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МЕТОДИЧЕСКИЙ ПОДХОД К ТРАНСФОРМАЦИИ БИЗНЕС-ПРОЦЕССОВ КОМПАНИИ НА ОСНОВЕ SCRUM И AGILE: ДИАГНОСТИКА ПОТЕРЬ, ПРИОРИТИЗАЦИЯ ИЗМЕНЕНИЙ И ОЦЕНКА ОПЕРАЦИОННОГО ЭФФЕКТА

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Аннотация. В статье разработан методический подход к трансформации бизнес-процессов компании с использованием Scrum и Agile-практик. Актуальность исследования определяется распространением Agile при сохраняющейся проблеме связи между организационными изменениями и измеримым бизнес-результатом. Цель исследования состоит в формировании алгоритма, объединяющего диагностику потерь бизнес-процесса, выбор практик изменения, многокритериальную приоритизацию инициатив, пилотное внедрение и оценку операционного эффекта. Методическую основу составили положения Business Process Management, исследования организационного применения Scrum и Agile, сравнительный анализ и структурное моделирование. Предложен восьмиэтапный цикл трансформации. Сформирована система диагностических и результативных метрик, в которую входят длительность процесса, время ожидания, объем незавершенной работы, возвраты на доработку и соблюдение SLA. Приоритизация инициатив осуществляется по ожидаемому операционному эффекту, ценности для клиента и бизнеса, трудоемкости, риску и обратимости решения, готовности к внедрению; для критериев затратного типа применяется обратная шкала оценки. Подход проиллюстрирован на синтетическом (модельном) процессе согласования и запуска продуктового изменения. В модельном сценарии на синтетических данных длительность процесса сократилась с 18,4 до 10,7 рабочего дня, доля повторной доработки с 27,5 до 12,5%, соблюдение SLA выросло с 57,5 до 82,5% при неизменной интенсивности завершения запросов (throughput). Полученные результаты подтверждают необходимость связывать Scrum и Agile-практики с предварительно диагностированной причиной потерь и заранее определенными операционными показателями.

Ключевые слова: бизнес-процесс, Scrum, Agile, трансформация бизнес-процессов, операционная эффективность, процессные потери, приоритизация инициатив, lead time, WIP, процессное управление.

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METHODOLOGICAL APPROACH TO BUSINESS PROCESS TRANSFORMATION USING SCRUM AND AGILE: LOSS DIAGNOSIS, CHANGE PRIORITIZATION AND OPERATIONAL EFFECT ASSESSMENT

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Abstract. The article develops a methodological approach to business process transformation using Scrum and Agile practices. The relevance of the study is determined by widespread Agile adoption and the persistent difficulty of linking organizational changes to measurable business outcomes. The study aims to develop a sequence integrating process loss diagnosis, selection of change practices, multi-criteria initiative prioritization, pilot implementation, and operational effect assessment. The methodology combines Business Process Management principles, research on organizational applications of Scrum and Agile, comparative analysis, and structural modelling. An eight-stage transformation cycle is proposed. The metric system includes lead time, waiting time, work in progress, rework, and SLA compliance. Improvement initiatives are prioritized according to expected operational effect, customer and business value, implementation effort, risk and reversibility, and implementation readiness; cost-type criteria (implementation effort, risk) are scored on an inverted scale. The approach is illustrated using a synthetic product-change approval process. In the pilot scenario, lead time decreases from 18.4 to 10.7 working days, rework from 27.5% to 12.5%, while SLA compliance increases from 57.5% to 82.5% and throughput remains unchanged. The results indicate the need to link Scrum and Agile practices to a previously diagnosed cause of process loss and predefined operational metrics.

Keywords: business process, Scrum, Agile, business process transformation, operational efficiency, process losses, initiative prioritization, lead time, WIP, process management.

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Introduction

A business process is an interconnected sequence of activities and decisions through which input resources are transformed into an outcome that creates value for an internal or external customer. Business process management involves process identification, modeling, analysis, transformation, and subsequent monitoring [1]. Accordingly, business process transformation requires changes to address the causes of delays, excessive approvals, rework, and other factors that directly affect the outcome [2; 3; 4].

The widespread adoption of Scrum and Agile in recent years has provided an additional set of organizational tools for implementing such changes. For example, the Scrum framework is based on short work cycles, adherence to the principles of transparency, inspection of results, and subsequent adaptation of actions [5; 6; 7]. It should be noted that Agile approaches were initially adopted in software development; however, subsequent research has demonstrated that the underlying principles can also be applied to product management, innovation projects, and other organizational functions [8; 9]. For example, a study of 1,002 projects found that the use of Agile was positively associated with both project efficiency and stakeholder satisfaction [8].

At the same time, implementing Scrum does not eliminate problems associated with business processes. Studies of large-scale Agile transformations have identified numerous organizational challenges, the most prevalent of which include resistance to change, insufficient management support, difficulties in cross-functional collaboration, and misalignment in ways of working [10]. The performance of a self-organizing Scrum team also depends, among other factors, on the quality of coordination, leadership, mutual monitoring, and a shared focus on outcomes [11].

This issue remains relevant in contemporary organizations. According to the 18th State of Agile Report for 2025, 76% of respondents reported increasing pressure to demonstrate business impact and return on investment from Agile; 74% of organizations used hybrid or self-defined operating models, while 73% of respondents indicated a need for stronger leadership support and closer alignment between their work and business objectives [12]. Only a proportion of organizations systematically link Agile to measurable business outcomes. Thus, establishing Scrum events, creating a backlog, and dividing work into short cycles (sprints) is not sufficient.

It is necessary to determine which process deficiency a specific change is intended to address, why the corresponding initiative is prioritized, and which metric is used to verify its outcome. However, determining these characteristics remains challenging, creating a need for a methodological approach that addresses this set of tasks.

The aim of the study is to develop a methodological approach to business process transformation using Scrum and Agile that ensures a consistent link between process loss diagnosis, initiative selection, prioritization, and operational effect assessment.

Research methodology

The methodological framework of the study draws on the principles of Business Process Management, methods of process analysis and transformation, the Agile Manifesto, the Scrum Guide, and empirical research on the application of Agile in organizations. The academic literature indicates that the conventional BPM lifecycle comprises process identification, modeling, analysis, transformation, implementation, and monitoring [1]. Information system data, process logs, interviews, observation, and process analytics methods can be used to identify process deficiencies [3]. At the transformation stage, techniques include eliminating redundant activities, changing the sequence of activities, combining tasks, and reducing the number of handoffs between performers [2].

In the proposed approach, Scrum and Agile are used to organize short cycles for implementing and evaluating selected changes, consistent with research indicating that Agile practices can be applied beyond software development when adapted to the specific conditions of an organization [9; 13].

A separate group of sources comprises studies on Lean production and the Kanban method, which have established the flow metrics and work-in-progress (WIP) limiting practice applied in the present study [14; 15; 16]. It should be emphasized that WIP limits are not part of the Scrum Guide [7] and are adopted from Kanban; accordingly, they are treated here as a Lean/Kanban practice incorporated into the broader framework of agile ways of working. The relationship between work in progress, throughput, and process lead time is described by Little's Law [17] and is subsequently used to interpret the results of the model-based validation.

The task of ordering proposed changes has previously been addressed using weighted prioritization methods, the most common of which include WSJF (Weighted Shortest Job First) [16; 18], as well as scoring models such as RICE and ICE. These methods evaluate initiatives based on expected value and implementation effort; however, they do not require a preceding stage of process loss diagnosis or the linkage of each initiative to an identified cause of deviation. The proposed approach differs in that prioritization is performed across a set of initiatives, each derived from the diagnostic results for a specific business process, and concludes with validation of the operational effect against predefined target and guardrail metrics, as opposed to prioritizing an arbitrary list of proposals.

The proposed approach comprises eight stages:

1. defining the process boundaries and target outcome;
2. establishing baseline metrics;
3. diagnosing process losses;
4. identifying their causes and selecting appropriate Scrum/Agile practices;
5. developing a backlog of initiatives;
6. conducting multi-criteria prioritization;
7. carrying out a limited pilot implementation;
8. assessing the operational effect and deciding whether to institutionalize the change.

In this study, the total time required to complete a request is referred to as lead time, the time spent directly performing operations as touch time, and the time a request spends waiting as waiting time. The amount of unfinished work is measured as work in progress (WIP), the proportion of requests returned for rework as rework, compliance with the established service level as SLA (Service Level Agreement) compliance, and the rate at which requests are completed over a specified period as throughput. The key evaluation metrics are presented in Table 1.

Table 1

System of criteria and metrics for business process transformation

Stage	**Criteria and metrics**	**Purpose**
Baseline diagnosis	Lead time, touch time, waiting time, WIP, number of handoffs, rework, SLA compliance	Identification of actual process losses
Cause analysis	Waiting, batch processing, repeated approvals, excessive handoffs, unclear responsibilities	Identification of the source of deviation
Prioritization	Operational effect, value, implementation effort, risk and reversibility, readiness (inverse scale for implementation effort and risk)	Ranking of initiatives
Pilot implementation	Limited process scope, responsible person, evaluation period, target and guardrail metrics	Controlled implementation
Outcome assessment	Changes in lead time, WIP, rework, SLA compliance, throughput	Validation of the operational outcome

Source: compiled by the author.

For prioritization, each initiative i is assigned a score based on five criteria. The overall priority is determined as follows:

$$P_i = \sum_{j=1}^{5} w_j s_{ij},$$

where s_{ij} is the score assigned to initiative i according to criterion j; w_j is the weight of criterion j, such that:

$$\sum_{j=1}^{5} w_j = 1.$$

The weights are determined based on the organization's objectives before the pilot results are obtained.

Initiatives are scored on a five-point scale. A direct scale is used for criteria where a higher value represents an improvement (expected operational effect, customer and business value, and implementation readiness). An inverse scale is used for cost-type criteria: for implementation effort, a score of 5 corresponds to the lowest implementation cost; for risk and reversibility, a score of 5 corresponds to the lowest risk and the greatest ability to reverse the change. Aligning all criteria in the same direction is essential for the validity of the additive aggregation, since otherwise an increase in implementation effort or risk would increase the initiative's overall priority.

The operational effect for metrics where a decrease represents a positive outcome is calculated as follows:

$$E_m = \frac{M_0 - M_1}{M_0} \times 100\%,$$

where M_0 is the value before the change and M_1 is the value after the change.
For metrics where an increase represents an improvement:

$$E_m = \frac{M_1 - M_0}{M_0} \times 100\%.$$

However, a positive change in the target metric is not sufficient grounds for scaling if a predefined guardrail metric deteriorates at the same time, such as outcome quality or the number of errors.

Results and discussion

The proposed methodological approach is presented in Fig. 1.

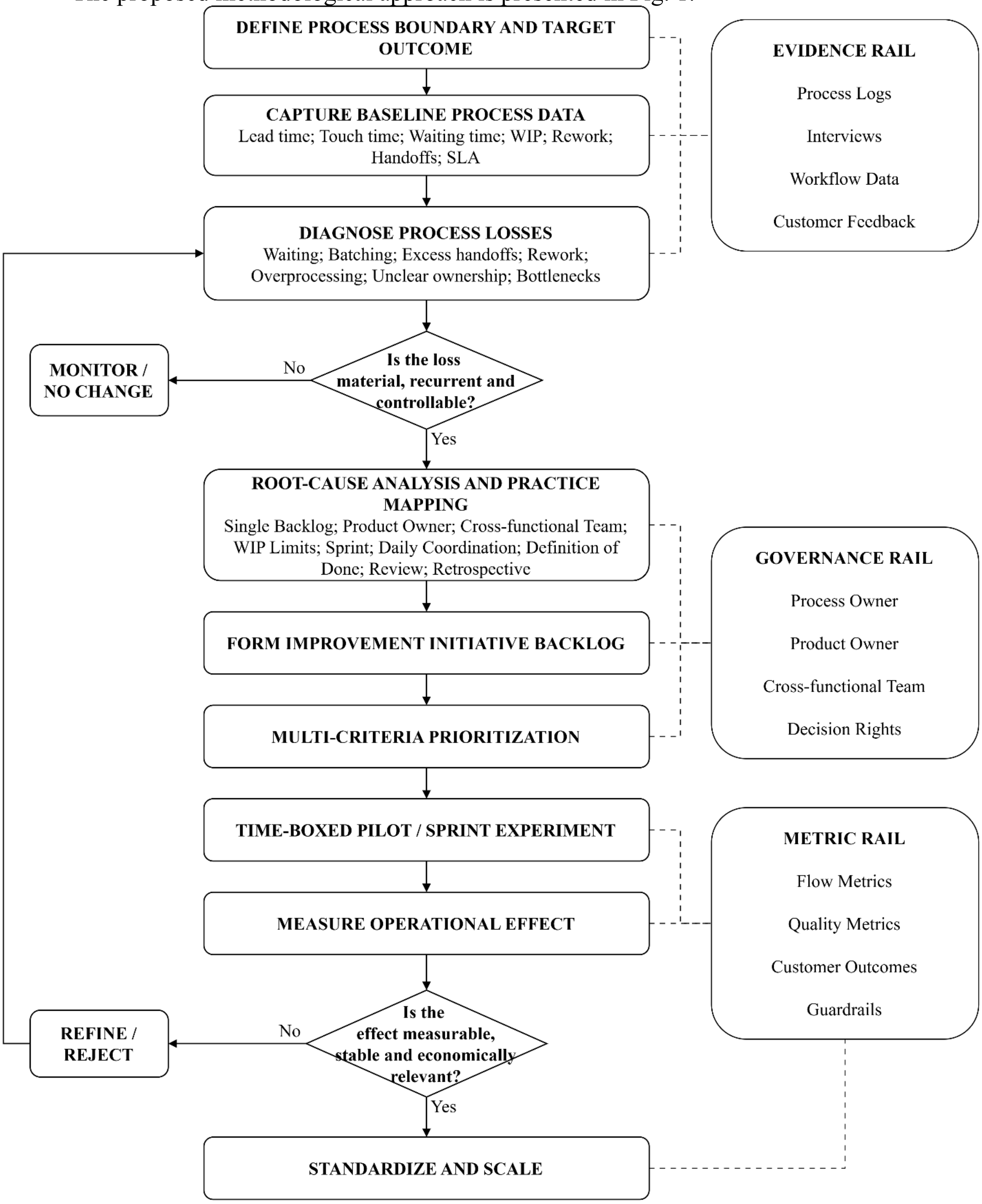

Fig. 1. Methodological cycle for business process transformation using Scrum and Agile practices

Source: compiled by the author.

As shown in Fig. 1, the proposed methodological approach represents a sequential cycle of business process transformation. Each stage builds on the results of the preceding stage and produces the data required for the next management decision. The starting point is to define the process boundaries, its target outcome, and the set of baseline operational metrics, thereby ensuring that subsequent changes are measurable and enabling the initial state of the process to be documented before transformation begins.

The next stage involves diagnosing process losses. At this stage, process lead time, waiting time, work in progress, the number of cross-functional handoffs, rework frequency, SLA compliance, and other metrics reflecting the actual flow of work are assessed. The resulting data make it possible to identify the areas of the process with the greatest deviations and determine their impact on the final outcome.

Once the process losses have been identified, their underlying causes are analyzed. The analysis focuses on the allocation of responsibilities, approval procedures, the structure of cross-functional interaction, the pattern of incoming work, the stability of requirements, and the workload of process participants. This results in a list of causes for which specific process transformation initiatives can be developed.

In the proposed approach, Scrum and Agile practices are introduced at the stage of selecting organizational solutions; their application is determined by the nature of the identified causes and the characteristics of the specific business process. Each initiative is linked to a specific process problem, assigned a responsible person, and associated with an outcome metric, thereby creating a traceable sequence leading to the expected operational effect [7; 13; 19; 20].

The development of a backlog of transformation initiatives plays a significant role in the proposed approach, bringing together potential changes that have undergone preliminary justification. Each initiative is described in terms of the problem it addresses, the proposed mechanism of impact, the required resources, the responsible person, and the target metric. This enables the initiatives to be compared and a justified sequence for their implementation to be established.

In addition, three supporting components are identified:

1) the transformation information base, including information system data, process logs, and the results of interviews, observations, and feedback;

2) the allocation of authority among the process owner, the Product Owner, and participants in cross-functional interaction;

3) operational, quality, and customer-related metrics used to assess outcomes.

The combined use of these components ensures that the transformation remains manageable throughout all stages of the cycle.

The next element of the approach is the pilot implementation of the selected initiative or an agreed set of initiatives. The change is implemented within a limited area of the process or over a defined time period. During the pilot implementation, the actual values of the target and guardrail metrics are recorded, and once the observation period is complete, the results are compared with the baseline.

The decision on whether to scale the change further is based on the magnitude of the operational effect and its compliance with the established constraints. If the results are insufficient, the initiative returns to the stage of refining the identified causes, the proposed solution, or the implementation sequence. If the effect is confirmed, however, the change is incorporated into the process regulations and included in ongoing monitoring.

Thus, the proposed approach forms a closed-loop cycle. Its key feature is the sequential establishment of a link between the state of the business process, the cause of the identified deviation, the selected initiative, and the measurable outcome of its implementation. Scrum and

Agile practices are used within this cycle as organizational transformation tools selected according to the specific process problem being addressed.

Once the backlog of initiatives has been developed, the next task is to determine the sequence of their implementation. To address this task, a multi-criteria prioritization method is proposed that considers the expected operational effect, customer and business value, implementation effort, risk and reversibility, as well as organizational and technical readiness. The corresponding evaluation mechanism is presented in Fig. 2.

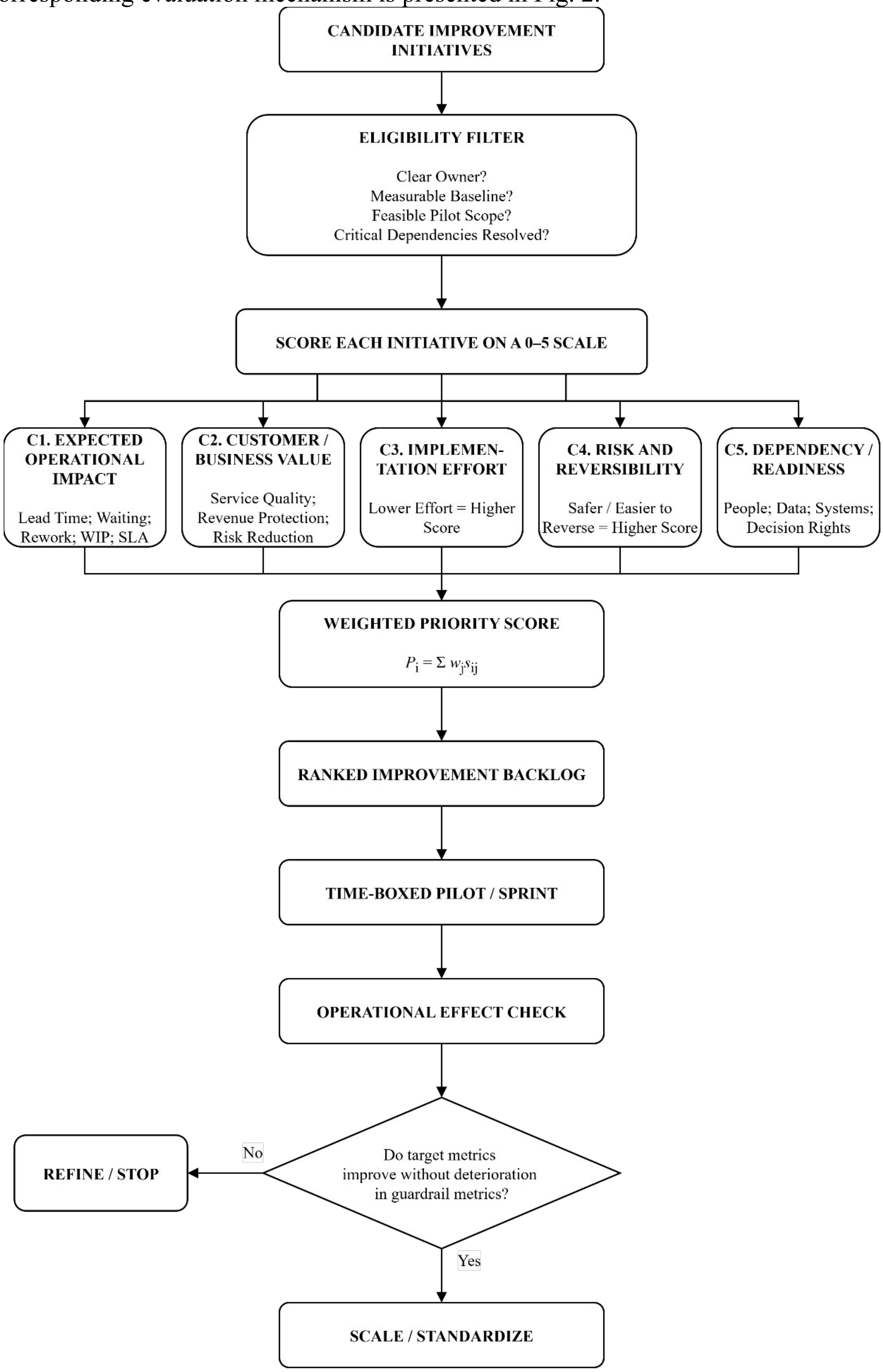

Fig. 2. Multi-criteria prioritization and operational effect validation

Source: compiled by the author.

For illustrative purposes, a synthetic (model-based) dataset was constructed for a typical process of approving and launching a product change. In the baseline process, a request sequentially passed through seven functional stages: registration, initial qualification, requirements clarification, commercial approval, legal review, operational approval, and final launch. The diagnosis showed that the main contributors to lead time were waiting between departments, batch processing of requests, and rework caused by incomplete initial requirements.

The model sample included 40 completed requests before the change and 40 requests from the pilot period. In the baseline scenario, the average lead time was 18.4 working days, of which 6.1 days were spent on direct processing. Thus, waiting accounted for approximately two-thirds of the total time. The rework rate reached 27.5%, while SLA compliance was 57.5% (Fig. 3).

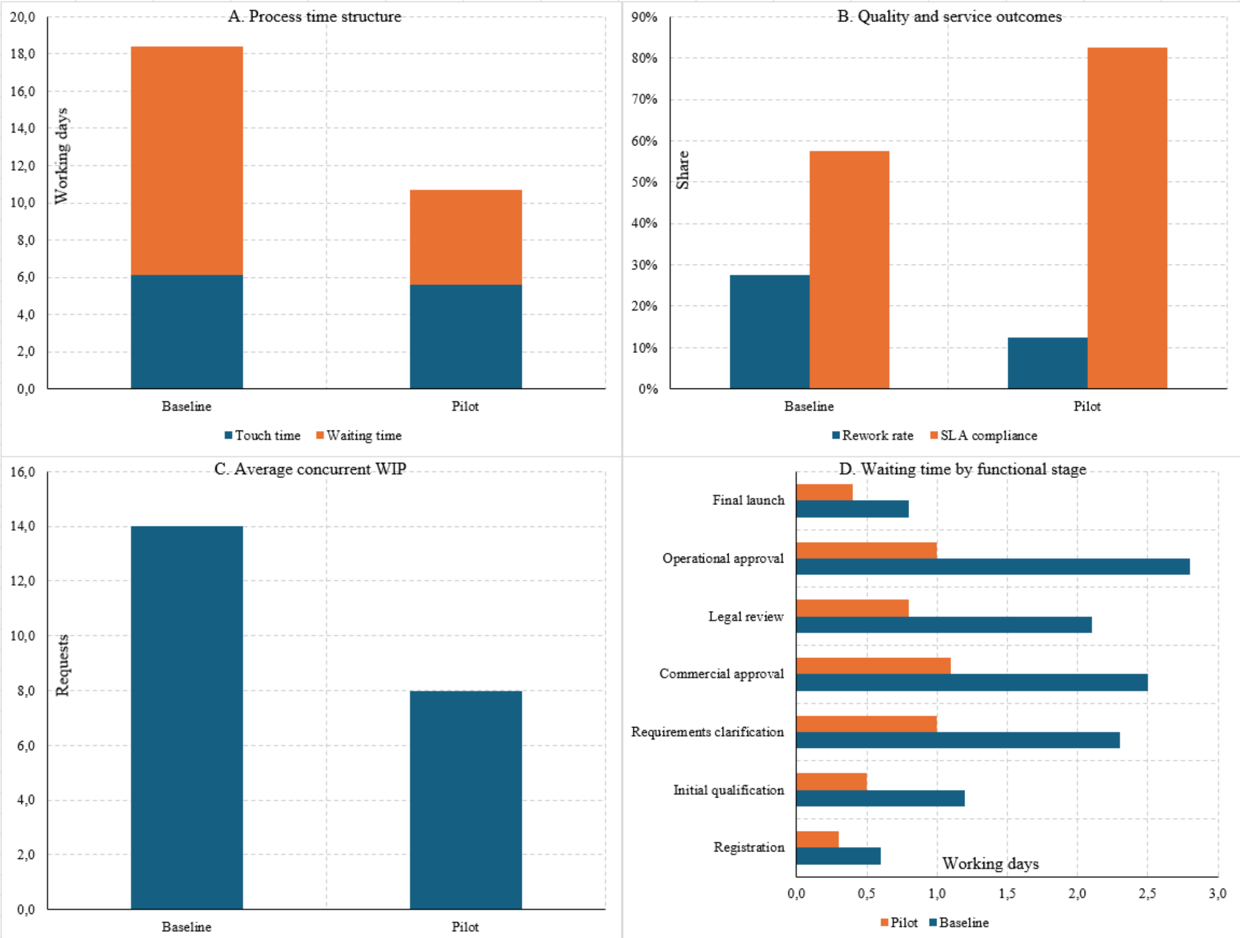

Fig. 3. Results of the model-based testing of a methodological approach to business process transformation

Source: compiled by the author.

For the illustrative prioritization, the weights of the five criteria were each set at 0.2. The three highest-priority changes were interrelated: a unified backlog with a designated priority owner; a cross-functional team for key approvals, with WIP limits (a Kanban practice [15]); and work organized into short cycles with mandatory Reviews and Retrospectives. Notification automation received a lower priority because, although it reduced information-related delays, it had virtually no impact on the primary cause of waiting.

The results of the multi-criteria evaluation are presented in Table 2. Each initiative was evaluated on a five-point scale across all established criteria, with an inverse scale applied to implementation effort and risk. The use of equal weights allows the overall scores to be directly compared and a ranked backlog of changes to be developed.

Table 2

Results of the multi-criteria prioritization of business process transformation initiatives

Initiative	**C1**	**C2**	**C3**	**C4**	**C5**	P_i	**Rank**
Unified backlog with a designated priority owner	5	5	4	5	5	4,8	1
Cross-functional team with WIP limits	5	5	3	4	4	4,2	2
Short cycles with Review and Retrospective	4	4	4	5	4	4,2	2
Standardization of input requirements and Definition of Ready	4	4	3	4	4	3,8	4
Notification automation	2	2	5	4	4	3,4	5
Additional approval level	1	2	2	2	3	2,0	6

Source: compiled by the author.

The evaluation results show that the highest priority was assigned to initiatives that directly address task assignment procedures, cross-functional interaction, and limits on work in progress. Notification automation received a lower score because of its limited impact on the main causes of waiting, despite its relatively low implementation effort. The model-based validation included initiatives with an overall score of at least 3.5 points, corresponding to ranks one through four: a unified backlog with a designated priority owner; a cross-functional team with WIP limits; short cycles with Review and Retrospective; and standardization of input requirements and Definition of Ready. The fourth initiative was included to preserve the completeness of the causal link, since the first three initiatives address waiting between departments and batch processing of requests, whereas the third diagnosed cause of process losses—rework resulting from incomplete initial requirements—is specifically addressed by standardizing input requirements. Notification automation (3.4 points) and an additional approval level (2.0 points) were not included in the pilot implementation.

Following the model-based pilot implementation, lead time was 10.7 working days, representing a reduction of 41.8%. Direct processing time decreased from 6.1 to 5.6 days. Thus, the primary improvement resulted from reduced waiting rather than faster execution of the operations themselves. The rework rate decreased from 27.5% to 12.5%, corresponding to a reduction of 54.5%. SLA compliance increased from 57.5% to 82.5%, i.e., by 25 percentage points (a relative increase of 43.5%). The average number of requests simultaneously in progress decreased from approximately 14 to 8. The reduction in the rework rate was achieved through the standardization of input requirements and the introduction of readiness criteria, while the reduction in waiting time resulted from the unified backlog, cross-functional interaction, and WIP limits.

Throughput remained virtually unchanged in the model scenario, at approximately 0.76 requests per working day before the transformation and approximately 0.75 afterward, since the inflow of requests was assumed to remain constant in the model (40 requests during the observation period in both cases). This relationship is consistent with Little's Law [17]: with throughput remaining constant, a reduction in work in progress from 14 to 8 is accompanied by a proportional reduction in process lead time. Thus, the observed effect relates to the speed at which requests move through the process rather than to an increase in the volume of work performed. The proportion of launches requiring correction after the change was implemented was used as a guardrail metric: 7.5% (3 of 40) in the baseline period and 5.0% (2 of 40) in the pilot period. No deterioration in the guardrail metric was observed, which, in accordance with the established rule, indicates that the change is suitable for incorporation into the process regulations.

The relationship between the results illustrates that if the transformation were evaluated solely in terms of individual performer productivity, the improvement would appear modest: touch time decreased by less than 10%. However, from the perspective of the business process as a whole, the main potential for improvement lay between operations. In this case, Scrum and Agile practices affected prioritization procedures, cross-functional interaction, and the amount of work being performed concurrently.

The proposed sequence thus avoids a common situation in which a company first selects a transformation tool and only subsequently attempts to identify a metric that demonstrates its effectiveness. In the proposed approach, the direction of causality is reversed, proceeding from process loss to its cause, an initiative, a change practice, pilot implementation, an operational metric, and a decision.

This principle is consistent with the current shift in Agile from measuring the number of completed tasks toward measuring business outcomes. In the State of Agile 2025, customer satisfaction was most frequently cited as the primary measure of success, followed by efficiency and cost reduction; at the same time, organizations faced increasing pressure to demonstrate ROI from Agile [12].

At the same time, the proposed approach has several limitations:

1) First, the use of Scrum is most appropriate for processes in which a limited backlog can be established, changes can be implemented incrementally, and rapid feedback can be obtained. For fully standardized transactional operations, individual Scrum events may create additional implementation effort.

2) Second, multi-criteria prioritization depends on the selected weights. For this reason, the weights should be determined before the pilot and subjected to sensitivity analysis.

3) Third, the presented validation was conducted using model-based data. The results demonstrate how the proposed approach operates but do not establish that applying a similar set of practices will produce the same effect in a real company. Empirical validation requires process execution logs from before and after the intervention, consistent metric definitions, and a sufficiently long observation period.

Conclusion

Thus, the study resulted in the development of a methodological approach to business process transformation using Scrum and Agile that links identified process deficiencies to change initiatives and measurable operational outcomes.

The approach comprises eight stages: defining the process boundaries, establishing baseline metrics, diagnosing process losses, analyzing their causes and selecting appropriate practices, developing a backlog of initiatives, conducting multi-criteria prioritization, carrying out pilot implementation, and assessing the results.

For diagnosis, the proposed metrics include lead time, touch time, waiting time, WIP, rework, the number of handoffs, and SLA compliance. Initiatives are selected based on five criteria: operational effect, customer and business value, implementation effort, risk and reversibility, and implementation readiness.

The model-based validation showed that reductions in process lead time can be achieved primarily by reducing waiting and cross-functional delays, while the duration of directly performed operations changes to a lesser extent. At the same time, throughput remained unchanged in the model, indicating that the observed effect relates to the speed at which work moves through the process rather than to an increase in the volume of work performed. This finding confirms the need to evaluate Scrum and Agile practices using end-to-end business process metrics.

The scientific significance of the proposed approach lies in the systematic integration of BPM methods, Lean and Kanban flow metrics, and short Scrum cycles with multi-criteria change selection, whereby prioritization is performed across a set of initiatives derived from the diagnostic results for a specific business process. Its practical significance lies in enabling organizations to move away from implementing Agile as a stand-alone organizational objective and instead link each practice to a specific cause of process loss and a predefined outcome metric.

Further validation should involve applying the proposed approach to actual company process data and comparing multiple business processes that differ in the number of participants, the degree of operational repeatability, and the level of cross-functional interdependence.

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