data into calendars, as well as e-mails, is an essential requirement to make the software product both comfortable and effective in use. Additionally, integrable third party software includes Google Maps, Waze, CRM-Applications, or invoicing applications. Design principles address the generalized meta-level and thus aims at the general need for integrability. Goal-oriented integrability requires targeted design based on the respective customer segments. The technical integration requires the provision of well-designed APIs, which would facilitate the integrability with, for example, ERP systems **(KR12)**.

5.5 Revenue Model

Design Principle 8: Design the software with flexible pricing options in order for users to find accommodating pricing plans suitable for varying company sizes and frequency of use, given the design of the revenue model in route optimization business models.

Rationale: Also, in terms of customizability, the range of customers ranges from single-enterprise consumers to larger-scale companies. The data indicate that the pricing options need to be perceived as both flexible and fair. Flexible in that regard means that the borders between pricing plans (for small, medium, and large enterprises) would depend on the number of routes to be optimized, the size of the fleet or a time limit. Users frequently complain about disproportionate jumps between pricing plans, e.g., the small plan would include a small number of routes, and the next pricing plan would require thousands of routes to be optimized more. Depending on the revenue model, the customer should be able to choose between a static *subscription plan* and dynamic *pay-per-use*. Thus, to generate the broadest reach possible, the goal for this is, that small, medium-sized, and large enterprises find a suiting pricing plan for their particular needs **(KR13)**.

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6 Conclusion, Limitations, and Outlook

The present study develops design principles for business models around route optimization software. First and foremost, the **managerial contributions** are the provision of instantiable prescriptive templates for action. The design principles may assist practitioners in reflecting their existing business model and to re-design it accordingly or support them in designing a new business model from scratch. The design principles rely on qualitative analysis of 500 user reviews, which is why, under the assumption that these user reviews reflect customer demands accurately and honestly, they have a high likelihood to be useful for increasing the chance of economic success. Also, design principles decouple data gathered from reviews of specific products and target a class of artifact, which makes them applicable for a wide array of practitioners [45, 59]. Lastly, the design principles, even though generalized, are on a near-instantiable level, which makes their application into practice intuitive and straightforward.

The **scientific contribution** lies in the elevation of raw data into the generalized and prescriptive form of design principles. Even though the design principles cover a narrow span of digital business models, they are the first step into generating comprehensive design guidelines for business models around route optimization software. The design principle derives from empirical user-generated reviews, thus, generate inductive insights, which extend the current body of knowledge regarding the overall theme of digital business models in the logistics domain.

The research is subject to **limitations**. Firstly, using user reviews as the underlying data source delimits possible observations to be from a strictly outside perspective. Also, naturally, the focus of the data lies on product features, and thus, business model elements such as key partners are not covered. Design principles, in general, provide generalized prescriptive action that needs contextual knowledge of their users to be implemented successfully [37, 38]. Thus, even though the authors argue that they provide, at the very least, general guidance into critical areas of business model design, they are by no means a guarantee for success on their own. Finally, the design principles result from user reviews and, thus, naturally, are a fixed snapshot at the time of their development.

The limitations have implications for **further research** on the aforementioned design principles, as they provide ample opportunity for subsequent design science research undertakings that include instantiation and field testing. As the method of the paper limits the insights into business models onto more external factors and cannot claim insights about internal elements (e.g., the cost structure, the specific architecture of the business model), further research might also use additional data sources, e.g., interviews or questionnaires to triangulate a more comprehensive look into business model elements. Keeping that in mind, conducting practice-oriented research in the form of case studies would be a beneficial way to complement and complete the design principles outlined above.

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