

Designing a Method for Defining and Monitoring Business Model Performance Indicators

Citation for published version (APA):

van de Ven, M. (2021). Designing a Method for Defining and Monitoring Business Model Performance Indicators. In W. M. P. van der Aalst, & R. Dijkman (Eds.), *BPM 2021 Best Dissertation Award, Doctoral Consortium, and Demonstration & Resources Track: Proceedings of the Best Dissertation Award, Doctoral Consortium, and Demonstration & Resources Track at BPM 2021 co-located with 19th International Conference on Business Process Management (BPM 2021) Rome, Italy, September 6th to 10th, 2021* (pp. 91-96). (Ceur Workshop Proceedings; Vol. 2973). CEUR-WS.org.

Document license:

CC BY

Document status and date:

Published: 01/10/2021

Document Version:

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.tue.nl/taverne

Take down policy

If you believe that this document breaches copyright please contact us at:

openaccess@tue.nl

providing details and we will investigate your claim.

Designing a Method for Defining and Monitoring Business Model Performance Indicators

Montijn R. van de Ven¹

¹ Eindhoven University of Technology, Groene Loper 3, 5600 MB Eindhoven, The Netherlands

Abstract

A business model provides a description or architecture of how a company creates, delivers, and captures value. Business model performance management refers to the continuous monitoring of performance indicators and changes in the environment to control business model performance and timely trigger business model (re-)design. The business processes of a company produce a wealth of data and information about a company's operational performance, which may be aggregated to a higher level, i.e., the tactical level of the business model. However, process data may not always be directly mappable to business models because a complex relationship exists between the two concepts. Existing studies provide little insight or guidance on how business model performance indicators can be defined and monitored. To address this knowledge gap, we will employ a design science research approach to develop a method for the definition and monitoring of business model performance indicators. This research aims to contribute to BPM research by exploring the relationship between business models and business processes.

Keywords

Business Models, Performance Indicators, Performance Management, Business Processes, Process Performance, Design Science Research

1. Research Problem

The business model has become a prominent concept to describe the way a company does business. It is defined as the design or architecture of how a company creates, delivers, and captures value [1]. A business model functions as an interface between a company's business strategy and its business processes, including its IT systems [2, 3]. While a business model describes a company's business logic in a rather abstract way, business processes provide a more detailed representation of how a company conducts its operations [4, 5]. To support the design and definition of business models, scholars have developed a wide range of business model tools, including the Business Model Canvas [6], e-3 value ontology [7], and Service Dominant Business Model Radar [8, 9].

Business model performance management refers to the continuous monitoring of performance indicators and changes in the environment to control business model performance and timely trigger business model (re-)design [10, 11, 12, 13]. From a top-down perspective, monitoring business model performance allows managers to track whether a business model is implemented effectively [11, 12]. Suppose the performance of an operational business model deviates from its expected performance. In that case, this may trigger managers to create detailed descriptions and action plans for business model elements, that can serve as input for business process (re-)design [5, 14]. From a bottom-up perspective, the business processes of a company produce a wealth of data and information about the operational performance of a company [15, 16, 17]. The aggregation of process data to a higher level of the company, i.e., the tactical level of the business model [2, 3], may provide relevant insights about the

Proceedings of the Demonstration & Resources Track, Best BPM Dissertation Award, and Doctoral Consortium at BPM 2021 co-located with the 19th International Conference on Business Process Management, BPM 2021, Rome, Italy, September 6-10, 2021

EMAIL: m.r.v.d.ven@tue.nl (M.R. van de Ven)

ORCID: 0000-0001-7521-3324 (M.R. van de Ven)



© 2021 Copyright for this paper by its authors.

Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

CEUR Workshop Proceedings (CEUR-WS.org)

configuration of a companies' business model, as well as the interaction between business model elements [18].

However, process performance data may not always be directly mappable to business models because a complex relationship exists between business models and business processes [14, 19, 20]. Since both concepts are interconnected, changes in a company's business model may affect one or more of a company's business processes, and vice versa. The challenge of monitoring the performance of a business model has become even more pronounced in today's multi-stakeholder business settings, since it may require business actors to share potentially sensitive data [21].

Defining and monitoring business model performance indicators is a relevant way to manage business model performance [12, 22, 23]. Yet, existing studies provide little insight or guidance on how business model performance indicators can be defined [24, 25] or how business model performance can be monitored [22]. Despite the importance of managing business model performance, most business model monitoring efforts in practice are limited to monitoring financial performance [10]. Although there are a few studies on business model performance [12, 22, 26, 27, 28, 29], current studies mainly focus on performance evaluation in the early phases of a business model, i.e., assessing business model design.

To address this knowledge gap, this research aims to develop a method to support the definition and monitoring of business model performance indicators.

2. Research Design

To develop the method, a design science research methodology will be employed. Design science research is a methodology developed in the field of information systems (IS), with the goal to solve practical problems by designing and developing artifacts [30, 31]. A standard design science research methodology (DSRM) by Peffers et al. [32] will be followed to design and develop the artifact. Accordingly, the research process will involve identifying the problem and objectives of the solution (method), designing and developing the method, applying it in a suitable context, and evaluating it in a real-life business setting to examine its validity and utility. The primary research activities are visualized in the research design diagram in Figure 1.

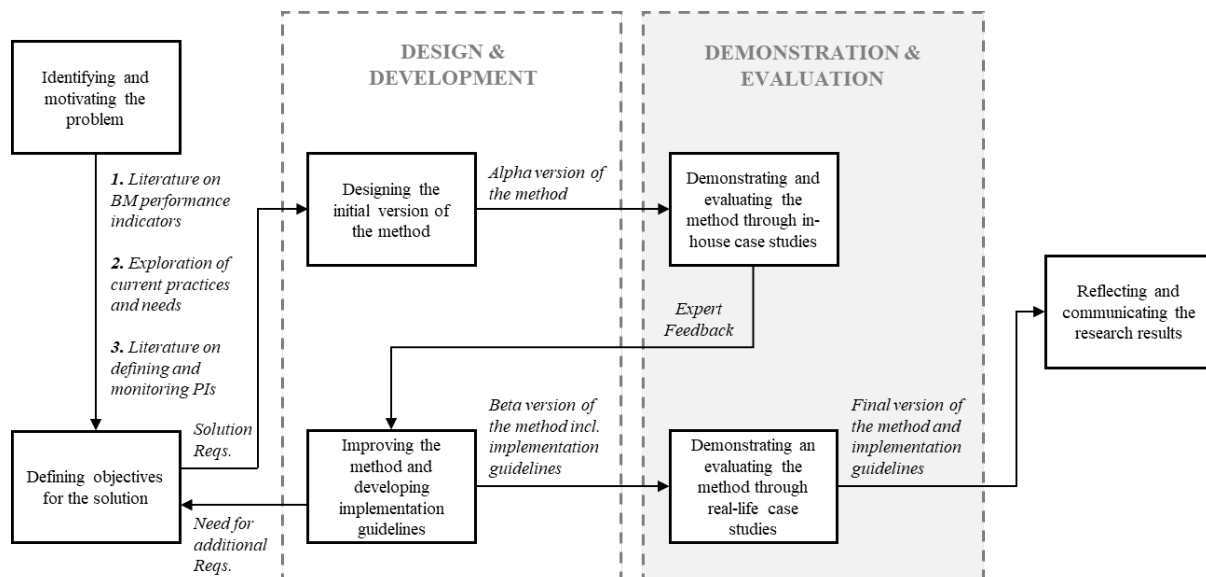


Figure 1: Research design diagram

First, the problem will be identified and motivated through three research activities. The first activity is a structured literature review (SLR) on business model performance indicators. The goal of this SLR is to investigate and synthesize the existing knowledge about business model performance. We will apply the SLR procedure by Kitchenham and Charters [33] to structure our review. The scientific

databases Scopus and Web of Science will be searched to find studies that identify, analyze, and monitor any kind of performance indicator of business models. We consider the combination of these two databases to cover the appropriate academic publication venues. Potential keywords for searching the databases are a combination of the terms ‘business model’, ‘performance indicator’, ‘performance metric’, and ‘performance measure’.

As the second activity in the problem identification and motivation phase, we will conduct exploratory semi-structured interviews with business model experts from academia and practice to gain a better understanding of the current practices and needs in business model performance management. To guide the interviews, we will develop an interview protocol based on the results of the literature review on business model performance indicators. For the selection of the interviewees, we will contact the key authors of the relevant articles identified in the literature review. Moreover, we will consider reports on business models performance management from industry to identify practitioners with relevant practical knowledge.

The third activity in the first DSR step is to conduct an SLR on existing approaches for defining and monitoring performance indicators. The definition of performance indicators has been a major field of study in other research fields, such as Business Process Management (BPM), Enterprise Modeling, Project Management, and Managerial Accounting. These fields have been more mature than the business model domain, hence we see a potential to transfer and utilize the existing knowledge from these fields to business models. Therefore, the goal of this SLR is to find the outstanding work in relevant fields and analyze the existing approaches for defining and monitoring performance indicators from a business model perspective. For this literature review, we will apply the forward and backward snowballing approach by Wohlin [34] to structure our literature search. This snowballing procedure allows us to identify relevant articles based on a starting set of seminal papers. We aim to examine both academic and grey literature (e.g., Gartner, BPTrends) that discuss relevant methods and techniques for defining and monitoring performance indicators.

The objectives for a solution will be logically derived from the three research activities in the problem definition and motivation phase [32]. Based on the requirements and knowledge from the existing literature and business model experts, the initial version of the artifact will be developed. We will employ a method engineering approach [35] to iteratively design and develop the artifact, i.e., a method for defining and monitoring business model performance indicators.

After having designed the initial version of the artifact (i.e., the alpha version), we will demonstrate and evaluate the artifact in a number of in-house case studies. We plan to organize workshops with academic experts in our network, and gather feedback to refine and/or restructure the artifact. Based on the feedback from the in-house case studies, we will develop an initial version of implementation guidelines for the artifact (i.e., the method of use). After that, the refined artifact and implementation guidelines (beta version) will be demonstrated and evaluated in a number of real-life case studies with practitioners to develop the final version of the artifact. For these case studies, business models from varying domains will be selected to showcase the applicability of the method in different business settings. The research team has access to such real-life business cases and companies via the ongoing industry projects in the mobility domain (e.g., UMOS).

To evaluate the validity and utility of the artifact, we will conduct interviews and set out surveys among the case study participants. We consider case studies, interviews and surveys to be a relevant means of evaluation for our research, as the to-be designed artifact is user-oriented and developed for long-term use by practitioners [36].

Lastly, the research results will be communicated to researchers and practitioners in the communication phase. We intend to publish the research in the form of a doctoral dissertation, as well as in journal articles and conference papers.

We aim to improve the external validity our research by conducting multiple case studies in which the use of the method will be demonstrated and evaluated. Construct validity will be improved through the use of multiple resources and maintaining a chain of evidence in the data collection phase. The protocols we will define for the exploratory interviews, case studies and expert reviews that are to be planned for evaluation of the research outcomes will help to increase the reliability of the results.

3. Intended Solution

The intended solution is an artifact in the form of a method for defining and monitoring business model performance indicators. The method includes guidelines for defining performance indicators for business models and monitoring the defined indicators. The to-be designed method is aimed at practitioners who are responsible for managing the performance of a company's business model (e.g., tactical managers, product owners) and that operate on the tactical level of a company, i.e., between the strategic and operational level [2, 3]. The design and implementation of the artifact will be demonstrated in real-world case studies, and we will thereby contribute to advancing the knowledge about business model performance indicators [24, 25] and business model performance management [10, 37, 38].

4. Contributions to BPM Research

This research contributes to BPM research by exploring the complex relationship between business models and business processes [3, 19]. We will consider business model performance management from a top-down as well as a bottom-up perspective. Hence, we propose using process data and process performance indicators, which are now mainly used at an operational level, by aggregating these to a higher tactical level, i.e., the level of a business model [2, 3]. The method developed in this research can provide relevant insights about the performance of a company's business model for researchers and practitioners, which may serve as high-level input for business process (re-)design [5, 14].

5. Project Status and Challenges

At the time of submitting this application, the literature review on business model performance indicators has started and is still in progress. The next phases of the research are pending. Currently, there are two main challenges within the research. Firstly, a main challenge pertains with relation to transferring process performance insights onto business models. While process performance data may offer relevant information about the performance of a company's business model, this data may not be directly mappable to business models [19]. Hence, techniques must be identified that support the aggregation of performance data into business model performance indicators. Secondly, scholars have not yet reached a consensus about what dimensions constitute a business model [39]. This may pose as a challenge for selecting an appropriate set of meta-dimensions for structuring the method for defining business model performance indicators.

6. References

- [1] D.J. Teece, Business models, business strategy and innovation, *Long Range Planning*. 43 (2010) 172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>.
- [2] M.M. Al-Debei, D. Avison, Developing a unified framework of the business model concept, *European Journal of Information Systems*. 19 (2010) 359–376. <https://doi.org/10.1057/ejis.2010.21>.
- [3] D. Veit, E. Clemons, A. Benlian, P. Buxmann, T. Hess, D. Kundisch, J.M. Leimeister, P. Loos, M. Spann, Business Models, *Business & Information Systems Engineering* 2014 6:1. 6 (2014) 45–53. <https://doi.org/10.1007/S12599-013-0308-Y>.
- [4] C.M. DaSilva, P. Trkman, Business model: What it is and what it is not, *Long Range Planning*. 47 (2014) 379–389. <https://doi.org/10.1016/j.lrp.2013.08.004>.
- [5] B. Suratno, B. Ozkan, O. Turetken, P. Grefen, A Method for Operationalizing Service-Dominant Business Models into Conceptual Process Models, in: *Lecture Notes in Business Information Processing*, Springer Verlag, 2018: pp. 133–148. https://doi.org/10.1007/978-3-319-94214-8_9.
- [6] A. Osterwalder, Y. Pigneur, *Business model generation: a handbook for visionaries, game changers, and challengers*, John Wiley & Sons, 2010.
- [7] J. Gordijn, J.M. Akkermans, Value-based requirements engineering: exploring innovative e-commerce ideas, *Requirements Engineering*. 8 (2003) 114–134.
- [8] E. Lüftenegger, *Service-dominant business design*, Ph.D. thesis, Eindhoven University of Technology, Eindhoven, The Netherlands, 2014.

- [9] O. Turetken, P. Grefen, R.A.M. Gilsing, O.E. Adali, Service-Dominant Business Model Design for Digital Innovation in Smart Mobility, *Business and Information Systems Engineering*. 61 (2019) 9–29. <https://doi.org/10.1007/s12599-018-0565-x>.
- [10] N. Terrenghi, J. Schwarz, C. Legner, U. Eisert, Business model management: current practices, required activities and IT support, in: *Internationale Tagung Wirtschaftsinformatik 2017*, 2017.
- [11] C. di Valentin, D. Werth, P. Loos, Analysis of IT-Business models towards theory development of business model transformation and monitoring, in: *BMSD 2015 - Proceedings of the 5th International Symposium on Business Modeling and Software Design*, SciTePress, 2015: pp. 171–177. <https://doi.org/10.5220/0005886701710177>.
- [12] C. di Valentin, A. Emrich, D. Werth, P. Loos, Conceiving Adaptability for Business Models: A Literature-based Approach., in: *CONF-IRM*, 2012: p. 50.
- [13] D. Globocnik, R. Faullant, Z. Parastuty, Bridging strategic planning and business model management – A formal control framework to manage business model portfolios and dynamics, *European Management Journal*. 38 (2020) 231–243. <https://doi.org/10.1016/j.emj.2019.08.005>.
- [14] C. di Valentin, T. Burkhart, D. Vanderhaeghen, D. Werth, P. Loos, Towards a Framework for Transforming Business Models into Business Processes, in: *AMCIS 2012 Proceedings*, 2012.
- [15] M. Dumas, M. la Rosa, J. Mendling, H.A. Reijers, *Fundamentals of business process management*, 2nd ed., Springer Berlin Heidelberg, 2018. <https://doi.org/10.1007/978-3-662-56509-4>.
- [16] M. Leyer, D. Heckl, J. Moormann, Process performance measurement, in: *Handbook on Business Process Management 2: Strategic Alignment, Governance, People and Culture*, Second Edition, Springer Berlin Heidelberg, 2015: pp. 227–242. https://doi.org/10.1007/978-3-642-45103-4_9.
- [17] A. van Looy, A. Shafagatova, Business process performance measurement: a structured literature review of indicators, measures and metrics, *SpringerPlus*. 5 (2016). <https://doi.org/10.1186/s40064-016-3498-1>.
- [18] D. Augenstein, C. Fleig, Exploring Design Principles for a Business Model Mining Tool., in: *ICIS*, 2017.
- [19] B. Betzwieser, B. Levkovskyi, H. Krcmar, At the Nexus of Business Models and Business Processes: A Systematic Literature Review, in: *24th Pacific Asia Conference on Information Systems (PACIS)*, 2020.
- [20] A. Bonakdar, T. Weiblen, C. di Valentin, T. Zeißner, A. Pussep, M. Schief, Transformative influence of business processes on the business model: classifying the state of the practice in the software industry, in: *2013 46th Hawaii International Conference on System Sciences*, 2013: pp. 3920–3929.
- [21] R.A.M. Gilsing, O. Turetken, B. Ozkan, P. Grefen, O.E. Adali, A.M. Wilbik, F. Berkers, Evaluating the Design of Service-Dominant Business Models: A Qualitative Method, *Pacific Asia Journal of the Association for Information Systems*. 13 (2021) 36-70.
- [22] M. Heikkilä, H. Bouwman, J. Heikkilä, S. Solaimani, W. Janssen, Business model metrics: an open repository, *Information Systems and E-Business Management*. 14 (2016) 337–366. <https://doi.org/10.1007/s10257-015-0286-3>.
- [23] M. Heikkilä, S. Solaimani, A. Soudunsaari, M. Hakanen, L. Kuivaniemi, M. Suoranta, Performance estimation of networked business models: case study on a Finnish eHealth Service Project, *Journal of Business Models*. 2 (2014) 71–88.
- [24] T. Burkhart, J. Krumeich, D. Werth, P. Loos, Analyzing the Business Model Concept – A Comprehensive Classification of Literature, in: *International Conference on Information Systems 2011*, 2011.
- [25] C. Nielsen, M. Lund, P.P. Thomsen, K.B. Kristiansen, J.C. Sort, C. Byrge, R. Roslender, S. Schaper, M. Montemari, A.C.P. Delmar, others, Depicting a performative research Agenda: The 4th stage of business model research, *Journal of Business Models*. 6 (2018) 59–64.
- [26] R. Gilsing, A. Wilbik, P. Grefen, O. Turetken, B. Ozkan, O.E. Adali, F. Berkers, Defining business model key performance indicators using intentional linguistic summaries, *Software and Systems Modeling* 2021. 1 (2021) 1–32. <https://doi.org/10.1007/S10270-021-00894-X>.
- [27] J.M. Mateu, A. Escribá-Esteve, Ex-ante business model evaluation methods: a proposal of improvement and applicability, *Journal of Business Models*, 2019, Vol. 7, Num. 5, p. 25-47. (2019).

- [28] M. Montemari, M.S. Chiucchi, C. Nielsen, Designing Performance Measurement Systems Using Business Models, *Journal of Business Models*. 7 (2019) 48–69.
- [29] S. Sharma, J.A. Gutiérrez, An evaluation framework for viable business models for m-commerce in the information technology sector, *Electronic Markets*. 1 (2010) 33–52. <https://doi.org/10.1007/S12525-010-0028-9>.
- [30] S. Gregor, A.R. Hevner, Positioning and Presenting Design Science Research for Maximum Impact, *MIS Quarterly*. 37 (2013) 337–355.
- [31] A.R. Hevner, S.T. March, J. Park, S. Ram, Design science in information systems research, *MIS Quarterly*. 28 (2004) 75–105.
- [32] K. Peffers, T. Tuunanen, M.A. Rothenberger, S. Chatterjee, A design science research methodology for information systems research, *Journal of Management Information Systems*. 24 (2007) 45–77.
- [33] B. Kitchenham, S. Charters, Guidelines for performing systematic literature reviews in software engineering, EBSE Technical Report, Keele University and University of Durham, Keele, United Kingdom, 2007.
- [34] C. Wohlin, A. Aurum, Towards a decision-making structure for selecting a research design in empirical software engineering, *Empirical Software Engineering*. 20 (2015) 1427–1455. <https://doi.org/10.1007/s10664-014-9319-7>.
- [35] S. Brinkkemper, Method engineering: engineering of information systems development methods and tools, *Information and Software Technology*. 38 (1996) 275–280.
- [36] J. Venable, J. Pries-Heje, R. Baskerville, FEDS: a Framework for Evaluation in Design Science Research, *European Journal of Information Systems* 2014 25:1. 25 (2014) 77–89. <https://doi.org/10.1057/EJIS.2014.36>.
- [37] B.W. Wirtz, *Business Model Management: Design-Process-Instruments*, Springer Nature, 2020.
- [38] E. Bucherer, *Business Model Innovation - Guidelines for a Structured Approach*, Ph.D. thesis, University of St. Gallen, St. Gallen, Switzerland, 2010.
- [39] N.J. Foss, T. Saebi, Business models and business model innovation: Between wicked and paradigmatic problems, *Long Range Planning*. 51 (2018) 9–21. <https://doi.org/10.1016/j.lrp.2017.07.006>.