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Development of an Evaluation Procedure for the Systematic Prioritization of Risk Oriented Process Management

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Abstract: Process risks are omnipresent in the corporate world and repeatedly present organizations with the challenge of how to deal with these risks. Efforts in trying to analyze and prevent these risks are costly and require many resources, which do not always bring the desired added value. The goal of this work is to determine how a benefit-oriented resource allocation can be made for risk-oriented process management. For this purpose, the following research question is posed: "How can systematic prioritization decisions regarding risk-oriented process management be made?" To answer it, an evaluation procedure is developed which assesses processes based on their characteristics regarding potential risk disposition as well as entrepreneurial relevance. For this purpose, requirements for such a procedure are first collected and used to define selection criteria for it. After the detailed analysis of known selection and evaluation procedures, one of them is selected and used for further development. Next steps include the definition of relevant criteria for the evaluation of the processes by examining process characteristics regarding their suitability for process evaluation. The focus here lies on characteristics that provide indications of the risk disposition and business relevance of processes. The result of this approach is a scoring model with a criteria catalog consisting of 15 criteria according to which a process is evaluated. The evaluation result is presented both numerically and in a matrix. This enables the comparison of several processes and a derived prioritization of those for a more in-depth risk analysis. The application of this approach will ensure a benefit-oriented allocation of resources in the management of process risks and increased process reliability.

Keywords: Risk Management, Prioritization of Risk, Process Management

1. Introduction

In a continuously changing and evolving business world, companies are confronted with uncertainties in all areas. In order to be in a position as a market participant to make entrepreneurial decisions and to comply with the legal duty of care, a fact-based decision-making basis must be created in which, among other things, potential opportunities and risks associated with the decision are also considered and weighed up. Since entrepreneurial activity cannot be risk-free in itself, the active management of risks is a necessity for maintaining the future viability of a company (Brauweiler, 2019). For this purpose, risk management can be implemented in the company (Gleißner, 2019). In order to consider risks within business processes in addition to externally occurring uncertainties, a risk-oriented process management can be introduced in which risks of business processes are identified, analyzed, and appropriate follow-up measures are taken (Schmelzer & Sesselmann, 2020). This requires a holistic and structured approach to dealing with risks in process management, which includes all business processes and examines them with regard to risks. This approach implies a very high expenditure of work and resources, which can only

be guaranteed to a limited extent in today´s ever-day business. In addition, there is a risk that an arbitrary approach will first deal with those processes for which less relevant risks or risks with a lower probability of occurrence and lower extent of damage are identified.Thus valuable resources will flow into the wrong channels (Pika et al., 2016).
This leads to tension between resources needed and provided. One approach to ease this tension would be to provide a way to prioritize business processes for deeper risk analysis in order to avoid misinvestment of resources and strive for a benefit-oriented resource allocation. The resulting research question to be answered in this paper is therefore: "How can systematic prioritization decisions regarding risk-oriented process management be made?"

1.1 Objective

The objective of this paper is to answer the research question at hand by developing a structured approach for prioritizing risk-oriented process management. The aim is to create an evaluation procedure that can evaluate business processes based on their characteristics in terms of potential risk susceptibility as well as their relevance to the company. These process characteristics are selected accordingly so that each business process is assigned a prioritization rating. The result of the procedure is to be used as a decision-making basis for prioritizing the processes for risk analysis in order to enable a benefit-oriented allocation of resources. The result of the application of the evaluation procedure is intended to provide an indication of which processes potentially are the biggest targets for relevant risks and should therefore be examined for risks with higher priority. Consequently, it is not intended to represent a final risk assessment of the processes.

1.2 Approach

In order to achieve this objective, an overview of previous approaches to process risk management and possible starting points for the development of a structured approach to prioritizing risk-oriented process management will first be provided. Subsequently, a literature review will be conducted to select from a number of known selection and evaluation procedures a suitable one to answer the research question. Then, the criteria to be used for the subsequent process prioritization will be developed. For this purpose, the prevailing systems and collections of process characteristics in the literature are examined to determine the extent to which specific characteristics and features indicate the potential risk disposition or entrepreneurial relevance of the respective process. Subsequently, these process characteristics are operationalized to make them assessable. This is followed by the integration of these criteria into the previously chosen selection and evaluation procedure as well as the precise definition of the procedure for interpreting the results and deriving recommendations for action.

2. Basic principles and previous research approaches

In this chapter, the relevant fundamentals and definitions in process risk management will be briefly discussed. Additionally, previous research approaches in this field will be outlined and linking points for answering the research question presented here will be highlighted.

2.1 Fundamentals of process risk management

In the following, the terms risk as well as process risk will first be defined in order to be able to derive criteria for its determination in the further course. The definitions of risk that appear in the literature are manifold (Kohlen & Müller, 2021). In this paper, the definition of Becker et al. (2012) or also Frahm (2021) is used, in which risk is understood as negative effect of uncertainty. In the context of process management, process risk can be defined as a possible event, the occurrence of which causes the process flow outcome to deviate from the plan (Austrian Standards Institute, 2013). In this paper, the term risk is used exclusively to describe negative effects of uncertainty. Possible positive effects of uncertainty are not considered due to the thematic focus of this paper and the otherwise too large scope of the study. If this understanding of the term risk is transferred to the understanding of risk in processes, then process risk can be understood as the negative impact of uncertainty on the process flow or the process outcome.

The structured management of risks can be achieved by the iterative execution of the risk management process, which is already used in the literature as well as in various standards (cf. Becker et al. 2012; NAOrg 2018). Brauweiler (2019) modifies this risk management process to the extent that he incorporates the step of early risk warning and detection before the step of risk identification. The method to be developed in this paper also belongs to the upstream process step of early risk detection. This fact will become clearer in the later course of the work.

For the conceptual understanding it is to be clarified that risk-oriented process management refers to managing processes under consideration of risks and to make decisions regarding process design. In contrast, process-oriented risk management deals with managing the risk management process (zur Muehlen & Rosemann, 2005). In accordance with this definition, this paper deals with the process of risk-oriented process management, as it is intended to examine processes with regard to their risk disposition.

2.2 Previous research approaches

A number of research and investigation findings already exist in the area of process risk management, of which the for our purpose relevant ones will be briefly mentioned.

Suriadi et al. (2014) examined a number of research approaches in this area and identified several research gaps. Among others, the call for a study of factors or patterns that indicate risk incidence occurs here, as there would not yet be sufficient evidence in this area. This is where the method of this paper aims to tie in by identifying process characteristics which indicate a risk susceptibility of processes.

In 2014, the Society for Process Management published a method for process-oriented risk management, the so-called prorisk-matrix. This approach is used to identify trends and focal points of process risks as well as an assessment of the degree of risk contribution in the overall context of the company's processes. This approach aims to examine processes in terms of their susceptibility to certain risks previously identified in the risk analysis of a selected process (Arbeitsgruppe der Gesellschaft für Prozessmanagement, 2014). Therefore, not all possible risks are identified, but only the susceptibility of processes to a small selection of risks, which in our case is not considered useful for fulfilling the objective of this paper. However, this approach provides a starting point on which to build further, as it basically pursues the goal of prioritizing processes.

Another interesting linking point is offered by the work of Dey (2001), in which a model for risk assessment of projects is developed as a decision support tool. It follows the approach of determining a potential risk disposition of projects based on their characteristics. This approach will be built upon in this paper to analyze processes based on their characteristics to determine their potential risk disposition. As in Dey's model, this result is then to be used as a decision support for prioritizing processes for deeper risk analysis and thus resource allocation.

3. Development of the method

Now that the relevant fundamentals of process and risk management have been described for this paper, the next step is to develop an evaluation procedure to support prioritization decisions in risk-oriented process management. For this purpose, the term "evaluation procedure" will first be defined before then the procedure for selecting an evaluation procedure and for deriving the criteria for process prioritization will be described in more detail.

3.1 Determination of an evaluation procedure

With the application of an evaluation procedure, the goal is to support decision making in the case of several potential (solution) variants (Bender and Gericke, 2021). For the selection of a suitable evaluation procedure in this case, the decision process anchored in decision theory is used, which has a five-stage system (Laux et al., 2014).

The decision problem at hand, which is to be formulated in the first step of this process, reads: which evaluation procedure should be used to prioritize processes concerning their risk susceptibility? To specify the target system, all relevant applications from theory and practice are collected and prioritized. In the present case, the particular focus lays on the possibility of multidimensional evaluation, to create a ranking order of the alternatives to be evaluated, as well as a resource-saving application (Edel, 2022).

The third step of the decision process includes the research of solution alternatives, and thus the literature research on the different selection & evaluation procedures as well as their characteristics.

Subsequently, these alternative solutions are evaluated against the previously established requirements and the most suitable one is selected. In our case, the final choice fell on the point evaluation procedure in order to develop a prioritization method in risk-oriented process management. This can be justified by the fact that the point evaluation has, above all, a low degree of complexity, a fast feasibility and does not have any remarkable characteristics that have a negative impact on the purpose of this work (Edel, 2022).

The last step involves the realization of the chosen alternative. This includes enriching the evaluation procedure with appropriate criteria that prioritize processes based on their characteristics in terms of potential risk disposition.

3.2 Selection of suitable evaluation criteria

For the development of suitable criteria we investigated which process characteristics show a connection to the risk disposition of a process. For this purpose, the target system with requirements for these criteria was established. Basically, a higher susceptibility to risk of a process must lead to a higher prioritization of this process for the deeper risk analysis. From this it can be deduced that the criteria to be developed here must cover the two dimensions of risk disposition and business relevance of a process (Edel, 2022).
In order to obtain an overview of the already established process characteristics and features, a literature review was conducted. In particular, work done by Becker et al. (2015), Hilmer (2016), Schmelzer and Sesselmann (2020), and Gadatsch (2017) was taken into account. After a detailed analysis, the process characteristics *determinism, constancy, degree of repetition, degree of collaboration, degree of cognitivity, degree of information & IT requirements, degree of value creation*, and *resource intensity* were identified as relevant.

These characteristics were then examined in more detail for their relationship to risk disposition and the business relevance of a process and operationalized into 15 assessable criteria. An excerpt of this criteria catalog can be seen in Table 1. In order to evaluate a process, it is now possible to specify the characteristics of the respective process features in accordance with the principle of the point value method.The process features are translated into numerical evaluations and added to an overall evaluation in accordance with the previously determined weighting. It should be noted here that a higher numerical rating of the criterion implies a higher prioritization of the rated process for more in-depth risk analysis.

Table 1. Operationalized criterion, their possibilities of expression and ratings (Edel, 2022)

Process Characteristic	**Operationalized Criterion**	**Possibilities of expression**	**Rating**
Determinism	Plannable portion of process	≤25%; 50%; 75%; ≥95%	1; $0,\overline{6}$; $0,\overline{3}$; 0
Consistency	Number of different proess inputs/ triggers	>3; 2-3; 1	1; 0,5; 0
Degree of collaboration	Need for communication/ coordination during process execution	High; medium; low	1; 0,5; 0
Degree of cognivity	Knowledge intensity	High; medium; low	1; 0,5; 0
Degree of information &IT requirements	Number of information sources	High; medium; low	1; 0,5; 0
Degree of value creation	Is it a core process?	yes; no	1; 0
...	...	...	...

3.3 Derivation of recommendations for action

Based on the resulting overall score evaluation, it is possible to prioritize the processes for more in-depth risk analysis. The separate evaluation results for the two dimensions of risk disposition and business relevance additionally enable an even more differentiated classification of the processes and thus greater scope for action in the further procedure. If a process has a low business relevance but a very high risk disposition (or vice versa), an individual decision can be made on how to proceed. Thus, no process should be wrongly prioritized as low, although a risk analysis would make sense. The visualization of the

evaluation results of all processes in a portfolio supports the interpretation of the results and the decision on how to proceed. Such a portfolio of evaluated processes is shown as an example in Figure 1.

The processes were ranked according to their ratings in risk disposition and business relevance. On the one hand, this provides good comparability of the different processes and an initial impression of how the prioritization for risk analysis should be carried out. In addition, a recommendation can be made for each quadrant of the portfolio on how to proceed with the respective processes.

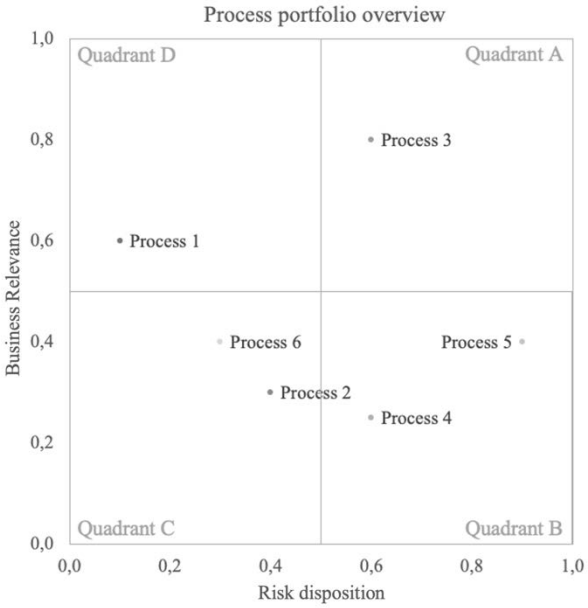

Figure 1. Process portfolio overview

Processes in quadrant A have the highest risk disposition as well as the highest business relevance and are therefore given a high priority for a detailed risk analysis. Regular reviews of these processes with regard to risk development is also recommended. Quadrant B contains processes with low relevance for the company, but high risk disposition, and should therefore not be neglected either. The situation is similar for processes in quadrant D, which were rated low in terms of risk disposition, but should be checked for risks on a regular basis due to their high relevance for the company and should therefore be prioritized in third place. Processes in quadrant C can generally be given a low priority.

4. Conclusion

In the following, the most important aspects of the present work will be highlighted and summarized. Additionally, an outlook with recommendations for the further development of the method and the need for further research will be presented.

4.1 Summary of the results

To answer the research question presented here, "How can systematic prioritization decisions regarding risk-oriented process management be made?", various partial results were obtained. After the extensive collection of requirements for a selection and evaluation procedure for prioritizing processes for deeper risk analysis, different procedures could be rated according to their characteristics and their fit to our purpose. The final choice fell on the procedure of point evaluation, since it fulfills in particular the requirements, namely the ranking possibility, user friendliness as well as resource-saving application.

Subsequently, criteria for the evaluation of the processes were developed with regard to the two dimensions of risk disposition as well as business relevance. For this purpose, prevalent process characteristics in the literature were analyzed with regard to their correlation with these dimensions and operationalized to assessable criteria. Recommendations for action were made and visualized in order to interpret the evaluation results and derive further measures.

4.2 Criticism and need for further research

For organizations that want to use this procedure, it is true that, as with any new introduction of methods, the implementation of this procedure entails short-term additional effort in training and application, especially if the procedure is to be used by employees throughout the company. In principle, however, the application of this procedure is quick and easy to learn and perform, and provides a relatively large benefit to the organization in terms of resource allocation. Arbitrary risk analysis of processes can thus be prevented and more time can be invested in analyzing processes that are actually at risk. In the long term, regular application creates additional confidence in the way process management works and ensures increased process reliability within the company, which has a positive effect on the organization's overall business activities.

There are various investigation options for further development of the method presented here. The recommendation is made to investigate the possibilities for also managing opportunities in process management, which are defined as positive effects of uncertainty, in addition to risk management (NQSZ, 2015). Furthermore, it should be examined whether there are other relevant factors for determining the risk disposition of a process in addition to the process characteristics, such as external influences. However, care should be taken to ensure that this method is not too extensive and continues to be designed in a way that conserves resources, since it is only the upstream step of risk identification.

It should also be investigated what specific influence the various process characteristics have on the risk disposition or business relevance of a process and how this can be expressed numerically. The goal should be to provide accurate criterion ratings and not have the user choose between *low*, *medium*, and *high* options. This will lead to improved reliability of the method, as the subjective assessments of users would be minimized.

Any dependencies among the evaluation criteria also need to be investigated to eliminate them as much as possible and increase the structural consistency of the procedure.

Finally, the question remains open as to what happens if a relevant process is omitted from the prioritization. For this purpose, recommendations should be defined on how exactly the processes to be compared should be selected and how the group of processes to be evaluated should be delimited.

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