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OPPORTUNITY-DRIVEN BUSINESS PROCESS REDESIGN – A SYSTEMATIC LITERATURE REVIEW

Master's Thesis (20 ECTS)

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Title: Opportunity-Driven Business Process Redesign – A Systematic Literature Review

Abstract: In today's business environment organizations appeared to be in a constant search for process improvement opportunities, hence it brought the necessity to explore redesign alternatives. This paper presents the research on business process improvements through opportunity-driven methods – benchmarking and positive deviance. These approaches imply the principle that any enhancement is implemented by looking at superior performance to embrace company's potential. The chosen research method – systematic literature review – synthesized existing evidence to provide an empirically derived response and filled the gap in theoretical inconsistency. As a result, paper delivers a coherent conceptual framework that has practical contribution by being a guideline for opportunity-driven methods application and brings theoretical value by gathering past experiences.

Keywords: benchmarking, positive deviance, business process improvement, redesign

CERCS: P170 Computer science, numerical analysis, systems, control

Pealkiri eesti keeles: Võimalustest Juhitud Äriprotsesside Ümberkujundamine – Süstemaatiline Kirjandusülevaade

Lühikokkuvõte: Tänapäevas ärikeskkonnas otsivad organisatsioonid pidevalt võimalusi protsesside täiustamiseks, tuues kaasa vajaduse otsida alternatiivseid ümberkujundamisvõimalusi. Käesolevas artiklis tutvustatakse äriprotsesside täiustamise uurimistulemusi läbi võimalustest juhitud meetodite, kasutades võrdlusuuringuid ja positiivseid hälbeid. Need lähenemisviisid viitavad põhimõttele, et iga täiustamine peab aluseks võtma organisatsiooni parimaid tulemusi ja neid omakorda võimendama. Süstemaatilise kirjandusülevaatega sünteesiti olemasolevaid uuringutulemusi, et pakkuda empiiriliselt tuletatud vastuseid ning täita lünka teoreetilises järjekindlusetuses. Selle tulemusena pakub artikkel sidusat kontseptuaalset raamistikku, millel on oma praktiline panus, pakkudes juhist võimalustest juhitud meetodite rakendamiseks ja andes teoreetilist väärtust, kogudes varasemaid kogemusi.

Võtmesõnad: võrdlusuuring, positiivne hälve, äriprotsesside parendamine, ümberkujundamine

CERCS: P170 Arvutiteadus, arvutusmeetodid, süsteemid, juhtimine

TABLE OF CONTENTS

1. INTRODUCTION

Today's industrial and commercial environment makes companies put more effort to deliver the expected business value with continuously increasing customer expectations and tougher competition. It is required for every company to identify their operations in a formal system of business processes in order to analyze and review them and propose improvement opportunities. Business processes are one of the key concepts of operations management and it can be defined as events, activities and decisions involving multiple actors and resources, that collectively lead to an outcome that is of value to an organization or its [1]. The importance of business processes is explained by many aspects, among them are having better control over all the tasks, mobility, development capabilities, better collaboration among teams and risk reduction capabilities [2]. Overall, they are seen as links that integrates between systems, personnel and processes within an organization [3].

There is no one single approach or methodology how to successfully manage business processes. The discipline – business process management (BPM) – uses various methods to discover, model, analyze, measure, improve, optimize, and automate business processes [4]. Organizations undertake a sequence of cyclical steps which are composing BPM lifecycle. It is needed to identify, discover existing processes "as is" to understand business rules and then analyze the given data to see the insight on firms' weaknesses. Afterwards, process redesign step takes place when "to be" model is created. Therefore, organization needs to implement designed model and establish its control and constant monitoring [1]. In the context of this paper, out of all lifecycle steps we will focus of analysis and redesign stages or in other words, how companies go from "as is" to "to be" model.

Business process redesign is the analysis and design of workflows and processes within and between organizations [5]. The concept of redesigning became popular in 1990s, when business leaders were focused on adapting industries to changing technologies. Considering again BPM lifecycle steps, redesign step is the most value-added as it is "act of improving the process" [6]. Companies can benefit from it in a way that it simplifies determining areas that require improvements, designing and developing changes etc. To implement process redesign, organizations can choose out of two approaches – transformational or transactional – which differ in redesign scope. The most famous method of transformational redesign is business process reengineering and it requires fundamental rethinking and radical change of processes in order to apply improvements in measures of performance: cost, quality, service and speed [7]. On the contrary, transactional approach involves improving specific processes or subprocesses and even can leave existing ones intact while boosting measures like customer

satisfaction, cycle time etc. Foundational practices for the transactional redesign are removing non-value adding tasks and re-sequencing tasks. The former one is accomplished through waste removal and is associated with customer focus and internal process efficiency. The latter one improves business processes through relocating the tasks which should lead to process optimization and higher productivity [8].

Although redesigning is a well-acknowledged and widely used approach for process improvement, it still has limitations. Method itself assumes that the main reason of the poor performance is faulty business processes. Instead of only supporting problem-driven activities, it is also needed to focus on opportunity-driven ones and look for improvements by checking better business process performance. In order to accomplish that, organization should have ambidexterity – an ability to reach a balance between innovation-related activities and refinement-related ones [9], [10]. Ambidexterity creates an opportunity to prevent companies from exploitation success trap that limits the capability to response to environmental changes [11] and exploration failure trap that lacks short-term results oriented to long-term survival [12]. One of the approaches that concentrates on how company can grow and develop its potentials based on the opportunities and organizations' strengths is known as benchmarking.

Benchmarking is "a process of continuously measuring and comparing an organization's business process against business leaders anywhere in the world to gain information which will help the organization to take action to improve its performance" [13]. Another important concept which is related to performance improvements is positive deviance (+D). The positive deviance paradigm aims to increase company's effectiveness by examining positive organizational phenomena in the workplace [14] and can be very effectively used for business process improvements and complex behavior and social change in the organization.

However, currently there is no framework that provides an overview of how benchmarking can drive process redesign. One of the problem managers face when implement benchmarking is lack of understanding which processes are actually deliver value to the end customer as they are remote from operational activities [15]. With positive deviance it also can be difficult to identify all the variables that have impact on performance as there may be some hidden factors lead to outstanding results.

Mentioned considerations lead us to the research objective of this paper which is addressing the question of how companies can improve their business processes by considering opportunity-driven approach. More specifically, to answer the main question, we will look at the list of research questions:

- What kinds of business processes in the organizations have been improved by opportunity-driven methods?
- What aspects have been considered to identify performance dimensions for business processes improvement by opportunity-driven methods?
- What performance dimensions have been used for opportunity-driven methods implementation?
- How have organizations conducted opportunity-driven business processes improvements and redesign?
- How have improvement opportunities in business processes been identified with opportunity-driven methods?
- How can organizations conduct the change for business processes improvement?

The work aims to deliver the value for the organizations which are dealing with business process transformation. Particularly, when companies have already managed improvements based on their operational weaknesses, next step would be to grow based on other opportunities and firms' potential. In addition, as process redesign usually is applied by larger organizations, this work can help smaller ones gain sustainable competitive advantage through external ways. Following the paper goal, it will fill the current gap in existing theoretical works and, as a result, the framework could be used as a guideline for the organizations that decided to apply benchmarking for their business processes.

The main research method of this paper is systematic literature review. It involves identifying, synthesizing and assessing all available evidence in order to generate an empirically derived answer to a research question. Systematic review can be used to reveal the knowledge gap and highlight if there is any inconsistency in existing methodology. In addition, this method is flexible: it can be adjusted in order to get the most comprehensive answer [16]. These reasons make systematic literature review the suitable methodology for this work.

The structure of this paper includes 7 sections, including the introduction. In the second block the background will be discussed. Afterwards, research method will be introduced, together with systematic literature review protocol. Next section will present the results of the research. Finally, the framework will be delivered and thereafter its discussion and validation. Conclusion part will summarize the work process and the outcome of the paper.

2. BACKGROUND

The following chapter will provide the overview about key concepts which are used in this paper. Firstly, different approaches for business processes improvement and redesign are discussed. Particularly, the opportunity-driven approach is presented in the scope of the research. Secondly, the chapter will take a closer look at opportunity-driven methods, their characteristics. The chapter aims to clarify the terms which concerns the research question to avoid any ambiguity in further reading and understanding. What is more, detailed concepts' presentation shows relevant history of the current situation and proves the relevance of research question.

2.1. Business process improvement methods

Business process management contributes to the purpose of organizations to improve their performance and increase effectiveness [17]. Undertaking the BPM initiatives is a sequential process of six steps which are composing BPM lifecycle (figure 1) in the organization [1].

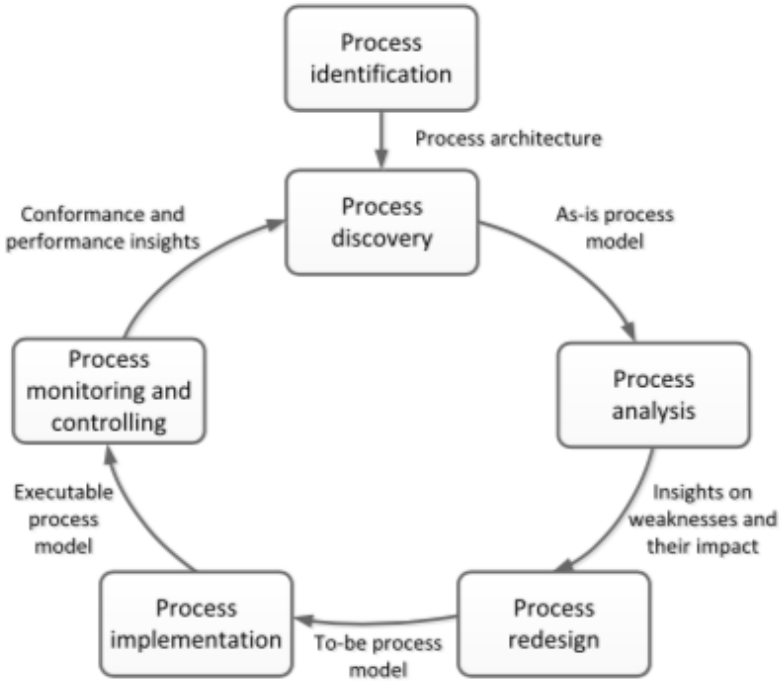

Figure 1. The BPM lifecycle. Image from [1].

First and foremost, identification of processes required improvement is completed. This stage is also responsible for defining performance measures and associated performance objectives. Secondly, during the phase called process discovery existing processes are described "as is" which helps to understand current business rules and discuss desired outcomes. The third step, process analysis, is required to identify and assess all problems and

potential remedies for process improvement with the usage of organization's data and with regard to stakeholder interests. The next phase is when the "to be" process model is prepared and proposed – process redesign. Thereafter, implementation step goes which requires accommodating company's operations to the designed model through personnel training, infrastructure and system changing, automation. Final lifecycle stage – process monitoring and controlling – aims to track business operations by establishing KPIs or analytical tools from the fields of Big Data, internet of things, process mining, machine learning [18]. With an effective reporting system organization can optimize its business processes and launch new improvements.

Considering again BPM lifecycle stages, it is important to mention that analysis and redesign steps are closely related to each other. During the process analysis company observes its current operations exactly the way they are happening in the organization at the moment to get the full "picture". The phase itself usually consists of few sub steps like conducting the interviews with process performers, examining documentation, validating knowledge and documentation [19]. Afterwards, being aware of all shortcomings from the analysis process makes it possible to start aligning with company's strategic goals and prepare new model with necessary improvements on redesign stage. Its sub steps include making comparisons and investigating the gaps, designing the process and modelling it, preparing new process procedures and deploying creation plan. Analysis stage serves as an input and redesign one – output. While developing new process model, the team can end up with multiple redesign options and each of them is referred to particular analysis. As a result, the final chosen model is correlated to the best-informed choice.

Among all BPM initiatives, the most value-added one is the "act of improving the process" [6] which is known as the redesign stage. To implement process redesign, organizations can choose a specific strategy and therefore an approach. One of the concepts which present different redesigning perspectives is called redesign orbit. The model is an example of a classification schema which organizing the whole spectrum of process improvement methods [1].

The following figure is illustrating the model (figure 2). The scheme differs in three dimensions. To start with, the orbit has its ambition or the magnitude of the change – transactional and transformational. The former methods aim to resolve the issues incrementally without challenging the existing set of institutional and structural arrangements. Transactional changes reform a single barrier to achieve the universal goal. The latter methods try to reach breakthrough innovation by questioning the fundamental assumptions of the current process

structure. Transformational changes restructure the system rather than reform just few relationships within this system.

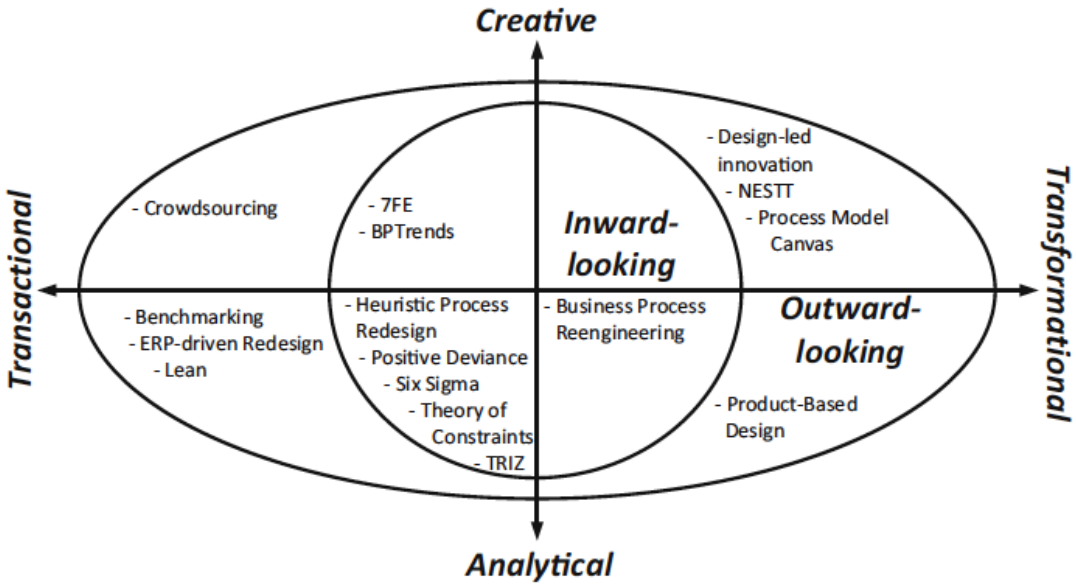

Figure 2. The Redesign Orbit. Image from [1].

Thereafter it goes the orbit nature which distinguishes analytical and creative redesign methods. Analytical methods like benchmarking, six sigma, process reengineering have a strong mathematical, quantitative focus. They tend to embrace tools and technologies. Alongside, creative methods embrace group dynamics and rely on human creativity, inventiveness to come to new ideas. Last dimension is the perspectives of the methods which are inward-looking and outward-looking. The first one is about considering the process in terms of internal organization. While undergoing process redesign, inward-looking methods are driven by company's objectives and performance measures. In contrast, outward-looking perspective relies on external opportunities and developments [20].

The redesign orbit made it possible to get the full overview of the possible solutions when it comes to process redesign. However, it is necessary to narrow down the list and emphasize the focus of this particular paper in terms of considered methods. The approaches investigated are opportunity driven. In terms of first dimension the scope will be the transactional ambition. Regarding the nature of the business process redesign, opportunity driven methods belong to analytical ones. The focus of the last dimension is not that obvious. On the one hand, benchmarking approach usually considered as an outward-looking perspective. On the other hand, positive deviance is seen as an inward-looking.

As a result, our perspective will include both sides which can be explained in a way that opportunities can be taken from both internal and external environments. For instance, by looking outward and using benchmarking as a method, telecom company can introduce new process like provision and then benchmark its results with the best practices in the industry. Another example presents the inward-looking way of improving business processes or positive deviance practice: bakery chain examines the performance of each bakery, find positive deviant behavior that explains exceptional performance. As a result, organization can apply that knowledge to other units and increase the overall productivity [21]. After defining the classification of opportunity-driven methods, it is necessary to clarify the peculiarities of each of them.

2.2. Opportunity-driven business process redesign

To continue with any further investigation of the research question, it is needed to present opportunity-driven methods for business process improvements in detailed way. Opportunity-driven here means the principle when any enhancement is implemented by looking at favorable possibilities and superior performance to embrace organization's strengths and potential. As mentioned previously, the scope of the redesign approach is transactional, analytical and both inward and outward looking perspective. In this way there are two key methods in focus – benchmarking and positive deviance.

Benchmarking originated in Japan in mid 1980s and it aims to constantly emulate the best in order to introduce change and aspire for superior performance standards [22]. Common understanding of the term is a process of measuring the performance of a company's products, services, processes against those of another business considered to be the best [23]. In general, the benchmarking process consists of five steps: identifying the object, selecting the superior performer or benchmarking partner, collecting and examining data, setting performance's goals and implementing plans together with their monitoring [24]. Although, the process may a bit differ depending on the strategic purpose, organization type, benchmarking type etc.

The benchmarking practice is usually classified by the object of study or the comparison partner. The first classification distinguishes product, strategy and process benchmarking. Regarding the topic of this paper, process benchmarking is in the scope and it compares work practices, business operations and processes with the best practices [23]. Another important classification refers to the type of benchmarking partner – competitive, functional, generic and internal. Particularly, competitive benchmarking compares performance with direct competitor, functional – specific function with the best practice within the same industry and

generic is making comparisons beyond the industry. One of the peculiarities is that benchmarking was usually considered as externally focused or outward-looking and that it is trying to assess the firm's competitiveness on the market. However, even in terms of the mentioned classification, there is internal benchmarking which compares units' or departments' performance within one organization [22].

Furthermore, recent way of distinguishing the method is to categorize it into external and internal benchmarking. External one finds the superior performer among company's competitors, within or beyond the industry or simply across the globe and tends to collect data thought the third party. It includes different strategies like collaborative, process, product, strategic, corporate and global benchmarking. Internal benchmarking is undertaking internal comparisons of the organizational performance, and what is more, data collection is done within the company itself. Among its strategies are SWOT, financial and functional benchmarking, performance metrics and best practice benchmarking [25]. In today's understanding of benchmarking practice, it is about reaching the performance of the superior performers and finding new opportunities within and beyond any setting.

Another important concept which is related to performance improvements is positive deviance (+D). The positive deviance paradigm aims to identify and learn the exceptional performance on an outcome of interest and then apply discovered existing solutions to complex problems [26]. This approach is bottom-up and it assumes that company's issues can be overcome by experiences existing within communities. As a result, community involvement is integral for this practice. What is more, as previously said, positive deviance is an inward-looking method and it follows that solutions are usually taken internally to ensure their feasibility within existing capacity, acceptance and sustainability [27].

Positive deviance has been successfully used in the social fields like childhood nutrition, neo-natal mortality, antibiotic infections. HIV/AIDS etc. Considering the concept itself, it can be applicable to any environment with available performance data to compare. Practicians suppose that it can be very effectively used for business process improvements [28]. For example, there were attempts to apply +D approach to eliminate waste in business processes [29] and this is not a limit. Any operation in the organization can show exceptional performance and positive deviance will serve as a tool to identify success factors of this particular process.

The correct implementation of positive deviance can make this practice a powerful tool for processes improvement. However, with positive deviance it can be difficult to identify all the variables that have impact on performance as there may be some hidden factors lead to

outstanding results. That is why a great quantity of appropriate data is required. The process itself should start with determination of what is the measure of success in the organization. The step is crucial, and results should be clear and precise. Therefore, there is a step of data collection to make possible to identify the positive deviance which is a third step itself. With defined +D examples, next it comes to formulate the factors or all variables that make those examples exceptional. Afterwards, the team makes statistical analysis to find the causality between the variables and positive deviant behavior and then conducts controlled tests for the hypothesis. Finally, the +D practices are translated and communicated across the organization which is an essential part of change management [30].

Positive deviance practice together with benchmarking approach help companies to discover the sorts of significant business process improvements by looking at superior and exceptional performances. This way of improvement identification is opportunity-driven, and it goes beyond organizational potential and capacity. In today's environment rather than reject or neglect extraordinary productivity or seek just for waste elimination, it is required to embrace the exceptional or the best in the field and try to make it a new norm.

To conclude, in this chapter the terminology relevant to the research question is discussed in detail. Further mentioning of these concepts will be used in the same perspective as explained here. Next chapter will present the research method and its relevance to the investigated goal.

3. RELATED WORKS

The chapter aims to provide the reader a literature review on papers which are related to the further research and connected to the same topic. It will help to observe the stated problem from different perspectives, will show various research methods used and will reveal the gaps in conducted works, which are not covered yet and can be fulfilled with this research. Aspects which will be discussed are redesign and business process improvement methods at high level, specific heuristics of those methods and opportunity-driven methods in different perspectives.

To start with, there are recent works which embrace all kinds of business process improvement methods. Referring to the redesign orbit [1], one paper set a goal to investigate each method and its characteristics in order to present the framework that arranged the activities related to process change [20]. Authors used systematic literature review to develop a framework which included an extended list of activities categorized in six stages – envision, initiate, diagnose, redesign, reconstruct and evaluate. One more paper explored in depth redesign alternatives from ontological perspective to deliver a practical guidance [31]. Particularly, researchers made comparisons between methods in terms of their redesign rationale and either they are problem or opportunity driven to develop business process design space. Although, the work touched the presented in the current work methods, their scope is broad that gives space for specification. These works are discussing the variety of methods could be applied for a business process improvement and trying to categorize them whereas current work will focus only on opportunity driven ones and how they are implemented.

Furthermore, other authors looked closer at redesign implementation based on best practices and their successful heuristics [32]. In this case, the framework of BPR initiatives which address cost, quality, flexibility and time criteria was developed. Similar principle follows another paper, where based on the major areas of redesigning project – the customer, the products, the information flow – together with the best practices, authors create the framework of BPR implementation [33]. However, in both cases researchers are discussing inward-looking activities of redesign or the ones that are eliminating weaknesses whereas this paper will cover also outward-looking methods. One more application of best practices for a redesign approach was used in order to investigate process reengineering in healthcare industry [34]. Following the same redesign heuristics from Reijers and Manson work [33], authors came up with multiple scenarios and approaches of process improvement for healthcare institutes. Their experience showed that there is a necessity to develop a practical guidance for process improvement implementation, but researchers limited their focus on one industry. In the

context of this paper methods application will be covered without connection to any particular sector.

Considering the approaches which are in the scope of the current work – opportunity-driven – it is needed to include papers which embrace them in different way. Author of one particular work conducted an extensive literate review about the benchmarking concept to reveal its development and trace existing models and frameworks [35]. In the discussion of the work, it was stated that benchmarking research are lacking innovative methodologies to guide practices. Another work discussed the growth, development, applicability of benchmarking [36]. With support of literature review, authors managed to present an insight of the concept covering its aspects, issues. One more paper presented an overview of benchmarking approach by discussing its principles, types, benefits and criticism and then applied method to the higher education field [37]. Nevertheless, these works did not embrace process improvements, which is the key focus of this research,

Previously mentioned papers covered benchmarking approach in general terms, but there are also works which brought different insight on this concept. Particularly, there are researchers who investigated in depth classification scheme of benchmarking and its unique models in order to propose a universal model which fit all types of benchmarking [38]. Interesting detail about this work is that authors used benchmarking as a research methodology to improve existing benchmarking models. However, the limitation is that the paper is theoretical and did not assess the effectiveness of created model in the industry. Another work had a focus on benchmarking reluctance and the objective was to identify barriers which complicated the practice [39]. Although the results of the research brought more practical value by helping leaders anticipate possible challenges with benchmarking implementation, they did not capture process improvements. In contrast, the following research of this paper will pay particular attention to the practical guidance of improving business processes.

Besides benchmarking concept, opportunity-driven approach includes positive deviance method. One research article took a look at the current state of positive deviance through systematic literature review and the potential to overcome its challenges with the usage of big data [40]. Another paper studied positive deviance in organizational domains to integrate the findings into a coherent framework which would help to understand this complex phenomenon, explain its determinants, consequences and offer methodological advice to practitioners [21]. Authors of one more work were focused of the PD approach application in healthcare organizations. They managed to define positive deviance in the particular context and assess the quality, issues of the methods used in these organizations. These papers were

determined to study positive deviance approach and its application; however, current work will take a closer look at its implementation on business process improvement to identify the important aspects.

Altogether, mentioned related papers do cover some aspects that intersect with the current research. The discussion made it clear that there is a space and a need for a conceptual work which will capture business process improvements by opportunity-driven methods and bring a demonstrative framework of their implementation in various industries. Finally, it is important to mention that several papers used as a key research methodology literature review or systematic literature review which prove the relevance of the chosen method for the following study.

4. RESEARCH METHOD

In order to conduct the paper research, the systematic literature review (SLR) was chosen as a method. The full description of the research method and process can be found in Appendix 1 – the systematic literature review protocol. The following chapter is aimed to summarize the document and present method conduction steps and the outcome.

The main objective is to respond to the question of how organizations can improve their business processes by using opportunity-driven approach. The SLR was performed by identifying relevant papers within the field and extracting the data according to the research questions. The systematic literature review allows to identify, assess all available evidence and hence produce empirically derived answer. This method helps to expose the gap in existing knowledge and highlight any inconsistency. The SLR is rigorous in contrast to ad hoc reviews but flexible in terms of provided answers. The aim for the notion of completeness makes the method suitable.

To address the research objective, the key question was decomposed into a set of research questions. Each of them is responsible to gather findings which will help to formulate the framework.

- RQ1: What kinds of business processes in the organizations have been improved by opportunity-driven methods?
- RQ2: What aspects have been considered to identify performance dimensions for business processes improvement by opportunity-driven methods?
- RQ3: What performance dimensions have been used for opportunity-driven methods implementation?
- RQ4: How have organizations conducted opportunity-driven business processes improvements and redesign?
- RQ5: How have improvement opportunities in business processes been identified with opportunity-driven methods?
- RQ6: How can organizations conduct the change for business processes improvement?

After determining the research question, search strategy should be proposed. Overall, the strategy is to find a body of relevant scientific studies. In order to complete this, particular search strings were selected to enable comprehensive search on several electronic databases. Three key terms were identified – business process, benchmarking and positive deviance. Based on these terms, two search strings were formulated:

Search string 1: (("business process") AND ("benchmarking" OR "process benchmarking" OR "internal benchmarking" OR "benchmark-driven" OR "best practice" OR "superior performer") OR

Search string 2: (("business process") AND ("positive deviance" OR "constructive deviance" OR "comparative deviance" OR "process deviance" OR "deviance" OR "Exceptional performance" OR "Exceptional behaviour"))

The search was performed in 5 electronic databases – ACM Digital Library, IEEE Xplore, Scopus, Web of Science and Emerald Insight. It allowed to cover the wide range of published journal, workshop articles in the field of business administration and computer science. What is more, to include all possible sources, scanning of grey literature through Google Scholar was conducted.

Another decision to make was to pick inclusion and exclusion criteria which aim to identify relevant studies that provide sufficient information to respond the research questions and filter unnecessary ones. Considering the inclusion criteria, it is important that the chosen paper is within the domain of business processes. Besides that, the paper should present or discuss a case for process improvement by one of the opportunity-driven methods. Finally, the last inclusion criterion states that the case from the paper should demonstrate the real application of the method. Furthermore, in order to filter the papers and remove irrelevant ones, it is necessary to set exclusion criteria. Firstly, the list of articles should be checked on duplicates. Secondly, the papers which are less than 5 pages are removed as they are unlikely to have enough depth to develop the research theme. Last two criteria are related to the paper access and its language. If the full-text version of the work is inaccessible or written in language other than English, it is removed from the list.

The search result lists from databases were downloaded and compounded in a single list. The search results per source are shown in Table 1, it composed a total of 3962 publications.

Table 1. The total number of papers identified per source.

Source	**Total Number of Papers Identified**
ACM Digital Library	793
IEEE Explore	328
Scopus	282
Web of Science	526
Emerald Insight	988
Google Scholar	1045
Total	**3962**

During the screening procedure, each study is examined against the inclusion and exclusion criteria. First, irrelevant papers are filtered according to the exclusion criteria. Afterwards, the list of primary studies within the scope is made based on the review of the titles. Next step is to examine the abstracts of studies and consider the new list of relevant papers. The last step is having IC3 considered when detailed look at the papers is completed. Finally, the definitive list of papers is made.

It should be mentioned that Emerald Insight and Google Scholar databases did not allow to download the full list. Therefore, filtering was done during the screening procedure and papers which appeared to be relevant based on abstract were added to the list. In the table 1 the search result which was checked manually is presented.

The following table 2 summarizes the data on the number of papers that were processed and represents the filtering process. As mentioned before, studies from Google Scholar were added on the firth step when papers were filtered by the abstract.

Table 2. The results of the application of selection criteria per selection criteria.

Selection Criteria	**Number of Identified Papers**	**Total Number of Papers Left**
Primary search results	3962	
Primary search results without Emerald Insight and Google Scholar	1929	
1. Filtering out duplicates	89	1840
2. Filtering by number of pages	110	1730
3. Filtering by paper title	1309	421
4. Filtering by paper abstract	255	166
5. Filtering by paper abstract with papers from Emerald Insight and Google Scholar	265	265
6. Filtering by reading the full paper	219	**46**

Figure 3 depicts a visual representation of the paper filtering process results. It can be noted that the most significant decrease was on the stage of filtering by paper title. As a result of the screening procedure, conducted based on determined inclusion and exclusion criteria, out of 3962 papers obtained from the primary search, 46 papers were selected as eligible for this SLR.

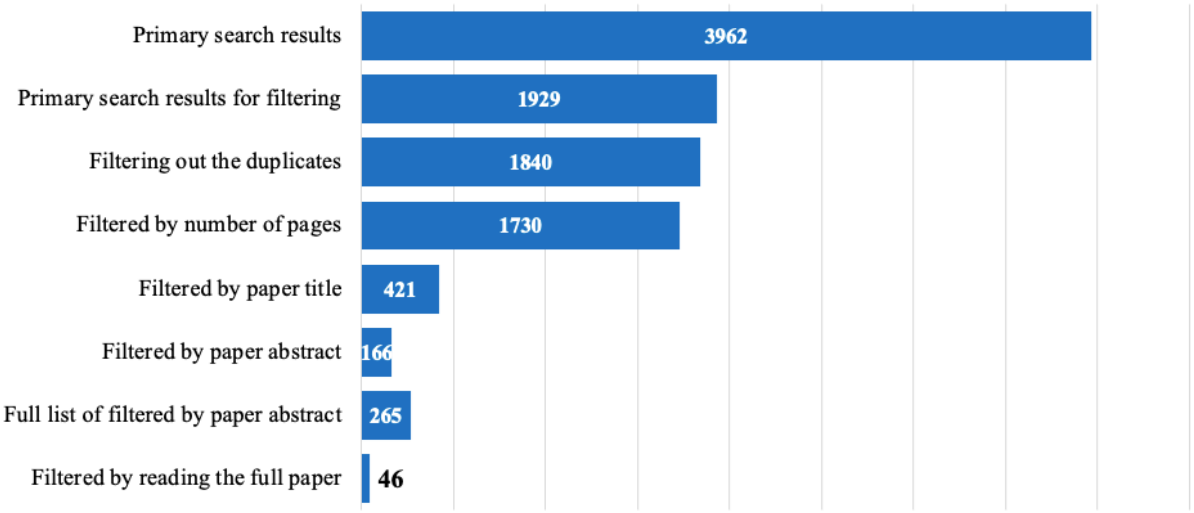

Figure 3. The number of papers per selection stage.

In order to proceed further with the data extraction stage, the data extraction form was developed to collect data in a structured, unbiased and consistent way. The whole form is presented in the SLR protocol in Appendix. Based on the formulated research questions, it included 7 categories of data:

(1) Identification data: paper title and authors, publication year and the number of citations.

(2) Context of study: case industry, targeted business process, improvement method, its description and process, external superior.

(3) Opportunity-driven method aspects: performance dimensions, their description and rationale.

(4) Business process(es) improvement identification: data required, data generation method(s), improvement identification process and description, the list of identified improvement opportunities.

(5) External partner identification and analysis: external superior patterns, industry and its identification method.

(6) Business process(es) improvement change implementation: change implementation process and method, problems faced.

The data from the definitive list of 46 relevant papers was extracted by using the designed data extraction form. The full document of the data extraction is presented in additional Excel document. Further, data was summarised and analysed, from which the framework was derived.

5. RESULTS

Data extraction allowed to capture relevant information from each paper and categorize it according to the extraction strategy. The next step was to summarize the findings and outline the results. Therefore, this part is dedicated to present the data gathered from the systematic literature review based on the research questions.

5.1. Business processes improved by opportunity-driven methods

The first research question aims to determine what types of business processes can be improved by opportunity-driven methods. It will outline if there are any limitations, hence the organization may examine its potential and decide on the improvement method. In order to present findings on processes, the industries they belong to, will be outlined. Thereafter, business processes will be categorized and each process type – discussed and provided together with paper examples. The research question is formulated as:

RQ1. What kinds of business processes in the organizations have been improved by opportunity-driven methods?

During the data extraction it was noticed that opportunity-driven methods can be applied for business processes in a variety of industries. Figure 4 presents the list of the fields together with the number of papers within the same field. It is noticeable that the most frequent group is manufacture companies. Among 12 organizations there are the ones which specialize in automobiles [41], [42], [43], textile [44], ceramics [45], consumer goods [46], [47] etc. Therefore, variations are possible even within one industry. Besides manufacturing, there are cases for companies in public sector [48], [49], [50], [29], service [51], [52], [53], [54], [55], [56], broiler industry [57], finance [58], [59], [60] and IT [61], [62]. For instance, among the least presented industries, the case from education sector presented the usage internal benchmarking for improving incident management processes [63] and the example from construction was focused on corporate management [64]. As a result, it can be concluded that industry is not a limitation for using opportunity-driven methods.

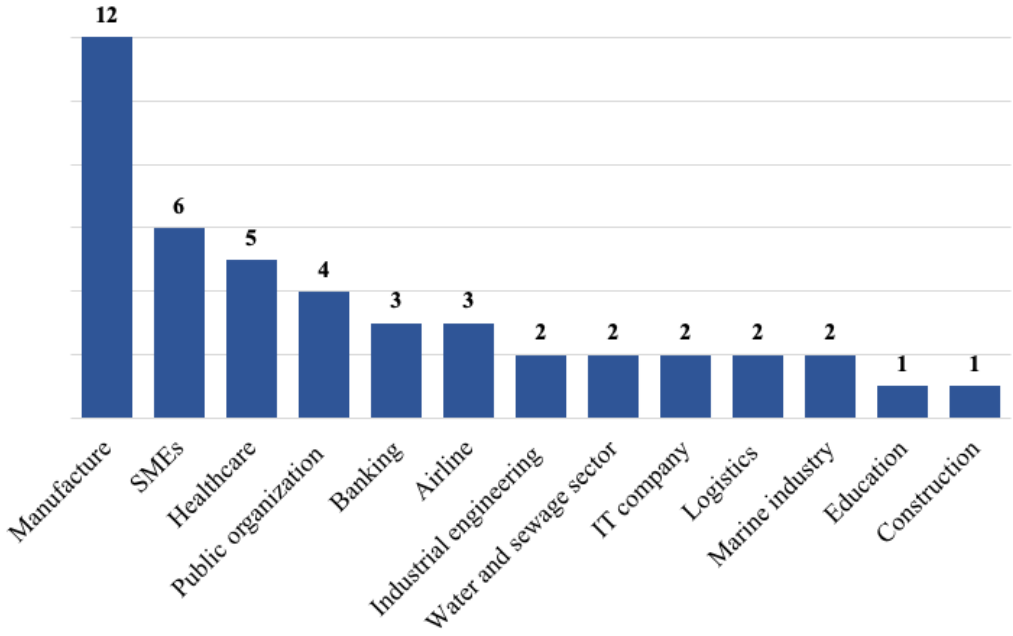

Figure 4. Number of paper examples across industries.

While having the diversity of industries, it was required to look at what kind of processes organizations were improving by benchmarking or positive deviance. For clear representation, figure 5 is used to show the distribution of paper examples within different process types. Here process types were grouped outside of any classification and typology, the idea was to demonstrate the variety. For example, in "Sales and Service" group, represented as the biggest one, there are processes like travel package selling process in the agency [56], customer call handling process [65] and permit application process in the municipalities [29]. Another group – "Logistics" – includes cases like improving the bed logistics and the pharmaceutical distribution process in the hospitals [66] and supply line logistics company [67]. What is more, there are processes which did not fit any group, but they represent that opportunity-driven methods can be applied widely. For instance, internal audit process in public and private organizations [49] and company's indirect functional areas in mechanical engineering such as distribution, design, process planning/manufacturing control, storing [68] and others were improved by external benchmarking. Having the full picture of business processes makes it easier to categorize them in the next step.

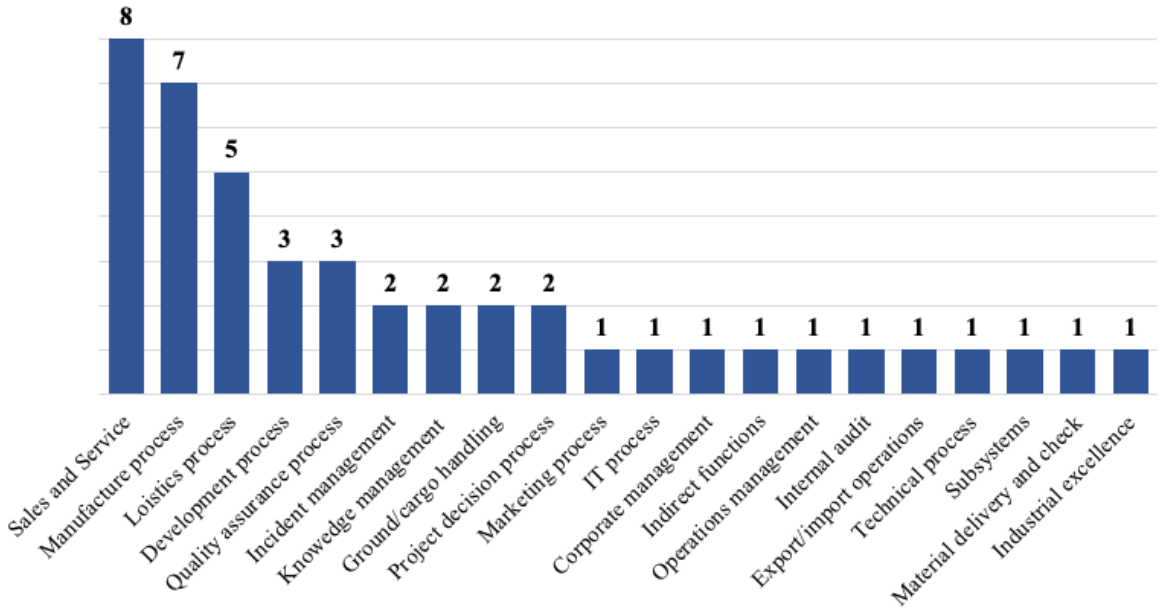

Figure 5. Number of paper examples across process types.

Due to the process types variation, it was necessary to find classification which would allow to categorize all collected cases. Following Porter classification [86], three types of processes – core, support and management – can be taken as a categorization basis for processes improved by opportunity driven methods. Figure 6 demonstrates the classification framework and the position of each process type.

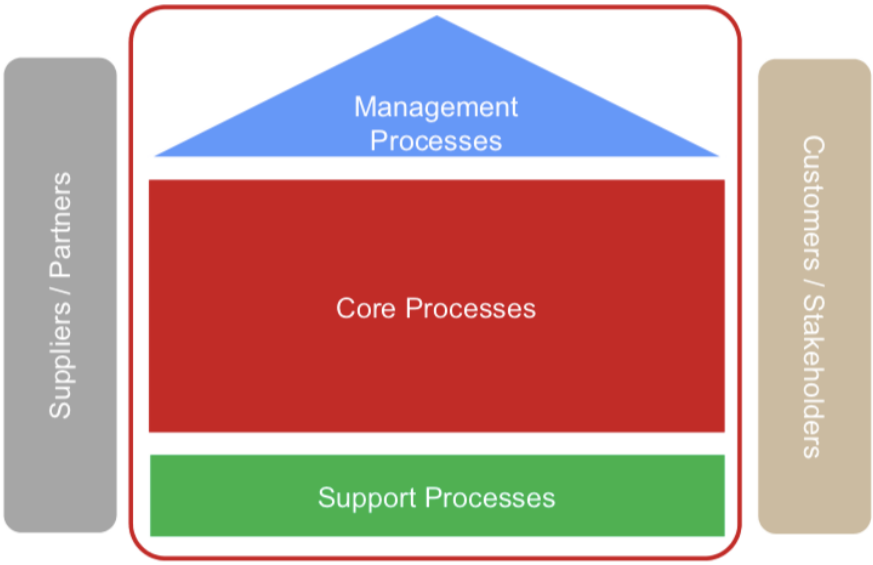

Figure 6. Porter: Types of processes. Image from [86].

It is needed to clarify what stands for each type. Core processes are essential activities which directly deliver value to intermediaries or clients. They might be cross-functional or exist within organizational function. Support processes are enabling activities designed to assist core processes by providing the resources and infrastructure. Finally, management processes

are designed to plan, measure, monitor, control business activities and ensure organization operates effectively and efficiently. They are needed to ensure that core and support processes meet operational, financial, legal and other requirements.

According to the figure 7 below, it is seen that, although all three types were taken as a target process in the cases, the majority is core processes – 71% or 32 out of total. Meanwhile, the minority is support processes – only 9% or 4 out of total and management processes are presented in between – 20% or 9 out of total. Concerning that information, it can be said that it is possible to use opportunity-driven methods for all three types. However, there is comparatively more interest from the change or improvement teams in the organizations towards the core processes than support or management.

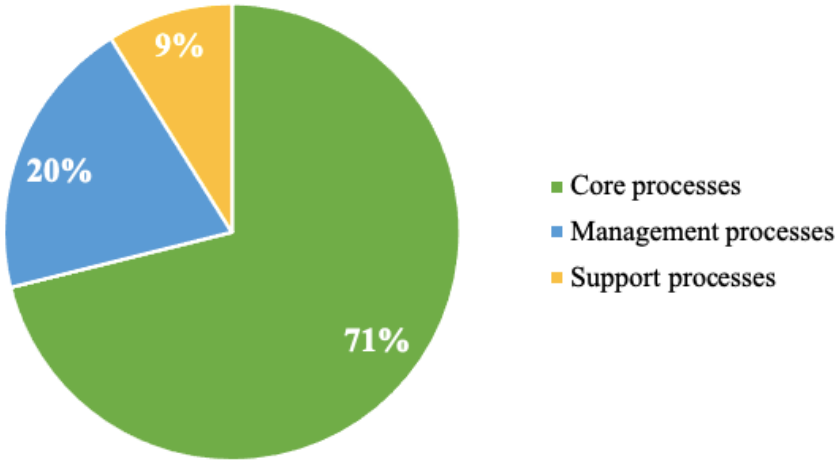

Figure 7. Process types distribution based on Porter classification [86].

To be more specific, all the core processes were then divided into 5 subgroups – design and development, manufacturing or service, marketing and sales, delivery and after-sale, direct procurement [69]. Figure 8 presents the distribution. Here the major group is manufacturing or service – 22 out of total. There are processes which include the activities directly responsible for value creation: car assembly in the automobile company [56], mortgage lending process in the bank [59], cargo handling in the airports or seaport [70], [71], [72]. The second subgroup contains cases which brings value through development – new product [73] or software [43] development processes. Other subgroups for core processes are focused on marketing and sales activities such as travel packages selling process [56] in the travel agency, delivery [50] and customer care [54] services and direct procurement case that includes raw material delivery and quality check process [74]. Due to this clarification, it can be concluded that by improving the core processes organizations are most likely to orient to main activities in charge of value

delivery. Table 3 below documents the full list of paper case example with industry specification.

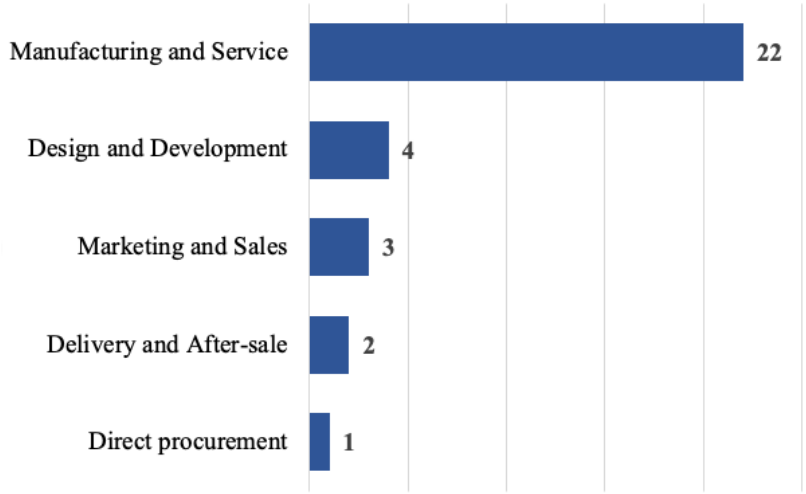

Figure 8. Core processes paper examples distributed across subgroups.

Table 3. Paper case examples categorization for core processes.

Core processes		
Example	Industry	Reference
Design and development		
New product development	Industrial engineering	[73]
Supply chain, product development, process development, operations strategy formulation and deployment.	Manufacture, textile sector	[44]
Business processes through research facility to achieve business excellence	SMEs, manufactures, services etc. in Montenegro	[53]
Software development processes	Manufacture, automobile company	[43]
Manufacturing and Service		
Process of patient flow to the X-Ray procedure	Healthcare	[75]
Water quality assessment process	Water and sewage sector	[76]
Subsystems "Finance", "Customers", "Business processes", "Personnel development"	Banking	[58]
Customer service processes: The Account Deletion process (ADP), The Technical Request process (TRP)	IT sector, online project platform	[61]
Supply line process	Logistics	[67]
Manufacturing process, high-scrap rates problem	Manufacture	[77]
Mortgage lending process	Banking	[59]
Customer service (customer call handling, waste water sampling) and operations processes	Water supply services	[65]

Processes from new product introduction to circuit card assembly	Manufacturing	[78]
Car assembly operations	Manufacture, automobile company	[42]
Services: air cargo and passenger transportation	Airline, airport	[70]
Cargo handling and documentation	Marine industry, seaport	[71]
Inventory, quality assurance, delivery, product cost control	Manufacturing, consumer goods segment	[46]
Logistics, marketing, storage, fabrication and purchasing	SMEs	[55]
Permit application process	Public sector, municipalities	[29]
The export and import operations of the freight forwarding firm	Logistics	[79]
The lamination process	Manufacture, the production of raw materials carbon and fiberglass	[80]
Processes along with value creation	Manufacture, ceramics	[45]
Ground handling processes	Airline, airport	[72]
Supple chain (SC): Grand Parents production (GP), parents production, broiler production and processing stages	Broiler industry	[57]
IT-enabled process changes or new Internet-enabled business models	IT sector	[62]
Silkscreen printing process	Manufacture, printed circuit boards	[81]
Marketing and Sales		
The marketing business processes	Pharmacy	[82]
Sales and service	Banking	[60]
Travel packages selling	Travel agency	[56]
Delivery and After-sale		
Customer care and service, delivery etc	SMEs	[54]
The delivery capacity and project management	The public sector organizations	[50]
Direct procurement		
Internal operations influencing customer satisfaction: raw materials delivery process and quality checking process	Manufacture, optical frames and sunglasses	[74]

Talking more about management processes, companies from the example cases were focused on two subgroups (figure 9): strategic and planning or compliance and risk management [69]. The former group included cases like projects evaluation [41], corporate

[64] and knowledge [51], [47] management. The latter one consists of example in food and drug administration (FDA) compliance [83] and incident management [63]. These processes have strategical importance for each organization but at the same time their analysis demands internal insight from another organization in case of using external benchmarking. Therefore, using opportunity-driven methods can be limited. The same way as for core processes table 4 presents the full list of paper cases.

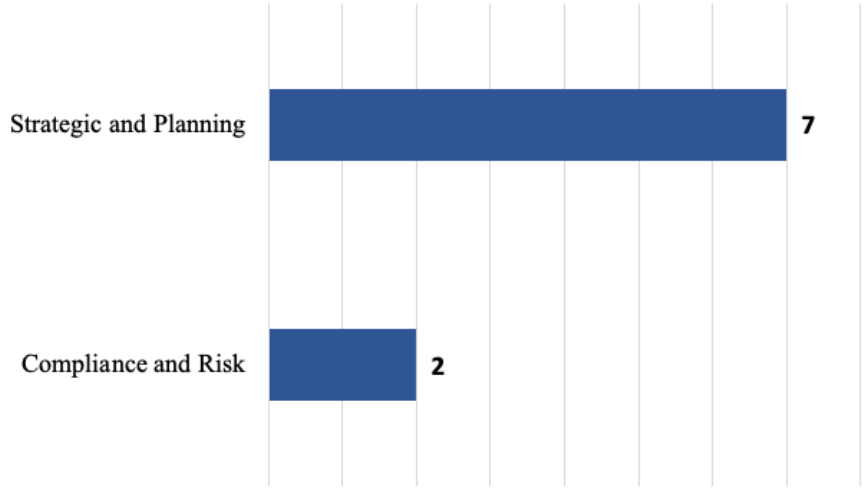

Figure 9. Management processes paper examples distributed across subgroups.

Table 4. Paper case examples categorization for management processes.

Management processes		
Example	Industry	Reference
Strategic and Planning		
Transportation management systems (TMS)	Airline	[84]
Knowledge management processes	The creative sector of SMEs	[51]
Operations management (ex. patient planning work procedures)	Healthcare	[85]
Decision making in the evaluation of project termination or continuation	Manufacture, automobile company	[41]
Logistics processes: the bed logistics process and the pharmaceutical distribution process	Healthcare	[66]
Knowledge management practices	Manufacture, industrial personal computer sector	[47]
Corporate management	Construction, road and bridge	[64]
Compliance and Risk Management		
Incident Management	Education	[63]
FDA compliance and quality management	Pharmacy	[83]

The last process type – support processes – is the minor one and does not allow us to distinguish it into subgroups (table 5). Example cases belongs to activities related to indirect functions [68], quality information management [48] and other internal processes [52], [49]. According to the mentioned definition and the role of support processes, they are closely related to the core processes. Improving support activities through opportunity-driven methods can result in unavoidable changes in core activities as well. This conclusion may appear as the reason for not frequent usage of benchmarking or positive deviance methods for this process type.

Table 5. Paper case examples categorization for support processes.

Support processes		
Example	Industry	Reference
Management of quality information	Government organization	[48]
Technical processes	Small service firms, case on architecture firm	[52]
Internal audit process	Private and public organizations	[49]
Indirect functional areas: design, process planning/manufacturing control, storing, materials management/procurement, quality assurance and shipping	Mechanical engineering	[68]

Presented findings about business types are critical for further discussion part. It was identified that opportunity-driven methods are widely applicable in terms of process types and company industries. However, there is still a traceable tendency in favor for core processes in charge of direct value production and manufacture and service organizations. Speaking about the process type preference, companies most likely want to replicate the value deliver activities, which have strategic importance, from the superior performer. Industry preference is stating that organizations with traditional business models like production or service delivery are most likely to use opportunity-driven methods and learn from the best.

5.2. Aspects for performance dimensions identification

The answer to the second research question should provide the support to the organizations in terms of starting the process of its operations' improvement. It aims to identify the patterns, which are considered, when the decision about choosing the performance dimensions is made. The research question is formulated as followed:

RQ2: What aspects have been considered to identify performance dimensions for business processes improvement by opportunity-driven methods?

Before the beginning of applying opportunity-driven methods for business processes improvement, companies ought to search relevant performance dimensions. This task can appear to be challenging: each organization is dealing with various indicators and KPIs. That is why, beforehand, it is helpful to find the aspects that would support decision making. In order to retrieve the aspect from the gathered studies, it was necessary to look at rationale behind the chosen dimensions. During data extraction, it became clear that there can be external and internal aspects. In case of external ones, organization relies on outward information in order to come up with relevant performance indicators. At the same time, companies can use internal information as an input to identify dimensions.

Starting with external sources, the most frequent one is the usage of existing literature [41], [47], [54], [61], [62], [67], [79], [86]. It may happen that there was previous research which fit a business process context. For instance, one study used measures which were previously formulated by Torkzadeh and Doll in their 1999 article [62]. What is more, it is makes sense to check the papers that belongs to the same field and taking into consideration the business specifics. In case organization does not manage to find relevant research, it may examine industry awards, reviews like the European Award of Excellence and International Motor Vehicle Programme [53], [42]. By checking those, the company finds the key characteristics which are traced to identify the market leaders. Another source for identifying performance dimensions are expert opinions [50], [57], [79]. In current papers it was done through in-depth interviews. One of the improvement teams interviewed several project executives of various organizations [50] and another talked with the firm's operational experts, possessing years of experiences [79]. Finally, the last two possible external aspects are competitors and customers. If the information access is allowed, the usage of competitive priorities, which have been or plan to be improved, may support the selection of performance indicators [46], [74], [83]. In other case, when company is customer-oriented or the targeted process is related to service, the client "voice" can serve as qualitative tool and customer needs are translated into performance dimensions [59], [70]. Improvement teams can also pay more attention to external partner KPIs when doing comparisons with companies which share similar business goal [63]. What is more, one of the papers stated that the variables were collected based on publicly available data, but not specified concretely what type of public data [72].

While identifying performance indicators for process improvement purposes, organization can also rely on internal sources. One of the aspects to consider are business goals aimed to achieve through opportunity-driven methods [75], [43]. What is more, company's

strategy and organizational culture can serve as a support as they are connected to performance outcomes [82]. Same study also states that business process modelling is an essential part of understanding the activities and, therefore, the indicators connected to their performance [82]. The next aspect is to have a focus on a particular process or point in a process through its isolation [77]. By doing this, the improvement team will identify the root cause problem or existing opportunities and can come up with accurate dimensions. In another case the team conducted the diagnosis which presented the strong and weak points of the enterprise's activities together with related resources. In the end the identified malfunctions were used as a performance dimensions [55]. Structural break of performance between two periods was also used to examine the change before and after internal benchmarking application [71]. Different study used a top-down scheme, which is used for the balanced scorecard design procedure, to identify indicators [45]. In other words, the approach for internal KPIs was applied in order reveal dimensions for current process improvement. The following table 6 summarize the aspects which were extracted from example papers.

Table 6. External and internal aspects for performance dimensions identification.

External aspects	Reference	Internal aspects	Reference
The usage of literature	[41], [47], [54], [61], [62], [67], [79], [86]	The usage of business goals aimed to achieve through opportunity-driven methods	[43], [75]
The usage of industry awards, recognitions or reviews	[42], [53]	The usage of company's strategy and organizational culture	[82]
The usage of expert opinion	[50], [57], [79]	The usage of business process modelling	[82]
The usage of competitive priorities which have to be improved for the organization	[46], [74], [83]	Focus on a particular process or point in a process through its isolation	[77]
The usage of customer needs	[59], [70]	The usage of weak or strong points of the company's activities and related resources.	[55]
The usage of publicly available data	[72]	The usage of structural break of performance	[71]
Organizations that have a similar goal have a shared interest in certain KPIs	[63]	The usage of schemes, procedures that are applied for internal indicators identification	[45]

Below presented figure 10 illustrates the percentage distribution of external and internal aspects used by example studies. It is clear that external ones were exploited more frequently, however, it does not deprive the suitability of internal aspects.

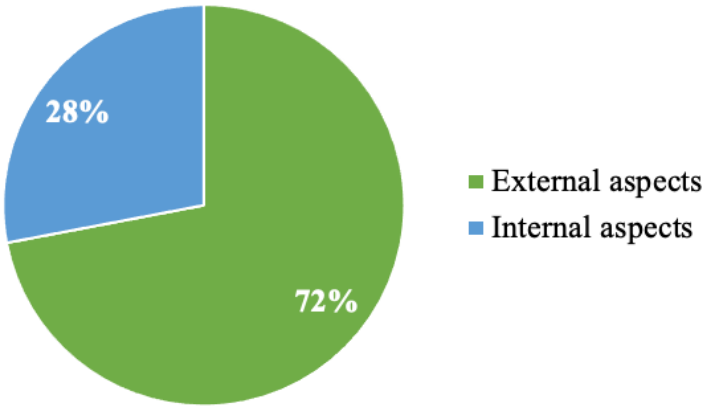

Figure 10. The percentage ratio of two types of aspects presented by example papers.

Overall, the findings from the second research questions provide the list of aspects which can be considered by organizations during performance dimensions identification. Although not all studies included rationale behind the indicators' choice, during the extraction two types of aspects were revealed – external and internal. The difference between them is the information type or, in other words, the focus – outward or inward. When the company relies on external aspects, it will support its dimensions identification with literature or expert review, competitor and customer data. On the contrary, organization will examine its culture, strategy or existing procedures for indicators design when it uses internal aspects.

5.3. Performance dimensions for opportunity-driven methods

After considering the aspects which helped organizations to identify performance dimensions, it is necessary to look at actual indicators used by case studies. Next research question aims to present dimensions that supported business process improvements by opportunity-driven methods. In order to document data in a comprehensible way, the attempt to categorize performance dimensions was made. Extracted data from the collected papers with real-life applications made it possible to demonstrate indicators based on business process type, applied method and industry. The research question is formulated as:

RQ3: What performance dimensions have been used for opportunity-driven methods implementation?

Collected data on performance dimensions has a limitation that should be noted before findings reporting. Although all the papers included real method application and its discussion, not all of them provided full information on indicators. Some papers paid more attention to that

aspect and reported chosen dimensions in detail, others only mentioned general information. This could happen because of different level of confidentiality. Therefore, it may affect the presented insight and result in some inaccuracy. Further conclusions and assumptions are relied on existing extracted data.

First of all, as mentioned earlier, it is necessary to categorize all the dimensions that were extracted. One of the standard metrics classifications is based on data type – quantitative or qualitative. Quantitative dimensions are expressed in raw numbers and provide the concrete aggregate statistics. In contrast, qualitative indicators look at value beyond numerical measurements, they capture information that results from observation and analysis. Besides having just quantitative or qualitative dimensions, some papers included both types. Therefore, during categorization, option for both types of indicators was included.

Figure 11 illustrates the percentage ratio between dimensions groups. From the result it is seen that the usage of only quantitative indicators or both, quantitative and qualitative, is the most prevalent way – 41% or 18 papers each. Meanwhile, only 18% of studies, which is counted to 8 cases, preferred to apply only qualitative dimensions to business process improvement. Among quantitative indicators there are cost values [59], [68], critical success factors which contains sales, revenue, inventory and other metrics [46], number of successful transactions [56] etc. Similarly, qualitative dimensions include various type of data. For example, the organization specifics, knowledge of employees [51], characteristics collected from certification and questionaries [53], task innovation, management control, customer satisfaction [62]. One of the studies [48] used IQ requirements which aimed to describe the quality aspects of information on the context of governmental organization – security, completeness, timeliness and accuracy. Finally, the rest of the papers combined these two types of dimensions. For instance, one improvement team chose to compare their business processes based on performance metrics together with data on customer and supplier relations [42]. Another paper operated with quantitative indicators like cost metrics, production number index and qualitative ones like feed quality [57].

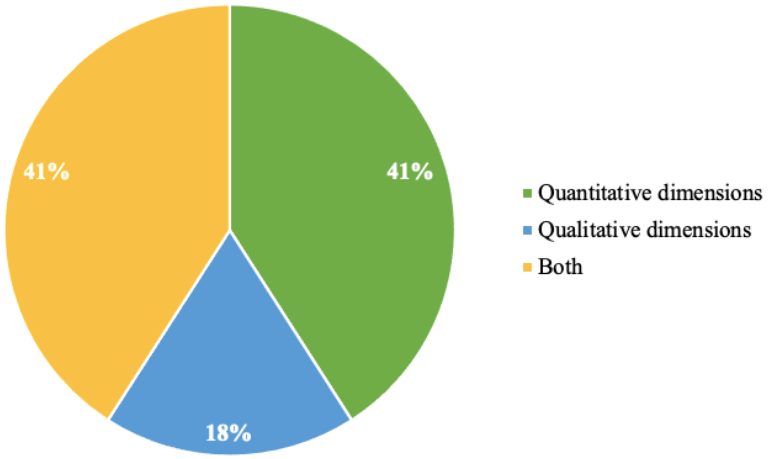

Figure 11. The percentage ratio of dimensions types used in example papers.

After classifying all dimensions, it is possible to add process type and identify what type of performance dimension is used in each case. Figure 12 presents the distribution of studies based on these two typologies. By looking at the core processes group, it can be said that the ratio of chosen performance dimensions is the same as for the whole list of papers – companies prefer to use quantitative indicators or the combination of both types. It is explained by the fact that core processes are the major group among all process types. As for management processes, there is a preponderance of preferences towards the use of both indicators' categories. Finally, cases that focused on support business processes operated with qualitative and quantitative dimensions but in favor to the first type. However, both management and support processes groups are comparatively small, hence it is no possible to make final conclusions. On this step, quantitative dimensions are still the most preferable one among case studies: they are used solely or together with qualitative ones.

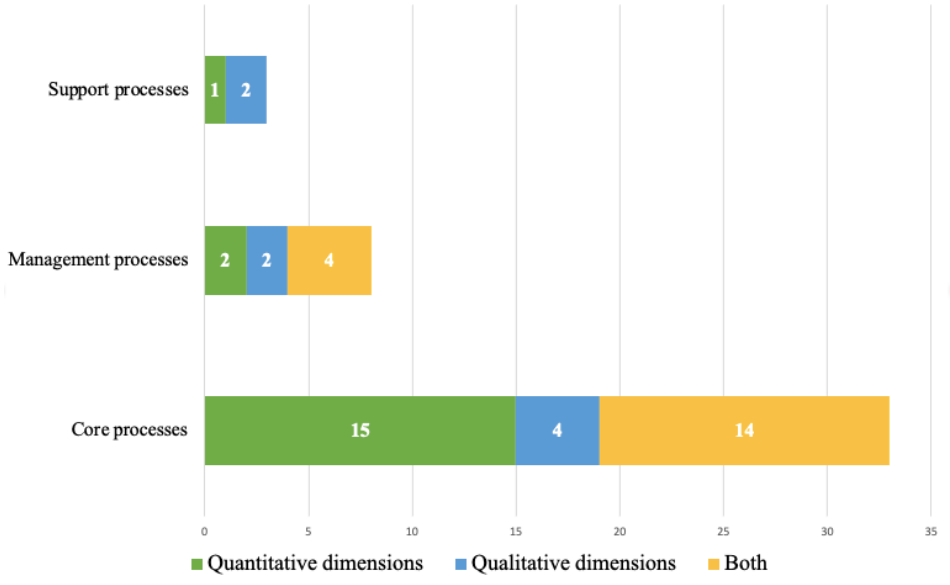

Figure 12. Number of example papers across process type and dimensions type.

In the next step the approach was taken to show how the choice of performance dimensions differs depending on chosen opportunity-driven method. As it was stated in background chapter, there are three methods considered – internal and external benchmarking, positive deviance. The same way it was done for business processes, figure 13 illustrates what type of dimensions was used according to applied method.

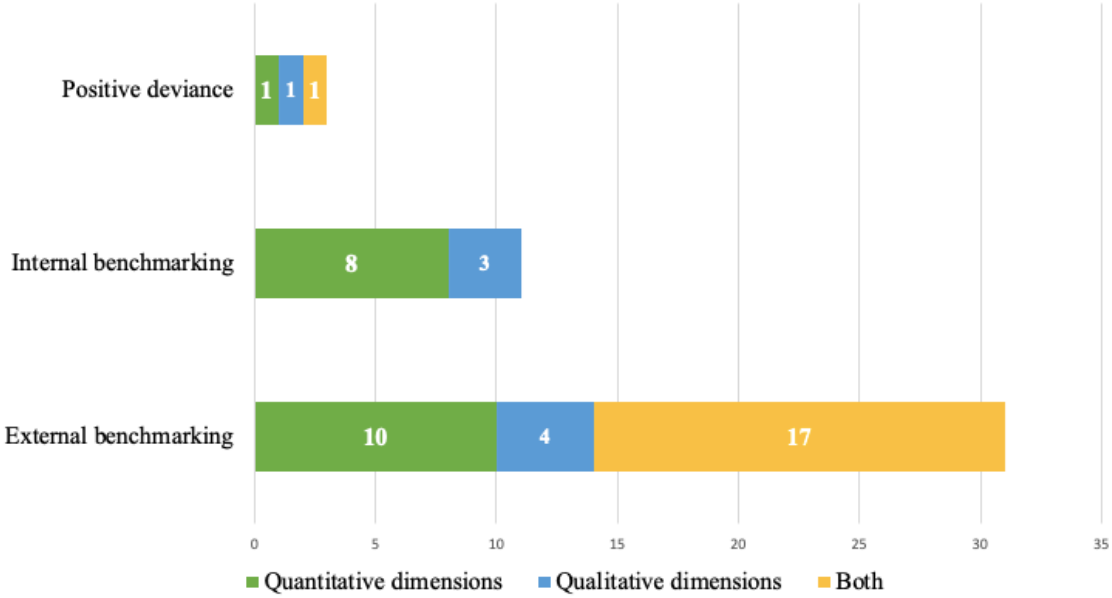

Figure 13. Number of example papers across applied method and dimensions type.

Based on these findings, few suggestions can be made. First of all, by taking a look at dimensions chosen by studies that applied internal benchmarking, improvement team was focused on quantitative indicators. Meanwhile, for organizations that used external benchmarking there is a tendency to exploit more a combination of qualitative and quantitative metrics. This fact can be explained in a way that when the company's superior partner is external enterprise, it is not enough to make comparisons by only numeric measures. Qualitative data allows to have deeper understanding of the successful performance. As for positive deviance method, there is not enough data on this method type to make any statement. According to the extracted data, organizations used all types of indicators.

Furthermore, an insight about the difference between dimensions choice depending on case industry was gathered. Due to the fact that there is a diversity of industries among collected papers, the tables were created in order to demonstrate findings. Table 7 presents all extracted quantitative dimensions together with case sector. According to the data, it can be said that quantitative indicators were applied in various fields – services like banking [59], [60], travel agencies [56], education [63], manufactures specializing on optical frames [74], consumer goods [46], ceramics [45]. Talking more about dimensions, the majority of papers improvement

teams used standard metrics – performance and cost measures, minor group – more specific ones like transactions [56], case's duration [29], process execution data [80].

Table 7. Quantitative performance dimensions across industries.

Quantitative dimensions		
Dimension	Industry	Reference
Five key performance indicators: reliability, responsiveness, cost, flexibility, and assets	Industrial engineering	[73]
Not defined, Key Performance Indicators (KPIs)	Education	[63]
The microbiological indicator set	Water and sewage sector	[76]
Not defined, Key Performance Indicators (KPIs)	SMEs, architecture firm	[52]
Own performance measure and other's performance levels	Manufacture, optical frames and sunglasses	[74]
Eight standardized major cost line-item categories	Banking	[59]
Metrics and business practices	Manufacturing	[78]
DEA inputs for two models (sales, costs)	Banking	[60]
Port performance	Marine industry, seaport	[71]
Critical success factors (CSFs) - performance measures, gross annual profit, total sales	Manufacturing, consumer goods	[46]
The process costs, the process cost accounting method	Mechanical engineering	[68]
Successful transactions	Travel agency	[56]
A case's duration in days	Municipalities	[29]
Value-added processes – process execution data	Manufacture, raw materials carbon and fiberglass	[80]
KPIs (ex. KPI no. 5: expected-quality stocks/ total stocks received-accepted)	Manufacture, ceramics	[45]
The list of variables in the airport performance: staff costs, other operating costs, declared runway capacity	Airline industry, airport	[72]
The financial indicators, indicators of activity and profitability, debt indicators, operating indicators.	Construction, road and bridge	[64]
Performance measurement (cycle time, costs), process flow data	Manufacture, printed circuit boards	[81]
Input variables: (1) quay length; (2) terminal area etc. Output variable: Container throughput (TEU)	Container port, the sea transport	[86]

Next dimension type to document – qualitative. Again, all the examples are presented in the table format (table 8). It is noted that qualitative indicators were used mostly by service organizations like public [48], [49], IT firms [61], [71] and SMEs [51], [53], [55]. In contrast to quantitative type of metrics, in this case each dimension is different and focused on particular

business process perspective. For instance, a case from manufacture field defined important criteria for knowledge management which aim to support process comparison and improvement [47]. Another example paper that examined private and public firms used eight best practices of top-performing internal audit organizations – customer understanding, quality concepts usage, regular communication within the departments etc. [49]

Table 8. Qualitative performance dimensions across industries.

Qualitative dimensions		
Dimension	Industry	Reference
IQ requirements – the quality aspects of information: security, accuracy, completeness, timeliness	Public organization	[48]
The specificity of the organization, knowledge of employees, and the pathways to specific solutions	SMEs	[51]
6 Digital nudges: Incentive, Salience, Precommitment, Default Setting and Additional Information	IT sector	[61]
The internal audit approach and understanding of internal audit functions	Private and public organizations	[49]
Characteristics of operating systems in terms of certification and questionnaires and the criteria for business excellence awards	SMEs, manufacture, service in Montenegro	[53]
The malfunctions into 15 different categories	SMEs	[55]
Five most important criteria for KM practices (C1), quality of KM (C2), learning ability of the enterprise (C3), degree of knowledge sharing (C4), and commitment of the enterprise (C5)	Manufacture, industrial personal computer sector	[47]
Impacts on task productivity, task innovation, management control, customer satisfaction, and supplier management	IT sector	[71]

Last but not least, it is necessary to present dimensions which included the usage of quantitative and qualitative metrics (table 9). Same as it was for quantitative dimensions, there is a diversity of companies' industries – healthcare and pharmacies [66], [75], [82], [83], logistic firms [67], [79], manufactories in areas like textile [44], automobiles [41], [42], [43] etc. The group of dimensions is also varied. One case from manufacturing field decided to use performance level together with measures that indicate its company's attitude, supplier relations and employee recognition patterns [44]. Banking company chose numerical indicators of its balanced score card and data on customers, business processes and personnel development [58]. Another paper with a focus on logistics industry provided dimensions which were related to the most important factors in the freight forwarding business – cost, quality of service, resource utilization, flexibility, transparency and others [79].

Table 9. Quantitative and qualitative performance dimensions across industries.

Quantitative and qualitative dimensions		
Dimension	Industry	Reference
The use of personnel such as TAs and DI-dedicated porter; type of equipment displaying wait times to patients	Healthcare	[75]
Indicators of the BSC, "Finance", "Customers", "Business Processes", "Personnel development".	Banking	[58]
Functional, Business, Qualitative aspects Maturity of Transportation Management Business Processes	Airline	[84]
The concepts of energy conservation and process predictability	Logistics	[67]
KPIs, standard operation procedures (SOP), experiences regarding FDA compliance	Pharmacy	[83]
Focus on process and not functional areas; root cause	Manufacture	[77]
Indices (the performance level) and measures (the company's attitude, supplier relations and employee recognition patterns)	Manufacture, textile sector	[44]
Company's vision, mission Companies' marketing process flow modeling	Pharmacy	[82]
Internal service level agreements – business, process, cost	Water supply	[65]
Expected contribution, size of investment, innovativeness, business advocacy	Manufacture, automobile company	[41]
Plant performance, internal management practices, customer and supplier relations	Manufacture, automobile company	[42]
A list of benchmarking indices: Financial performance, Marketing information, Quality of products	SMEs	[54]
Requirement qualities (the customer needs into a hierarchy of primary, secondary, and tertiary needs)	Airline industry, airport	[70]
Critical success factors – adequate project plan, appropriate design and detailed engineering, availability of work front	The public sector organizations	[50]
Size, code quality, or robustness, productivity, customer satisfaction	Manufacture, automobile company	[43]
Decision criteria: output quality, consistency, employee engagement, risk of mistakes, security of supply	Healthcare	[66]
Cost, quality of service, quality of data, resource utilization, efficiency of SOP	Logistics	[79]
Cost metrics, product acquisition costs, production number index, feed quality, integrated process	Broiler industry	[57]

Although we managed to gather useful insight from perspectives like process type, applied method and industry, it can be also helpful to look into combination of two perspectives. Table 10 presents findings across processes type and case field. Inside the table dimensions also marked depending on their classification: Q1 stands for quantitative indicators, Q2 is qualitative metrics and B – both.

Table 10. Performance dimensions across process type and industries.

	Core	Management	Support
Manufacture	**B.** Focus on process and not functional areas; root cause. **Q1.** Own performance measure is the baseline data and other's performance levels. **B.** Indices and measures. **Q1.** Metrics and business practices. **B.** Plant performance, internal management practices, customer and supplier relations. **Q1.** Critical success factors (CSFs). **B.** Size, code quality, or robustness, productivity, customer satisfaction. **Q1.** Value-added processes. **Q1.** Not defined, KPIs. **B.** Cost metrics, product acquisition costs, production number index, feed quality, integrated process. **Q1.** Performance measurement (cycle time, costs), process flow data.	**B.** Expected contribution, size of investment, innovativeness, business advocacy. **Q2.** (C1), quality of KM (C2), learning ability of the enterprise (C3), degree of knowledge sharing (C4), and commitment of the enterprise (C5).	N/A
SMEs	**Q2.** Characteristics of operating systems. **B.** Financial performance, Marketing information, Quality of products, Product innovation. **Q2.** The malfunctions into 15 different categories. **Q1.** Successful transactions.	**Q2.** The specificity of the organization, knowledge of employees, and the pathways to specific solutions.	**Q1.** Not defined, KPIs.
Healthcare	**B.** The use of personnel such as TAs and DI-dedicated porter; type of equipment displaying wait times to patients. **B.** Company's vision, mission. Companies' marketing process flow modeling.	**B.** KPIs, SOP, experiences regarding FDA compliance. **B.** Output quality, consistency, employee engagement, risk of mistakes, security of supply.	N/A
Public organization	**B.** Critical success factors – adequate project plan, appropriate design and detailed engineering, availability of work front etc. **Q1.** A case's duration in days.	N/A	**Q2.** IQ requirements **Q2.** The internal audit approach and understanding of internal

			audit functions.
Banking	**B.** Indicators of BSC, "Finance", "Customers", "Business Processes", "Personnel development". **Q1.** Eight standardized major cost line-item categories. **Q1.** DEA inputs for two models.	N/A	N/A
Airline	**B.** Requirement qualities. **Q1.** The list of variables in the airport performance: staff costs, other operating costs, declared runway capacity.	**B.** Functional, Business, Qualitative aspects. Maturity of Processes.	N/A
Industrial engineering	**Q1.** Reliability, responsiveness, cost, flexibility, and assets.	N/A	**Q1.** The process costs, the process cost accounting method.
Water and sewage sector	**Q1.** The microbiological indicator set. **B.** Internal SLAs - business, process, cost.	N/A	N/A
IT company	**Q2.** Incentive, Salience, Precommitment, Default Setting and Additional Information. **Q2.** Impacts on task productivity, task innovation, management control, customer satisfaction, and supplier management.	N/A	N/A
Logistics	**B.** The concepts of energy conservation and process predictability. **B.** Cost, quality of service, quality of data, resource utilization, efficiency of SOP.	N/A	N/A
Marine industry	**Q1.** Port performance. **Q1.** Input variables: (1) quay length; (2) terminal area etc. Output variable: Container throughput (TEU).	N/A	N/A
Education	N/A	**Q1.** Not defined, KPIs.	N/A
Construction	N/A	**Q1.** The financial indicators, indicators of activity and profitability, debt indicators, operating indicators.	N/A

By taking a look at the results (table 10), it is noticeable that core manufacture processes are usually compared based on quantitative data or together with qualitative values. However,

in case of management activities, improvement teams may have a need for unmeasurable aspects such as level of innovativeness [41] or firm's learning abilities [47]. Small and medium firms and also public organizations form a diverse group, each of them may have different business goals and models. Hence there are also a diversity of metrics type. As we do not have more specific data about each case, it can be assumed that there are other factors that lead to the choice of dimensions. In contrast, there is a tendency for healthcare organizations and pharmacies to use both quantitative and qualitative indicators. Same goes for financial enterprises, airline industry which prefer to operate with only quantitative measures for process improvements or with addition of quality data. Other sectors have two or less examples, therefore it makes it hard to make objective conclusions. However, it can be assumed that industrial engineering companies and firms from marine industry will choose quantitative dimensions for improving core and support processes. In addition, IT companies might prefer qualitative measures for core business processes.

Overall, the goal to present performance dimensions was fulfilled. Extracted data gave us general understanding on what kinds of dimensions can be used for opportunity-driven methods. The findings allowed us to classify indicators and identify the most common type. What is more, the usage of dimensions was examined based on targeted process type, applied method and industry. As a result, it can be concluded that quantitative dimensions are preferred by major part of study cases. They are either used solely or combined with qualitative metrics. It can be noted that studies that used internal benchmarking preferred to use only numeric metrics meanwhile cases for external benchmarking took into account quality data. What is more, industry can also influence the choice of dimensions. Manufacturing, financial, engineering and enterprises specializing in marine transportation tend to choose quantitative indicators or the combination of two types of metrics. Meanwhile, health service and IT firms are operating with quality data.

5.4. Opportunity-driven methods implementation

Fourth research question dedicated to find out how opportunity-driven method is applied on real-life case. It is related to the choice of the method, application approach and the process of implementation. The question is formulated as followed:

RQ4: How have organizations conducted opportunity-driven business processes improvements and redesign?

First and foremost, it is needed to document what kind of opportunity-driven methods were applied. Figure 14 is a bar chart where the number of example papers is presented

according to their method choice. There are three opportunity-driven approaches – external and internal benchmarking, positive deviance. As a result, the majority of cases applied benchmarking: 33 used external and 11 internal one. It should be mentioned that one paper operated with both internal and external benchmarking for its business process improvements. The minority of studies implemented positive deviance – only 3 out of total.

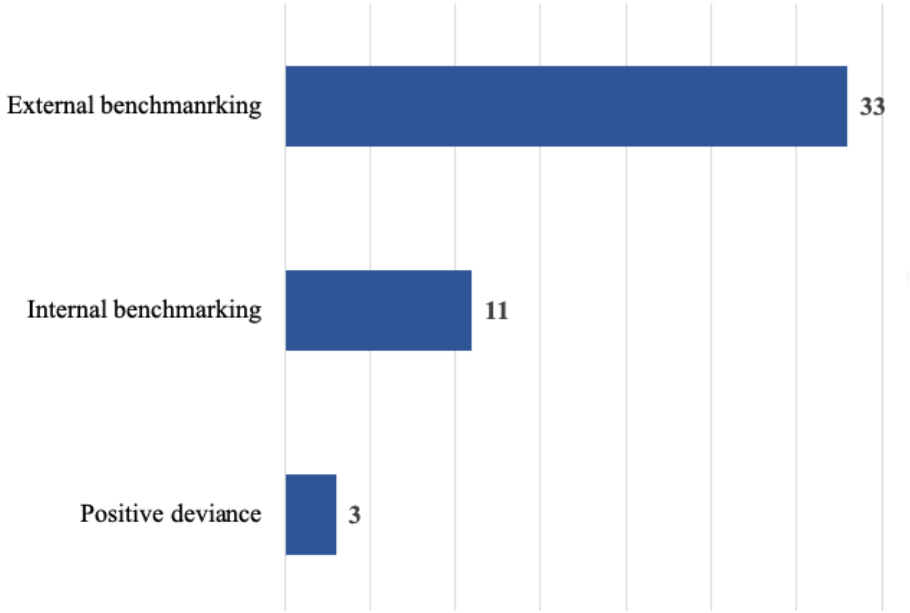

Figure 14. The number of example papers across applied method.

The next step is to deliver findings about how exactly the method was applied. To start with, the minor group will be considered. One of the studies [61] used digital nudging in order to implement positive deviance. Concept of nudging tries to improve decisions which are made by changing economic incentives, providing or forbidding any options directly. In case of digital version, improvement team conducted an online experiment based on two processes with positive deviance. Other two studies [29], [56] implement positive deviance as it is: a method that incorporate better solutions to problems by examining positive phenomena in the workplace. In addition, authors of one of the mentioned papers suggest their own approach: first, create evidence-based models and then capture the relevant influences on the process behavior [29].

In contrast to positive deviance method, application of benchmarking was performed with support of various specific approaches. Starting with internal benchmarking, table 11 presents different ways of method implementation extracted from study cases. In order to clarify the approaches, description is added. It should be noted that the approach descriptions are taken directly from the papers, hence some of them may appear to be not fully clear.

Table 11. Approaches used for internal benchmarking implementation.

Internal benchmarking		
Approach	Description	Reference
Sequence Graph Transform (SGT)	Based on associations between events. Focus on feed-forward sequences since the order of activities depends on one another in most business processes.	[63]
The analytic hierarchy process (AHP) method	AHP was developed to determine the relative priorities or weights to be assigned to different criteria and alternatives that characterize a decision.	[41]
Data envelopment analysis (DEA)	A mathematical programming-based method, an effective tool for evaluating the relative efficiency of peer decision making units (DMUs) when multiple performance measures are present.	[60]
Data Envelopment Analysis (DEA) and PROMETHEE II	DEA analyses DMUs (Decision Making Units) and evaluates their relative efficiency scores based on linear programming. The PROMETHEE methodology prefers and prioritizes alternatives based on pairwise comparisons. PROMETHEE II includes complete ranking.	[57]
Quantitative approach supported by statistical techniques	Examines the quantified data, condensing the results collected from the target population sample to measure the incidence of various views and opinions. Further, analysis of the data obtained from the firm is performed based on the identified parameters.	[79]
The usage of individual combination of characteristics – filter matrix	The chosen benchmarking filter combinations result in respective benchmarking profiles. All benchmarking profiles can be classified to the benchmarking performance level and be located within a portfolio matrix.	[80]
The usage of multicriteria group decision-making problem	The process of measuring and benchmarking KM practices is modeled as a multicriteria group decision-making problem where the process usually involves in discovering all available alternatives, identifying the evaluation criteria, assessing, aggregating the alternatives and selecting the best one in the given situation.	[47]

It can be noted that last two papers [57], [60] are using the same Data Envelopment Analysis (DEA) approach but one of the teams combines it with another methodology. Few example papers also stated their own approach for internal benchmarking implementation [47], [79], [80] but in comparison to the rest, they do not have formal title. It can be assumed that methodology was applied for the particular case.

Nevertheless, some studies did not provide concrete approach that they used for the internal benchmarking implementation. Improvement teams from several studies only indicated that they examined internal knowledge, data, dimensions and then compared certain

sections or domains of activities against the best standards in performance [43], [55], [71], [77]. Again, it may appear as a limitation for the analysis. The same situation applies to external benchmarking implementation approaches, which is discussed further on.

For better representation external benchmarking application techniques are documented in a table form (table 12). It can be noted that each case has a particular approach or the combination of several ones. However, few examples share same methodologies. For instance, DEA non-parametric method, which was already mentioned, is suitable not only for internal but also for external benchmarking. Two studies used it solely [72], [86], another joined it with canonical and cluster analysis [58]. The analytic hierarchy process (AHP) method appeared in two cases [50], [53] and served as a decision-making tool. Among other methodologies there are lean method, which analyzing similar workflows, sizes [75], qualitative approach, which requires conducting observations and behavior recordings and several ones which are following particular benchmarking steps [46], [45], [74], [78].

Table 12. Approaches used for external benchmarking implementation.

External benchmarking		
Approach	Description	Reference
Plan-do-check-act Deming's cycle	IQ requirements are mapped according to literature, benchmarks, case study, and stage of information process flow, then analyzed and improved.	[48]
Lean method	Benchmarking for the purposes of LEAN involves contacting sites that are similar in size or workflow to gain a better understanding of standards of care.	[75]
The design chain operation reference-model	Model has been developed to provide a complete design chain analysis framework for reference. The as-is process is being clarified via semantic similarity analysis and redesigned according to the process logic of DCOR. Then, the to-be process is derived by adjusting the redesigned process with a DSM method to make it more efficient and, finally, is evaluated and verified.	[73]
Data Envelopment Analysis (DEA), Canonical and Cluster analysis	DEA: nonparametric method in operations research and economics for the estimation of production frontiers. Canonical: is a multivariate technique which is concerned with determining the relationships between groups of variables in a data set. Cluster: the task of grouping a set of objects in such a way that objects in the same group are more similar to each other than to those in other groups.	[58]
Two directional benchmark analysis	The first step is to benchmark business requirements to the market solutions. The second step is to assess its maturity level of transportation management organization and business processes.	[84]
Qualitative approach	It involves observation and recording of complex human behavior and social systems and provides insights through depth of data	[52]

	collected with emphasis on description and discovery rather than hypothesis testing and verification.	
Basic process-oriented benchmarking	Visualizing partner business processes for resolving problems. Well directed business process identification and documentation is a basic benchmarking condition. The process model works as a reference for benchmarking partner company analysis.	[83]
The SUPER methodology	Five-phase BPI framework used to tackle the improvement problems which arise in an organization. It serves as a road map to move a process from its current state along a guided path to better, even world-class, performance.	[74]
Pareto and the analytic hierarchy process (AHP) methods	Getting the model coefficients significance in achieving the requirements of business excellence. The idea is to determine the most important elements of business processes, then to indicate the current state and give guidance to improve the criteria and sub-criteria.	[53]
P-D-C-A cycle	Benchmarking follows the plan, do, check, act cycle: the plan phase, a self-study, the comparison of findings and managing the gaps.	[78]
Systematic rigorous approach to data collection	Data collection with an emphasis on quantitative, "hard" information: first plant visit, questionnaire to indicate areas of uncertainty or ambiguity and to gain background information, second plant visit, a verification exercise by each plant.	[42]
Multi-method research approach	The questions about benchmarking were included as part of a larger survey about the use of change management practices in SMEs (extensive search of the literature, survey, interviews).	[54]
The quality function of deployment (QFB) technique	QFB puts emphasis on competitor's analysis and reveals our own position with respect to competitors. The quality-planning table reports priority needs of the customer, upgrading rate of our product and target quality-planning level of the best company in industry.	[70]
The universal benchmarking process	Proposed by Anand and Kodali, enumerated to benchmark and assess the lean manufacturing implementation. 12-phase, 54-step BM process.	[46]
Olympios Audit and three data analysis method	Olympios Audit, a diagnosis tool based on the Olympios model. The model proposes a designing method which ensures the continuity between different stages of the information and decision systems life cycle. Three data analysis methods: lexical analysis, and two multivariate analysis (factor analysis) methods; principal components analysis (PCA); common factor analysis (CFA).	[55]
Model of representation and evaluation of the performance	It allows a comparison between firms, and from which a simulation of the effects of the potential actions for each one of these companies can then be carried out.	[68]
The analytic hierarchy process (AHP)	It is a multiple criteria decision-making technique that allows subjective as well as objective factors to be considered in the decision-making process.	[50]

7SF (7 steps) model	The appraisal mechanism of the 7SF consists of a two-sided process, linked by a performance-gauge procedure: decomposing the whole into basic blocks; properly gauge them; recomposing them into meaningful transversal entities.	[45]
Data Envelopment Analysis (DEA)	DEA is a non-parametric method of frontier estimation that measures the relative efficiency of decision-making units utilizing multiple inputs and outputs.	[72]
Performance benchmarking – Value delivery system (VDS).	To identify or re-modify the objective and target of an organization during a non-linear improvement project. VDS consists of all people, processes, procedures, facilities and machines that provide a group of products, services or information to customers. VDS should be designed to deploy optimally the strategies of the business.	[81]
Data Envelopment Analysis (DEA), using DT based context-dependent DEA	In the context-dependent DEA the evaluation contexts are obtained by partitioning a set of DMUs into several levels of efficient frontiers. The partitioning method proceeds by excluding all of the DMU/s originally placed into the efficient frontier and then using the original DEA methodology to form a new second tier efficient frontier from all the remaining DMUs.	[86]

Here it is important to repeat the limitation about the extracted data. Authors of some studies did not provide full information about the applied method or if they did, the concrete approach was not specified enough. For instance, few papers only stated benchmarking was conducting with the support of survey [51], [49] or interview [67]. In other cases, external benchmarking was applied as a tool for planning, managing business activities [76], identifying improvements [85] or as a discipline, which involves measuring and comparing the results of key processes with the best performers [66]. These approaches are acknowledged and documented but are not used for the analysis.

As there are many ways of how internal and external benchmarking can be implemented, it might be useful to provide insight on how all approaches differ depending on company's industry and targeted process. Both aspects are primary and fixed, in contrast to the technique choice. Table 13 presents the findings within two dimensions. Inside the table each approach is tagged depending on to which benchmarking type is belongs: EX stands for external method and IN – for internal.

Table 13. Benchmarking application approached across industries and process types.

	Core	Management	Support
Manufacture	**EX.** The SUPER methodology. **EX.** Systematic rigorous approach to data collection. **EX.** P-D-C-A cycle.	**IN.** The analytic hierarchy process (AHP) method.	N/A

	EX. The universal benchmarking process. **EX.** 7SF (7 steps) model. **EX.** Performance benchmarking – Value delivery system (VDS). **IN.** The usage of individual combination of characteristics – filter matrix.	**IN.** The usage of multicriteria group decision-making problem.	
SMEs	**EX.** Pareto and the analytic hierarchy process (AHP) methods. **EX.** Multi-method research approach. **EX.** Olympios Audit and three data analysis method.	N/A	**EX.** Qualitative approach.
Healthcare	**EX.** Lean method. **EX.** The analytic hierarchy process (AHP).	**EX.** Basic process-oriented benchmarking.	
Public organization	N/A	N/A	**EX.** Plan-do-check-act Deming's cycle.
Banking	**EX.** Data Envelopment Analysis (DEA), Canonical and Cluster analysis. **IN.** Data envelopment analysis (DEA).	N/A	N/A
Airline	**EX.** The quality function of deployment (QFB) technique. **EX.** Data Envelopment Analysis (DEA).	**EX.** Two directional benchmark analysis.	N/A
Industrial engineering	**EX.** The design chain operation reference-model. **EX.** Model of representation and evaluation of the performance.	N/A	N/A
Logistics	**IN.** Quantitative approach supported by statistical techniques.	N/A	N/A
Education	N/A	**IN.** Sequence Graph Transform (SGT).	N/A
Broiler industry	**IN.** Data Envelopment Analysis (DEA) and PROMETHEE II.	N/A	N/A

By looking at the results, it cannot be stated that one approach or the other is only suitable for particular industry or process type. Nevertheless, we still can extract some insight. For example, as manufacturing industry cases is the biggest group in the sample, it made it clear that they operate with various approaches. There has been a tendency to apply external benchmarking for core company activities and internal – for management processes. In addition, among the approaches the most frequent ones are methodologies which suggest the

particular benchmarking steps – SUPER [74], 7SF [45], universal [46], P-D-C-A cycle [78]. In contrast, small and medium firms were using specific techniques like AHP and Olympius Audit. Interesting finding was done for financial organizations: both example cases implemented benchmarking with support of DEA method [58], [60]. What is more, approach was applied to external and internal benchmarking. Talking more about DEA methodology, it appeared that it is applicable for different sectors – airline [72], banking [58], [60], broiler [57], and for both types of benchmarking. Same goes for second most frequent approach, AHP: it works for internal and external method and was implemented in industries like manufacture [41], healthcare [50] and SMEs [53]. In general, if a company which belongs to one of the mentioned sectors is conducting benchmarking, it can initially consider the methodology that has been used by a similar company. It will help to reduce the risks and support decision making.

Besides approaches used for implementing opportunity-driven methods, data about the process of application was extracted or, in other words, the particular steps. In order to document them in a comprehensive way, the stages from all example papers were divided into 3 big groups – pre-launch, launch and post launch activities. Although each case had their own process of method implementation, there were similarities in each, hence the most common activities are provided together with paper reference (table 14). As a result, it also allows to understand how often the activity was performed. Only activities which were performed at least in 2 studies were included. It should be stated that, during table creation and activities allocation, only available data was taken in consideration. For example, it can be assumed that all papers did data collection and research as a part of pre-launch step, but it was not clearly mentioned during process implementation discussion.

Table 14. Implementation steps and activities.

Step	Step activities	Reference
Pre-Launch	Company/ process assessment	[41], [46], [43], [45], [48], [50], [52], [55], [59], [62], [68], [70], [71], [73], [74], [75], [76], [79], [80], [81], [83], [84]
	Dimensions selection	[43], [45], [48], [50], [58], [62], [63], [68], [79]
	Process selection	[58], [62], [64], [70], [71], [74], [77], [78], [81], [82]
	Best practice search	[46], [43], [50], [55], [58], [63], [64], [70], [71], [76], [77], [78], [82]
	Data collection and research	[42], [52], [53], [54], [62], [64], [68], [70], [79], [82]

Launch	Improvement execution	[48], [50], [55], [62], [68], [71], [74], [76]
	Comparison	[41], [46], [55], [62], [68], [78], [83]
	Evaluation	[77], [80]
	Integration	[70], [71]
	Process mapping	[73], [75]
Post Launch	Monitoring	[55], [62], [74], [77]
	Continuous improvement	[46], [55], [71]

Pre-launch activities are the ones performed before actual method application. It is noticeable that improvement teams paid the most of their attention to the implementation preparation. One of the critical tasks to undertake was to conduct the assessment – company and targeted process analysis. For instance, processes were assessed through semantic similarity analysis [73] or mapping and modelling [79], [80]. Meanwhile, for the company, in general, the team had to conduct strategic assessment [45], define objectives and the scope [43], [62], [68] examine the performance [50], [55], [71]. Data collection activities were performed in a various way as well: through observation and questionnaire [42], literature review, survey and interviews [54]. What is more, several papers presented during the preparation stage activities like targeted process, dimensions selection and search for the superior partner are required.

Next step is launch or, on other words, method implementation. In most of the cases authors mentioned this activity as an improvement execution without further specification. For instance, in one study authors described it as performing improvement actions suggested by the previous phase and being able to lean on the best practices suggested by the knowledge base [55]. Some studies still provided data that improvement teams specified that they undertook comparison, evaluation, integration or process mapping activities in order to realize the action plan. For example, comparison was conducted by establishing pair-wise comparison matrix [41], gap analysis [46], [68], [78] and integration – by relating gaps to benchmarking goals [70], [71]. Value stream mapping [75] together with activity mapping relationship [73] also served as an activity to redesign processes and achieve improvements.

Last but not least, post launch activities were less presented in the flow of process application. It was noted that on that step improvement teams were mainly focused on two tasks – monitoring the undertaken changes and establishing continuous improvement. In monitoring, activities like reviewing [74], observation [55] are included as related ones. As for second task, studies mentioned realizing it by incorporating best practice into everyday business processes [71] or by introducing adjustments to current improvement objectives [55].

It can be said that launch and post launch steps are related to change activities which are done during opportunity-driven methods implementation. Those activities are presented and discussed in the last research question.

Overall, the answer to the fourth research question is provided. First of all, methods that were applied in collected papers were presented. Based on the data, external benchmarking is the most popular tool for process improvement among other opportunity-driven methods. Thereafter, specific approaches that were used for implementation were documented. DEA and AHP techniques were noted to be the most frequently used by both internal and external benchmarking. Although not all studies provided full information on that perspective, extracted data still allowed us to document findings across industries and process types. Similar companies can rely on these results during decision making process about method choice. Further on, particular process steps and activities that are performed during opportunity-driven methodologies application were identified. To document data in a comprehensive way, all tasks were divided into three steps – pre-launch, launch and post launch, hence were discussed separately. It turned out that although each study undertook different implementation process, there are common activities which are essential for any opportunity-driven method application.

5.5. Improvement opportunities identification

The next step is to present findings about how companies define the areas for improvement while applying opportunity-driven methods. To be exact, the following research question aims to demonstrate what actions were undertaken to identify process improvements. The question was formulated as:

RQ5: How have improvement opportunities in business processes been identified with opportunity-driven methods?

To document the findings in a comprehensive way, it is be helpful to use a table form. As there are different approaches towards method application, there are also diverse ways of how improvements were identified. Thereafter, improvements revealing activities are presented across opportunity-driven methodology type and its approach, if it was provided (table 15). First, results are provided for external benchmarking as the biggest group in the sample. It should be noted that the activities descriptions are taken directly from the papers, hence some of them may appear to be not fully clear.

Table 15. Process improvement opportunities identification for external benchmarking.

External benchmarking		
Approach	Improvement opportunities identification activity(ies)	Reference

Plan-do-check-act Deming's cycle	Data is assessed based on IQ requirements using predefined parameters of accuracy, completeness and timeliness dimension.	[48]
Lean method	Closely monitoring and evaluating wait times and access to essential services.	[75]
The design chain operation reference-model	Through matching the logic sequence of as-is activities to DCOR process logic, a DSM framework based on the DCOR process was established as the main basis for redesign.	[73]
NA	Dominance analysis.	[76]
Data Envelopment Analysis (DEA), Canonical and Cluster analysis	Identification of deviations in the values of the comparable indicators, determination of the causes of such deviations and development of proposals for their elimination.	[58]
Two directional benchmark analysis	A maturity assessment grid to assess which of the statements and "symptoms" is true for a given transportation management process area.	[84]
NA	Taking into account the impact of both intra-organizational factors and external environment. Analyzing, both in terms of the process logic and the individual actions, parameters adopted, metrics used, resources employed, etc.	[51]
NA	Spendolini's benchmarking process: a framework that structured the indicators, ensured comparability and covered all relevant aspects.	[85]
NA	Coding, statistical tests. Consolidating all questionnaires received, 2 coding steps, testing observation on their statistical significance.	[61]
NA	Processes are compared in terms of their effectiveness in achieving customer satisfaction, and their efficiency in terms of cost at a variety of throughput levels.	[67]
The SUPER methodology	Categorizing processes with the problem areas matrix into the critical tasks, the critical problems and the non-value-added tasks.	[74]
NA	The analysis of cost benchmarks, the analysis of time benchmarks for executing successful loans.	[59]
NA	Indices and measures examining, significant differences between the samples detection through statistical methods.	[44]
NA	Comparative analyzes of a business processes targeted at specific area.	[82]
NA	Mapping and evaluating the process with simple graphical displays.	[65]
Pareto and the analytic hierarchy process (AHP) methods	Assessment is done on two levels. Level I: relationship of selected issues (area / area of a system) and the criteria for business excellence awards. Level II: the level of significance of certain alternatives in relation to its objectives.	[53]
P-D-C-A cycle	Gap analysis: observing whether negative or positive gaps exist.	[78]

Systematic rigorous approach to data collection	Comparison through a scattergram of the plants, with quality levels plotted against standardized comparative productivity scores. The average scores of these plants compared to the others on a series of performance and management practice measures.	[42]
Multi-method research approach	Comparing indices.	[54]
The quality function of deployment (QFB) technique	Results were structured their linguistic responses into signal meanings. Quality table was prepared to see which parts of the product are needed most, how well those needs are met, and whether there are any gaps between the best product and own product.	[70]
NA	Gap analysis to determine current competitive gap and identification of possible root causes.	[46]
Olympios Audit and three data analysis method	The common factor analysis to locate the weak points of each sector according to the abnormalities. Using the CFA analysis diagram to show the positions of the same domain of activities logistics and positioning diagrams to demonstrate and represent the profile of supplier performance of the enterprises analyzed.	[55]
Model of representation and evaluation of the performance	Data gathering and evaluation with process cost accounting (process capacities, total costs, process costs and times).	[68]
The analytic hierarchy process (AHP)	The success factors were structured into a form of hierarchy along with ratings. Then the priorities were derived by comparing each set of elements in a pair-wise fashion with respect to each of the elements in the higher stratum.	[50]
NA	Decision criteria comparing and analysis. Used tools like Six Sigma.	[66]
7SF (7 steps) model	Comparative analysis. The parallel application of the 7SF to the target companies makes possible a benchmarking among these three organizations via this methodology.	[45]
Data Envelopment Analysis (DEA)	The dataset was split according to in-house or outsourced ground handling provision and DEA was applied individually to each category. Under basic DEA, all airports are compared against a single Pareto frontier.	[72]
NA	Finding a performance difference against the peak of performance.	[64]
NA	Competitive comparisons to evaluate performance against the overall sample and key competitors; internal organizational comparisons to analyze data by organizational unit, business process.	[62]
Performance benchmarking – Value delivery system (VDS)	Analyzing the improvement in cost and performance compared to the initial phase of reengineering,	[81]

Data Envelopment Analysis (DEA), using DT based context-dependent DEA	By using DEA algorithm, the inefficient units were organized into multiple efficient stratums thereby providing a level-wise improvement path for poor performing DMUs and also context for evaluation. Conducting attractiveness analysis to check the threats and utilization of tree model to identify priority attributes in each stratum.	[86]

As a result, the data shows the diversity of activities which were conducted in order to identify improvement areas. Even in case of the same method approach, DEA, each example had its own way to manage the opportunities identification process: the usage of value deviations [58], Pareto frontier [64] or attractiveness analysis and tree model [86]. Same applies for AHP method: one paper [50] used hierarchy structuring with following pair-wise comparisons and another [53] implemented two level assessment. In other example cases more activities were performed: gap analysis [46], [78], process maturity assessment [84], dominance analysis [76] or common factor analysis [55].

Next opportunity-driven method to consider is internal benchmarking. Table 16 summarizes findings on improvement identification activities. Likewise for external benchmarking, presented activities are diverse that complicates their reporting. In case of DEA method that is applied in two example papers [57], [60] particular ways for improvement areas identification were again performed. For instance, the usage of model graphs to show the benchmark score and undertake the branches performances was done [60]. Other papers presented activities like contrast analysis [43], process visualization together with flow charts, cause and fishbone diagrams, Pareto and run charts, the five "why" questions model [77] and comparative study based on comparable multicriteria group decision-making approach [47].

Table 16. Process improvement opportunities identification for external benchmarking

Internal benchmarking		
Approach	Improvement opportunities identification activity(ies)	Reference
Sequence Graph Transform	Detecting statistically significant differences between the event logs of a cluster pair for benchmarking. Using the process mining metrics.	[63]
NA	Measuring and comparing with flow charts, cause and fishbone diagrams, Pareto charts, run charts, the five "why" questions model and process visualization.	[77]
Data envelopment analysis (DEA)	Using model graphs (representative performance change patterns) to show the benchmark score and represent when the e-branch or traditional branch performed better. Next, the performance change is studied within the 12 branches.	[60]

NA	KPA performance records were used to analyze various aspects of port performance improvement.	[71]
NA	The common factor analysis diagram: positioning diagrams with circles allowed, for each domain of activities, to demonstrate and represent the profile of supplier performance of the enterprises analyzed.	[55]
NA	Contrast analysis. Contrasting the best projects with a control group shows what the best projects do that the others do not.	[43]
The usage of multicriteria group decision-making problem	A comparative study on the relative performance of the proposed fuzzy multicriteria group decision-making algorithm with comparable multicriteria group decision-making approaches was conducted.	[47]
Data Envelopment Analysis (DEA) and PROMETHEE II	Considering decision making matrix in PROMETHEE II, the rank of supply chains was computed based on equal weight for all stages and V-shape preference function with 0.1 parameter p which were determined in interaction with experts.	[57]

The last opportunity-driven method, positive deviance, is represented by three example papers. Table 17 demonstrates activities that helped to identify improvement opportunities. In contrast to benchmarking methodology, there is no approach column due to data absence. In two studies improvement teams conducted statistical tests [29], [61]. The first one accompanied them with coding steps and testing observation on their statistical significance, whereas another performed tests which aimed to find the structural differences of the process and check the behavioral patterns significance. In the third example paper authors identified deviants – positive, mid-range and low-range performers – and then conducted root-cause analysis.

Table 17. Process improvement opportunities identification for positive deviance.

Positive deviance	
Improvement opportunities identification activity(ies)	Reference
Coding, statistical tests. Consolidating all questionnaires received, 2 coding steps, testing observation on their statistical significance.	[61]
The positive deviants, mid-range and low-range performers were identified, and then root-cause analysis was conducted (process, culture, behavior, infrastructure, policies, and other contextual factors). Further analysis was done to understand their performance across various metrics.	[56]
2 tests were conducted (process models similarity results, pairwise correlation plot for cases' characteristics, fitting distributions to the dataset).). The first test concerns the structural differences of the process, while the second checks the significance of the behavioral patterns to the classification of cases (positive, normal).	[29]

Overall, findings on opportunity areas identification process were presented. As it is seen from the extracted data, undertaken activities are specific in each study that hampered to

provide comprehensive insight. It may lead to a conclusion that the company is flexible to choose the way to analyze its data. First of all, the firm can rely on the method and approach it chose and afterwards take into account the specifics of performance dimensions and data availability.

5.6. Business processes improvement change execution

The following research question is focused on providing an insight on how change was carried out after the usage of opportunity-driven methods. In addition, it documents possible challenges that the company may face during this stage. The question is formulated as:

RQ5: How can organizations conduct the change for business processes improvement?

Before delivering the results, data limitation should be stated again. Out of 46 papers only 16 actually shared information about their change management activities. The reason behind could have been confidentiality or the fact that the study was focused on other parts of process improvement tasks like preparation activities or method description. Anywise, it may affect the answer completeness.

Although authors mentioned various approaches to change management, many similarities were noted. Collected information from 16 example papers was separately listed and examined, common activities were highlighted and consolidated into meaningful parameters. As a result, extracted data provided the opportunity to formulate in total 5 parameters that should be considered during change execution: prior internal communication, action plan, top management approval, employee training, information system update. Each point will be explained and accompanied with example papers.

1) Prior internal communication

First of all, organization ought to spread the information about upcoming changes among all employees. Particularly, when people directly or indirectly involved in process improvements implementation [51] or their duties and responsibilities are related to the change scope, clear working instructions are needed to be delivered [74], [85]. In addition, communicating the forthcoming updates should be accompanied with the related project benefits [46] and a new strategic course that would engage the staff in the process of reengineering and get a management commitment [82]. Only once the improvement perspective is shared, new process model can be developed [81]. Hereafter, companies also need to maintain communication and update internal information constantly not only within targeted divisions but across all organization [79].

2) Action plan

After getting the results from opportunity-driven method application, it is required for improvement teams to prepare an action plan that will trigger project and change management [64], [74], [84]. Moreover, action reports allow to monitor inefficiencies from the beginning and to discuss potential issues at the meetings [52]. The plan itself should contain necessary recommendations, implementation time frame [46] and impacts for specific organization units, software packages, business processes [62]. To develop the action report, several sessions are generally required, during those, initial plan is prepared, required updates are made and the follow-up studies are conducted in order to decide if the desired outcome was achieved [62].

3) Top management approval

Another essential point for change management is to get an acknowledgement from the top management in request for process improvements as soon as possible [46], [77]. Not only it will simplify and accelerate the whole process of change implementation, but also improvement team will get the needed support and resources to conduct the updates. In this situation, comprehensive communication is the key: it will encourage the management commitment and engagement [82].

4) Employee training

In order to perform the required process improvement, support from the employees is an essential part. Followed by the prior communication and reaching the understanding of the reasons, advantages of the upcoming changes, staff training should be provided. Training program can be realized, for example, through engaging workshops [65] or educational courses [43]. The ultimate goal is to involve the team, project leader, sponsor and achieve full comprehension of the scope, processes involved in the improvements and gain needed skills and competence [65].

5) Information system upgrade

Finally, by taking into consideration that we live in the data driven world, the company should integrate business process improvements into information technology systems [50]. The software upgrade may facilitate lowering communication barriers within and across the organization and improve operational performance [79]. In addition, this point can serve as a support to the first one and provide the easy way to share coming changes.

Second part of the findings concerns problems that arise during the change execution. Although the above-mentioned parameters may help to simplify this stage, organizations still risk facing challenges and failing the process improvements implementation. First problem arises from inefficient communication and can be followed by disagreed opinions about the change [73]. Thereafter, inadequate understanding of process changes and their benefits [65]

can result in the lack of stakeholder involvement, employee's unwillingness to cooperate and approve the update [51], [64]. What is more, while one department is involved in the project, others may have nothing to do with it. This fact again leads to the situation, when the essential information is missing, and divisions do not support the improvement process.

Second issue is connected with possessing the needed resources for opportunity-driven methods. For instance, organization may not own enough resources to implement all potentially valuable improvements ideas [61]. What is more, resource constraints can occur because of data issues. There could be barriers to the data collection for benchmarking purposes [52] or the question about the appropriateness of potential applicability of the data to company's context [54].

Third challenge that change management team can face is related to employees' internal relationships and issues. The process improvement project can trigger the change in the organizational structure and lead to internal competition between the staff members, stemming from poorly designed compensation systems [77]. On the contrary, company's updates may also result in a job loss fear among employees [71]. What is more, process change can affect the workload and it should be considered beforehand. Otherwise, team members, responsible for the project, would not have enough hours to complete the tasks [65].

Besides these three issues of change management, there are some more to add, that were provided by the authors of example papers. One study marked that among the factors impeding implementation of business process improvements are political interference, wrong attitude to change, frequent changes in top management and already mentioned fear of job loss [71]. In addition, another paper mentioned that unrealistic assumptions, lack of contingency plan and excessive subject area may lead to the situation when process changes are not properly reflected [65].

Presented insight on this research question that aimed to reveal the specifics of change execution is documented. As a result, several aspects that companies should consider before the start of change management activities were formulated. Extracted data allowed to provide five of them: the need of prior internal communication, action plan, top management approval, employees training and information systems upgrade. What is more, potential challenges for business process improvement application were identified. Among them are inefficient and incomplete communication, resource constraints and staff related issues. Although, there were comparatively less extracted data on this particular research question, useful findings were outlined.

Altogether, extracted data on six research questions allowed to gather an insight on the real-life application of opportunity-driven methods. First of all, findings helped to fill the current gap in existing works and brought the overview for benchmarking and positive deviance usage in process redesign. Secondly, the results were used to formulate the framework that will support organizations in method implementation.

6. DISCUSSION

In the last chapter previously presented results are summarized in order to establish the framework that assists business process improvements through opportunity-driven methods. First, the main insight from each research question and interconnection between the findings will be discussed. Second, the framework itself will be provided and interpreted. Third, the work limitations and considerations about future research will be stated.

6.1. Research questions main outcomes

The sequence of the research questions followed the order of how organizations undertake business process improvement execution. In this way, it was possible to trace all required steps and extract data for future framework. Initially, enterprise has its focus on particular process or function area that need the change. At this point company should make a decision about improvement method, and hence it was necessary to examine what type of processes are likely to be redesigned through opportunity-driven approach. To categorize operations, Porter classification was chosen [86]. Although it was discovered that methods are applicable to the variety of processes and across many industries, the most frequent case was the improvement of core processes responsible for direct value production in manufacture or service enterprises. Few assumptions can be made to argument this insight. Management and support processes might be more challenging to examine and replicate from the best performer in comparison to core ones. The core activities results are visible in the value quality they deliver that is not applicable to other process types, therefore other firms know which company is performing as the best practice. Regarding the industry affiliation, production and service delivery organizations tend to perform with traditional business models which are comprehensible, and the success of their business processes is easy to follow. However, the data findings proves that opportunity-driven methods usage is not limited by process type or company's field of specialization.

Further on, the process type data together with related industry information was considered for getting insight on performance dimensions. At first, no strong connection between indicators and operation types was noticed. Nonetheless, when industry data was added, several conclusions were formulated. For instance, core processes of manufactural enterprises tend to be compared based on solely quantitative dimensions or combination of quantitative and qualitative, whereas healthcare and financial organizations in general use both dimension types. Based on the gathered insight, it can be assumed that the difference of performance metrics choice in all examples may be hidden in the level of business model

complexity or the uniqueness of offering services and products. Furthermore, the same way process type data was applied to benchmarking implementation findings to examine its dependency on used approaches. As a result, there was no confirmation on this fact: approaches are flexible to be applied in various industries, for different process types and even among opportunity-driven methods.

Next decision organization needs to make while performing process improvements is to choose performance dimensions. This decision can be associated with identifying a tool which is used for method application. Two research questions were dedicated to extract findings on metrics used for opportunity-driven methodology. Before considering actual dimensions, the aspects that can support making the choice of dimensions were revealed. There are two kinds of aspects – external and internal – and organizations are free to be guided by any of them. However, based on sample ratio companies prefer using external aspects like examining existing literature, competitors, customers or study field experts' opinions. Afterwards, performance dimensions that were actually applied in previous cases were classified into quantitative, qualitative and combination of both, as mentioned before. If consider sample ratios the most applicable metrics are quantitative ones: solely or combined with qualitative data. Although not every case provided detailed description of used KPIs, gathered results may serve as a decision support for firms across presented industries and for organizations with a particular process in focus. What is more, one interesting finding was derived for the metrics choice for internal benchmarking: tendency to use quantitative dimensions. It might be assumed that when the firm orientates to its own data during process improvement, the team does not necessarily need qualitative insight that is required for deep understanding of how operations are performed.

After considering the targeted process and choosing appropriate performance dimension, organization starts opportunity-driven method implementation. The last three research questions were focused on how companies apply methodology and it enabled to discover particular approaches for external, internal benchmarking and positive deviance, activities to identify improvement opportunities and change management events. In contrast to previous data categories, at this point findings turned out to be diverse. In case of benchmarking application, although there were few same approaches, their execution was performed differently. Further on, activities for identifying areas for improvement even among the same approaches were also dissimilar. This leads to the conclusion that opportunity-driven methods are flexible in terms of implementation technique. In addition, there may be additional factors that affect the technique choice.

Regarding the application of opportunity-driven method types in general, external benchmarking turned out to be the most popular tool for process improvements. Although the results for opportunity-methods methods implementation were comparatively disordered, it was possible to derive the steps that organizations follow for process redesign through external and internal benchmarking. The whole application process was divided into three stages – pre-launch, launch and post launch. Stages contains activities which are essential for organizations to conduct.

The final step in examining how companies apply opportunity-driven methods was to get overview on change management execution. As a result, five key points were retrieved that can be applied universally to any industry, process and method type. They can work as a checklist to consider after company implemented process redesign through opportunity-driven method. Furthermore, several potential issues were identified that may affect the acceptance of conducted changes. Overall, the most important condition for the organization during the change management is to assure efficient communication across departments, between employees, top management and improvement team.

6.2. Opportunity-driven business process redesign framework

Framework formulated as a result of this work follows the same logic as the research questions sequence – the order of how organizations manage business process improvement execution. Specifically, it is divided into three categories – what, with and how. The first category – what – represents the processes or the object of improvement. The next category refers to the tool that is in charge of applying opportunity-driven methods. In other words, by "with" performance dimensions are implied. The third category – how – corresponds to the implementation process. It includes method types together with application steps and change management recommendations. T

The framework is presented in figure 15. It contains the data only from the current work, and the design was done entirely by the author. All the references correspond to the references in the end of the thesis. The framework gives only several examples on gathered performance dimensions and methods application approaches. However, the whole list is always available by reaching the work results chapter.

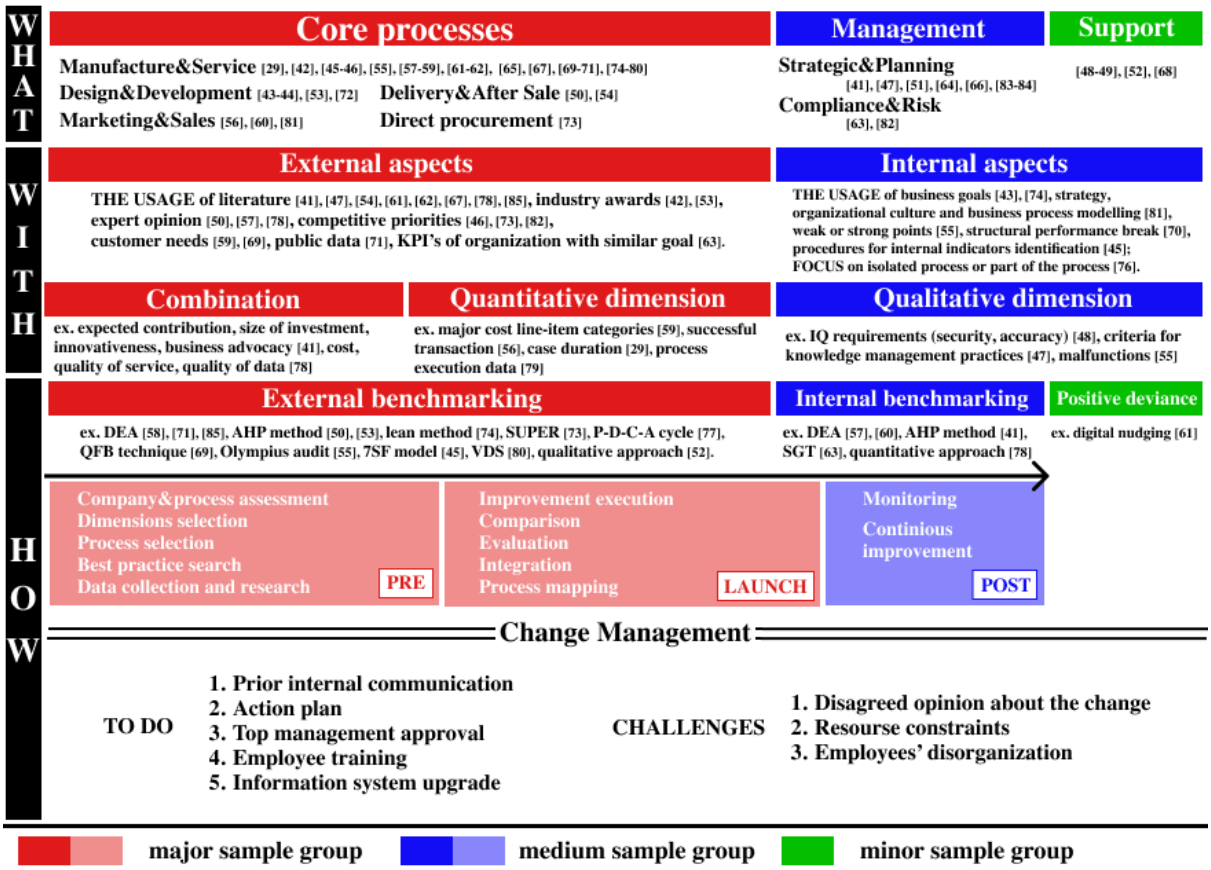

Figure 15. Opportunity-driven business process redesign framework.

Another important framework dimension is blocks colours. As it is demonstrated in the legend, red colour refers to the major group in the sample, blue and green to medium and minor accordingly. The reason to include this dimension was the fact that during data extraction and reporting in most cases there would be provided categorization up to three groups. For instance, three types of processes, performance indicators, opportunity-driven methods and two types of aspects for identifying the metrics. Therefore, the colouring demonstrates the sample ratios for each category and provides to the reader understanding which type is frequently applied or used. In addition, it should be mentioned that the activities for pre-launch, launch and post launch stages presented in the figure are also distinguished by the colour. In this particular case the number of activities was taken to count the sample. First two stages both have five events and the last one just two, hence there are two major groups and one medium. Same applies to performance dimensions blocks: example papers provided the data on two major sample groups simultaneously – quantitative metrics and combination of quantitative and qualitative. The change management part of the figure is simply documented by listing the "to do" checklist and challenges without any colour block.

Any organization that chose one of the opportunity-driven methods may follow the introduced framework for its process improvement. For instance, first, it will categories its own targeted process and compare it with the process types mentioned in the "what" block. Afterwards, while looking for performance dimensions, a firm may check the list of aspects, choose the most relevant one and simplify the search. At the same time, a company also can rely on the existing list of performance dimensions which are classified. Finally, for implementation an organization would be able to be guided by the list of existing approaches used for benchmarking or positive deviance. In case of planning the benchmarking implementation, a firm should consider pre-launch, launch and post launch activities. Before actual change management activities, a company may consider how to accomplish the recommended "to do" list and avoid potential problems. It should be mentioned that although industries were not included to the framework, if company operates in the same area as one of the previous studies, the data collected in the results part may be followed and used to support process improvements application.

6.3. Limitation and future research opportunities

Nevertheless, there are few limitations which could possibly affect data interpretation and reliability of the findings. First of all, there was a common data extraction form for every paper. However, each study had its own structure and focus, hence not all required information was always provided. In many cases only short description on one of the data categories. Partially the reason behind that is organization's confidentiality which prohibited sharing the specific data. Second limitation is the language restriction for paper search. Although English is the most prevalent for journal articles in the field of business administration and computer science, there could have been more studies with opportunity-driven implementation. Next constraint refers to the usage of only five databases in total that can be explained by having access to the limited amount of paper sources. Finally, one of the data categories in this work was not taken into consideration – external partner identification and analysis – as the amount of the extracted data was insufficient. However, there could have been missing insight based on the analysis with this category.

Delivering the framework for opportunity-driven method process redesign creates more space for further investigation. For instance, it might be necessary to question the assumptions made during current data analysis. What is more, as the approaches for method application together with activities for improvement identification appeared to be diverse, it makes sense to conduct separate research and examine factors behind their selection. For example, from this

work perspective, it can be assumed that it is driven by the chosen performance dimensions. However, it cannot be discussed with existing findings. Change management for opportunity-driven methods also should be studied more as current output is general.

Overall, the framework incorporates the findings on research questions and provides the guideline for the opportunity-driven method process improvement. It summarizes companies' previous experiences and supports decision making for future cases. Besides the practical contribution, the framework also managed to fill the gap in existing theoretical works by realizing the systematic literature review on the topic of opportunity-driven methodology.

7. SUMMARY

Nowadays business environment requires organizations to undertake constant process improvements in order to deliver the promised value for customers with continuously increasing expectations and under condition of tougher competition. Among the variety of process enhancement methodologies, there are ones that look at favorable possibilities and superior performance to embrace organization's strengths and potential. These are opportunity-driven methods – benchmarking and positive deviance that defined the focus of the current work.

The purpose for conducting the research on opportunity-driven methods was driven by the existing gap in both theoretical and practical perspectives. Related works review revealed the need for a conceptual work which should capture the specifics of business process improvement through opportunity-driven approaches and deliver bring a demonstrative framework. These considerations were taken into account in the research objective of this paper which is answering the question of how companies can improve their business processes through opportunity-driven methods.

To investigate the stated objective, business processes which are likely to be improved by benchmarking, positive deviance approaches were considered. In addition, industries data was examined to identify if there is a tendency for opportunity-driven methods among certain areas. Afterwards, the aspects considered when the decision about choosing the performance dimensions is made were investigated. Thereafter, actual performance indicators were analyzed to provide understanding of what metrics companies may use to compare their processes. Further on, the research was focused on identifying approaches of opportunity-driven method implementation and activities that defined areas for improvement. Finally, change management events were explored to provide an insight on launching the changes and potential challenges that the company may face.

The systematic literature review (SLR) was conducted in order to identify, synthesize and assess the evidence and generate an empirically derived answer. In addition, the appropriateness of the SLR was confirmed by the experience of previous related papers that tended to use systematic literature review. As a result, the data from 46 papers was extracted on six categories – identification data, context of study, opportunity-driven method aspects, business processes improvement identification, external partner identification and analysis, business processes improvement change implementation.

Extracted data was reported and discussed according to the stated research questions. Therefore, the final outcome in the form of framework was delivered (figure 15). The framework captures three categories: what, with and how. First of all, "what" category represents the object of the applied improvements – business processes. Three process types were reported – core, management and support. It was concluded that opportunity-driven methods are applicable to all process types and for enterprises from different industries but with preference for core processes in manufacture and service organizations.

The second "with" category refers to the performance dimensions which are used for comparison the firm with its superior partner. This block delivers two findings – aspects that companies consider identifying the correct metrics and the overview on actual performance indicators from real-life cases. Two types of aspects were captured – external and internal with the difference in their focus which can be outward or inward accordingly. Framework lists all formulated aspects; hence it is easy to reach the information if needed. Regarding further performance dimensions block, it presents the metrics categorization – quantitative, qualitative and their combination. According to the results, the most preferrable choice for indicators are quantitative: either solely or accompanied with qualitative ones.

The third and the last framework category – "how" – captured data on opportunity-driven method implementation. It includes the block with method types – external, internal benchmarking and positive deviance. In compliance to the findings, external benchmarking is the most popular opportunity-driven method. Furthermore, implementation activities for benchmarking methods are listed. The activities themselves are divided into three stages – pre-launch, launch and post launch. Finally, the last framework block is dedicated to change management recommendations.

Besides the division to the mentioned categories, the framework also has colour dimension which is explained in the legend. This dimension allowed to demonstrate the sample ratios for each categorization and make it clear what type of process, performance dimension, method is the most prevalent in the group. As a result, it helped to deliver the accumulated experience data towards opportunity-driven methods implementation among all example papers.

Despite paper limitations, conducted research managed to extract enough relevant data to address research questions. The presented framework reached the main research objective: it can be used as the guideline for the opportunity-driven method process redesign application. What is more, the framework is exploited to bring the theoretical value and summarize the specifics opportunity-driven methodology.

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9. APPENDICES

Appendix 1. Systematic Literature Review Protocol

Introduction

Business processes are a key asset of the organization that collectively lead to an outcome that is of value to an organization or its customers. Every company is required to define their operations in a system of business processes in order to identify improvement opportunities. Redesigning is considered as widely used method that simplifies determining areas that require improvements, designing and developing changes, but at the same time it focused on supporting problem-driven activities. Besides that, there are approaches like benchmarking, positive deviance that concentrates on how company can grow and develop its potentials based on the opportunities. This research aims at collecting and structuring existing knowledge about applying benchmarking and other opportunity-driven methods for business process improvements. The research is performed by the means of systematic literature review and focuses to discover the essential aspects of implementing opportunity-driven methods for improving business. Based on the results, a framework is developed to support the practitioners in business process improvement.

Research Methodology

The key objective of this research is to propose a framework that address the question of how companies can improve their business processes by considering opportunity-driven approach. To explore this question, a SLR is conducted to identify relevant papers within the field of opportunity-driven business process improvements and redesign. This document presents the SLR review protocol.

Planning of Systematic Literature Review

The SLR follows the guidelines suggested by Kitchenham [87]. SLR can be outlined in three main phases, planning, conducting, and reporting. The first phase includes motivation for a review, the definition of research questions, development and evaluation of the review protocol. The second phase concerns identifying studies, selecting primary studies, quality assessment, data extraction, and data synthesis. Finally, the third phase consider the dissemination, formatting, and evaluation of the report. In this section, we elaborate on the first phase of SLR.

Motivation for Review

The main objective of the SLR is to identify how business processes can be improved through opportunity-driven methods. We look for studies to explore how and in what way

organizations implemented benchmarking, positive deviance in their business processes in order to categorize that experience into one framework. Systematic review can be used to identify, synthesize and assess all available evidence in order to generate an empirically derived answer to a research question. In addition, it reveals the knowledge gap and highlight if there is any inconsistency in existing methodology. As we aim for the notion of completeness, the SLR methodology is particularly suitable. A SLR is methodologically rigorous in contrast to ad hoc reviews.

Research Questions

The main research question is to find out how companies can implement opportunity-driven methods for business processes improvement. In order to response to the main research objective, it is needed to decompose it into a set of research questions.

RQ1: What kinds of business processes in the organizations have been improved by opportunity-driven methods?

Companies need to make a decision about business processes improvement approach. This research question aims to identify processes which are suitable for benchmarking, positive deviance approaches. As a result, organization is able to analyse beforehand its capabilities and potential.

RQ2: What aspects have been considered to identify performance dimensions for business processes improvement by opportunity-driven methods?

This question refers to the identification of aspects that should support the organization in order to start the process improvements. In other words, it aims to identify the patterns, which are considered, when the decision about choosing the performance dimensions is made.

RQ3: What performance dimensions have been used for opportunity-driven methods implementation?

Third research question is required to present performance dimensions that supported business process improvements by opportunity-driven methods in past cases. As a result, it should give the companies understanding of what metrics they may use to compare their processes.

RQ4: How have organizations conducted opportunity-driven business processes improvements and redesign?

This question requires to take a look at past experiences of companies which were able to validate and apply benchmarking, positive deviance for processes redesign. This leads to

identifying approaches of opportunity-driven method implementation and presenting generic procedure for initiating the improvement process in the organizations.

RQ5: How have improvement opportunities in business processes been identified with opportunity-driven methods?

This question is supposed to lead us into more details about how companies define the areas for improvement while applying opportunity-driven methods. To be exact, it aims to demonstrate what actions were undertaken to identify process improvements.

RQ6: How can organizations conduct the change for business processes improvement?

The last research question refers to providing an insight on launching the changes to business processes after opportunity-driven method application. What is more, data on possible challenges that the company may face during this stage will be documented.

Search Strategy

The overall search strategy is to find a body of relevant scientific studies. The search strategy used in this SLR is based on the recommendations provided in studies and guidelines on conducting the SLRs [88], [89]. For the search, we used search strings on several electronic databases to enable comprehensive search and identify the set of papers.

Search String

The development of the search strings, we followed the guidelines suggested by Kitchenham et.al. The range of terms used for the search included the following:

(1) "business process" – the term is the key term of the research and describes the foundation of the study.

(2) "benchmarking" – the term is derived from the research questions. To make the search comprehensive, it is also needed to include few more terms:

   a. Process benchmarking
   b. Internal benchmarking
   c. Benchmark-driven
   d. Best practice
   e. Superior performer

(3) "positive deviance" – the term directly related to the studied research questions. Due to the fact, that there is no standard notion expressing the given term definition and different sources tend to use term variants, the following terms were also included in the search string:

   a. Constructive deviance
   b. Comparative deviance

c. Process deviance
d. Exceptional performance
e. Exceptional behaviour

Based on the search terms, the following search string is formulated.

Search string 1: ((“business process”) AND (“benchmarking” OR “process benchmarking” OR “internal benchmarking” OR “benchmark-driven” OR “best practice” OR “superior performer”) OR

Search string 2: ((“business process”) AND (“positive deviance” OR “constructive deviance” OR “comparative deviance” OR “process deviance” OR “deviance” OR “Exceptional performance” OR “Exceptional behaviour”))

Search sources

The electronic databases were selected based on coverage of journal papers, conference proceedings, and workshop papers in the field of computer science where research on business process improvement is mostly published. The databases were also required to be freely accessed with the university domain.

In addition, to cover all possible sources it will be necessary to scan the grey literature, or, in other words, materials produced outside of traditional academic channels. The usage of searching engines like Google will support that need.

Hence, the following databases were used:

(1) ACM Digital Library
(2) IEEE Xplore
(3) Scopus (includes SpringerLink)
(4) Web of Science
(5) Emerald Insight
(6) Google Scholar

Selection Criteria

The purpose of the selection criteria is to identify relevant studies that provide sufficient information to address the research questions. The criteria consisted of exclusion and inclusion criteria.

(1) Inclusion criteria (IC):
   a. **IC1: Is the paper within the domain of business processes? (I)** This criterion is aimed at filtering out the papers that the research objective and research field are outside of the scope of the business process improvement domain.
   b. **IC2: Does the paper present, review, discuss, or demonstrate a case for business process improvement by opportunity-driven approach? (I)** Based on this

selection criterion the studies that represent any practical application in the field of business process improvement through particular approaches are identified.

c. **IC3: Was the case validated on real-life situation? (I)** This criterion is set to include only practical cases which demonstrate the real application of selected approaches.

(2) Exclusion criteria (EC):

a. **EC1: Is the paper a duplicate? (E)** Duplicate papers are those where papers with the same title from the same authors published the same year appear in different digital libraries (exact duplicate). Duplicates are also those studies that are published by the same authors with approximately the same topic (version duplicate). In the case of an exact duplicate, only one is included and in the case of version duplicates, the most recent version is included. In case there are duplicates that are conference version and journal version, the journal version is included as far as it contains more data on the research.

b. **EC2: Is the study less than 5 pages? (E)** Papers that are less than 5 pages are excluded from the review as they will not have enough depth to develop the research theme. They are unlikely to describe the implementation of benchmarking or positive deviance for business processes improvement to the level of details required by this research.

c. **EC3: Is the full-text version digitally accessible? (E)** Papers accessible via digital libraries subscribed to by the University or available on the Internet in free access are considered as accessible. Papers provided for the payment and not available via mentioned channels, are considered as inaccessible and excluded from the review.

d. **EC4: Is the study written in English? (E)** Papers that are not available in English are considered as unavailable for the review as far as it is impossible to understand them for both reviewers at the same time.

Screening Procedure

The screening is conducted according to a two-step procedure as recommended by [90], [91]. Each study is examined against the inclusion and exclusion criteria, following a top to bottom approach. If a paper fails an inclusion criterion, it is excluded without the other criteria being considered. If then paper meets exclusion criterion, it is excluded from the review. Afterwards, reviewer identifies relevant primary studies based on review of the title and excludes papers which are out of scope. Second step is started with reviewing the abstracts of

studies which left after first step screening. Based on that, it is decided if the paper is relevant for the further review. The last step is having IC3 considered; more detailed look at the papers is completed. If the paper fails to meet a criterion, it is excluded. Then final list of relevant papers is made.

Data Extraction Strategy

Following the identification of the final list of papers, relevant data was extracted. To ensure unbiased data extraction strategy, it has been recommended to develop a data extraction strategy.

Data Extraction Form

In order to proceed further with the data extraction stage, the data extraction form was developed. Data form allows collecting data in a structured, unbiased and consistent way. It is used to map the obtained insights from the paper review during the screening stage. Based on the formulated research questions, the designed data form includes 7 categories of data:

(1) **Identification Data.** Data that helps to identify the paper: paper title and authors, publication year and the number of citations. Moreover, a unique identifier was assigned to each paper to facilitate the paper referencing further in the data analysis stage.

(2) **Context of Study.** This data provides the reader with the context of the study, describing the settings where the study was conducted.

(3) **Opportunity-Driven Method Aspects.** This block aims to identify all possible aspects which are considered while using opportunity-driven methods. In addition, it is needed to define the aspect's source and reasoning for its relevance.

(4) **Business Process(es) Improvement Identification.** Next block refers to describing the way company undertook the process of identifying its business process(es) improvement opportunities.

(5) **External Partner Identification and Analysis.** In case the organization is doing outward looking business process(es) improvement, it is important to present the way of choosing the right partner and describe its key characteristics.

(6) **Business Process(es) Improvement Change Implementation.** This block is delivering the data about applying the change to the organization: methods, tools.

The data extraction form with the definition of each parameter is presented in Table 18.

Table 18. Data extraction form.

Identification Data	
Identifier	Unique identifier of the paper
Title	Title of the paper
Authors	Authors of the paper
Publication Year	Year of publication of the paper
Citations	Number of citations of the papers
Context of the Study	
Industry	The industry where the case study was performed, the method applied, or the example provided.
Targeted Business Process	The process(es) under examination and improvement.
Improvement Method	The method applied for business process improvement and its category.
Improvement Method Description	The description of applied method, the particular way it is implemented.
Method Process	The way method is implemented: steps, stages, sequences etc.
External Superior	The outside unit which business process(es) were taken as the best practice.
Opportunity-driven Method Aspects	
Performance Dimension(s)	The aspect(s) of business process(es) which are taken to track efficient performance.
Performance Dimension(s) Description	A statement of the exact meaning of the found dimension(s) in the papers' context.
Rationale for Performance Dimension(s)	The set of reasons identifying the importance/relevance of performance dimension(s).
Business Process(es) Improvement Identification	
Data Required	Description of the data taken for the improement identification analysis.
Data Generation Method(s)	The chosen way of data collection.
Improvement Identification Process	The chosen process of defining the area(s) of process improvements.
Improvement Identification Description	The way organization undertakes improvement identification. Moreover, if there is no particular method(s) but some set of actions is done.
List of Identified Improvement Opportunities	List of improvements that can be undertaken for business processes.
External Partner Identification and Analysis	
External Superior Identification Method	The process of finding the outside partner and patterns considered.
External Superior Patterns	Key features which were considered while choosing the best external company.

External Superior Industry	External company industry: within or outside the organization.
Business Process(es) Improvement Change Implementation	
Change Implementation Process	The set of actions undertaken to apply changes for process(es) improvement.
Change Implementation Method	Name of the method or its description.
Problems Faced	Any problem or challenge organization had to deal with while implementing the change.

Results

In this section the exact results of the paper search, selection, and screening, as well as data extraction results are presented. The developed search string was applied to each of the selected databases. Among all combination, these are the ones which managed to find the most of related papers:

Search string 1: (("business process") AND ("benchmarking" OR "best practice")).

Search string 2: (("business process") AND ("positive deviance" OR "deviance")).

The search result lists from databases were downloaded and compounded in a single list. The search results per source are shown in Table 19, it composed a total of 3962 publications.

Table 19. The total number of papers identified per source.

Source	**Total Number of Papers Identified**
ACM Digital Library	793
IEEE Explore	328
Scopus	282
Web of Science	526
Emerald Insight	988
Google Scholar	1045
Total	**3962**

It should be mentioned that Emerald Insight and Google Scholar databases did not allow to download the full list, hence the search was done in a different way. Firstly, the search strings were applied, and total number of search result was captured. This search result is presented in Table 2. Secondly, titles and abstracts were read to identify the relevant papers. Thirdly, suitable cases were taken to the next list. In Google Scholar, particularly, the search results were more than 45000 for few strings, therefore only first 300-500 papers were checked: it made the final search result as 1045.

Based on the defined paper selection criteria, the selection procedure was executed as follows: first, filtering by duplicates and papers containing fewer than 5 pages were removed, filtering by paper title and paper abstract was performed, and finally, filtering by reading the

full paper was executed. As mentioned above, for Emerald Insight and Google Scholar filtering was done during the search stage, therefore Table 3 represents filtering for the other databased until the last step – reading the full paper.

Table 20 summarizes the data on the number of papers that were processed and filtered, Figure 1 depicts a visual representation of the paper filtering process results.

Table 20. The results of the application of selection criteria per selection criteria.

Selection Criteria	**Number of Identified Papers**	**Total Number of Papers Left**
Primary search results	3962	
Primary search results without Emerald Insight and Google Scholar	1929	
1. Filtering out duplicates	89	1840
2. Filtering by number of pages	110	1730
3. Filtering by paper title	1309	421
4. Filtering by paper abstract	255	166
5. Filtering by paper abstract with papers from Emerald Insight and Google Scholar	265	265
6. Filtering by reading the full paper	219	**46**

During the search, open access and English language were set to satisfy EC3 and EC4.

(1) **Filtering out duplicates.** Since there are 4 resources of paper search, some papers can inevitably occur in several resources, thus creating duplicates in the list of research papers for data extraction. Hence, the first step was to remove the duplicates from the list. 89 duplicates were identified and removed, leaving 1840 papers for the further filtering stage.

(2) **Filtering by the number of pages.** Based on the exclusion criteria EC2, 110 papers that are less than 5 papers are removed and 1730 papers entered the next round of filtering.

(3) **Filtering by paper title.** The rest of the papers are filtered by the title matching the research topic and question driven by the selection criteria IC1 and IC2. If from the title it is evident that the paper does not relate to the research, such paper is removed from the list. In case it is not clear and/or confusion occurs, the paper is left for the next filtering stage. In the result of filtering the paper title, 1309 papers were considered irrelevant for this research and removed from the list. 421 papers entered the last round of filtering that is filtering by the abstract.

(4) **Filtering by paper abstract.** Similarly, to the filtering by title, this kind of filtering considers paper relevance to the research topic based on selection criteria IC1, IC2 and

IC3 but this time we examined paper abstracts. When paper abstract gave a clear understanding that the paper is focused on different research questions not connected with this research, such paper was excluded from the list. During this filtering stage, 255 papers were identified as those examining different research questions and removed from the list. As a result, 166 papers were selected. In addition to these papers, on these step 99 papers from Emerald Insight and Google Scholar were added as they were filtered by the abstract. 265 papers formed the final list of papers relevant to the research study and are eligible for the data extraction session.

(5) **Filtering by reading the full paper.** During the data extraction procedure (See Section 4.6) additional papers were filtered out from the list of relevant studies based on the selection criteria IC1, IC2 and IC3 as far as the grounding for paper exclusion can be achieved only when the paper is attempted to be fully reviewed. Thus, out 265 papers resulted from the filtering, 219 papers were removed based on the above-mentioned criteria, resulting in 46 papers included in the data extraction stage.

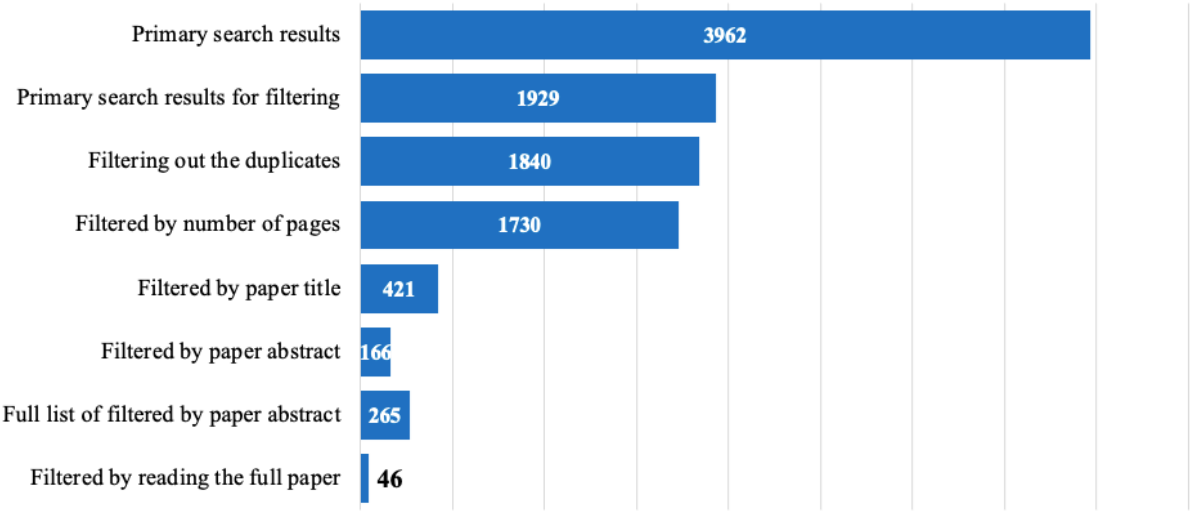

Figure 16. The number of papers per selection stage.

As a result of the filtering process, conducted based on determined inclusion/exclusion criteria, out of 3962 papers obtained from the primary search, 46 papers were selected as eligible for this SLR. Having the primary list of papers filtered and obtaining the list of 46 relevant papers, the data was extracted from them using the designed data extraction form. Further, data was summarised and analysed, from which the framework was derived.

10. LICENSE

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