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Process Maps and Scenario Simulation in Large-Event Organisation under Limited Data: A Case Study*

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Abstract

This article analyses the possibility of using process maps and BPM-class tools to study and simulate the organisation
of large events under conditions of limited quantitative data availability. The research problem arises from the fact that event-organisation processes are complex, multi-stage and highly interactive in nature, while at the same time they rarely generate complete event logs enabling the application of advanced process-mining techniques or discrete-event simulation. The study adopts a case-study approach based on the Manager's Rally event, using BPMN 2.0 and the SAP Signavio Process Manager environment to develop both a detailed and a simplified process model and subsequently to conduct simulation in two scenarios: a modal variant reflecting typical organisational conditions and a maximum variant representing conditions of extreme workload. The results indicate strong non-linearity in the relationship between execution time, iteration and cost. The analysis reveals that the key sources of process instability are activities requiring multi-stage approval and subprocesses related to promotion and communication. The article contributes to researchon process-oriented event management by demonstrating that process maps embedded in a BPM environment can provide a useful basis for scenario analysis even in the absence of detailed operational data. At the same time, it formulates practical recommendations for event organisers, including the clarification of approval criteria, earlier verification
of requirements and a stronger decomposition of the process into manageable subprocesses.

Keywords: business process management; process maps; BPMN; event management; scenario simulation;

Introduction

The organisation of large events, such as conferences, sporting events, or academic initiatives, constitutes a complex multi-stage process requiring the coordination of numerous stakeholders, interdependent tasks and decisions made under time pressure. As the scale and complexity of such undertakings increase, an ad hoc organisational approach proves insufficient and effective management requires formal methods of planning, control and improvement. In this context, Business Process Management (BPM) provides a useful analytical framework because it focuses not on the functional structure of the organisation, but on the flow of activities, information and resources that create value for stakeholders (Curtis, Kellner & Over, 1992). Of particular importance are process maps, which enable the visualisation of process logic, organisational roles, decision points and interdependencies between activities, thereby supporting the identification of bottlenecks and potential areas

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for improvement (Popovič, Štemberger & Jaklič, 2006). This issue is especially significant in event management, where processes are dynamic in nature and historical operational data are often incomplete or unavailable, which limits the application of methods based on event logs and discrete-event simulation (Van der Aalst, Weijters & Maruster, 2004). This article therefore asks whether process maps supported by SAP Signavio can constitute a sufficient analytical basis for the qualitative and scenario-based simulation of large-event organisation. Using the example of the Manager's Rally, the paper shows how BPMN-based process modelling and variant analysis enable the identification of key sources of delay, cost escalation and workload concentration.

Literature Review and Theoretical Foundations

In the literature devoted to the process-oriented approach, a process is most often defined as an ordered set of interrelated activities leading to the achievement of a specified organisational outcome. Process models therefore fulfil not only a descriptive function, but also analytical, communicative and design-oriented roles (Curtis, Kellner & Over, 1992). In this context, BPMN notation has gained particular importance because it enables the formal representation of flows, events, decision points and organisational roles in a manner supporting both model comparison and their use for simulation. At the same time, research indicates that the usefulness of process models depends not only on formal precision, but also on the appropriate selection of the level of abstraction, which should be adapted to the purpose of the analysis and the specificity of the process under study (Dijkman, La Rosa & Reijers, 2012). Process maps are particularly useful under conditions of limited data availability because they enable a synthetic representation of the logic of activities, responsibility structures and decision dependencies and even in simplified form they may provide the basis for scenario analysis and the design of improvements (Popovič, Štemberger & Jaklič, 2006). In research on event organisation, it is increasingly emphasised that such undertakings have the character of project-based processes requiring the integration of multiple streams of activity, such as logistics, communication, partnership management and formal-administrative support (García-Vallejo et al., 2020; Kulczycki & Wendland, 2012). It is also pointed out that classical process-mining techniques have limited applicability in this domain because event-organisation processes are shaped by creative work, communication and expert decision-making and therefore rarely generate complete and consistent operational data (Dolak, Musil & Kolesar, 2017; Motahari-Nezhad et al., 2011). For this reason, a model-based approach to process analysis, based on process maps and supported by BPM tools, remains a particularly promising solution.

Contemporary BPM platforms support not only the documentation of process execution, but also variant analysis, simulation and the assessment of resource utilisation. In this context, SAP Signavio constitutes a particularly useful tool because it combines formal BPMN-based modelling with parameterisation and simulation functions, which makes it an appropriate environment for studying project-based processes, including event organisation (Elstermann & Piller, 2022; Sola et al., 2023). The possibility of representing alternative organisational scenarios under conditions of limited empirical data availability justifies the use of this platform as the principal research tool in the present article. More broadly, the literature on operational process intelligence and event management also indicates that real-time process visibility and event-driven integration can substantially improve analytical insight in distributed organisational environments (Berner & Jegadeesan, 2014; Navas, 2011; Herzberg et al., 2013; Mandal, 2016).

Research Methodology and Case Study

Input data collection and processing were carried out using a structured questionnaire addressed to members of the organising team involved in the preparation of the Manager's Rally. The survey included [n = 15] respondents representing the main organisational roles in the process: event coordinator, promotion team, partnership team, logistics team, formal-administrative team. Respondents estimated the duration of each activity, indicated the number of persons typically involved and assessed whether a given activity could require repetition due to negative approval decisions. The questionnaire was based on the activities identified in the BPMN process model, ensuring consistency between the process representation and the simulation parameters.

The responses were analysed at the activity level. For each task, two parameter values were derived. The modal value, defined as the most frequently indicated estimate, represented typical organisational conditions. The maximum value, defined as the highest declared estimate, was used to construct the extreme workload scenario. For activities requiring approval, respondents also indicated the possibility of repeated execution, which was reflected in the decision gateways of the simplified BPMN model.

To improve data reliability, the estimates were validated with the event coordinator. Task durations, staffing levels and repetitions were reviewed against practical experience from previous editions of the event. Where discrepancies occurred, the final values were based on the dominant response or, in the maximum scenario, the highest plausible estimate reported by respondents.

The study was conducted in the form of a case study of the Manager's Rally event-organisation process, using a process-oriented approach, BPMN notation and scenario simulation in the SAP Signavio environment. The methodological objective was to determine how variability in task-execution time, the level of resource engagement and the number of iterations resulting from approval points affects the total process duration and its costs. The research procedure comprised three stages: the development of a detailed and a simplified process model, the parameterisation of activities using declarative data obtained from process participants and the simulation of two variants - a modal and a maximum scenario. Owing to the lack of complete operational data, the study relied on model-based simulation, treating the process model as the principal carrier of organisational knowledge and the primary analytical tool. Input data used in the simulation were obtained on the basis of survey responses from process participants. The analysed case concerns a cyclical academic event aimed at student integration, the development of soft skills and community building.

The organisation of the event engages multiple functional teams, a central coordinator and a broad range of interdependent tasks encompassing concept development, logistics, promotion, partnerships, registration and formal-administrative support. Such a process structure justifies the selection of a case study as an appropriate research strategy for analysing the influence of process architecture, decision points and iteration on the temporal and cost dynamics of event organisation.

The modelling of the event-organisation process was carried out using BPMN 2.0 notation, which constitutes a widely accepted standard for the description of business and organisational processes (Curtis et al., 1992; Dijkman et al., 2012). The application of this notation made it possible to formally represent sequential, parallel and iterative structures, which is of crucial importance in the analysis of dynamic event-organisation processes. From a methodological perspective, a process-oriented view was adopted in which the process map and BPMN model function as the analytical backbone enabling the identification of activity sequences, interdependencies between teams, decision points and iterative loops.

In the first stage, a detailed process model was developed, covering the full structure of activities, roles, approvals and alternative paths. Subsequently, for simulation purposes, the model was simplified by aggregating homogeneous activities while preserving the key dependencies between tasks and the logic of decisions. This approach made it possible to maintain a balance between representational detail and the usefulness of the model for variant analysis, especially in a setting where complete event logs, message correlation and automated schema alignment were not available (Van der Aalst et al., 2004; Motahari-Nezhad et al., 2011; Rahm & Bernstein, 2001).

Input data for the simulation was obtained from members of the organising team and included estimated task durations, levels of resource engagement and probabilities of repetition at approval points. Two parameter sets were adopted in the analysis: modal values, representing typical execution conditions and maximum values, reflecting conditions of extreme organisational workload. Labour cost was estimated by converting task duration and staffing levels into a simplified measure of human-resource cost under the assumption of a uniform hourly rate. This solution was intended to preserve comparability between simulation variants and to focus the analysis on the relationship between time (h), workload (W) and cost (O).

$$Event\ cost\ = O \times W \times h$$

$$Labor\ cost\ = \sum Event\ cost$$

The modal and maximum variants represent two distinct states of the same process. The modal variant reflects typical event organisation conditions and was parameterised using the most frequently indicated values of task duration and resource involvement. The maximum variant represents a stress scenario based on the highest declared durations, resource requirements and increased repetitions at approval points. Comparing these variants makes it possible to identify process elements that remain stable under normal conditions and those that become bottlenecks when workload, delays and rework increase.

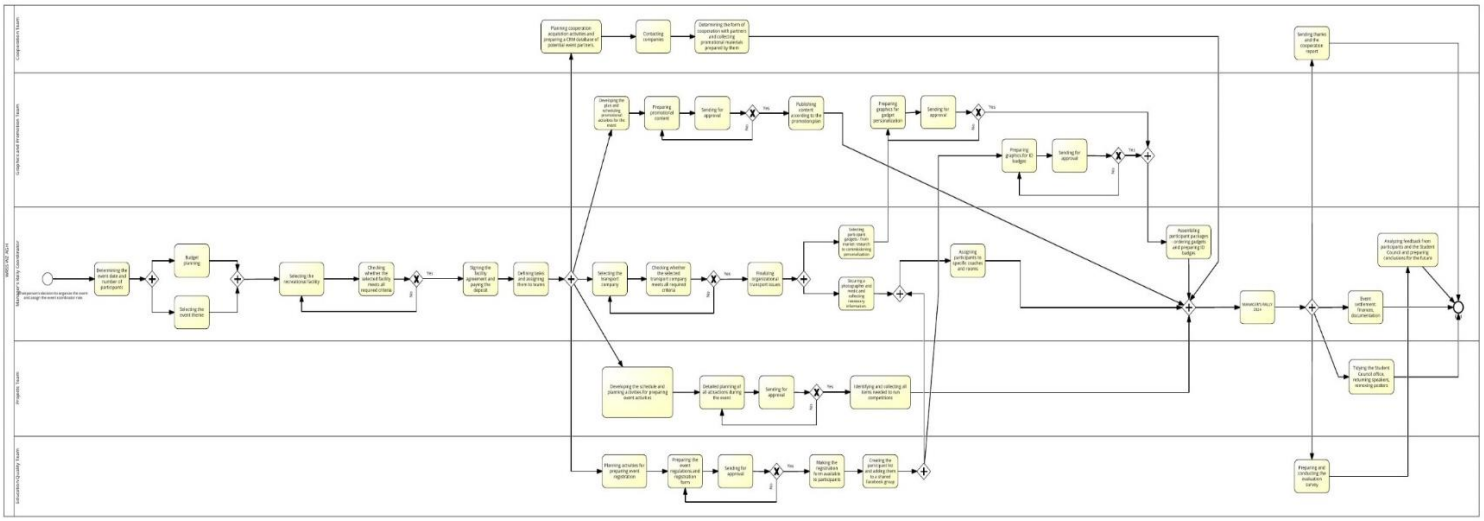

Fig 1 Simplified model of the "Manager's Rally" organisation process (BPMN 2.0, simulation version)

Table 1. Summary of estimated input data

Task	Time (hh:mm:ss)	No. of persons	Cost
Determining the event date and number of participants	00:30:00	20	280.00 PLN
Budget planning	60:00:00	2	3,360.00 PLN
Selecting the event theme	02:00:00	20	1,120.00 PLN
Selecting the recreational facility	02:00:00	20	1,120.00 PLN
Checking whether the selected facility meets all required criteria	01:00:00	1	28.00 PLN
Signing the facility agreement and paying the deposit	02:30:00	2	140.00 PLN
Defining tasks and assigning them to teams	02:30:00	1	70.00 PLN
Planning cooperation acquisition activities and preparing a CRM database of potential event partners.	02:30:00	2	140.00 PLN
Contacting companies	140:00:00	8	31,360.00 PLN
Determining the form of cooperation with partners and collecting promotional materials prepared by them	06:00:00	6	1,008.00 PLN
Developing the plan and scheduling promotional activities for the event	02:30:00	2	140.00 PLN
Preparing promotional content	24:00:00	5	3,360.00 PLN
Sending for approval	00:15:00	5	35.00 PLN
Publishing content according to the promotion plan	01:30:00	3	126.00 PLN
Selecting the transport company	02:30:00	2	140.00 PLN
Checking whether the selected transport company meets all required criteria	01:00:00	1	28.00 PLN

Finalizing organizational transport issues	02:30:00	1	70.00 PLN
Selecting participant gadgets - from market research to commissioning personalization	60:00:00	3	5,040.00 PLN
Preparing graphics for gadget personalization	05:30:00	2	308.00 PLN
Sending for approval	00:15:00	1	7.00 PLN
Securing a photographer and medic and collecting necessary information.	24:00:00	1	672.00 PLN
Developing the schedule and planning activities for preparing event activities	24:00:00	2	1,344.00 PLN
Detailed planning of all attractions during the event	05:30:00	11	1,694.00 PLN
Sending for approval	00:15:00	6	42.00 PLN
Identifying and collecting all items needed to run competitions	24:00:00	5	3,360.00 PLN
Planning activities for preparing event registration	01:00:00	2	56.00 PLN
Preparing the event regulations and registration form	03:00:00	2	168.00 PLN
Sending for approval	00:15:00	1	7.00 PLN
Making the registration form available to participants	00:15:00	1	7.00 PLN
Creating the participant list and adding them to a shared Facebook group	36:00:00	2	2,016.00 PLN
Assigning participants to specific coaches and rooms	03:00:00	2	168.00 PLN
Preparing graphics for ID badges	03:00:00	1	84.00 PLN
Sending for approval	00:15:00	1	7.00 PLN
Assembling participant packages - ordering gadgets and preparing ID badges	36:00:00	11	11,088.00 PLN
Preparing and conducting the evaluation survey	01:30:00	1	42.00 PLN
Sending thanks and the cooperation report	03:00:00	8	672.00 PLN
Event settlement: finances, documentation	06:00:00	2	336.00 PLN
Tidying the Student Council office, returning speakers, removing posters	24:00:00	11	7,392.00 PLN
Analyzing feedback from participants and the Student Council and preparing conclusions for the future	03:00:00	20	1,680.00 PLN

The data presented in Table 1 show that, under modal conditions, the most resource-intensive activities are not necessarily those requiring the longest formal duration, but those combining longer execution time with the involvement of larger teams. Contacting companies, assembling participant packages, selecting participant gadgets and post-event office-related activities generate relatively high labour costs. These tasks should therefore be interpreted as potential operational bottlenecks under typical conditions, especially because they require coordination between several organisational areas. Promotional-content preparation is also important, not because of its absolute cost alone, but because it is linked to approval points and may trigger rework.

Design of the Simulation Experiment

The simulation experiment was conducted in the SAP Signavio Process Manager environment based on the simplified process model. In SAP Signavio Process Manager, the simplified BPMN model was used for scenario simulation. Each activity was assigned an estimated duration and the required number of persons. Costs were calculated based on activity duration, staffing level and a uniform hourly labour rate. Decision gateways represented approval points and possible returns to previous activities, capturing the iterative nature of the process. The simulation covered one process instance corresponding to a single edition of the Manager's Rally. Key outputs included total process duration, labour cost, workload distribution and the impact of repeated activities. Using the same process structure in both scenarios ensured comparability, with differences resulting only from changes in task duration, resource involvement and repetitions. The simplification of the model consisted in the aggregation of homogeneous activities and the elimination of excessive operational details that did not significantly affect the results of the time and cost analysis. Minor technical subtasks, repetitive information exchanges and supporting activities were reduced, while all elements determining process flow, including decision

gateways, stages requiring approval and alternative paths, were preserved. The resulting reference model was used to compare two variants of process execution: a modal variant reflecting typical execution conditions and a maximum variant representing a scenario of extreme workload, characterised by longer task durations, higher levels of resource engagement and a greater number of iterations triggered by negative approval decisions. The analysis focused on total preparation time, total labour cost, workload distribution across teams and the role of iteration in increasing organisational burden. The application of a uniform hourly rate for all process participants made it possible to limit the influence of confounding variables and to focus the interpretation of results on differences arising from process structure and variability. Such a design is consistent with studies that use process mining and performance analysis primarily to detect bottlenecks, variant behaviour and improvement potential under constrained data conditions (Mohammadi, Kazempourian & Vanani, 2023; Dolak, Musil & Kolesar, 2017).

Table 2. Summary of simulation data for the critical path

Task	Time (hh:mm:ss)	No. of persons	Cost
Determining the event date and number of participants	40:00:00	20	22 400.00 PLN
Budget planning	120:00:00	3	10 080.00 PLN
Selecting the event theme	120:00:00	20	67 200.00 PLN
Selecting the recreational facility	120:00:00	20	67 200.00 PLN
Checking whether the selected facility meets all required criteria	120:00:00	3	10 080.00 PLN
Signing the facility agreement and paying the deposit	120:00:00	2	6 720.00 PLN
Defining tasks and assigning them to teams	120:00:00	1	3 360.00 PLN
Planning cooperation acquisition activities and preparing a CRM database of potential event partners.	20:00:00	12	6 720.00 PLN
Contacting companies	320:00:00	9	80 640.00 PLN
Determining the form of cooperation with partners and collecting promotional materials prepared by them	80:00:00	9	20 160.00 PLN
Developing the plan and scheduling promotional activities for the event	120:00:00	9	30 240.00 PLN
Preparing promotional content	320:00:00	6	53 760.00 PLN
Sending for approval	01:00:00	6	168.00 PLN
Publishing content according to the promotion plan	08:00:00	3	672.00 PLN
Selecting the transport company	80:00:00	20	44 800.00 PLN
Checking whether the selected transport company meets all required criteria	03:00:00	6	504.00 PLN
Finalizing organizational transport issues	120:00:00	3	10 080.00 PLN
Selecting participant gadgets - from market research to commissioning personalization	320:00:00	20	179 200.00 PLN
Preparing graphics for gadget personalization	320:00:00	6	53 760.00 PLN
Sending for approval	01:00:00	6	168.00 PLN
Securing a photographer and medic and collecting necessary information.	120:00:00	3	10 080.00 PLN
Developing the schedule and planning activities for preparing event activities	320:00:00	12	107 520.00 PLN
Detailed planning of all attractions during the event	320:00:00	12	107 520.00 PLN
Sending for approval	01:00:00	12	336.00 PLN
Identifying and collecting all items needed to run competitions	320:00:00	15	134 400.00 PLN
Planning activities for preparing event registration	02:00:00	6	336.00 PLN
Preparing the event regulations and registration form	80:00:00	15	33 600.00 PLN
Sending for approval	00:30:00	2	1 680.00 PLN
Making the registration form available to participants	24:00:00	2	1 344.00 PLN
Creating the participant list and adding them to a shared Facebook group	80:00:00	6	13 440.00 PLN

Assigning participants to specific coaches and rooms	32:00:00	6	5 376.00 PLN
Preparing graphics for ID badges	40:00:00	2	2 240.00 PLN
Sending for approval	00:30:00	2	2 800 PLN
Assembling participant packages - ordering gadgets and preparing ID badges	40:00:00	15	16 800.00 PLN
Preparing and conducting the evaluation survey	24:00:00	3	2 016.00 PLN
Sending thanks and the cooperation report	16:00:00	12	5 376.00 PLN
Event settlement: finances, documentation	40:00:00	3	3 360.00 PLN
Tidying the Student Council office, returning speakers, removing posters	40:00:00	12	13 440.00 PLN
Analyzing feedback from participants and the Student Council and preparing conclusions for the future	40:00:00	20	22 400.00 PLN

Table 2 indicates that, in the maximum variant, the strongest cost and workload concentration occurs in tasks related to participant gadgets, preparation of attractions, assembling materials for competitions, cooperation with companies, venue-related decisions and promotional-content preparation. These activities become critical because they combine long execution times, high staffing levels and strong dependencies on other subprocesses. Promotional and personalised-material tasks are vulnerable to repeated approval cycles, which explains their role in the cascading increase in total preparation time and cost.

Research Results and Discussion

This section presents the results of the analysis of two simulation variants and their interpretation from the perspective of process management. Attention is devoted to preparation time, labour cost, iteration and the concentration of resource workload, because these dimensions best reflect the mechanisms of instability in the process under investigation. The comparison of the modal and maximum variants makes it possible to assess the sensitivity of the process to adverse execution conditions and to identify subprocesses functioning as bottlenecks. In both variants, activities related to approval and promotional subprocesses proved to be especially important sources of disruption.

The modal variant reflects the standard course of event organisation, in which task durations and team sizes correspond to the values most frequently declared by process participants. The simulation identified two repetitions: the reassessment of the event venue and the revision of promotional content. The total cycle time amounted to 25 days, 4 hours and 15 minutes; after excluding the duration of the event itself, this corresponds to approximately 545 hours of preparatory work. The result indicates that, even under typical conditions and with a limited number of iterations, the organisation of the event remains a long-term and coordination-intensive process.

In the modal variant, the total labour cost was estimated at PLN 116,858 under the assumption of a uniform hourly rate and the conversion of labour time into a cost measure. Although the adopted calculation procedure is simplified in nature, it is methodologically justified from the perspective of variant comparison, because it makes it possible to analyse the relationship between execution time, resource workload and total cost. The results indicate that even a limited number of iterations contributes to cost growth, especially in tasks involving larger teams. This confirms the high sensitivity of process costs to repeated activities in communication- and coordination-intensive areas.

The results also indicate a significant cost effect of iteration: in a fully reliable model (approval granted at the first attempt), costs would be markedly lower, whereas in the simulation reflecting the need for repeated task execution, costs increased substantially despite a relatively small increase in time. This supports the interpretation that costs are highly sensitive to repeated tasks involving large teams, especially in promotional activities. From a BPM perspective, this pattern reflects the role of approval gateways as quality-control points that may trigger rework loops; even when the number of such loops is limited, they may significantly affect downstream coordination and costs when they occur in communication-intensive subprocesses.

In the modal variant, the greatest workload rested on the coordinator and the graphics and promotion team (approximately 28% and 30% of total labour input, respectively). This is consistent with expert experience concerning the organisation of the Manager's Rally, in which promotional and decision-related areas generate the largest number of interactions and require constant supervision, including approvals, revisions and the synchronisation of information across the registration, partnership and logistics subprocesses.

The maximum variant represents an extreme time-intensive scenario characterised by long task durations, greater staff involvement and intensified iteration at approval points. The simulation demonstrated a tenfold increase in the total cycle time of preparatory work. Such a substantial increase indicates a strong cumulative effect of delays and multiple rework loops, which is typical of project-based processes with numerous feedback mechanisms. The source material emphasised that under such parameters, the organisation of the event would in practice be difficult to complete within a one-year time horizon.

The greatest accumulation of repetitions occurred in the promotion domain and in personalised artefacts (promotional materials and name badges), which is consistent with the logic of the process: creative activities generate versioning and versioning - when not accompanied by unambiguous approval criteria - increases the probability of returns and rework. In the model, these activities are also strongly linked to other subprocesses (e.g. participant lists and package preparation), which reinforces the cascading effect: delays in promotion and communication directly translate into delays in subsequent stages of the process. The total organisational cost in the maximum variant increased proportionally to the increase in time and resulted both from the prolongation of execution times and from the increased number of repeated activities in critical process nodes. The maximum variant may therefore be interpreted as a stress test of process architecture. It shows that repeated returns at approval points destabilise the system not only by extending execution time, but also by amplifying workload in the most interdependent subprocesses. This finding suggests that limiting iteration through clearer standards and earlier review mechanisms is likely to be more effective than merely increasing staffing levels.

The maximum variant revealed a strong cumulative effect of delays and iteration, leading to a multiple extension of preparation time and a sharp increase in costs. Promotional activities and stages requiring approval proved particularly susceptible to destabilisation, becoming key bottlenecks of the process under extreme conditions. The comparison of both variants confirms the non-linear character of the analysed process: relatively small changes in input parameters may lead to a cascading escalation of time and cost. From a process-management perspective, this means that the stability of event organisation depends primarily on the efficiency of decision-making mechanisms, the quality of first versions of materials and the degree of standardisation of subprocesses. These results justify the need for earlier verification of requirements, precise definition of approval criteria and a clearer division of the process into manageable subprocesses. While Tables 1 and 2 present the task-level input structure of the two simulation variants, Table 3 synthesises the process-level consequences of these assumptions. It shows how changes in time, resource engagement and iteration affect overall process stability, cost escalation, workload concentration and organisational risk.

Table 3. Synthetic comparison of the modal and maximum variants of the event-organisation process

Comparison area	Modal variant	Maximum variant	Interpretive significance
Nature of process execution	Stable, predictable	Unstable, disruption-prone	The process enters a critical state as iteration increases
Effective preparation time	544,25 h	4 838,5 h	More than an eightfold increase in time – a cascading effect
Scale of time increase	-	~18× (gross)	The process response is non-linear
Total organisational cost	PLN 116,858	PLN 1,330,476	Cost escalation in iterative areas
Scale of cost increase	-	~11×	No proportionality in the time-cost relationship
Iteration of activities	Limited (2 repetitions)	High (multiple repetitions)	Iteration as the main destabilising mechanism

Location of iteration	Single decision points	Concentrated in promotional areas	Creative tasks are prone to rework
Coordinator workload	28%	33%	Increased risk of decision overload
Promotion team workload	30%	31%	Promotion as a process bottleneck
Workload concentration (2 roles)	~58%	>60%	Centralised work increases susceptibility to delay
Process resilience to disruption	High	Low	Limited resilience under extreme conditions
Organisational risk	Limited	Very high	Reveals the limits of system stability

The obtained results confirm the findings of the literature, according to which process maps - even in relatively simplified form - may function as effective analytical and decision-support tools in environments characterised by limited quantitative data availability. The study shows that the absence of advanced methods based on event logs does not preclude the identification of key sources of process instability. On the contrary, already at the level of process modelling and variant simulation, it is possible to reveal the mechanisms responsible for the accumulation of delays, the overload of decision-making resources and the escalation of costs resulting from the iterative character of activities. From the perspective of organisational diagnosis and improvement, this also aligns with change-management approaches that emphasise the interpretation of situations, actors and process relationships as a basis for prioritising interventions (Pramod & Banwet, 2010; Thampi, Pramod & Abdul Samad, 2016).

From a practical perspective, the study indicates that the effectiveness of event organisation depends to a large extent on the quality of approval mechanisms, the throughput of decision-making and the degree of standardisation of tasks performed in communication and promotional areas. The use of SAP Signavio as a modelling and simulation environment makes it possible not only to formally represent the course of the process, but also to support organisational decision-making through the analysis of the effects of changes in input parameters. The results therefore justify treating BPM tools not merely as instruments for process documentation, but also as practical means of supporting the planning and improvement of complex organisational undertakings. This interpretation is additionally consistent with research on process intelligence, complex event processing and distributed event/data management, which highlights the value of integrating process representations with operational signals and analytical feedback for organisational coordination (Berner & Jegadeesan, 2014; Herzberg et al., 2013; Mandal, 2016; Navas, 2011).

It should nevertheless be emphasised that the study is subject to important limitations. The simulation was based on declarative input data provided by process participants and the model was simplified for analytical purposes, which may have affected the level of detail in the representation of the actual course of activities. In addition, the application of a uniform hourly rate limits the precision of cost estimates, although it increases the comparability of variants. The results also relate to a single case study embedded in an academic context and therefore their generalisation requires caution. Future research should include a comparison between simulation results and the actual course of the process after the implementation of organisational changes and should extend the analysis to other types of events, which would allow a more precise determination of the scope of universality of the conclusions obtained.

In conclusion, the study confirms the legitimacy of applying a process-oriented approach and scenario simulation in the analysis of the organisation of large events. The proposed methodology enables a deeper understanding of process structure and dynamics, the identification of key sources of risk and the assessment of the consequences of variability in input parameters. At the same time, it provides a practical tool supporting the planning and improvement of organisational activities, which may be applied not only to academic events, but also to other project-based undertakings requiring the coordination of multiple teams and stakeholders.

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References

- Berner, M., & Jegadeesan, H. (2014). *SAP operational process intelligence: Empowering line-of-business workers with real-time process visibility*. CEUR Workshop Proceedings.
- Curtis, B., Kellner, M. I., & Over, J. (1992). Process modeling. *Communications of the ACM, 35*(9), 75–90. https://doi.org/10.1145/130994.130998
- Dijkman, R., La Rosa, M., & Reijers, H. A. (2012). Managing large collections of business process models: Current techniques and challenges. *Computers in Industry, 63*(2), 91–97. https://doi.org/10.1016/j.compind.2011.12.003
- Dolak, R., Musil, D., & Kolesar, J. (2017). Process mining of event log from web information and administration system for management of student’s computer networks. In *Lecture Notes in Computer Science* (pp. 180–191). Springer.
- Elstermann, M., & Piller, C. (2022). A comparative study of simulation tools for business processes. In *Communications in Computer and Information Science*. Springer.
- García-Vallejo, A. M., Albahari, A., Añó-Sanz, V., & Garrido-Moreno, A. (2020). What’s behind a marathon? Process management in sports running events. *Sustainability, 12*(15), Article 6000. https://doi.org/10.3390/su12156000
- Herzberg, N., Meyer, A., Khovalko, O., & Weske, M. (2013). Improving business process intelligence with object state transition events. In *Lecture Notes in Computer Science* (Vol. 8094, pp. 115–130). Springer. https://doi.org/10.1007/978-3-642-41924-9_14
- Kulczycki, E., & Wendland, M. (Eds.). (2012). *Komunikologia. Teoria i praktyka komunikacji*. Wydawnictwo Naukowe Instytutu Filozofii UAM.
- Mandal, S. (2016). *Integrating complex event processing to case management*. Technische Berichte des Hasso-Plattner-Instituts für Softwaresystemtechnik an der Universität Potsdam.
- Mohammadi, F., Kazempourian, S., & Vanani, I. R. (2023). Process mining approach to performance analysis and bottleneck finding in electronic processes (case study: The billing process of hospital services). *International Journal of Process Management and Benchmarking*.
- Motahari-Nezhad, H. R., Saint-Paul, R., Casati, F., & Benatallah, B. (2011). Event correlation for process discovery from web service interaction logs. *The VLDB Journal, 20*(3), 417–444. https://doi.org/10.1007/s00778-010-0203-9
- Navas, J. (2011). Insight into events: Event and data management for the extended enterprise. In *Lecture Notes in Business Information Processing*. Springer.
- Popovič, A., Štemberger, M. I., & Jaklič, J. (2006). Applicability of process maps for simulation modeling in business process change projects. *Interdisciplinary Journal of Information, Knowledge and Management, 1*, 79–95. https://doi.org/10.28945/117
- Pramod, V. R., & Banwet, D. K. (2010). System modelling of telecom service sector supply chain: A SAP-LAP analysis. *International Journal of Business Excellence*.
- Rahm, E., & Bernstein, P. A. (2001). A survey of approaches to automatic schema matching. *The VLDB Journal, 10*(4), 334–350. https://doi.org/10.1007/s007780100057
- Sola, D., Warmuth, C., Schäfer, B., & Kampik, T. (2023). SAP Signavio academic models: A large process model dataset. In *Lecture Notes in Business Information Processing* (Vol. 459, pp. 441–454). Springer. https://doi.org/10.1007/978-3-031-27815-0_33
- Thampi, H. K., Pramod, V. R., & Abdul Samad, K. (2016). Analysis of change management using SAP-LAP hills. In *Proceedings of the International Conference on Industrial Engineering and Operations Management*.
- Van der Aalst, W. M. P., Weijters, T., & Maruster, L. (2004). Workflow mining: Discovering process models from event logs. *IEEE Transactions on Knowledge and Data Engineering, 16*(9), 1128–1142. https://doi.org/10.1109/TKDE.2004.47