



Process Maturity Model for Improving Blood Donor Service Quality – Proposed Assumptions and Assessment Criteria

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Abstract. The article presents the assumptions and criteria for assessing the process maturity model developed to improve the quality of blood donor service in blood donation and blood therapy centres. The methodological basis was a literature review and case analysis of public blood service units, in cooperation with the National Blood Centre (NBC) in Warsaw. The research was conducted as part of the project ‘Improving the quality of management in blood donation and blood therapy centers’ implemented by the NBC in 2022–2023. The model, developed by the author as a logistics expert, is multidimensional and makes it possible to assess the level of process maturity of Regional Blood Center (RBC). It takes into account the specificity of operational activities and donor relations as key elements of the quality of medical services provided by the centres. The publication contains proposals for the practical use of the model as a tool supporting management and improving service standards.

Keywords: process maturity, Regional Blood Center, medical service quality, process management, maturity assessment model, process improvement

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1. INTRODUCTION

According to numerous authors, a key determinant of both quality and efficiency is the maturity of an organisation – regardless of its operational profile (Brajer-Marczak, 2018; Enkel et al., 2011; Kalinowski, 2017; Vom Brocke & Rosemann, 2015). This maturity denotes a certain level of capability (excellence) and may be considered in terms

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of managerial, process, project, technological, quality, knowledge, or cultural maturity, among others (Cieśliński et al., 2014; Detyna, 2020; Kucińska-Landwójtowicz & Kołosowski, 2012; Skrzypek, 2014; 2020; Wolniak, 2011). For instance Skrzypek (2014), in her research, presents the essence and importance of quality maturity in organisations, demonstrating the relationship between quality maturity and financial as well as economic performance. Similarly, Łukasiński (2016) addresses this issue by focusing on the maturity of quality-oriented management organisations. Analysis of both Polish and international literature indicates that the predominant area of research in this context is organisational maturity, particularly within the framework of a process-oriented approach (Albliwi et al., 2014; Detyna, 2020; Grajewski, 2007; Harmon, 2004; Rohloff, 2009; Tarhan et al., 2016). This trend is closely related to the growing interest among various organisations, including those providing medical services, in implementing quality management standards such as ISO 9001:2015 (Bitkowska, 2013; Ludwiczak, 2017; Mutafelija & Stromberg, 2008). These services are delivered not only by outpatient clinics or hospitals but also by blood donation and transfusion centres. Their purpose is to meet the needs of patients (recipients) requiring blood and its components in the appropriate type and quantity, ensuring timely and adequate supply to hospitals (Lorek et al., 2023). Blood donation and transfusion centres (BDBTCs) in Poland operate within the framework of the public blood service, fulfilling key tasks in the collection, testing, preparation, and distribution of blood and its components. Their operations rely on complex processes such as donor registration, laboratory diagnostics, inventory management, and donor service, which must be executed in a consistent, safe, and efficient manner (krwiodawcy.org).

Empirical research confirming the correlation between the process maturity of hospitals and the quality of medical services (Detyna, 2020) prompted the development of a process maturity model for blood donation and transfusion centres. The guiding research assumption was the thesis that process maturity models can serve as effective tools for improving the quality of services delivered by such centres. In the light of growing public expectations and the necessity of ensuring the highest quality of services, the implementation of a process maturity model may constitute a key instrument for improving management practices, standardising operations within centres, enhancing safety, and strengthening the system's capacity to respond promptly to blood demand (Albliwi et al., 2014; Enkel et al., 2011; Harmon, 2004; Rohloff, 2009; Tarhan et al., 2016; pacjent.gov.pl).

Consequently, a process-oriented management approach should be regarded as not merely desirable but as essential for the sustainable development of these institutions. The characteristics of process maturity in BDBTCs as a research object include:

- capacity to build and improve service delivery as a result of collaboration, not merely individual efforts;
- full identification of processes and effective dissemination of process knowledge to all staff (core operational, administrative, technical, financial, and logistical);
- process design activities are planned;
- processes are validated, monitored, and improved, including through input–output ratio analysis;

- roles and responsibilities are clearly defined across the entire organisation, as well as within individual processes and projects;
- donor service quality is subject to ongoing monitoring;
- existence of an objective (quantitative) basis for assessing the quality of services and activities (Detyna, 2020; 2023).

This list can be supplemented with parameters that indicate the process-oriented nature of the organisational structure of the described centres.

- multifunctional value chains form a dynamic system composed of clearly distinguishable management and operational processes;
- the course of processes is specific and conditioned;
- processes are implemented according to their natural sequence – tasks are performed in a logically ordered flow;
- a broadly developed system of horizontal communication focused on comprehensive donor service is in place;
- organisational structure has evolved from a hierarchical model into an ‘input–output’ configuration, oriented towards object–process specialisation;
- due to the input–output architecture, sequences of control–regulatory, informational, and operational interactions frequently occur;
- management instruments and operational techniques, as process components, are widely applied and utilised;
- work is organised through process teams – different positions are combined to streamline process flow and maximise efficiency;
- emphasis on empowering employees involved in the process – the manager’s role is more advisory than supervisory;
- processes and their constituent tasks are performed in the most optimal, convenient, and suitable conditions and locations, with high importance placed on flexibility and innovation (Detyna, 2023; Stabryła, 2010).

To summarise, process maturity for RBCs can be defined as: The ability of a centre to responsibly, flexibly, and effectively manage its core, managerial, and support processes, as reflected in the continuous achievement of improved performance (strategic, tactical, and operational objectives), including the satisfaction of donor and stakeholder (medical entities, centre employees) needs and expectations. It also includes a future-oriented, comprehensive approach to development and continuous improvement, which constitutes a fundamental indicator of the organisation’s overall maturity (Detyna, 2020).

2. RESEARCH METHODOLOGY

The article uses two main research methods: a literature review and a case study. The case study was conducted on the basis of data on Polish blood donation and blood therapy centres that participated in the project entitled ‘Improving the quality of management in blood donation and blood therapy centers’ implemented in 2022–2023 by the NBC. The research included an analysis of organisational documentation and

operational procedures provided by the centres' employees. The author, as a logistics expert, participated in the project work and, on this basis, developed a proposal for a multidimensional process maturity model. This model was adapted to the realities of the functioning of blood donation and blood therapy centres, and its utility was assessed based on consultations with representatives of the units participating in the project. As part of the consultations, meetings with the centre directors were held in 2023.

3. RESEARCH RESULTS – KEY ASSESSMENT CRITERIA IN THE PROPOSED PROCESS MATURITY MODEL

The multidimensional process maturity assessment model proposed in this paper may serve as a tool for increasingly effective management of blood centres and for identifying the current development level of organisations from the perspective of process-oriented management. By determining the level of process maturity, the organisation's overall development can be evaluated, ranging from a functional to a process-based organisation (Detyna, 2020; Grajewski, 2016). The proposed model recommends integrating process maturity assessment with service quality evaluation. This approach enables a comparative analysis of organisational outcomes in both dimensions, justified by the primacy of donor and recipient needs (the centres' core mission) over other activities.

A review of the literature and empirical studies conducted by the NBC (2022–2023) reveals that the process maturity model for RBCs should be: multidimensional, aligned with the centre's mission and strategy, complementary to ISO 9001:2015 requirements (if applicable), simple, flexible, positively influencing employee motivation, and most importantly, useful as a tool for improving donor service quality.

The key criteria for assessing process maturity have been divided into several groups: general goals (GG), process areas (PA), general practices (GP), assessment criteria for the maturity level of employee development processes (ED), and criteria for assessing the maturity of process owners (PO).

The general goals identified in the model, common to many process areas, include:

- GG1: Institutionalisation of managed processes – corresponding to maturity level 2 (Managed);
- GG2: Institutionalisation of defined processes – corresponding to maturity level 3 (Defined);
- GG3: Institutionalisation of quantitatively managed processes – corresponding to maturity level 4 (Quantitatively Managed);
- GG4: Institutionalisation of optimising processes – corresponding to maturity level 5 (Optimising).

The extent to which individual general goals are achieved by RBCs determines the so-called institutionalisation of the implemented process area within the facility – thus confirming the actual execution of processes and their classification into a specific level of process maturity.

The assessment criteria applied in the model also relate to eleven process areas within the centres, which include:

- PA1: Planning;
- PA2: Monitoring and control;
- PA3: Metrics and analysis;
- PA4: Process and service quality assurance;
- PA5: Training;
- PA6: Process focus;
- PA7: Process definition;
- PA8: Process performance;
- PA9: Quantitative process management;
- PA10: Organisational innovation and implementation;
- PA11: Root cause and solution analysis.

Taking into account the specific nature and operational conditions of RBCs, the model distinguishes two main categories of process areas:

- Process Management – comprising eight areas related to process definition, planning, implementation, and monitoring (PA1, PA2, PA5, PA6, PA7, PA8, PA9, PA10);
- Process Support – comprising three areas that organise change management, quality assurance, data and indicator collection and analysis, and decision-making mechanisms (PA3, PA4, PA11).

The assessment criteria within the model referring to specific dimensions (processes) are the so-called general practices, which are shared across many process areas. Their implementation determines the achievement of the general goals and, consequently, the institutionalisation of the implemented process area within a given centre.

The criteria for assessing process maturity, categorised by process area, goal, and general practice, are presented in Table 1 (shaded fields in the table indicate fulfilment of a given criterion).

The basis for determining process maturity levels includes thirteen criteria, defined as general practices (GPs):

- GP1: Processes are planned;
- GP2: Resources are ensured;
- GP3: Responsibilities are assigned;
- GP4: Training is organised;
- GP5: Relevant stakeholders are identified and involved;
- GP6: Processes are monitored and controlled;
- GP7: Process flow is reviewed with management;
- GP8: Implemented processes are evaluated;
- GP9: Processes are defined and described;
- GP10: Information is collected for process improvement;
- GP11: Quantitative goals are set for processes;
- GP12: Continuous process improvement is ensured;
- GP13: Root causes of problems are eliminated.

Table 1. *Assessment criteria in the proposed process maturity model for RBCs*

Process area (PA)	General goal (GG)	General practice (GP)	Maturity level				
			1	2	3	4	5
			Initial	Managed	Defined	Quantitatively managed	Optimising
PA1: Planning	GG1: Institutionalisation of managed processes	GP1: Processes are planned					
		GP2: Resources are ensured					
		GP3: Responsibilities are assigned					
		GP4: Training is organised					
		GP5: Relevant stakeholders are identified and involved					
PA2: Monitoring and Control		GP5: Relevant stakeholders are identified and involved					
		GP6: Processes are monitored and controlled					
		GP7: Process flow is reviewed with management					
PA3: Metrics and Analysis		GP6: Processes are monitored and controlled					
PA4: Process and Service Quality Assurance		GP8: Implemented processes are evaluated					
PA5: Training		GP4: Training is organised					
PA6: Process Focus	GG2: Institutionalisation of defined processes	GP9: Processes are defined and described					
		GP10: Information is collected for process improvement					
PA7: Process Definition		GP9: Processes are defined and described					
		GP10: Information is collected for process improvement					

Table 1 (cont.)

PA8: Process Performance	GG3: Institutionalisation of quantitatively managed processes	GP11: Quantitative goals are set for processes					
PA9: Quantitative Process Management		GP11: Quantitative goals are set for processes					
PA10: Organisational Innovation and Implementation	GG4: Institutionalisation of optimising processes	GP12: Continuous process improvement is ensured					
PA11: Root Cause and Solution Analysis		GP13: Root causes of problems are eliminated					

Source: author's own work (Detyna, 2023).

The model enables a multidimensional analysis and evaluation of process maturity, including alignment with ISO 9001:2015 requirements. In this context, three core process groups are distinguished in RBCs: managerial, core (main), and support processes. Each group may include several individual processes (i.e., maturity evaluation dimensions) depending on organisational needs and characteristics.

Examples of RBC processes for self-assessment:

- 1) Managerial processes:
 - Quality Management System improvement;
 - General management;
 - Financial resource management.
- 2) Core processes (related to RBC's mission):
 - Service delivery – blood and component collection, processing, storage, transport – targeting both donors and stakeholders (recipients, healthcare providers, etc.);
 - Diagnostics – donor qualification, laboratory and analytical work, physician and nurse qualification procedures.
- 3) Support processes:
 - Promotion of voluntary blood donation;
 - Sanitary and hygienic supervision;
 - Occupational health and safety supervision;
 - Human resources management – including personnel organisation;
 - Infrastructure management;
 - Procurement and supply – assessed independently or within logistics processes;
 - Logistics – covering the flow of materials, people, and accompanying information (registration, RBC accessibility, communication, and marketing);
 - Medical equipment supervision – including validation of premises, devices, and tools;
 - Data analysis;
 - Documented information control – including personal data protection.

It is recommended that each RBC assess these processes separately based on the level of general practice implementation. To simplify the evaluation procedure, three response options are used: 'Yes', 'Partially', and 'No'. Shaded cells in Table 2 indicate the degree of criterion fulfilment.

Table 2. *Criteria for assessing the level of process maturity of the examined dimension (process) – implementation of general practices in RBCs*

Evaluation criteria	Level of fulfilment	Maturity level				
		1	2	3	4	5
GP1: Processes are planned	Yes					
	Partially					
	No					
GP2: Resources are ensured	Yes					
	Partially					
	No					
GP3: Responsibilities are assigned	Yes					
	Partially					
	No					
GP4: Training is organised	Yes					
	Partially					
	No					
GP5: Relevant stakeholders are identified and involved	Yes					
	Partially					
	No					
GP6: Processes are monitored and controlled	Yes					
	Partially					
	No					
GP7: Process flow is reviewed with management	Yes					
	Partially					
	No					
GP8: Implemented processes are evaluated	Yes					
	Partially					
	No					
GP9: Processes are defined and described	Yes					
	Partially					
	No					

Table 2 (cont.)

GP10: Information is collected for process improvement	Yes					
	Partially					
	No					
GP11: Quantitative goals are set for processes	Yes					
	Partially					
	No					
GP12: Continuous process improvement is ensured	Yes					
	Partially					
	No					
GP13: Root causes of problems are eliminated	Yes					
	Partially					
	No					

Source: Author's own work (Detyna, 2023)

Among the key factors enabling process implementation are executors, while essential organisational capabilities include employee competences (Detyna, 2020). The proposed model allows RBCs to classify process maturity in terms of employee development (ED). Table 3 presents the requirements that a centre must meet to achieve a given maturity level. As before, shaded cells indicate the degree of criterion fulfilment.

Table 3. *Criteria for assessing process maturity in terms of employee development in RBCs*

Evaluation criteria	Level of fulfilment	Level offulfilment				
		1	2	3	4	5
ED1: Work environment serves only to fill job positions	Yes					
	Partially					
	No					
ED2: Remuneration program is defined	Yes					
	Partially					
	No					
ED3: Performance management policy is in place	Yes					
	Partially					
	No					
ED4: Communication system is operational	Yes					
	Partially					
	No					

Table 3 (cont.)

Evaluation criteria	Level of fulfilment	Level offulfilment				
		1	2	3	4	5
ED5: Training and employee development program is in place	Yes					
	Partially					
	No					
ED6: Competency-based HR development system is operational	Yes					
	Partially					
	No					
ED7: Career development plans are prepared	Yes					
	Partially					
	No					
ED8: System for team work planning is in place	Yes					
	Partially					
	No					
ED9: Trainings are planned based on competency analysis	Yes					
	Partially					
	No					
ED10: System for monitoring employee development is implemented	Yes					
	Partially					
	No					
ED11: Teams are granted extended decision-making powers	Yes					
	Partially					
	No					
ED12: Quantitative methods are used in performance management	Yes					
	Partially					
	No					
ED13: Employee competences are treated as key RBC resources	Yes					
	Partially					
	No					
ED14: The centre continually improves its capabilities	Yes					
	Partially					
	No					
ED15: RBC staff are encouraged to innovate	Yes					
	Partially					
	No					
ED16: Organisational achievements align with donor/recipient needs	Yes					
	Partially					
	No					

Source: Author's own work (Detyna, 2023)

The criteria for assessing process maturity levels also include questions concerning the role of process owners (POs); that is, organisational units or individuals responsible for the processes. These criteria, formulated as questions, are presented in Table 4. The highest, fifth level of maturity is achieved by those RBCs in which process owners not only ensure the necessary resources, monitor the achievement of process goals, and are held accountable for them, but are also open to implementing changes and have actual influence on the structure and improvement of these processes. An answer of ‘I don’t know’ is treated during the assessment as an indication of failure to meet the criterion.

Table 4. *Criteria for assessing the level of process maturity in relation to process owners in RBCs*

Questions – Do/are process owners in RBCs:	Responses	Maturity level				
		1	2	3	4	5
WP1: ensure the resources necessary for process improvement?	Definitely yes					
	Rather yes					
	Rather no					
	Definitely no					
	I don’t know					
WP2: monitor the achievement of their process goals?	Definitely yes					
	Rather yes					
	Rather no					
	Definitely no					
	I don’t know					
WP3: held accountable for achieving process goals?	Definitely yes					
	Rather yes					
	Rather no					
	Definitely no					
	I don’t know					
WP4: open to introducing changes in processes?	Definitely yes					
	Rather yes					
	Rather no					
	Definitely no					
	I don’t know					
WP5: have actual influence over the structure of their processes?	Definitely yes					
	Rather yes					
	Rather no					
	Definitely no					
	I don’t know					

Source: Author’s own work (Detyna, 2020)

By applying the criteria of the proposed model, a given RBC can independently assess the current level of its overall process maturity, as well as the maturity of individual processes (dimensions). When conducted systematically, such an evaluation may serve as an effective tool for process improvement, following a clearly defined development pathway.

This pathway is structured into five maturity levels, whose characteristics, specific to RBC operational conditions, are presented in Table 5. With each successive level, processes are managed more proactively, and the organisation as a whole becomes better governed. However, achieving a higher level requires fulfilling all the criteria of the previous level(s). For instance, a RBC at level 5 must have achieved all the objectives corresponding to levels 2, 3, and 4.

Table 5. *Characteristics of process maturity levels for RBC's*

Maturity level	Characteristics
Level 1	Processes are not identified and function chaotically. There is no awareness of the benefits of using a process approach. Responsibilities are unclear. The organisation is learning how to manage its processes. Outcomes depend on the individual efforts of the staff. Instability and frequent changes occur during project implementation. At this stage, the organisation is at the beginning of its development towards process maturity.
Level 2	Processes are planned and executed in accordance with organisational policies. They are monitored and controlled, with outcomes reviewed by management. Staff understand how various factors influence one another. There are no formal process descriptions or evaluation metrics yet, but basic parameters are being documented. Fundamental project management processes have been implemented and institutionalised through general objectives and practices for this level. Qualified personnel are hired, essential resources are provided, staff undergo necessary training, and key milestones are defined.
Level 3	Processes are well-defined and precisely described. Project work within processes is standardised and repeatable. Staff demonstrate full awareness of process-based operations. Processes are presented as maps, but there is still no complete measurement system – quantitative goals are only partially defined. All level 2 objectives have been achieved. Process descriptions include goals, activities, inputs, outputs, input/output criteria, roles, process context (e.g., hierarchy), and procedures. Processes are managed more proactively, and the organisation is significantly better governed than at level 2. At this stage, the RBC gains a sense of organisational identity.
Level 4	Processes are fully described and quantitatively managed. Their performance is tracked, and causes of variability are analysed using SPC (Statistical Process Control) tools. Process execution is predictable, but measurements are not yet used for strategic decision-making – only for operational corrections. There is no systemic improvement yet. All objectives of levels 2 and 3 have been achieved. The key difference between levels 3 and 4 lies in the predictability of process performance.

Table 5 (cont.)

Level 5	Processes are continuously improved based on SPC methods. Causes of variability are analysed and corrective actions are taken. The organisation implements innovative solutions and technologies for process improvement. Monitoring results are used in strategic decision-making. The principle of continuous improvement is fully embedded. All objectives from levels 2, 3, and 4 have been achieved. Measurable improvement goals are regularly updated, and root causes of errors are promptly eliminated.
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4. DISCUSSION AND CONCLUSIONS

The analysis and evaluation of process maturity in RBCs requires a comprehensive examination of both the factors that determine effective process management and the specific conditions in which these organisations operate. Key factors influencing the success and effectiveness of process management – and consequently the implementation of the proposed maturity assessment model – include:

- awareness of external and internal customer expectations (in the case of RBCs: donors, staff, and other stakeholders);
- organisational structure;
- organisational flexibility (including process adaptability);
- teamwork;
- organisational culture, including process awareness among all staff;
- employee development (e.g., training systems);
- formal process identification (including definition and visualisation);
- standardisation and continuous process improvement;
- use of improvement tools (methods and techniques);
- performance measurement (selection of relevant metrics and indicators for systematic analysis and evaluation);
- roles and functions of process owners;
- employee motivation systems;
- quality management systems;
- knowledge management, including process-related knowledge (Detyna, 2020; Grajewski, 2012; Wąsowska, 2018).

Achieving the highest level of process maturity cannot happen overnight and requires RBCs to define a long-term strategy for transitioning from functional to process-based management. The philosophy of continuous improvement must not only be a declared value but a real, conscious, and everyday effort of all staff working in the centre. Nowosielski (2016) emphasised the necessity of a gradual, staged approach to organisational maturity, arguing that the highest level of development cannot be achieved instantly. According to Grajewski (2016), this should be implemented as an action plan consisting of successive stages that enhance the system's ability to achieve sustained competitive improvement by continuously activating the organisation's development potential across all operational dimensions. In the author's

view, the proposed process maturity model constitutes a significant step towards the systematic improvement of the quality of the blood donor service in Polish RBCs. Its implementation may lead to increased operational efficiency, improved internal process management, and enhanced donor experience.

In future research, it would be valuable to focus on empirical validation of the model across various organisational units, analysis of its impact on key quality indicators, and adaptation to the dynamically evolving legal and technological environment. Important directions for development may also include integrating the model with digital tools that support process management, as well as creating benchmarks for comparing maturity levels across different centres.

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