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BUSINESS PROCESS MANAGEMENT

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MASTER THESIS

Dirbtinio intelekto integravimas siekiant geresnių organizacijos veiklos rezultatų: Duomenimis pagrįstos procesų vertinimo sistemos kūrimas	Integration of Artificial Intelligence for Enhanced Organizational Performance: Developing a Data-Driven Process Measurement System
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# TABLE OF CONTENTS

INTRODUCTION	4
1 PROCESS MEASUREMENT STRATEGIES IN COMPARISON	7
1.1 Process Measurement Frameworks	9
1.1.1 Balanced Scorecard	9
1.1.2 European Foundation for Quality Management (EFQM) Model	12
1.1.3 Performance Prism	16
1.1.4 Dynamic Performance Measurement Systems (DPMS)	18
1.1.5 Multi-Perspective Model Approach	20
1.2 Evolution of Process Measurement	22
1.3 Systematic Overview of Process Measuring Strategies	24
1.4 Integration of AI in Process Measurement and Decision-Making	28
1.5 Research Design for the Literature Review	32
2 RESEARCH METHODOLOGY FOR THE DEVELOPMENT OF A PROCESS MEASUREMENT FRAMEWORK	33
3 DEVELOPMENT OF A PROCESS MEASUREMENT FRAMEWORK	42
3.1 Expert Interviews	42
3.2 Analysis of Open-Ended Questions	43
3.3 AHP Results: Criteria Analysis	46
3.3.1 Determination of Sub Criteria and Indicators	60
3.3.2 Developed Process Measurement Framework	62
3.4 Discussion	63
CONCLUSIONS	66
LIST OF REFERENCES AND SOURCES	71
SUMMARY	79
ANNEX 1 RESEARCH DESIGN OF THE LITERATURE REVIEW	81
ANNEX 2 QUESTIONNAIRE FOR MASTER THESIS RESEARCH	82
ANNEX 3 EXPERT INTERVIEWS	85
ANNEX 4 AHP RESULTS	176

## LIST OF FIGURES

<b>Figure 1 The Balanced Scorecard</b>	<b>12</b>
<b>Figure 2 The EFQM 2020 Model</b>	<b>14</b>
<b>Figure 3 The EFQM, 2013 Model</b>	<b>15</b>
<b>Figure 4 The Performance Prism</b>	<b>17</b>
<b>Figure 5 The DPMS Model</b>	<b>19</b>
<b>Figure 6 Research Design Scheme</b>	<b>33</b>
<b>Figure 7 Hierarchical structure in the AHP method</b>	<b>35</b>
<b>Figure 8 Consolidated Global Priorities</b>	<b>47</b>
<b>Figure 9 Experts' Priorities Distribution</b>	<b>52</b>
<b>Figure 10 Group Priorities Average</b>	<b>52</b>
<b>Figure 11 Quadrant Chart for the AI-Enhanced Process Measurement Framework</b>	<b>62</b>
<b>Figure 12 AI-Enhanced Process Measurement Framework</b>	<b>63</b>

## LIST OF TABLES

<b>Table 1 Theoretical Foundations of Process Measurement Strategies</b>	<b>24</b>
<b>Table 2 Strengths, Weaknesses, Structure and Relevant Sectors</b>	<b>25</b>
<b>Table 3 AI Integration and Suitability for Modern Process Measurement System</b>	<b>27</b>
<b>Table 4 Semi-Structured Interview Questionnaire</b>	<b>38</b>
<b>Table 5 Pair Comparison Table</b>	<b>41</b>
<b>Table 6 Expert Position Experiences and Position Categories</b>	<b>42</b>
<b>Table 7 Global Priorities</b>	<b>47</b>
<b>Table 8 Expert 01 Decision Matrix</b>	<b>48</b>
<b>Table 9 Expert 02 Decision Matrix</b>	<b>48</b>
<b>Table 10 Expert 03 Decision Matrix</b>	<b>48</b>
<b>Table 11 Expert 04 Decision Matrix</b>	<b>48</b>
<b>Table 12 Expert 05 Decision Matrix</b>	<b>49</b>
<b>Table 13 Expert 06 Decision Matrix</b>	<b>49</b>
<b>Table 14 Expert 07 Decision Matrix</b>	<b>49</b>
<b>Table 15 Expert 08 Decision Matrix</b>	<b>49</b>
<b>Table 16 Expert 09 Decision Matrix</b>	<b>49</b>
<b>Table 17 Expert 10 Decision Matrix</b>	<b>50</b>
<b>Table 18 Expert 11 Decision Matrix</b>	<b>50</b>
<b>Table 19 Expert 12 Decision Matrix</b>	<b>50</b>
<b>Table 20 Expert 13 Decision Matrix</b>	<b>50</b>
<b>Table 21 Expert Priorities</b>	<b>51</b>
<b>Table 22 Interpretation of AHP Consensus Indicator S*</b>	<b>53</b>
<b>Table 23 Group Consensus</b>	<b>53</b>
<b>Table 24 Similarity Matrix Group Consensus Cluster Analysis with Scale</b>	<b>54</b>
<b>Table 26 Process Quality Criterion Analysis</b>	<b>56</b>
<b>Table 27 Process Effectiveness Criterion Analysis</b>	<b>57</b>
<b>Table 28 Resource Utilization Criterion Analysis</b>	<b>58</b>
<b>Table 29 Digital and AI Readiness Criterion Analysis</b>	<b>60</b>

# INTRODUCTION

## **Relevance of the Research Topic**

In rapidly changing business settings, organizations are confronted with demands to improve performance, optimize effectiveness, and maintain agility correlating to ever-changing market demands (Cunha et al., 2023). Traditional process measurement framework, such as the Balanced Scorecard or the EFQM model, been of fundamental importance for evaluating organizational effectiveness (Kaplan & Norton, 2001; Fonseca, 2022). While these frameworks impart valuable insights on operational performance, current business environments require real-time adaptability, actionable insights, and comprehensive analysis on organizational success (Cunha et al., 2023).

## **Exploration of the Research Topic**

While existing research recognizes the potential of process measurement enhanced by AI, studies focus narrowly on technical capabilities rather than integrated solutions with actionable insights and KPIs (Haefner et al., 2021). Some frameworks successfully combine non-financial KPIs, predictive analytics and cross-functional alignment into a combined system (Wahrstötter, 2023). Even less frameworks address implementation challenges from structural as well as human-driven causes, such as ambiguous metrics, change resistance, or non-centralised stakeholder priorities, that essentially determine acceptability and success in practice (Papulová et al., 2021).

## **Novelty and Problem of the Thesis**

The shift to digital transformation, particularly through developments in artificial intelligence (AI) and data-driven predictive analytics, has presented new capability for redefining how organizations are capable to measure and manage processes (Garbero et al., 2025). Innovative businesses increasingly depend on predictive analytics, intelligent key performance indicators (KPIs), and automated monitoring methods to gain a competitive edge (Ransbotham et al., 2017). Nonetheless, despite such technological developments, organizations can struggle to integrate advanced digital inventions seamlessly into existing performance measurement frameworks without a required interconnected strategy (Brynjolfsson & McElheran, 2016). Central challenges manifest in organisational fragmentation, misaligned performance metrics and a resistance to data-driven decision making exist and limit the potential for transformational improvements (Stoyanovich et al., 2025).

## **Aim of the Thesis**

The aim of this master's thesis is to develop a data-driven, and AI-based process measurement framework to enhance organizational performance in the information service sector.

The thesis fills a research gap in the existing literature by designing a framework that combines the strategic strengths of traditional performance evaluation models with the predictive

and adaptive capabilities of modern AI technologies (Brynjolfsson and McElheran, 2016). The goal is to support organizations in dynamic, digitally transformed business environments to sustainably improve effectiveness, quality and resource utilization through intelligent, adaptive and data-based process evaluation.

### **Objectives of the Thesis**

By developing and statistical validating a next-generation process measurement framework, this research aims to provide organizations with a scalable, dynamic tool for optimizing performance across factors of effectiveness, quality, and resource utilization. The study contrasts traditional and data-driven approaches as well as it researches how the integration of AI can elevate process measurement and their precision, predictive accuracy, and strategic decision-making (Sishi and Telukdarie, 2025) with the main research question “What data-driven process measurement system can be developed so that it can optimize organizational performance in effectiveness, quality and resource utilization?” and the following objectives:

1. To identify the conceptual foundations, strengths, and limitations of traditional process measurement frameworks in the context of organizational performance.
2. To determine the role of artificial intelligence and digital technologies in enabling adaptive, data-based, and predictive process measurement.
3. To develop a multi-perspective process measurement framework suitable for the information service sector by combining expert judgement and the Analytic Hierarchy Process.
4. To assess the practical relevance and applicability of the developed AI-integrated process measurement framework through empirical validation using the Analytic Hierarchy Process (AHP) and expert-based prioritization.
5. To provide implementation sector specific recommendations that support the adoption of the proposed framework effectively by enhancing decision-making processes.

### **Methods of the Thesis**

The theoretical coverage of this study falls in the category of “substantive theories” (Saunders et al., 2023, p. 53), to an extent of a “middle-range theory” (Saunders et al., 2023, p. 53), depending on how it is applied. Substantive theories are created on a specific subject, which covers a particular field of settings and are more restricted than middle-range theories (Saunders et al., 2023). Thus, this thesis adopts a qualitative conceptual research design aimed at theory building and framework development. A structured and theory based literature review is conducted to synthesize existing research on process measurement, non-financial key performance indicators, with a outlook of AI-enhanced decision-making possibilities. The literature is critically assessed to identify dominant themes and research gaps, which grounded the development of a

conceptual process measurement framework. To support structured prioritization and integration of performance dimensions, the framework is analytically guided in multi-criteria decision-making principles.

### **Structure of the Thesis**

This study is structured in the following sections: Literature review, methodology, the display of the developed process measurement framework, findings and their analysis with further discussion and conclusions. In the methodology section, the methods used are described to develop and optimize the framework afterwards. In the development section, the created framework is presented and explained combined with traditional approaches and then, in the findings and analysis section, the results of the applied methodology are evaluated and utilized to propose optimizations to the framework. The last sections provide a discussion of the relevance of the following work to existing research and the conclusion to provide possible directions for future studies on the subject. Concepts, which are mentioned within the study, are clarified in the following to ensure a structured research understanding and the reader's coherent perception of the topic:

- Data-driven process measurement framework, which demonstrate a performance management system utilizing real-time data analytics, AI, and non-financial KPIs to adjust metrics based on gained, predictive insights (Sishi and Telukdarie, 2025).
- Cross-functional alignment ensures the integration of performance measurements across departments to ensure coherence (De Smet et al., 2025).
- AI-enhanced analytics is the usage of machine learning and analytics to automate KPI modification and identify inefficiencies and ineffectiveness within processes (Čančer et al., 2023).

# 1 PROCESS MEASUREMENT STRATEGIES IN COMPARISON

“Effective process measurement provides a window into the efficiency and health of organizational operations, enabling targeted improvement based on data rather than intuition.” - Wahrstötter, 2023

Performance Measurement Systems (PMS) are collections of metrics utilised to quantify effectiveness and efficiency of organizational actions and processes. They serve as essential tool for organizations aiming toward continuous improvement, operational sustainability, and strategic alignment and agility. The role of PMS has evolved significantly in response to increasing digitalization and data availability, emphasizing real-time monitoring, adaptive metrics, and predictive analytical capabilities (Cunha et al., 2023). This evolution reflects a broader transition from static, retrospective reporting toward dynamic, insight-driven decision-making. Although, in this research PMS are understood primarily as enabling structures for process measurement, where organizational performance is assessed through the systematic evaluation of business processes.

The development and implementation of PMS involves setting organizational objectives, generating relevant performance indicators, and assessing performance data according to operate with acquired insights (Cunha et al., 2023). Collecting and analysing performance data assists organizations in identifying key improvement areas while prioritizing interventions and monitoring progress. From a process measurement perspective, these activities translate strategic objectives into measurable process-level indicators that guide operational improvement and sustainability while performance measurement is fundamental for ongoing improvement management and process sustainability in organizations (Leyer et al., 2015; Van Looy & Shafagatova, 2016). However, despite numerous available PMS models, many are not effectively utilized, maintained, or correct implemented (Papulová et al., 2021). The main obstacle for researchers and practitioners of such models is the absence of an structured approach for defining key performance indicators, the integration across organisational layers and utilisation for continuous improvement. According to McCunn (1998), around 70% of performance measurement plans are unsuccessful, highlighting the importance of identifying obstacles to effectiveness of performance measurement systems.

Business processes represent a structured sequence of value increasing activities that transform inputs into meaningful outputs. In this, process measurement focuses on evaluating how effectively these activities contribute to organizational value creation, quality, and efficiency within the entire workflow rather than isolated functional outputs (del-Río-Ortega et al., 2018). Activities that do not enhance value create operational waste, a principle foundational to process optimization and performance measurement systems (Raynus, 2011). Modern performance measurement extends this principle by integrating dynamic authentication mechanisms that

continuously estimate value contribution relative to strategic objectives and stakeholder requirements.

Process reengineering, as one method for organizational transformation and application for process measurement systems, involves the redesign of organizational processes to realise improvements with performance metrics such as cost, quality, service, and pace (Raynus, 2011). In contrast to phase-based improvements, this method involves a revision of existing processes by challenging traditional perceptions and utilising technological innovations to unlock new operational approaches. This approach aligns closely with the principles underlying the Multi-Perspective Model Approach (MPMA) (Stefanescu & Logofatu, 2017) which is applied in this thesis specifically as a process measurement framework to integrate multiple dimensions of performance, excluding financial, into a comprehensive model. MPMA highlights that effective process measurement requires capturing interdependencies across all available organizational levels and perspectives, rather than evaluating metrics in isolation of each other (Wątróbski et al., 2016). The focus on digital transformation in performance measurement systems, such as on AI and process mining, increases potentials of process reengineering by changing the way organisations collect, analyse and leverage process performance data (Wahrstötter, 2023). In particular, AI could enable process measurement systems to evolve from retrospective monitoring toward predictive and adaptive evaluation of process performance. These technologies benefit hybrid PMS models, which allow firms to react quickly to operational difficulties and strategic changes by using dynamic, cross-functional data to inform continuous improvement (Schrage et al., 2024; Sishi & Telukdarie, 2025). In settings with interdependent processes and complexity, where disconnected measuring methods can conceal performance gaps and limit well-informed decision-making, this digital synergy is especially relevant (Carneiro et al., 2024).

Effective reengineering initiatives require strong leadership commitment and willingness to consider whole organizational restructuring, which is a pattern exemplary in literature on process measurement systems and performance improvement (Keathley-Herring et al., 2024). The MPMA provides structured approach for aligning performance indicators across multiple perspectives, facilitating data integration, and ensuring that improvement efforts correspond with overarching strategic goals (Wijayanayake, 2025). Moreover, MPMA can be effectively combined with established frameworks such as EFQM model (The EFQM Model, 2025) and the Balanced Scorecard (Kaplan & Norton, 1996), illustrating the trend toward hybrid models that merge disruptive innovation with continuous improvement. By emphasizing multi-perspective measurement and data-driven decision-making, MPMA supports the alignment of performance management with sustainability goal setting and digital transformation initiatives, and stakeholder engagement. Consequently, MPMA provides a viable theoretical foundation for developing

integrated process measurement systems that balance efficiency, quality, and strategic relevance within a unified framework (Carneiro et al., 2024). This process-oriented interpretation of MPMA directly informs the empirical research design and framework development presented in subsequent chapters.

## **1.1 Process Measurement Frameworks**

Previous Process Measurement Frameworks refer to early-stage models of performance measurement that were designed primarily for monitoring stability, productivity, and effectiveness within static organizational environments. These frameworks are considered rather traditional because of their appearance within the context of linear value chains and hierarchical management structures, where process change was gradual and largely internally driven (Raynus, 2011). Their core function was often retrospective, focusing on evaluating past performance rather than enabling proactive, real-time interventions with limited integration in modern dynamic data systems while upholding a focus on financial metrics (Papulová et al., 2021). While generally, these frameworks conceptualize performance primarily through process-level indicators that reflect workflow efficiency and operational reliability (Barton et al., 2017, Viswanadham, 2000).

Unlike modern frameworks developed in the eras such as “Industry 4.0” (Cunha et al., 2023, p. 1), traditional frameworks generally lack a sufficient technological infrastructure and agility to adapt performance indicators in response to complex and continuously evolving operational environments. This limitation is particularly critical for process measurement, where real-time data availability and predictive insights are increasingly required to manage process complexity effectively (Andročec, 2023; Gill et al., 2024). Traditional frameworks, while foundational strong, must consequently evolve with contemporary systems such as process mining, AI-enhanced predictive analytics, and hybrid methodologies to remain effective in guiding organisations value creation under modern conditions (Sishi and Telukdarie, 2025). Therefore, as highlighted in the introduction to this chapter, the relevance of process measurements today lies not only in quantifying effectiveness, but in supporting sustainable, insight-driven improvement processes. Accordingly, this thesis focuses on the development of a data-driven process measurement system that integrates AI-enabled analytics to enhance organizational performance at the process level.

### **1.1.1 Balanced Scorecard**

#### **The Perspectives of the BSC**

Introduced by Kaplan and Norton (1996) the Balanced Scorecard (BSC) is a framework for converting organization’s strategy into **operational objectives** by integrating financial and

non-financial dimensions across four perspectives: Financial, Customer, Internal Business Processes, and Learning and Growth. This **multi-dimensional approach** provides monitoring of short-term financial outcomes and also factors of long-term value creation (Kaplan and Norton, 2001). Recent research shows that the BSC is one of the most widely used strategic management tools, although with adaptations across industries (Madsen, 2025). Adaptations may be sector-specific balanced scorecards, sustainability-focused approaches, and digital enhanced frameworks. The BSC has been connected to modern settings like big data analytics, AI applications, and sustainability performance evaluation, which demonstrates its ongoing applicability in complex environments (Kumar, 2024).

The financial perspective of the BSC focuses on the strategy of achieving revenue growth, profitability, and effective risk management from the stance of shareholders. It involves the **communication of high-level financial objectives** that reflect desired economical strategy outcomes. Such selection of performance measures such as cash flow or gross profit margin, can be indicators of an organization's ability to generate corporate sustainable value (Kaplan and Norton, 2001, p. 23). This view can be expanded to include **long-term resilience and value creation** while reflecting investors and stakeholder demands (Kumar, 2024).

Correspondingly, the customer perspective is broadened beyond product or service quality satisfaction to cover a **extensive customer experience, customization, and trust-building**, which stand as key factors in competitive market settings (Madsen, 2025). Strategic alignment of internal activities within the internal business processes perspective carries out an essential value delivery to customers and innovation development (Kaplan and Norton, 2001). The necessity here is the continuous **integration of digital capabilities, data-driven optimization and organizational sustainability-related operations** to align with evolving markets and customer expectations (Kumar, 2024).

The learning and growth perspective underlines the strategic importance of **creating organizational resources for change, innovation and constant improvement**. It focuses on employee skill and knowledge development, the use of information technology, and the promotion of a culture that embraces intentional learning. In this, companies are in the critical position by providing access to strategic information and nurturing an environment where the workforce is empowered to contribute to the organization's goals (Kaplan and Norton, 2001). In modern organizations this includes **digital literacy, agile abilities and platform for knowledge sharing** that supports strategic flexibility (Madsen, 2025). The four perspectives of the Balanced Scorecard provide a **multidimensional interpretation of organizational performance** and help implementing strategic goals across entire companies for alignment organizational activities with long-term visions.

## **Strengths of the BSC**

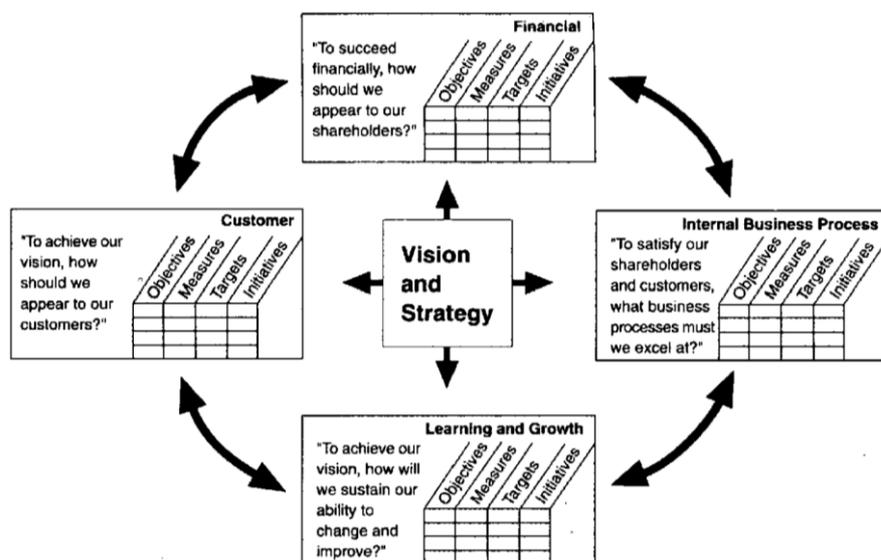
One core strength of BSC remains in its ability to create **strategic alignment** within all organization levels. For a successful accomplishment of strategic alignment, companies must implement their scorecard to all organizational units to guarantee **corporate synergy** (Kaplan and Norton, 2001). This approach reflects one of the five core principles that define a strategy-focused organization within the BSC. The five principles by Kaplan (2000) are: Translating the strategy into operational terms, aligning the organization to the strategy, making strategy everyone's everyday job, making strategy a continual process and lastly, mobilizing change through executive leadership. An example of successfully cascading the Balanced Scorecard involves the Hilton Hotels company. After adopting the BSC, the company translated its **corporate objectives into measurable targets** for individual hotel locations and staff positions (Niven, 2006). One strategic objective at corporate level was to increase customer loyalty, which was implemented in individual locations through objectives like reducing processing time, while forming these goals further into workforce goals. These structured implementations supported the consistent execution of the strategy and enabled Hilton to track performance across the company (Niven, 2006). In contrast, the U.S. Postal Service failed to implement the Balanced Scorecard (McCunn, 1998). Although the organization adopted the BSC framework to modernize its performance measurement and strategic planning, the initiative failed due to ineffective communication, insufficient acceptance by executives, and improper integration into operations. Furthermore, measures were over-defined and not aligned with employees' day-to-day activities, leading to confusion and disengagement (McCunn, 1998). This case shows that even a well designed BSC can fail if the organizational culture, communication and accountability structures are not suitably aligned.

## **Development of the BSC**

The strategy map, central to the BSC framework, visually represents the **cause-and-effect relationships** among strategic objectives and across the four BSC perspectives and formulates a clear organization strategic vision to be measured, managed, and improved further (Kaplan and Norton, 2001). The standard structure of a strategy map is set within the BSC's four perspectives, with the highlight on the financial perspective, which can include themes such as revenue growth and productivity enhancement. The revenue growth strategy might include objectives such as expanding markets, developing innovative products, or deepening customer relationships. Thereby the productivity strategy focuses on improving cost efficiency or optimizing resource utilization and allocation (Kaplan and Norton, 2001). While the original structure emphasized revenue growth and productivity, contemporary practice has extended this logic to include sustainability, digital transformation and corporate resilience strategy (Kumar, 2024). It reflects a

development of the BSC in a direction that it is no longer viewed solely as a performance measurement system but as a **dynamic tool for strategic communication, organization alignment and continuous adaption** (Madsen, 2025). Furthermore, BSC supports institutionalization of strategy as a dynamic and continuous process. Repeated monitoring, feedback loops, and regular reviews of objectives and performance statistics alter the strategy map into a active document. This process supports organizational learning and adaptability, which can be viewed still as key competencies in complex, contemporary business environments (Ha et al., 2023). The power of the BSC lies in its capacity to execute expectations transparent, enabling strategic learning and adjustment in real time.

**Figure 1** *The Balanced Scorecard*



Source: Kaplan and Norton, 1996, p. 9.

### Weaknesses of the BSC

Despite the BSC widespread usage, empirical studies highlight **challenges in the framework's implementation**. Organizations struggle with implementing the scorecard effectively to all levels, which leads to misalignment (Madson, 2025). Further, the framework hinders the usage by showing a **lack of detailed guidance** on selecting measures for non-financial dimensions and evaluating certain processes (Ha et al., 2023). Therefore, despite its advantages in offering a conceptual framework, organizations encounter difficulties in operationalizing it for complex and dynamic environments (Kvaløy and Olsen, 2023).

## 1.1.2 European Foundation for Quality Management (EFQM) Model

### Conceptual Grounds of the EFQM Excellence Model

The EFQM Excellence Model represents a organizational performance framework that defines excellence in a dynamic, learning-oriented, and stakeholder-driven approach rather than a static state of compliance and/or static data. Developed by the European Foundation for Quality Management, the model was originally introduced to support organizations in improving performances through self-assessment and continuous learning (The EFQM Model, 2025). Over time, EFQM has evolved from a quality oriented framework to a performance measurement approach that integrates the aspects strategy, processes, people, innovation, and results within one structure (Keathley-Herring et al., 2024).

At its core, the EFQM model is based on systems theory and organizational learning theory, emphasizing that sustainable performance emerges from the interaction between organizational enablers and achieved results. Rather than determining specific performance indicators, the model provides a conceptual construct where organizations can **identify, evaluate, and redefine drivers of performance across multiple dimensions** (Papulová et al., 2021). This perspective aligns with contemporary views of organizational performance as a multidimensional and context-dependent construct shaped by strategic intention, operational capabilities, and stakeholder expectations (Cunha et al., 2023). The current EFQM model structure is organized around the three overarching components **Direction, Execution and Results**. Direction captures organizational purpose, vision, and strategic orientation. Execution addresses how strategy is translated into operational practices through people, processes, and partnerships and the Results reflect the outcomes that are achieved for key stakeholders and the organization operation with the model. Notably, the model sets continuous learning, feedback, and innovation as fundamental instruments while connecting execution and results for reinforcing a dynamic approach (Fonseca, 2022).

**Figure 2** *The EFQM 2020 Model*



Source: The EFQM Model, 2025

### **A learning oriented Model**

Within this research, the EFQM Excellence Model is defined as a **conceptual reference framework for identifying and structuring performance dimensions**, rather than as a certification or assessment tool. The model is not applied to score organizational maturity or compliance; instead, it serves as a guiding framework that helps to choose, organize, and understand the key performance aspects for a modern, data-driven process measurement system. This distinction is essential. EFQM is explicitly used as a **diagnostic and learning-oriented model**, supporting reflective analysis of how organizational performance is generated and sustained. Its role is to guide what should be measured, not to prescribe how measurement must be conducted. Such an application aligns with academic literature emphasizing that excellence models are most valuable when used as learning tools rather than as normative benchmarks (Keathley-Herring et al., 2024).

### **Relevance in Process Measurement Research**

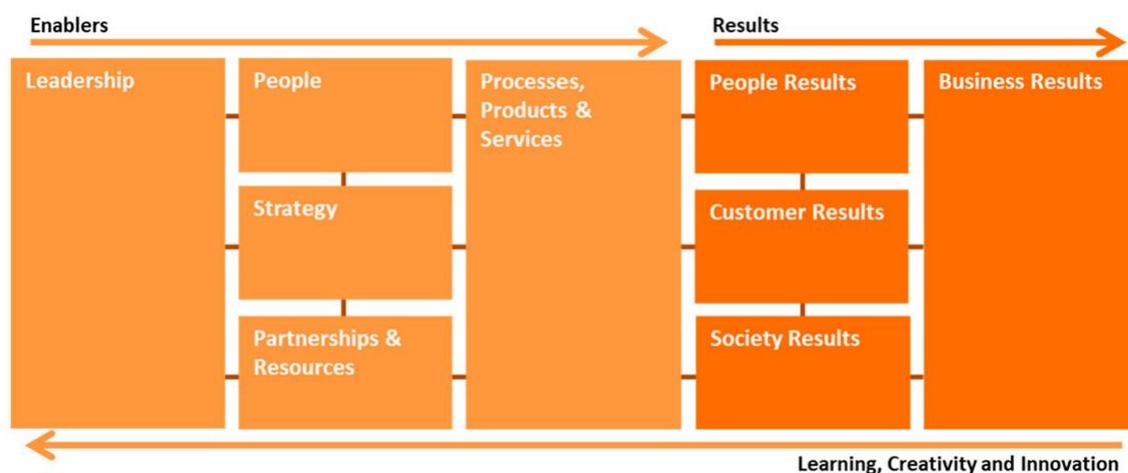
From a scholarly perspective, EFQM contributes to this research by providing a theoretically grounded justification for adopting a comprehensive examination of organizational performance. **Traditional performance measurement systems have been criticized for overemphasizing financial outcomes** while neglecting intangible drivers such as learning, adaptability, and stakeholder trust (Papulová et al., 2021). The EFQM model addresses this limitation by explicitly integrating such drivers into its performance logic. This approach is

particularly relevant in digitally transformed and information-intensive organizations, where **performance increasingly depends on knowledge flows, decision quality, and organizational responsiveness** rather than on linear process efficiency alone (Cunha et al., 2023). By conceptualizing performance as an outcome of aligned direction, effective execution, and continuous learning, EFQM provides a robust theoretical foundation for the development of adaptive and AI-enhanced process measurement systems.

### Contribution to Framework Development

In the context of this thesis, EFQM defines the conceptual boundaries and performance logic underlying the proposed process measurement framework. The model supports the **identification of key performance indicators, such as effectiveness, or resource utilization by framing them as enablers and results**. This logic complements the Multi-Perspective Model Approach by reinforcing the need to evaluate performance across multiple, interacting dimensions rather than through isolated indicators. Furthermore, EFQM’s **emphasis on learning and feedback directly** supports the integration of artificial intelligence into process measurement. AI-enabled analytics can be interpreted as an extension of the model’s learning mechanisms, enabling continuous sensing, interpretation, and adaptation of performance indicators in response to changing organizational conditions. In this sense, EFQM provides the conceptual justification for viewing AI not as a replacement for managerial judgment, but as a capability that enhances organizational learning and decision-making.

**Figure 3** *The EFQM, 2013 Model*



Source: Fonseca, 2022, p. 1015

Overall, the EFQM Excellence Model contributes to this research as a theoretical reference model that legitimizes a general and adaptive approach to performance measurement. Its

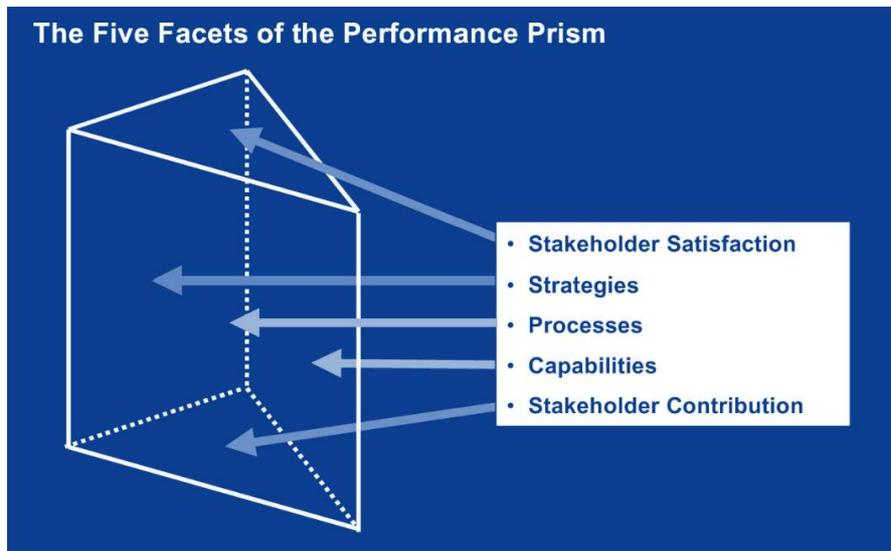
integration strengthens the conceptual accuracy of the framework development by anchoring AI-enhanced process measurement within established theories of organizational excellence, learning, and systemic performance management.

### 1.1.3 Performance Prism

#### Conceptuality of the Performance Prism

The Performance Prism represents a stakeholder-oriented performance measurement framework that defines organizational performance as a function of value creation between the organization and stakeholders. The model, which was created by Neely, Adams, and Kennerley (2001) in response to the deficiencies of strategy-centric measurement systems, points out that **sustainable performance depends on constantly reconciling stakeholder expectations, contributions, and organizational capabilities in addition to accomplishing organizational objectives**. The theoretical foundation of the Performance Prism is rooted in stakeholder theory and systems thinking, asserting that organizational performance emerges from complex interactions among multiple stakeholder groups rather than from unilateral strategic execution. The model structures performance measurement around five interrelated perspectives: **Stakeholder Satisfaction, Stakeholder Contribution, Strategies, Processes, and Capabilities**. These perspectives are not hierarchical but mutually reinforcing, forming a prism-like structure that highlights performance as a multidimensional and relational construct (Kennerley & Neely, 2003). The Performance Prism proposes a **dual-directional logic by considering what stakeholders contribute to the organization, such as knowledge, engagement, compliance, or data, alongside what they expect in return**. This framing is particularly relevant in knowledge-intensive and service-oriented organizations, where value creation is shaped through interactions rather than embedded solely in standardized processes (Bititci et al., 2000).

**Figure 4** *The Performance Prism*



Source: Neely et al., 2001, p. 12

### **Operational Definition as conceptual structuring Framework**

Within this research, the Performance Prism is operationally defined as a **conceptual structuring framework for stakeholder-driven performance dimensions**, supporting the identification and organization of non-financial and process-oriented performance indicators. The model is not applied as a prescriptive measurement system but as an analytical reference that informs how performance perspectives can be built from stakeholder relationships and organizational capabilities. This application aligns with previously stated arguments that **performance measurement systems must evolve beyond internal efficiency metrics toward frameworks that integrate external and internal stakeholder dynamics** (Kennerley & Neely, 2003). In this thesis, the Performance Prism provides a structured approach for interpreting stakeholder needs and their possible contributions into measurable process outcomes, which can subsequently be weighted and prioritized using decision-making techniques involving multiple criteria.

### **Contribution to Research and Framework Development**

From an academic standpoint, the Performance Prism contributes to the research by addressing a gap in the literature on traditional performance measurement, which is the inadequate **incorporation of stakeholder complexity into process measurement systems**. Performance results are influenced by a variety of stakeholders, including clients, workforce, regulators, and technology suppliers, as businesses increasingly function in data-driven and digitally focused contexts (Bititci et al., 2012). The model's applicability for AI-enhanced performance

measurement is further supported by its emphasis on processes and capabilities. Instead of being background factors, **capabilities like data quality, analytical maturity, and digital literacy become quantifiable performance drivers**. This is consistent with recent research showing that performance systems that can capture intangible and enabling elements prior to observable results are necessary for digital transformation (Cunha et al., 2023). In the context of this thesis, the Performance Prism offers definitions of the stakeholder and capability dimensions for the proposed process measurement framework. It includes indicators related to decision-making effectiveness, process transparency, and stakeholder trust. The model's **multidirectional logic complements the following Multi-Perspective Model Approach** (see chapter 1.1.4) by reinforcing the need to consider **interdependencies across performance dimensions**.

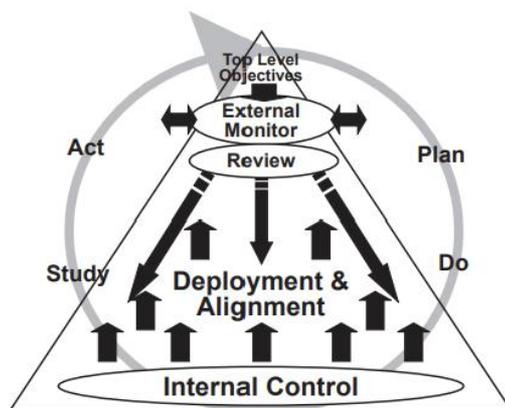
#### **1.1.4 Dynamic Performance Measurement Systems (DPMS)**

##### **The Foundation of DPMS**

Dynamic Performance Measurement Systems (DPMS) represent a **theoretical evolution of traditional performance measurement approaches by incorporating time, feedback, and organizational learning**. Rather than treating performance indicators as static representations of past outcomes, DPMS defines performance measurement as an adaptive system that continuously responds to internal and external change (Bititci et al., 2012).

The conceptual roots of DPMS lay in systems dynamics theory and organizational learning, emphasizing that organizational performance unfolds through feedback loops and delayed effects rather than linear cause–effect relationships. DPMS research argues that static performance indicators lose relevance in volatile environments, as they fail to capture shifts in strategy, processes, and stakeholder expectations over time (Bititci et al., 2012). DPMS frameworks therefore focus on three core principles: **responsiveness, integration, and learning**. Performance measures are continuously reviewed and adapted, decision-making is supported by real-time data flows, and organizational learning is institutionalized through feedback mechanisms that link performance outcomes to strategic and operational adjustments (Kennerley & Neely, 2003).

**Figure 5** *The DPMS Model*



Source: Bititci et al., 2000, p. 696

### **Relevance in the Context of Digital Transformation**

In this research, DPMS are defined as **conceptual models that explain how performance measurement systems evolve and adapt over time**. Their role is not to define specific indicators, but to justify the inclusion of mechanisms that allow indicators to be adjusted and responding to new information, process changes, or strategic shifts. This perspective is particularly relevant for AI-enhanced measurement systems, where predictive analytics and automated data processing enable continuous monitoring and adjustment of performance indicators. DPMS provide the theoretical justification for integrating such capabilities into process measurement without compromising analytical coherence or managerial oversight.

The relevance of DPMS has increased significantly in the context of digital transformation and data-driven decision-making. Empirical research demonstrates that organizations operating in digitally intensive environments require performance measurement systems capable of handling increased complexity, faster feedback cycles, and greater interdependence between processes (Cunha et al., 2023). DPMS frameworks emphasize that **performance measurement should not merely reflect operational efficiency, but support strategic agility by enabling timely interventions based on predictive insights**. This aligns with contemporary research on AI-supported management systems, which highlights the importance of continuous learning and adaptive control in achieving sustained performance improvements (Al-Surmi et al., 2022).

### **Contribution to Framework Development**

Within this thesis, DPMS provide the temporal and adaptive logic underpinning the proposed process measurement framework. They justify the **integration of AI-driven analytics as mechanisms for real-time sensing, prediction, and feedback rather than as static reporting tools**. By embedding dynamic feedback loops, the framework aligns performance measurement

with continuous improvement and strategic responsiveness. DPMS complement the Multi-Perspective Model Approach by explaining how weighted performance criteria can be revisited and adjusted over time without undermining methodological consistency. This ensures that the framework remains relevant in evolving organizational contexts, supporting both short-term operational control and long-term performance development. In summary, Dynamic Performance Measurement Systems contribute a critical theoretical dimension by framing **performance measurement as an adaptive, learning-oriented system**. Their inclusion strengthens the conceptual foundation of this research by aligning process measurement with the realities of AI-enabled, data-driven organizational environments.

### 1.1.5 Multi-Perspective Model Approach

The limitations of previous mentioned process measurement frameworks, such as the Balanced Scorecard or EFQM model, can be detected in their tendency to emphasize only a narrow dimension of performance indicators, often favouring financial or efficiency-driven factors (Van Looy & Shafagatova, 2016). However, contemporary organizations are characterized by increasing complexity, cross-functional interdependencies, and the demand to fulfil stakeholder expectations (Komm et al., 2025). To address such limitations, the **Multi-Perspective Model Approach (MPMA)** has emerged as a theoretical and methodological framework to evaluate organizational processes through multiple, interrelated perspectives rather than via a single dominant dimension (Wątróbski et al., 2016).

#### Cross-Domain Applications of MPMA

Addressed in the context of a sustainable urban energy system, Wątróbski et al. (2016) proposed MPMA to the need of evaluating green urban initiatives on a **economical, environmental, technical, and social dimension**. Their findings emphasized that effective evaluation of such initiatives required integrating all perspectives into a unified model. MPMA provided a balanced analysis of conflicting priorities through **multi-criteria decision-making (MCDM)** techniques, demonstrating how compromises across perspectives can be connected rather than obscured. Approaches based on MCDM such as the **Analytic Hierarchy Process (AHP)** enable structured weighting and prioritization across criteria, making them particularly suitable for multi-perspective applications (Amor et al., 2019). Beyond concepts of sustainability, the logic of MPMA has been extended into diverse domains. Hailu et al. (2024) showcased in their healthcare research that multi-perspective modelling can join **psychological, systemic, and social dimensions** to capture the complexity of body stigmata. The research highlights the analytical influence of observing organizational and even social phenomena as interdependent systems rather than isolated variables. Further research proposed a **multi-**

**perspective capability model** for evaluating maturity in business process management in the contemporary digital era, by revealing how technological, strategic, and human perspectives jointly influence organizational agility (Wijayanayake, 2025). These studies confirm the versatility of MPMA in integrating multiple evaluative dimensions while maintaining analytical coherence.

### **Theoretical and Methodological Perspective of MPMA**

Theoretically, MPMA aligns with the principle that organizational performance should be understood as a **multi-dimensional construct** influenced by dynamic interactions among structural, behavioural, and contextual variables (Saidani & Nurcan, 2014). Such approach is particularly valuable in data-driven environments, where performance must be continuously adjusted across interdependent perspectives such as process effectiveness, technological readiness, environmental sustainability, and human adaptability (Stefanescu & Logofatu, 2017). Methodologically, MPMA provides a conceptual foundation for structuring complex decision problems, while its methods operationalize by evaluating and prioritizing criteria within systematic procedures (Martinez Lopez et al., 2023).

Multi-criteria decision-making techniques, such as Analytic Hierarchy Process (AHP), “fuzzy AHP-TOPSIS” (Kılıç et al., 2025, p. 223), and hybrid approaches, enable decision-making to **interpret qualitative expert knowledge into quantitative prioritization systems** (Wei & Rokou, 2024). By **structuring diverse perspectives hierarchically** and **allocating relative weights**, these techniques can support transparent, data-informed conclusions in moments of uncertainty and complexity (Tavana et al., 2023). AHP by Saaty (2001), is especially suitable for this research due to its capability to operationalise multiple, interdependent perspectives into a transparent weighting scheme through pairwise comparisons and based on expert knowledge. Recent studies have advanced AHP by combining it with artificial intelligence (Svoboda & Lande, 2025) and fuzzy logic techniques to enhance analytical accuracy and adaptivity (Do et al., 2024), and ranking methods (TOPSIS) (Mishra et al., 2013) as well as efficiency analysis (Munier & Hontoria, 2021). These hybrid approaches improved accuracy and flexibility of multi-decision analysis, particularly with remaining uncertainties or incomplete data and demonstrates how technology can effectively support human reasoning for organizational decision making (Al-Surmi et al., 2022).

Hybrid models such as fuzzy AHP-TOPSIS demonstrate how expert uncertainty can be managed via fuzzy pairwise comparisons and ranking stability tests while the combination of AHP and efficiency analysis can connect subjective priorities to efficient objectives for benchmarking (Sequeira et al., 2023; Do et al., 2024). AI-guided AHP research (Svoboda & Lande, 2025) shows further how large language models can support criteria developing and consistency control (Chen

et al., 2024), though the research also raise concerns regarding explainability and over-automation.

### **The Foundation for AI-Enhanced Process Measurement**

The use of MCDM within the MPMA context allows decision-makers to address different categories of organizational problems, from strategic prioritization to operational optimization, such as the alignment of AI initiatives to corporate goals or allocation of resources and performance tracking of employees and whole departments. Amor et al. (2019) emphasized that MCDM methods with **flexibility as their key strength** can handle both compensatory (trade-off based) and non-compensatory (constraint-based) decision structures, allowing a flexible approach to integrating qualitative expert judgments with quantitative performance data for the development of management systems with multiple goals, criteria, and contexts utilisation strategies. This adaptability is further enforced by **dynamic performance models** which combine the Analytic Hierarchy Process (AHP) and “aggregation operators” (Mishra et al., 2013, p. 448), that allow **evaluation frameworks to develop with the organization** (Fattoruso et al., 2024). The synergy between MPMA and MCDM is particularly relevant within AI-enabled performance measurement systems, which facilitate real-time monitoring of organizational processes from multiple perspectives (Andročec, 2023). These technologies expand the scale of measurable dimensions beyond traditional indicators, enabling the **mapping of intangible or context-dependent factors** such as learning, innovation, and digital maturity (Sishi & Telukdarie, 2025). Integrating these dimensions into MPMA through MCDM-based frameworks can ensure that AI-driven insights are systematically weighted and aligned with strategic objectives (Garbero et al., 2025).

In summary, the Multi-Perspective Model Approach exceed descriptive performance tools by functioning as a **strategic decision-support construct**. An Integration with MCDM methods provides a framework which is theoretically significant and methodologically flexible. It supports decision makers in transforming fragmented data into a consistent, adaptive system by integrating diverse strategical, operational and technological perspectives, and quantifying expert judgement via structured weighting techniques such as AHP. Furthermore, MPMA enables the incorporation of AI-enhanced information flow to simplifying real-time performance evaluation and ensuring systemic alignment between individual departments and organization goals (Schrage et al., 2024).

## **1.2 Evolution of Process Measurement**

### **From Static Hierarchies to Agile Frameworks**

Traditional process management systems are fundamentally hierarchical with decision-making conclusions proceeding through static structures (Raynus, 2011). In increasingly unpredictable environments organizations require greater agility, which is defined as the ability to quickly adapt to internal and external change (Raynus, 2011). One challenge in process

measurement systems is **organizational fragmentation**, where departments or teams do not aim for internal cooperation and transparency due to misaligned goals which undermines data-driven decision-making. Contemporary frameworks try to counter these issues by incorporate **real-time analytics, cross-functional collaboration and transformative performance indicators** that allows organisations stay strategically aligned focus while dynamically responding to market changes. Technologies such as AI-driven automation, process mining and intelligent KPIs further improve measurement precision and support adaptability in complex operating settings (Wahrstötter, 2023; Sishi and Telukdarie, 2025).

Building on the need of greater agility, transitional models were created to bridge inflexible, traditional systems for a increasing demand of a dynamic environment. For instance, the **IMPACT model** structures process monitoring and active organizational responsiveness around six activities: Identify, Measure, Predict, Act, Communicate, and Track (Raynus, 2011). The model represents a shift from static evaluation to more responsive, data-driven methods by directly **including the predictive analytics** which is essential to contemporary process measurements (Sishi and Telukdarie, 2025). Similarly, the **SMART framework** translates objectives into specific, measurable, achievable, relevant, and time-bound criteria, ensuring operational clarity in process measurement (Doran, 1981). While less complex than system-wide models, the SMART principles remain significance in digital environments due to the framework's core requirement for specific, measurable, and time-bound criteria that provides the structured input and clear accountability that are established qualifications for effective automation and algorithm decision-making (Syed et al., 2020).

### **Enabling Proactive Decision-Making through Technology**

Recent developments go further by implementing process measurement systems around digital technologies. Simon Wahrstötter (2023) outlines a five-stage model for **integrating process mining into process performance measurement systems (PPMS)**. Based on 33 interviews in the German energy sector, the study shows how combining quantitative and qualitative indicators, such as duration, quality, and cost, provides evidence-based insights necessary for process evaluation. The proposed framework moves from initial adoption to full integration, highlighting that effective process **measurement requires resilience, interoperability, and the capability to link operational data with strategic objectives**. Furthermore, an article by Sishi and Telukdarie (2025) highlights the means by which data-driven automation can transform traditional KPIs into independent performance indicators. Their framework, which can be applied across the manufacturing industry, dynamically adapts KPIs to process movements based on predictive analytics. By integrating the data insights gained from the system with business process management tools, companies gain insight into process

inefficiencies while automating counteractive procedures. Sishi and Telukdarie's approach improved measurement accuracy and, like Wahrstötter (2023), enables **proactive decision-making** that overcomes limitations of organizational legacy systems. These overall developments illustrate an **process measurements evolution** from static, hierarchical structures to adaptive, technology-empowered systems. Early goal-oriented frameworks such as SMART and IMPACT depicted operational clarity and responsiveness as key focus, while modern PPMS and AI-driven automations extend these principles into fully integrated, data-driven settings. This development highlights that contemporary process measurement must address both **multi-perspective complexity and digital transformation**, subjects addressed by frameworks such as the Balanced Scorecard, the EFQM model, and the Multi-Perspective Model Approach.

### 1.3 Systematic Overview of Process Measuring Strategies

In the following, the tables 1 and 2 synthesize and evaluate the different methods of established and contemporary measurement systems, offering a **comprehensive evaluation of their theoretical foundations, structural measures and attributes as well as sectoral allocation**.

**Table 1** *Theoretical Foundations of Process Measurement Strategies*

<i>Model</i>	<i>Measures</i>	<i>Theoretical Foundation</i>	<i>Strategic Orientation</i>	<i>Key Statements</i>
SMART Goals (Doran, 1981)	Task-specific KPIs	Specification of objectives	Creation of operational clarity	Measurable goals improve performance
IMPACT Model (Raynus, 2011)	Quantified KPIs from real-time issues	Performance control and data analytics	Real-time process control	Data, collaboration and monitoring allow fast responding
Balanced Scorecard (Kaplan and Norton, 1996)	Financial and non-financial indicators	Strategy-as-practice and performance control	Multi-perspective strategy alignment	Strategy can be transformed into measurable indicators
EFQM Model (Fonseca, 2015)	Multidimensional performance indicators across enablers and results	Systems theory and organizational learning	Comprehensive organizational excellence and continuous improvement	Sustainable performance emerges from aligned direction, execution, learning, and stakeholder value creation

Performance Prism (Neely et al., 2002)	Stakeholder-, process-, and capability-oriented measures	Stakeholder theory and systems thinking	Stakeholder-centric performance alignment	Organizational performance depends on value creation between stakeholders, processes and capabilities
Dynamic Performance Measurement Systems (Bititci et al., 2011)	Adaptive and time-sensitive performance indicators	Systems dynamics and organizational learning theory	Strategic responsiveness and adaptability	Performance measurement systems must evolve continuously to remain relevant in dynamic environments
Multi-Perspective Model Approach (Wątróbski et al., 2016)	Economical, social, technical, environmental and contextual	Multi-criteria decision-making and adaptable performance measurements	Strategic and operational alignment through multiple dimensions	Complex processes require integral evaluation from various perspectives rather than a single dominant metric

Source: compiled by the author based on the conducted research

**Table 2** *Strengths, Weaknesses, Structure and Relevant Sectors*

<i>Model</i>	<i>Strengths</i>	<i>Weaknesses</i>	<i>Structure</i>	<i>Sectors</i>
SMART Goals	Priority identification	Narrow project focus, disregard of external factors	Criteria-based framework	Marketing, project management
IMPACT Model	Links KPIs to actions	Less standardized, requires strategic maturity	Linear framework	IT services
Balanced Scorecard	Strategic alignment across departments	Overwhelming measures, insufficient metrics	Perspective matrix with strategy map	Multi-perspective strategy alignment
EFQM Model	Comprehensive view of organizational performance and learning	Conceptual complexity, not designed for direct KPI prescription	Systemic excellence framework	Versatile, for any sector
Performance Prism	Stakeholder orientation and capability focus	Low prescriptive guidance for indicator selection	Stakeholder- and capability-centred prism structure	Service-offering organizations, knowledge-intensive industries

Dynamic Performance Measurement Systems	High adaptability and responsiveness to change	Implementation complexity and technological dependency	Feedback-loop-based, adaptive measurement system	Digitally transformative organizations, dynamic environments
MPMA	Integrated evaluation across multiple performance dimensions	Complex implementation, data-intensive, needed cross-functional coordination	Multi-dimensional, criteria integrated framework	Corporate strategy development, advanced performance management

Source: compiled by the author based on the conducted research

The tables 1–2 provide a comparative overview of established performance and process measurement models by summarizing their strengths, weaknesses, structural logic, and sectoral applicability. The purpose of this comparison is to provide a precise yet critical reference point for understanding the contextual usability and limitations of each framework. Traditional models such as SMART Goals and the Balanced Scorecard (BSC) emphasize **goal clarity and strategic alignment**. While SMART Goals support **focused prioritization**, but their narrow scope limits applicability in complex environments. Also, the BSC serves as **strategically grounding** for converting strategy into measurable dimensions, such as financial, customer, internal process, learning and growth, but may result in an excessive amount of indicators and limited guidance on metric selection in data-driven contexts.

More integrative frameworks, including EFQM, Performance Prism, Dynamic Performance Measurement Systems, and MPMA, extend beyond static indicators by **incorporating points such as stakeholder value, learning and adaptability**. For instance, the EFQM model provides a comprehensive view of organizational performance but lacks direct process KPI instructions, whereas Dynamic Performance Measurement Systems offer high adaptability, but at the cost of implementation complexity. MPMA explicitly structures measurement across multiple dimensions and perspectives, enabling the integration of quantitative data, expert judgment, and potentially conflicting performance and process criteria.

While all models provide fundamental contributions to process measurements, there are significant differences in how well suited they are for data-driven transformation. By assessing AI integration, digital preparedness, and structural compatibility with contemporary performance systems, Table 3 summarizes these distinctions. It compares the selected process and performance measurement models, with a specific focus on their applicability to modern process measurement systems in digitally transforming organizations. The comparison evaluates each model’s potential

for AI integration, readiness for digital transformation, data-driven structure, and overall suitability for contemporary process-oriented measurement.

**Table 3** *AI Integration and Suitability for Modern Process Measurement System*

<i>Model</i>	<i>AI Integration Potential</i>	<i>Digital Transformation Readiness</i>	<i>Data-Driven-Structure</i>	<i>Suitability for Modern Process Measurement</i>
SMART Goals	<b>Moderate:</b> Goal-setting can be automated	<b>Moderate:</b> Integrable to KPI structures	<b>Moderate:</b> Supports performance tracking	<b>Lacks</b> analytical depth, usage of supportive framework
IMPACT Model	<b>High:</b> Integrable to real-time decision-making processes and monitoring	<b>High:</b> Combines traditional and digital measures	<b>High:</b> Focuses on data-integration, collaboration and feedback loops	<b>Suitable</b> for hybrid model for digital adaption processes
BSC	<b>Moderate:</b> Possibility for digitization of its strategy map with dashboards	<b>Moderate:</b> Needed requirements for adaptation for dynamic data	<b>Moderate:</b> Integrates KPIs but lacks possibility of automation	<b>Viable</b> foundation, specially with digital extensions
EFQM Model	<b>High:</b> AI can enhance diagnostic assessment, learning and performance insight generation	<b>High:</b> Aligns with digital transformation and organizational learning	<b>High:</b> Integrates qualitative and quantitative performance dimensions	<b>Highly suitable</b> as a conceptual reference for AI-enhanced and comprehensive process measurements
Performance Prism	<b>High:</b> AI can support stakeholder analysis, capability assessment, and process insight	<b>High:</b> Compatible with digitally enabled, stakeholder focused environments	<b>High:</b> Strong focus on relational and capability-based data	<b>Suitable</b> for modern, stakeholder-driven and process oriented measurement systems
Dynamic Performance Measurement Systems	<b>Very High:</b> AI enables real-time feedback, predictive analytics, and adaptive KPI recalibration	<b>Very High:</b> Inherently designed for dynamic and digital environments	<b>Very High:</b> Fully data-driven with continuous feedback mechanisms	<b>Highly suitable</b> for adaptive, AI-supported, and future-oriented process measurements
MPMA	<b>High:</b> Multi-perspective data collection, integration and predictive analysis enhancement via	<b>High:</b> Compatible with digital analytical systems	<b>High:</b> Data-driven, integrates multiple KPIs across perspectives	<b>Highly suitable</b> for modern, data-driven process measurement systems

AI,

Source: compiled by the author based on the conducted research

The compiled table indicates that approaches such as SMART Goals or BSC remain conceptually valid for structured goal-setting for process level approaches. However, they lack analytical depth, modern automation capability, and integrable feedback mechanisms for dynamic process optimization and AI-enabled measurement systems. In contrast, the IMPACT Model shows high adaptability with the ability to link strategic objectives with real-time data integration, collaboration, and continuous feedback loops, therefore, being suitable for hybrid process measurement systems in digitally evolving environments. The BSC continues to provide a stable foundation for aligning processes with strategic objectives, but its effectiveness in data-driven settings depends on independent, digital extensions such as dashboard-based visualization and automated data integration.

More advanced frameworks, including the EFQM model, the Performance Prism, Dynamic Performance Measurement Systems, and MPMA, show through their structure possible strong alignment with AI-supported and data-driven process measurement. The EFQM model and Performance Prism offer comprehensive as well as stakeholder-oriented viewpoints that can be optimized through AI-based diagnostics and capability analysis, while Dynamic Performance Measurement Systems can be inherently designed for real-time feedback exchange, predictive analytics, and adaptive reconfiguration of process indicators. Among these models, MPMA stands out as the most future oriented framework for process measurement. Its multi-perspective structure enables the integration of quantitative and qualitative process data, can possibly support AI-assisted predictive analysis, and ensure contextual adaptability across an organization. Therefore, MPMA is identified as the most suitable theoretical foundation for developing modern, data-driven process measurement systems within organizations undergoing digital and AI transformation.

## 1.4 Integration of AI in Process Measurement and Decision-Making

### From Static Scorecards to a Dynamic Feedback Ecosystem

The integration of artificial intelligence (AI) into process measurement systems marks a fundamental transformation from traditional, retrospective monitoring which mainly work on historical data and manual interpretation, to a **dynamic, proactive control within the prospects of predictive analytics and therefore real-time responsiveness** (Kılıç et al., 2025). This change

is evident, for example, in the development of intelligent KPIs, which can **autonomously adapt to process fluctuations** and **continuously adapt based on operational data** in order to meet evolving business objectives (Sishi and Telukdarie, 2025). Similarly, Khaustova and Riabokin (2024) point out that AI realizes adaptive corporate management systems, where real-time data analysis operates with proactive engagement rather than with delayed corrective actions. Such developments transform process measurement into a **self-optimizing system** capable of continuous learning and adjustment. This evolution through AI represents a broader shift in which strategic measurements are no longer restricted on static scorecards but functioning as a **dynamic feedback ecosystem**. Therefore, the ability of AI to detect non-aligned performance drivers provides organizations with the potential to evolve past limitations of traditional KPI frameworks (Schrage et al., 2024). By automating the process of generating insights, AI links measurements and decision-making into a continuous cycle of organizational learning which creates a data-led environment where measures reflect both current conditions and strategic goals, creating the option to a **responsive and evidence-based management structure**.

#### **Core Dimensions of AI-Enhanced Process Measurement**

AI strengthens process measurement across three interrelated dimensions: **data integration, predictive and prescriptive modelling, and continuous learning** (Andročec, 2023). AI systems can process extensive quantities of structured and unstructured data from diverse sources such as IoT, ERP systems, and customer data platforms. Edge-AI and cloud-AI structures merge these data streams into consistent process maps, enabling real-time analysis. Specifically, Edge-AI refers to the process of AI algorithms directly operating on devices or local servers as the data source, rather than from a centralized cloud system (Gill et al., 2024). This approach can be essential for real-time process monitoring, as a systematic review by Gill et al. (2024) identifies its key enablers in **low-latency computation, local inference, and resource-efficient learning**. Additionally, Andročec (2023) further strengthens an edge-AI approach as enhancement of responsiveness, to reduce a central-system dependency, and to improve measurement precision.

Continuing integrated data foundations, AI can contribute strongly to **process measurement through predictive and prescriptive analytics**. Machine-learning algorithms are able to forecast process variations, resource bottlenecks, or quality issues and replicate the impact of different interventions. Al-Surmi, Bashiri, and Koliouisis (2022) indicate through empirical observation that AI-enhanced decision frameworks significantly improve operational performance when predictive modelling is combined with structured improvement strategies. The authors developed a hybrid AI decision-making framework and tested it by using a combination of case studies and simulations within a manufacturing setting. They empirically validated that by

integrating their **AI-based predictive models with structured improvement strategies**, they achieved significant performance gains. This was measured quantitatively using key operational metrics, including a significant reduction in order-cycle-time and a substantial improvement in delivery reliability. Their results confirmed that the **synergy between predictive analytics and prescriptive improvement strategies** were crucial in achieving these operational gains. By continuously evaluating cause-and-effect relationships, AI also transforms **process measurement from a passive evaluative mechanism into an active decision-support system** which predicts performance trends and autonomously suggests actions for optimization (Cunha et al., 2023). Further, process-mining tools, such as Celonis, use AI to discover process flows, identify inefficiencies, and trigger adaptive improvements even automatically.

### **Strategic and Organizational Effects**

The strategic integration of AI into process-measurement frameworks reshapes organizational governance, enhancing executive decision-making with timely insights and encouraging a decentralized, data-driven culture (Khaustova and Riabokin, 2024). By providing employees with accessible predictive insights, AI-enabled systems can **empower the workforce, thus reinforcing engagement and accountability**. Moreover, most effective process-measurement models do not replace human judgement but complement it, ensuring that automated improvements are evaluated within organizational and ethical contexts (Cunha et al., 2023). However, Merhi (2023) advises that a successful adoption requires **technological readiness, reliable data quality and management commitment as well as transparent structures**. Merhi's evaluation indicates that a lack of transparency implementing AI systems can lead to resistance from stakeholder, ultimately causing an implementation to fail. These factors are crucial in ensuring that AI-driven process measurement systems are perceived assessable and strategically aligned with the organization's values alongside of organizational goals.

### **Implementation Challenges**

Despite its potential, AI-enhanced process-measurement systems encounter several challenges. A main concern is the mentioned **lack of transparency** in complex "black boxes" (Rudin, 2019, p. 1) algorithms, which can obscure casual logic behind decisions and damage the users trust, essential in an environment of adoption. Furthermore, an over-reliance on automated outputs **risks disregarding human judgment**, especially when fundamental data is biased or incomplete. Organizations also face practical implementation barriers, including the **difficulty and cost of integrating it alongside legacy systems or even replacing such systems** with a lack of technical expertise (Khaustova & Riabokin, 2024). These technical and operational obstacles are intensified by occurring **ethical and governance risks**, such as the **algorithms bias and data privacy concerns** (van Berkel et al., 2023). Consequently, addressing these limitations requires

the creation of **comprehensive AI-governance frameworks**. Such frameworks must define clear accountability structures, actively promote algorithmic transparency, and formally maintain human-in-the-loop control. This balanced approach can ensure that AI-driven measurement systems are both intelligent and ethically sustainable. While AI is redefining process evaluation by creating dynamic, adaptable, and self-optimizing systems, its ultimate **value depends on a context-based combination of technological capabilities and human supervision**. The **transition from descriptive observation to predictive action** represents a paradigm shift for modern businesses. Therefore, the most effective companies will not view AI as a replacement for management decisions, but as a **strategic addition that complements human knowledge** to assist in continuous learning and performance improvement within the organization (Stoyanovich et al., 2025).

### **AI as Enablers of Corporate and Process Intelligence**

Beyond abstract AI capabilities, the increasing distribution of general purpose or organizational related AI tools illustrates how AI-enhanced process measurement is functionalized within organizational environments. Purpose generative AI systems such as ChatGPT, Gemini or Perplexity exemplify the role of large language models as cognitive support tools that facilitate scenario exploration and clarity, and interpretive analysis of performance data. From a process-measurement perspective, these systems can **support the translation of complex KPI patterns into actionable administrative insights**, thus enhancing decision quality rather than replacing formal measurement logic (Dwivedi et al., 2023).

In parallel, organizational integrated AI solutions, such as Einstein in the Salesforce application or in-house corporate solutions, embed **predictive and prescriptive analytics directly into workflows and process environments**. These platforms extend process measurement beyond reporting by continuously **monitoring task flows, predicting bottlenecks, prioritizing interventions, and aligning operational execution with strategic objectives** (Ransbotham et al., 2020). Theoretically, such systems illustrate the shift from detached performance measurement toward embedded, process-integrated intelligence, where AI becomes part of the organizational capability infrastructure. Rather than functioning as isolated analytics tools, the mentioned possibilities **operationalize AI as a dynamic mechanism that links data generation, performance evaluation, and managerial action within a continuous feedback loop**. This emphasises the conceptual argument that AI-enhanced process measurement is most effective when embedded within existing organizational systems and governance structures, supporting learning, alignment, and adaptive decision-making at both corporate and process levels (Haefner et al., 2021, Davenport & Mittal, 2022).

## 1.5 Research Design for the Literature Review

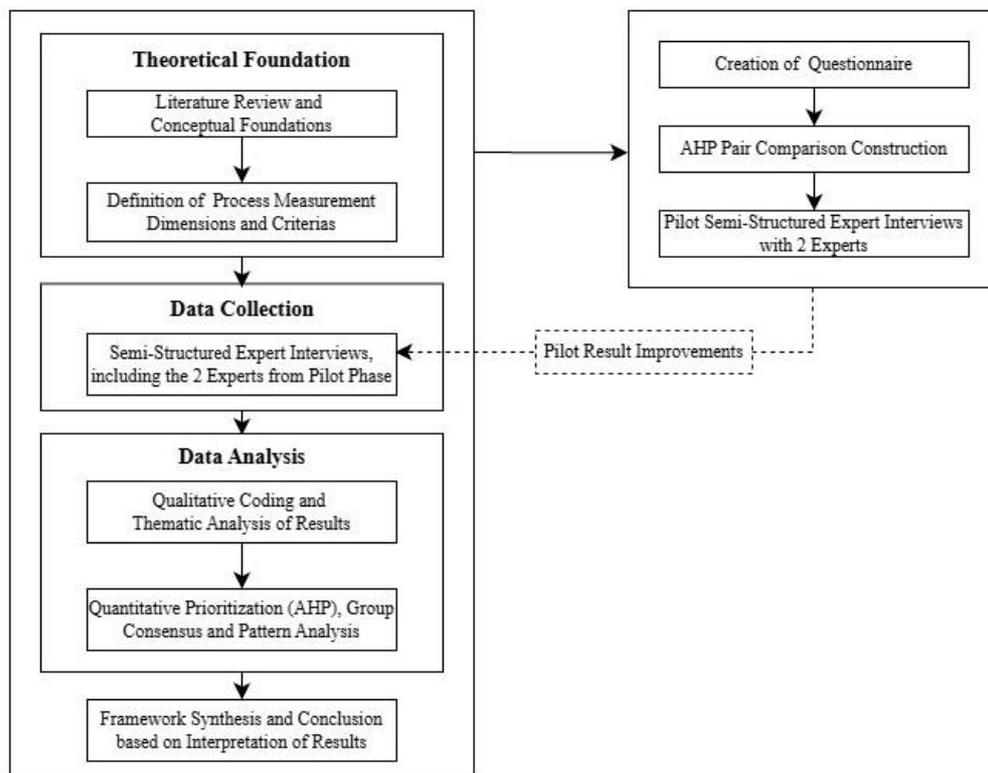
A visualized research design for the literature review, to be found in Annex 1, **structures the literature analysis and forms the theoretical foundation of this thesis**. It begins with the Exploration Phase, which aligns with the aim to systematically synthesize prior research on process measurement strategies and AI integration. The subsequent Design and Classification Phases reflect the methodological creation including research questions and objectives definition based on the comparison of theories, such as BSC and EFQM, with modern, AI-enabled approaches by identifying their strengths, limitations, and suitability for dynamic environments within the literature review. The Synthesis and Theory Creation Phases lead to the identification of key themes and research gaps, specifically, the lack of adaptive, multi-perspective, and AI-integrated measurement systems which guide the development of the proposed data-driven process measurement framework. Thus, the literature review is not merely descriptive, but analytically directed toward building an empirically grounded model for enhancing organizational performance.

## 2 RESEARCH METHODOLOGY FOR THE DEVELOPMENT OF A PROCESS MEASUREMENT FRAMEWORK

### Research Design Scheme

To be found in the following is a research design scheme for the presented empirical research to this thesis (Figure 6). The Research Design Scheme figure offers the reader a clear illustration that reflects the phases of the research. These phases are also explained in detail in the chapters below.

**Figure 6** *Research Design Scheme*



Source: compiled by the author based on the conducted research

### Objectives and Research Questions of the Research

The main objective of this research is to **develop a multi-perspective, process measurement system in form of a framework and the possibility to integrate AI that aims at optimizing organizational performance across process effectiveness, strategic alignment and resource utilization within companies in the information service sector.** Most performance measurement frameworks highlight financial results and operational efficiency, but lack a universal incorporation of functional, non-financial metrics. This study **aims to bridge the gaps by connecting existing frameworks into a modernistic structured framework concentrating**

**on modern usage** with dimensions such as effectiveness, quality, decision-making effectiveness, and employee engagement as well as the impact of digital technologies within the theory creation (Nambisan, 2017) such as AI-integration. The development of a multi-functional framework considers established methodologies as well as enhanced measurements to support measurement accuracy, effectiveness and decision-making. The transformation through digital technologies shaping organizational process (Nambisan, 2017), including performance measurement processes. This observation involves AI-integrations in form of real-time tracking and predictive analytics that have the potential to optimize process evaluation by offering a transition from static to a dynamic performance measurement approach to support continuous organizational improvement. Further, the research aims to **critically compare the developed framework with the mentioned process measurement systems** (see chapter 1), while emphasizing advantages in obtaining performance drivers. The developed framework incorporates a flexible yet balanced approach on performance evaluation in order to address limitations with a focus on non-financial metrics.

The main research question of this study is: **Which performance indicators should be included in an AI-enhanced process measurement system for data-driven organizations, and how should their relative importance be estimated to improve effectiveness, quality, and resource utilization?**

The secondary research question is: **How can the integration of artificial intelligence and expert-based decision models enhance adaptability, transparency, and strategic alignment of process measurement systems in companies?**

The selection of the research questions follows a **data-driven approach for enhancing organizational performance via process measurement** with the option to include **data-driven dimensions such as AI involvement in process measurements**. The main question focuses on developing a practical and empirically supported measurement system capable of strengthening decision-making processes in areas of resource utilization, effectiveness, quality improvements and their administration.

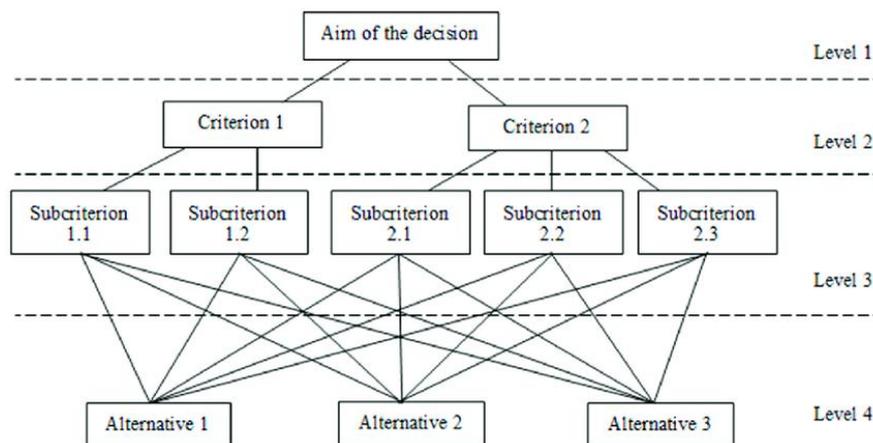
### **Explanation of the Research Methods**

The research design is structured within the spectrum of the **Analytic Hierarchy Process (AHP)**. AHP, developed by Thomas Saaty in the 1970s, is a structured decision-making approach that is relevant in multi-criteria decision analysis (Munier and Hontoria, 2021). AHP is adopted as the **fundamental multi-criteria decision making technique** due to its capability to transform qualitative expert judgements into quantitative priority weighting within a clear hierarchical structure (Li et al., 2013; Saaty, 1990). For this research, AHP is used to (1) **structure the multi-perspective measurement problem**, (2) **select relative weights for the perspectives and KPIs drawn from the expert interviews**, and (3) **combine those weights with empirical indicator**

**values to compare different measurement configurations** (Li et al., 2025).

Operationally, AHP is used in this study as follows: A four-level hierarchy is constructed (see Figure 3). The aim (Level 1) is to develop a MPMA-based process measurement system. The main criteria (Level 2) include the core perspectives identified from the literature, such as **Effectiveness, Resource Utilization, Digitalization Readiness and Process Quality Orientation**. The specific sub-criteria (Level 3) and the potential indicators or alternatives (Level 4) will be defined based on the qualitative analysis of the expert interviews and their judgement. In the AHP model, the alternatives level serves to evaluate the relative importance of specific, measurable indicators to inform which are most critical to include in the final framework. The detailed hierarchy, including sub-criteria and alternatives, will be defined from the interviews and expert insights.

**Figure 7** Hierarchical structure in the AHP method



Source: Wątróbski et al., 2016, p. 10

The expert judgements are collected via a structured questionnaire applying the **AHP 1 - 9 scale where the main criteria are compared in pairs to determine their relative weight**. For each expert a pairwise comparison matrix is constructed and displayed in this work. The local priority vectors (weights) and the Consistency Ratio (CR) are calculated for each matrix and the group matrix with the average group priorities. Expert criteria weighting is considered acceptably consistent if the CR is below 0.10 (10 %) (Li et al., 2013). Otherwise, inconsistent judgments may be reviewed to then adjust the set values by the expert itself during the interview to improve coherence in their judgement. To synthesize the input from all experts, the individual pairwise comparison matrices will be aggregated into a single group judgment matrix for each level of the hierarchy using the geometric mean method (Saaty, 2008). The global weights for all criteria and sub criteria are then calculated from the aggregated matrices and the AHP-OS Criteria Ranking

Analysis Tool. This approach ensures that the final weights represent a **sufficient consensus of the selected expert group**. However, empirical AHP applications frequently involve heterogeneous expert groups, where differences in professional background or conceptual understanding lead to structured conflict in agreements. To address this, the study extends the traditional AHP aggregation procedure by applying a Group Consensus Cluster Analysis, following the approach proposed by Goepel (2018) with the AHP consensus indicator based on the relative homogeneity  $S$ :

$$S = \frac{1}{D_{\beta}} - \frac{1}{D_{\beta \min}}$$

This method leads to the identification of internally consistent subgroups within the global expert group, thereby avoiding the risk of hiding meaningful differences through initial aggregation. The clustering procedure is based on entropy-based similarity measures, which treat individual AHP priority vectors as probability distributions. Each expert's normalized priority vector represents the relative importance assigned to the evaluation criteria.

Following Goepel (2018), the clustering procedure does not rely on an randomly defined similarity threshold. Instead, a consensus threshold examining approach is applied, where similarity **thresholds between 70% and 97.5% are evaluated in fixed increases**. For each threshold, the amount of clusters and the amount of unclustered experts are evaluated. The selected threshold represents the highest feasible level at which at least two clusters emerge while keeping the amount of unclustered experts as low as possible. This approach ensures that cluster groups reflect relevant and consistent expert perspectives.

### **AHP-OS Criteria Ranking Analysis Tool**

The AHP Online System (AHP-OS) was used to execute the Analytic Hierarchy Process (AHP) for the criteria ranking (Goepel, 2018). AHP-OS is a web-based software program that applies the AHP technique in a structured format to support multi-criteria decision-making. The methodological precision, accessibility, and conformity to academic research standards underlying the tool contributed to its selection.

The tool complies to a methodical process that is essential to the analysis: The tool's interface was utilized to organize the hierarchical decision model, which included the goal and main criteria. Pairwise comparisons were then carried out, converting qualitative expert judgments into quantifiable data. Its automatic computation of priority vectors and Consistency Ratio (CR) is a key feature while verifying the logical consistency of the experts' conclusions, the program determines the CR (threshold of 0.10). Criteria priorities identified during the interviews are displayed in chapter 3 and collected in the Annex of this work.

## Interview Structure and Questionnaire

The chosen method for this study includes **13 semi-structured, in-depth interviews with experts**, where the formulation of the questions and the sequence, in which they are partly predetermined by asking a **variety of scaled structured as well as open-ended questions** (Creswell and Creswell, 2023). The usage of qualitative interviews identifies essential KPIs and an understanding of fundamental processes for the development of a process measurement framework. Additionally, this flexibility in examining processes and systems, which involves human interactions and subjective experiences, enables to adjust questions and examine emerging themes for a comprehensive evaluation. The chosen market to be evaluated are primarily in **European countries while interviewed experts are employed in companies in Lithuania, Germany and Austria**. Participants are holding **professional roles in higher corporate levels** who are involved directly in process measurement and management within their professional environment. The selection of participants includes **project managers, data analysts, operations and performance managers alongside product owners and AI specialists**. The study concentrates on organizations in information services sectors and maintain a workforce of more than 50 employees in order to ensure the relevance of results and possible implementation of the developed framework. This threshold targets on excluding startups and small businesses, which feature characteristics of fluctuation such as evolving organizational structures, limited resources, and underdeveloped measurement processes (Papulová et al., 2021). The characteristics can undermine the comparability and consistency required to construct and evaluate a reliable process measurement system. By selecting more established businesses, the study considers to gain insight from organizations that are prone to be equipped with a robust data infrastructure, stable internal operations, and accustomed process frameworks. These factors are essential for implementing data-driven performance measurement into practice (Brynjolfsson and McElheran, 2016). This requirement also increases the probability that participants operate in structured settings where advanced analytics, process optimization, and strategic performance management are integrated and routinely used, thereby enhancing the validity and transferability of the study's conclusions.

A comprehensive literature review supports the mixed-method qualitative research approach with the usage of the AHP that is the base of this study's research design to build a data-driven process measurement framework. The chosen methodological strategy was selected to attempt capturing the whole scope and contextual complexity of process measurement procedures, along with their relevance in modern corporate contexts. Compared to quantitative methods, qualitative ones such as **expert interviews offer a complex understanding of the expert knowledge, internal processes and their dynamics** that may not be sufficiently revealed by numerical data only via quantitative research (Creswell, 2007). The interviews are recorded and

transcribed to enable a analysis by using the NVivo programme, where a **thematic coding approach allows identification and mapping of emerging patterns and recurring opinions**. This process allows to create a conceptual framework that is based on expert knowledge, evaluated and cascaded through the AHP method. The selected qualitative approach is strengthened by examples from **AI-guided process improvements** from some participants, which enhanced the selected topic direction and methodology. Further insights are gained from **previous empirical studies mainly on MPMA and AHP in the context of process measurement and AI**.

Several actions were adopted to guarantee credibility. In order to align the participants understanding of the research and interview direction, the participants are provided with interview guidelines prior the interview. To further ensure comprehension and prevent misunderstandings follow-up questions are asked during the interviews. By interviewing a **variety of specialists from different organizational roles and company types within the information service industry**, triangulation was used to further increase credibility (Nowell et al., 2017). This reduced single-source bias and incorporated varied perspectives on the topic. Transferability is strengthened by detailed context-related descriptions of the participants' roles, sector background and company size, providing relevance to similar framework settings to be determined in future studies.

The selection of research participants ensures that the study focuses on companies with structured processes and avoids fluctuations. Further, reliability is ensured via transparent research process including the use of a semi-structured interview guide and consistent documentation within each methodological step. Lastly, verifiability through consideration of the theoretical background and the adherence of analytical neutrality is established by **structured coding via qualitative software NVivo**. These combine efforts guarantee a high standard of quality, ensuring that the results are reliable and defensible both in science and in practice.

Further, the questionnaire design follows a theory-driven and expert-oriented approach to support the development of a data-driven, AI-enhanced process measurement framework. **The questions are structured in two complementary parts: an open qualitative exploration and a structured multi-criteria evaluation using the Analytic Hierarchy Process (AHP)**. The qualitative questions are designed to obtain expert insights of their process measurement practices, limitations, and opportunities for AI integration, thereby capturing contextual and experiential knowledge that is not accessible through quantitative data alone.

**Table 4** *Semi-Structured Interview Questionnaire*

Phase	Question	Purpose	Sources
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Participant Background	<ol style="list-style-type: none"> <li>1. What is your job title?</li> <li>2. What are your primary responsibilities in your current role?</li> <li>3. How many years of experience do you have in your current Role and sector?</li> <li>4. What is your company size by employees?</li> <li>5. What is your company's core area of business?</li> </ol>	Contextualizing expert's role, experience, and organizational setting, ensuring relevance and transferability of findings.	
Qualitative Discussion: Current Stage of Process Measurement	<ol style="list-style-type: none"> <li>6. How does your organization currently collect, process, and analyse data related to business process performance?</li> <li>7. In your opinion, what are the biggest strengths and weaknesses of your current process measurement in your company?</li> <li>8. For you, what are the most critical aspects for evaluating the success of a process?</li> </ol>	Qualitative exploration about process measurement systems (PMS) / practices while understanding expert perceptions of critical success factors in process evaluation generally.	Wahrstötter (2023); Van Looy & Shafagatova (2016)
Qualitative Discussion: The Role of AI and Data Analytics	<ol style="list-style-type: none"> <li>9. To what extent does your company use AI or advanced analytics to understand or improve business performance?</li> <li>10. What would be the greatest potential for AI or automations in improving process measurement / management in your daily work?</li> </ol>	Assessing current level of AI adoption and digitalization, and identifying apparent opportunities for AI and automation in enhancing process measurement and management.	Sishi & Telukdarie (2025); Andročec (2023)
Qualitative Discussion: Challenges and Chances	<ol style="list-style-type: none"> <li>11. What are the biggest technical and organizational barriers to implementing a fully data-driven process measurement system?</li> <li>12. In your opinion, what key factors support success when integrating AI-driven</li> </ol>	Uncovering possible implementation challenges and drivers for successful AI integration into PMS.	Merhi (2023); Khaustova & Riabokin (2024)

	analytics into existing process performance?		
AHP Weighting Scale	13. Which criterion is more important, and how much more on a scale 1 to 9?	Discovering expert judgments for pairwise comparison of main criteria, enabling quantitative prioritization within the AHP framework.	Saaty (2001); Munier & Hontoria (2021)
Sub Criteria	14. What are the most important sub criteria to be able to measure / scale the main criteria? Name 1 - 3 sub criteria for each main criteria.	Identifying measurable sub criteria and indicators that operationalize main criteria based on experts' knowledge.	Wątróbski et al. (2016); Amor et al. (2019)
Finalising Question	15. From your view, what is the most important change data-driven organizations need to make to improve how they measure and manage business processes?  <i>Additional question a. What role will modern technologies play in this change?</i>	Synthesizing expert insights on transformational needs and strategic roles of technology in future PMS.	Cunha et al. (2023); Schrage et al. (2024)

Source: compiled by the author based on the conducted research

The AHP-based part at question 13 operationalizes the insights by inviting the **experts to systematically compare and prioritize main process measurement criteria**, transforming subjective judgments into analytically consistent weightings. This dual design enhances the robustness of the framework development by integrating strategic relevance with technical feasibility, while maintaining methodological consistency through a structured and transparent evaluation process.

**Table 5** *Pair Comparison Table*

Criterion	Priority Vectors (Weighting)																		Criterion
Process Effectiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Process Quality	
Process Effectiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Resource Utilization	
Process Effectiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Digital & AI Readiness	
Process Quality	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Resource Utilization	
Process Quality	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Digital & AI Readiness	
Resource Utilization	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Digital & AI Readiness	

Source: compiled by the author based on the conducted research

### Data Saturation

In qualitative research, the selection of an sufficient amount of research participants is primarily influenced by the **perception of data saturation**, where they will be some point reached where interviews return with no new information, insights, or patterns. In-depth expert interviews were considered adequate to achieve thematic saturation in this study due to the participant specializations and competences as well as the goal of creating a framework for data-driven process measuring. An amount between **5 and 25 research participants are commonly sufficient for qualitative research** by utilising semi-structured interviews when the research problem is precise and the participants are informed in their expertise field (Creswell and Creswell, 2023).

In this study, a wide representation of expert knowledge regarding KPIs, digital integration with AI and process effectiveness was ensured by choosing the participants in different roles but equal significant to the research. These participants represent organizations in information service sectors that have **structured process environments and data-driven decision-making cultures**. Such settings are particularly well adapted for qualitative research on process performance measurement systems as they minimize variability generated by fluctuating operational structures (Papulová et al. 2021). In addition, the decision to use semi-structured interviews allows **iterative questioning and emerging topic refinement** during the data collection process, which further supports the achievement of saturation (Rahimi and Khatooni, 2024).

### 3 DEVELOPMENT OF A PROCESS MEASUREMENT FRAMEWORK

#### 3.1 Expert Interviews

##### Expert Coding

The identities of the experts are not revealed in this study due to confidentiality. Interview experts are assigned numerical codes, ranging from 1 to 13. Before conducting the actual interviews with all 13 experts over the course of a month, Expert 1 and 2 also took part in a test phase of the interviews. Two interviews were conducted in person during the actual interview conducting stage, and the remaining interviews were conducted remotely. For the purpose of simplicity, we will treat these two settings as one since the questionnaire's format remains unchanged. Table 4 provides an overview of the experts' years of professional experience as well as their professional position category according to their title and declared responsibilities.

**Table 6** *Expert Position Experiences and Position Categories*

<b>Expert</b>	<b>Position Experience</b>	<b>Position Category</b>
Expert 1	6 - 10 years	Data and Analytics
Expert 2	6 - 10 years	Quality and Excellence Management
Expert 3	16 - 20 years	Research and Development
Expert 4	3 - 5 years	Data and Analytics
Expert 5	11 - 15 years	Data and Analytics
Expert 6	6 - 10 years	Data and Analytics
Expert 7	20+ years	Research and Development
Expert 8	6 - 10 years	Technology and Digital Transformation
Expert 9	11 - 15 years	Corporate Strategy and Management
Expert 10	16 - 20 years	Technology and Digital Transformation
Expert 11	3 - 5 years	Technology and Digital Transformation
Expert 12	6 - 10 years	Corporate Strategy and Management
Expert 13	11 - 15 years	Quality and Excellence Management

Source: compiled by the author via NVivo based on the conducted research

### **3.2 Analysis of Open-Ended Questions**

This section presents empirical findings from 13 expert interviews, starting with a qualitative analysis of the interview transcript, conducted via NVivo to reveal key themes and patterns, followed by the AHP results, and finalized with a synthesis of how the findings shape the proposed framework.

#### **Characteristics of Existing Measurement Systems in Experts' Environments**

Current measurement systems across the experts organizations are characterized by considerable diversity and a strong emphasis on financial efficiency. The dominant measurement logic links performance with the relationship between revenue and effort within processes, demonstrating a principle that time represents cost. Common indicators include product or department profitability, effort per sales lead, profit per analyst per working day, and reductions in time invested while maintaining end product quality. In project and operational contexts, experts organizations frequently track lead times, compliance with deadlines, efficient resource utilization, planned vs. actual performance comparisons, system's up and down time, service-level agreement compliance, and incident frequency. In some cases experts stated that performance would be assessed by using qualitative or partly subjective goal accomplishment scales.

Notable strength of these systems are noted by the experts in simplicity and accessibility in a well-structured and established environment. Time planning and efficiency metrics are generally easy to understand and to communicate. Many experts organizations demonstrate robust capabilities in deadline management, resource planning, and project scope transparency. Available automated data collection in some experts technical systems allow fast perception of operative issues, while experts in smaller organizations benefit from agility and faster decision-making. However, measurement practices are often split with data distributed across multiple tools, systems or spreadsheets while relying on manual tracking. According to the experts, this fragmentation prevents the development of a comprehensive overview on process performance and limits opportunities for a systematic optimization. Moreover, some metrics used by the experts in their professional environment are subjective or inconsistently defined, challenging comparability and strategic alignment with other department or teams. Also, a remaining conflict exists between efficiency pressures and quality obligations that, in an effort to minimize project work time and costs, conflicts with demands for diligence and reliability. With that, experts emphasised a common divide between technical process metrics, value creation and governance reporting which can result in measurement systems that generate data but fail to support integrated performance management and decision-making.

#### **Factors for Implementing a Measurement System**

A number of technical, strategic, and foundational elements must come together for a

measuring system to be implemented successfully. Experts have repeatedly stressed that human expertise and high-quality data are essential preconditions for every measurement effort, while the implementation of an effective measurement system is depending on a combination of foundational, technical, and strategic factors. Experts, such as expert 2 and 5, consistently emphasized that human expertise and data quality form central requirements for any measurement initiative, stating that without reliable, timely, and scalable data, measurement systems fail to create useful insights. Some experts (Experts 1 and 6) emphasized that time-related indicators, such as time spent on activities which serve as essential record metrics in process-oriented contexts, regularly show quality itself. Therefore, the system success depends not only on data availability but also on its accuracy, consistency and usability over time. Another critical success factor is process clarity. Before measurement systems can be implemented, companies must clearly define processes under consideration of its inputs, outputs, interfaces, and scope. Within this context, AI is primarily perceived as supporting rather than determining factor, described by experts as supportive tool that accelerates implementation by assisting with tasks such as code review, anomaly detection, and handling large dimensions of data. AI can act as a “daily extra pair of hands” (Expert 10), particularly in technical environments, assisting in efficient handling of complexity. Technical solutions such as database normalization or denormalization were cited as practical methods for addressing performance holdups during such implementation. Further, measurement systems must be grounded in concrete, project related use cases, rather than abstract objectives. Thus, implementations should, according to expert 12 and 7, operate within clearly defined guidelines, particularly regarding data protection, methodological consistency, and legal compliance, whereas implementation are still formed by organizational growth and available financial capabilities, highlighting that measurement systems are not purely technical objects but strategic investments surrounded by business structures.

### **Obstacles to Implement a Measurement System**

Despite an availability of tools and methodologies, experts stated human, cultural, and infrastructural difficulties as the primary obstacles for an implementation. Resistance to change within the workforce appeared as the biggest challenge. According to Expert 1, 13 and 8, employees observe measurement systems, particularly AI supported ones, as threats to job security, leading to avoidance or resistance to these systems and AI in particular. This resistance continues when AI adoption is pushed as a management priority, indicating a gap between managerial intent and employee acceptance. From a technological perspective, experts raised concerns regarding the suitability of current AI systems for process analysis. Large language models were repeatedly described as not suitable equipped for accurate process evaluation, often producing oversimplifications or analytical errors (Experts 4, 12 and 6). Also, organizations can

face a fragmented tool environment, where systems complicate an integration and weaken infrastructure consistency. Attempts to solve human or behavioural problems through technological methods were seen as problematic, as they risk to increase complexity without addressing the root causes. Furthermore, Expert 10 stressed the necessity of continuously validating AI-generated outputs due to the risk of errors or hallucinations. The potential loss of the ability to track decision was described by the same expert as worrying in regulated or sensitive environments when in need of handling customer details within such processes. In such contexts, systems must often operate fully internally, demanding extensive investments, long learning cycles, and expertise. Thus, data protection regulations, especially under GDPR, were quoted as a possible obstacle.

### **AI/ML in Process Measurement and Required Industry Changes**

Across experts' environments, the current use of AI and ML within process measurement remains currently in a supportive rather than transformative manner. AI is primarily applied by the experts and their environments as an assisting tool that increases individual productivity and operational efficiency. Example use cases by Expert 1, 4 and 6 include text summarization, document analysis, script coding assistance, research automation, and generation of data visualizations or reports. In several experts' organizations, AI performs as a "sparring partner" (Expert 11) for idea generation, quality checks, and in problem solving situations for replacing low value tasks. Pattern recognition and specialised alerting systems are used to identify irregularities in operational data, while generative AI tools such as ChatGPT or in-house solutions are utilized for exploratory analysis and knowledge retrieval, according to Expert 2, 8 and 13. More advanced applications can be found in more specified areas, such as AI-driven lead scoring in sales (Expert 7) or internal AI platforms designed to support employees in everyday work tasks (Expert 8).

Despite partly superficial integration at the moment, experts emphasized the potential of AI/ML for process measurement because AI is expected to reduce manual effort by automating data collection, tracking, and reporting particularly in areas such as operational expenditure metrics, incident management, and performance reporting. Predictive capabilities, including warning systems, workload forecasting, and bottleneck-time predictions, were identified as high-value applications. Therefore, according to the experts, AI offers potential for pattern recognition, root cause analysis, and comparative evaluations across projects and processes, supporting organizations to identify opportunities for optimization which remain uncovered in traditional measurement approaches. Importantly, experts highlighted AI's ability to support the quantification of process aspects that are currently evaluated qualitatively and subjectively, thus enhancing consistency and objectivity within processes. For this inclusion of AI in a process

measurement system standardization and data readiness were identified by most of the experts as essential. The industry should address fragmented measurement practices by establishing standardized KPIs in organizations, consistent definitions, and consistent levels of detail for recurring processes. Existing data sources, such as databases, need to be transformed into AI-prepared, structured and interoperable resources enriched with metadata to allow meaningful evaluation and automation processes. Equally important for the majority of experts is the investment in the workforce knowledge management. Organizations should strengthen AI and data literacy across the staff, to guarantee qualified professionals with process and tool knowledge and improve documentation practices to externalize obtained knowledge. Lastly, some experts point out the importance of broader collaboration and knowledge sharing. More networking even across organizations and industries is viewed as necessary to exchange helpful use cases, experiences, and initiatives for development within AI-driven environments. According to the expert, only a combination of cultural workforce change in accepting AI, standardized measurement foundations and responsible AI integration can industries fully leverage AI or ML as a sustainable empowered of advanced process measurement.

### **3.3 AHP Results: Criteria Analysis**

#### **Consolidated Global Priorities**

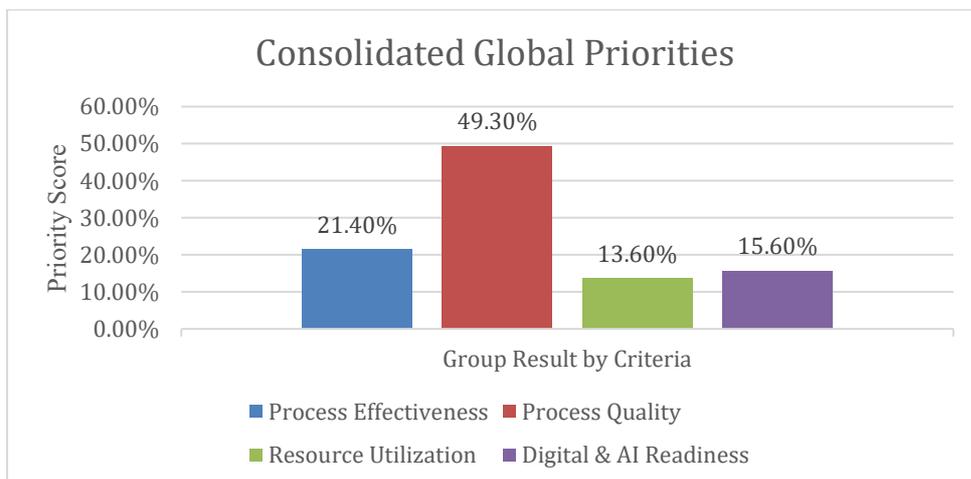
Recognized as the core pillar of process measurement in this expert group, the criterion Process Quality is of greatest importance with a dominant priority of 44.9%. Further, Digital & AI Readiness is a main enabler as second highest weight with 18.9% which validates technology's critical role in this topic. The criteria Process Effectiveness and Resources Utilization are secondary ranked in respect of involvement in a process measurement framework. With 21.7% on Process Effectiveness and 14.5% on Resource Utilization, these criteria complete the model as still important, but less critical dimensions. Therefore, The expert consensus strongly dictates that a modern framework must be built on a foundation of Quality, enhanced by Digital & AI readiness and lastly followed by Process Effectiveness and Resource Utilization. Further, while a Consistency Ratio (CR) below 0.10 is commonly recommended in AHP applications (Saaty, 1990), Expert 01 presents a CR of 0.142. Given the investigative nature of the study, the abstract role of the evaluated criteria, and the use of group aggregation as well as consensus clustering techniques, the value was considered acceptable. The judgement was maintained to preserve expert diversity while potential influence is mitigated at the group level through consensus analysis, and the expert's judgment is strengthened over answer depth of open-ended questions in this study.

**Table 7 Global Priorities**

Weights	Process Effectiveness	Process Quality	Resource Utilization	Digital & AI Readiness	CR (Consistency Rate)
Expert 13	0.386	0.386	0.177	0.050	0.057
Expert 12	0.546	0.304	0.099	0.050	0.082
Expert 11	0.385	0.424	0.055	0.137	0.061
Expert 10	0.176	0.481	0.133	0.210	0.093
Expert 09	0.122	0.544	0.064	0.271	0.073
Expert 08	0.107	0.442	0.386	0.064	0.074
Expert 07	0.164	0.316	0.116	0.404	0.095
Expert 06	0.081	0.399	0.360	0.159	0.042
Expert 05	0.093	0.536	0.169	0.203	0.032
Expert 04	0.265	0.588	0.110	0.036	0.080
Expert 03	0.203	0.642	0.103	0.052	0.070
Expert 02	0.170	0.163	0.073	0.594	0.047
Expert 01	0.121	0.606	0.042	0.230	0.142
<b>Group Average Result</b>	<b>0.214</b>	<b>0.493</b>	<b>0.136</b>	<b>0.156</b>	<b>0.006</b>

Source: compiled by the author based on the conducted research

**Figure 8 Consolidated Global Priorities**



Source: compiled by the author based on Table 7 Group Average Results

### Experts Decision Matrix

This section displays the decision matrix for every expert's criteria weighting regarding

developing a process measurement framework. In the pairwise comparisons the following criteria were included:

- 1 = Process Effectiveness
- 2 = Process Quality
- 3 = Resource Utilization
- 4 = Digital & AI Readiness.

**Table 8** *Expert 01 Decision Matrix*

	1	2	3	4
1	1	0.2	5	0.333333
2	5	1	7	5
3	0.2	0.142857	1	0.142857
4	3	0.2	7	1

Source: compiled by AHP-OS based on the conducted research data

**Table 9** *Expert 02 Decision Matrix*

	1	2	3	4
1	1	1	3	0.25
2	1	1	3	0.2
3	0.333333	0.333333	1	0.2
4	4	5	5	1

Source: compiled by AHP-OS based on the conducted research data

**Table 10** *Expert 03 Decision Matrix*

	1	2	3	4
1	1	0.2	3	4
2	5	1	6	8
3	0.333333	0.166667	1	3
4	0.25	0.125	0.333333	1

Source: compiled by AHP-OS based on the conducted research data

**Table 11** *Expert 04 Decision Matrix*

	1	2	3	4
1	1	0.333333	3	9
2	3	1	7	9
3	0.333333	0.142857	1	5
4	0.111111	0.111111	0.2	1

Source: compiled by AHP-OS based on the conducted research data

**Table 12** *Expert 05 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	0.25	0.5	0.333333
<b>2</b>	4	1	4	3
<b>3</b>	2	0.25	1	1
<b>4</b>	3	0.333333	1	1

Source: compiled by AHP-OS based on the conducted research data

**Table 13** *Expert 06 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	0.2	0.333333	0.333333
<b>2</b>	5	1	1	3
<b>3</b>	3	1	1	3
<b>4</b>	3	0.333333	0.333333	1

Source: compiled by AHP-OS based on the conducted research data

**Table 14** *Expert 07 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	1	1	0.25
<b>2</b>	1	1	4	1
<b>3</b>	1	0.25	1	0.333333
<b>4</b>	4	1	3	1

Source: compiled by AHP-OS based on the conducted research data

**Table 15** *Expert 08 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	0.166667	0.2	3
<b>2</b>	6	1	1	6
<b>3</b>	5	1	1	4
<b>4</b>	0.333333	0.166667	0.25	1

Source: compiled by AHP-OS based on the conducted research data

**Table 16** *Expert 09 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	0.2	3	0.333333
<b>2</b>	5	1	5	3
<b>3</b>	0.333333	0.2	1	0.2
<b>4</b>	3	0.333333	5	1

Source: compiled by AHP-OS based on the conducted research data

**Table 17** *Expert 10 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	0.2	2	1
<b>2</b>	5	1	2	2
<b>3</b>	0.5	0.5	1	0.5
<b>4</b>	1	0.5	2	1

Source: compiled by AHP-OS based on the conducted research data

**Table 18** *Expert 11 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	1	7	3
<b>2</b>	1	1	5	5
<b>3</b>	0.142857	0.2	1	0.25
<b>4</b>	0.333333	0.2	4	1

Source: compiled by AHP-OS based on the conducted research data

**Table 19** *Expert 12 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	3	5	7
<b>2</b>	0.33	1	5	6
<b>3</b>	0.2	0.2	1	3
<b>4</b>	0.142857	0.166667	0.333333	1

Source: compiled by AHP-OS based on the conducted research data

**Table 20** *Expert 13 Decision Matrix*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1</b>	1	1	3	6
<b>2</b>	1	1	3	6
<b>3</b>	0.333333	0.333333	1	6
<b>4</b>	0.166667	0.166667	0.166667	1

Source: compiled by AHP-OS based on the conducted research data

The analysis of the 13 pairwise comparison matrices indicates a definite and consistent expert consensus that fundamentally aligns with the qualitative findings of open-ended questions: Process Quality and Process Effectiveness are prioritized as the paramount operational criteria within the global group results, while Digital and AI Readiness is systematically ranked as the least important, after the 3<sup>rd</sup> ranked criteria Resource Utilization, in direct comparisons to each criteria. This quantitative validation is clearly visible with experts who strongly emphasized

operational excellence in their interviews, such as Expert 3 and 4, and therefore result in a weighting on Digital and AI Readiness as lowest relative importance within the expert group with values of 0.111 and 0.125. In comparison, few experts who demonstrated a more transformative prospect in their qualitative responses, such as Expert 2, are the ones who have results with a higher relative weight on Digital and AI Readiness in their matrices. A significant insight from the matrices tables is the presence of inconsistency and conflict in judgments concerning the criteria Resource Utilization. While the expert group significantly agrees on the hierarchy of the other three criteria, the weighting of resources and the associated efficiency as perceived by the experts, reveals a bimodal distribution of strategic logic. One cluster of experts (e.g., Expert 10, 9 and 8) consistently ranks Resource Utilization as more important than Digital and AI Readiness and often equal or close to Effectiveness, reflecting a strong "run-the-business" (Kotter, 2012) efficiency focus. Another cluster (e.g., Expert 11, 12 and 13) demonstrates an opposite pattern, ranking Resource Utilization as less important than Digital and AI Readiness, suggesting that a future oriented view for organizations is a more critical investment than optimizing current resource efficiency. This split is the primary source of mathematical inconsistency in the group data and empirically captures the core strategic tension between optimizing the present and investing in the future.

#### **Determined Priorities in AHP Results**

In the following the relative importance of the identified criteria and indicators are detected and evaluated how consistent and reliable the expert judgment can be considered. The final priority weights calculated from the aggregated expert judgment will be presented below.

**Table 21** *Expert Priorities*

<b>Expert</b>	<b>Process Effectiveness</b>	<b>Process Quality</b>	<b>Resource Utilization</b>	<b>Digital &amp; AI Readiness</b>
Expert 13	0.386	0.386	0.177	0.050
Expert 12	0.546	0.304	0.099	0.050
Expert 11	0.385	0.424	0.055	0.137
Expert 10	0.176	0.481	0.133	0.210
Expert 09	0.122	0.544	0.064	0.271
Expert 08	0.107	0.442	0.386	0.064
Expert 07	0.164	0.316	0.116	0.404
Expert 06	0.081	0.399	0.360	0.159
Expert 05	0.093	0.536	0.169	0.203

Expert 04	0.265	0.588	0.110	0.036
Expert 03	0.203	0.642	0.103	0.052
Expert 02	0.170	0.163	0.073	0.594
Expert 01	0.121	0.606	0.042	0.230
<b>Group Average</b>	<b>0.217</b>	<b>0.449</b>	<b>0.145</b>	<b>0.189</b>

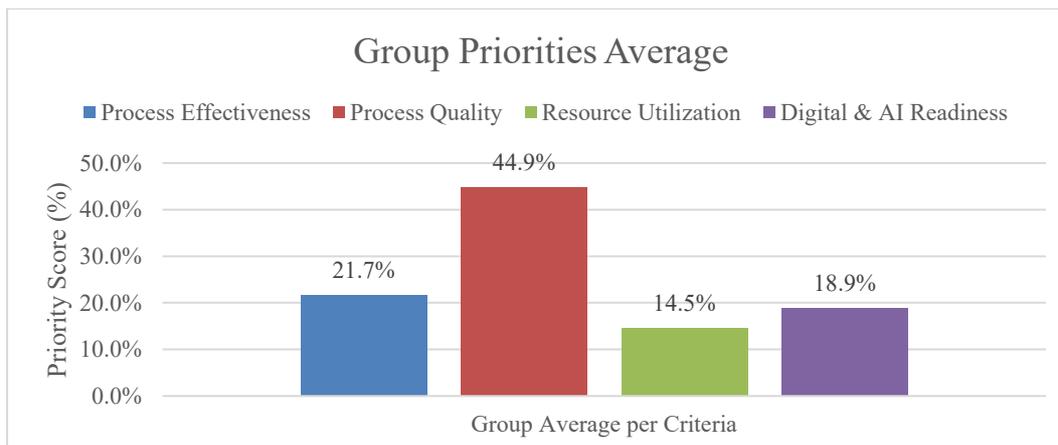
Source: compiled by the author based on the conducted research

**Figure 9** Experts' Priorities Distribution



Source: compiled by the author based on Table 16

**Figure 10** Group Priorities Average



Source: compiled by the author based on Table 16 Group Average

### Group Consensus Cluster Analysis

The group of experts had evaluated the main criteria using pairwise comparison (see chapter 2) in respect of the research aim of developing a process measurement framework. The consensus of the group before clustering lays at 67.1% (AHP Group Consensus S\*) which

indicates a moderate consensus according to Goepel (2018). The group data was further clustered to allow a better understanding into the overall group results. The majority of the 13 data samples (13 experts) can be clustered into two clusters with overall four hierarchy nodes and 52 global priorities within the group data.

**Table 22** Interpretation of AHP Consensus Indicator  $S^*$

$S^*$	Consensus $\leq 50\%$
$\leq 50\%$	Very low
50% - 65%	Low
65% - 75%	Moderate
75% - 85%	High
$\geq 85\%$	Very high

Source: Goepel, 2018, p. 478

The used program AHP-OS (Goepel, 2023) calculates the maximum consensus threshold from the expert priorities table (see Table 8) where the expert group is divided. Therefore, the group is divided into two sub groups, one with 9 experts and the other with two, while two unclustered experts are divided into a separate, unclustered group. The consensus range is scanned between 70% and 97.5% in steps of 2.5% as predefined range by the program's algorithm. Consensus threshold for clustering is determined as 0.9. This threshold was defined as the most optimal one so that the results are clustered in at least two groups and that the amount of unclustered experts will be acceptably low (Goepel, 2018).

**Table 23** Group Consensus

Threshold	0.975	0.95	0.925	0.9	0.875	0.85	0.825	0.8	0.775	0.75	0.725	0.7
Cluster	3	3	3	2	1	1	1	1	1	1	1	1
Unclustered	7	4	2	2	3	2	2	1	0	0	0	0

Source: compiled by AHP-OS based on the conducted research data

At a consensus threshold of 0.90, the following structure emerged: The first clustered group reached a high consensus  $S^*$  of 79.7% including the experts 01, 03, 04, 05, 06, 07, 09, 10 and 11. The group shows a coherent prioritization pattern dominated by the criterion Process Quality with 50.4% as priority group average. The relatively high  $S^*$  value indicates a strong consistency in evaluation logic by the experts while this group essentially determines global

consolidated priorities. In contrast, the second, rather minor, group reached a consensus S\* by 96.55 % including the experts 12 and 13. This group presents almost identical priority vectors, indicating an coherent performance logic with Process Effectiveness as most valued criteria with 46.6% and Process Quality with 34.5% as priority group average, followed by Resource Utilization by 13.8% and Digital and AI Readiness by only 5%. Lastly, two experts, expert 2 and 8, are parted into the unclustered group by emphasising with 32.9% as priority group average the criteria Digital and AI Readiness and Process Quality with 30.2%. Their judgments do not align sufficiently with the clustered groups at the selected threshold, positioning them as outlier regarding criteria priority setting.

Additionally, a similarity matrix below reveals a clear and structured pattern of expert agreement. Very high similarity values above 90% are consistently observed among the majority of experts that form the first clustered group, for example between Experts 04, 09, 05, 03, 11, and 10, with pairwise similarities frequently partially above 95%. This indicates a strongly shared prioritization logic within this group. An even stronger coherence is evident between Experts 13 and 12, as already mentioned above, whose similarity values approach near identical, confirming their classification as a secondary, very-high-consensus group. In contrast, Experts 08 and 02 display noticeably lower similarity values with most other experts, frequently being below 70%, while showing selective high similarity with only a limited number of other experts. This pattern explains their unclustered status at the selected consensus threshold. Overall, the matrix demonstrates mentioned homogeneity and clear separation within the clusters, validating that expert disagreement is systematic and imputable toward contrary priority structures rather than inconsistency in judgements.

**Table 24** *Similarity Matrix Group Consensus Cluster Analysis with Scale*

Scale	45 %	48 %	51 %	54 %	57 %	59 %	62 %	65 %	68 %	71 %	74 %	77 %	80 %	83 %	86 %	88 %	91 %	94 %	97 %	100 %
0	4	9	5	3	11	13	10	7	8	1	2	6	12							
4	100%	98%	97%	92%	92%	96%	90%	94%	91%	88%	80%	87%	79%							
9	98%	100%	96%	84%	91%	95%	87%	91%	94%	82%	70%	90%	74%							
5	97%	96%	100%	88%	88%	99%	85%	94%	84%	78%	70%	77%	80%							
3	92%	84%	88%	100%	91%	88%	92%	85%	74%	94%	94%	74%	71%							
11	92%	91%	88%	91%	100%	90%	99%	76%	82%	92%	84%	86%	55%							
13	96%	95%	99%	88%	90%	100%	86%	89%	80%	77%	70%	75%	75%							

10	90%	87%	85%	92%	99%	86%	100%	74%	79%	95%	89%	85%	53%
7	94%	91%	94%	85%	76%	89%	74%	100%	84%	76%	70%	74%	94%
8	91%	94%	84%	74%	82%	80%	79%	84%	100%	81%	66%	97%	67%
1	88%	82%	78%	94%	92%	77%	95%	76%	81%	100%	97%	86%	59%
2	80%	70%	70%	94%	84%	70%	89%	70%	66%	97%	100%	71%	57%
6	87%	90%	77%	74%	86%	75%	85%	74%	97%	86%	71%	100%	54%
12	79%	74%	80%	71%	55%	75%	53%	94%	67%	59%	57%	54%	100%

Source: Scale by Goepel, 2023; Matrix Table compiled by AHP-OS based on the conducted research data

### Process Quality Criterion Analysis

Efficiency and technical preparedness are frequently subjected to process quality, which is generally recognized as the most important, non-negotiable main criterion by the majority of experts (9 out of 13 Experts). Experts define quality as foundational to all other weighted process measurement criteria. The criteria includes error-free environments, process and technological stability, and overall reliability (Expert 12 and 11). For many experts, it is the primary core of their business products and services. For example, Expert 1 states, "quality is above all," while Expert 12 notes their market leadership is based on being "not cheap, but [having high] quality", therefore justifying higher resource use in project and product creation. High quality ensures trust in data and outcomes, according to Expert 1, and is seen as a requirement for valid, sustainable effectiveness. Expert 10 argues that "if it's a good quality process [...], effectiveness is [...] covered" and that bad quality within processes "loses effectiveness automatically". For example, process effectiveness is often seen as being facilitated by quality. The majority of experts (Experts 1, 3, 5, 6, 8, 9, 10, 11 and 13) believe that a well-designed process inevitably produces successful results, and they either view them as equal or place a higher value on quality. Also, process quality strongly outweighs resource utilization by the experts. Expert 12 expressed that for their business model "it is OK to use resources inefficiently or more than [...] needed" for delivering high-quality products. This positions quality as aspect of value creation that guarantees greater investment than other criteria. Moreover, in respect to the criterion Digital and AI Readiness, process quality is also considered significantly more important. Experts point out that modern technology cannot compensate for weak process fundamentals or even fix a process all together. In addition, a fundamental conflict exists for Expert 1 and 3 between the stated superiority of quality in established measurement systems while focusing on financial efficiency. The experts warn that high pressure to optimize for better speed or lower cost on processes within the scope of Resource

Utilization could directly compromise quality if not carefully managed.

To ensure transparency and traceability of the qualitative content analysis, the expert statements were coded into sub criteria for every main criteria. Tables 26 presents exemplary supporting statements, criteria assignments and the frequency of mentions across experts.

**Table 25** *Process Quality Criterion Analysis*

<b>Main Criterion</b>	<b>Sub Criteria</b>	<b>Supporting Statement</b>	<b>Frequency</b>
Process Quality	Data Accuracy	“Something like data accuracy would be one of the points for data.” (Expert 1); “I would divide process quality into the quality of deliverables, the quality of what comes out at the end of the process.” (Expert 2)	6
	Deliverables Quality	“Process quality is the quality of deliverables, what comes out at the end.” (Expert 2); “What people are buying from us is precision in our calculations.” (Expert 3); “Our project outcomes depend on quality and reliability, not just speed.” (Expert 12)	5
	Repeatability	“If you did the same process five times and five times you got a good result, that means it’s repeatable.” (Expert 5); “A stable process should be predictable.” (Expert 11)	4
	Error rate	“It’s probably about the frequency of some bugs and errors in the system, how often different incidents happen.” (Expert 11); “I have to say percentage of error.” (Expert 4)	9
	Reliability	“We have a strong focus on stability because disruptions directly affect customer trust.” (Expert 12)	5

Source: compiled by the author based on the conducted research

### **Process Effectiveness Criterion Analysis**

The criterion Process Effectiveness is seen as achieving core business objective and as the primary operational goal, but dependent on high quality. Effectiveness is defined by the experts as fundamentally for overall goal achievement and for creating business value (Expert 8). For the experts it is measured by outcomes such as sales, profit, market relevance, and project repetition possibility (Experts 1 and 12). For platform centred business processes, it is tied to user experience and reliability (Expert 3 and 11). Effectiveness is considered more important in the global expert group results than Digital and AI Readiness. The consensus is that a process must be effective with or without AI. Expert 13 emphasizes that as "we managed without AI before," and Expert 12

calls AI readiness a "nice to have" once effectiveness is fully achieved. However, Expert 1 provides a critical long-term perspective, arguing that Digital and AI Readiness will become more important for future competitiveness and business survival as it drives a type of next-level effectiveness. Additionally, Effectiveness is also generally considered more important than Resource Utilization by the expert group. While resource use matters, achieving the goal comes first for the experts. Expert 11 prioritizes "user experience and reliability" over "saving resources." However, an effective process is often assumed to be reasonably efficient, for example Expert 7 argues that "by default the resource utilization should be low" for an effective process.

Overall, Process Effectiveness is the criterion that mainly directly connects process performance to business results which includes profit, customer satisfaction and strategic goal achievement while it relies on quality and benefits from good resource utilization according to the experts. Therefore, the criterion Process Effectiveness is seen as measure of whether a process fulfils its purpose or not.

**Table 26** *Process Effectiveness Criterion Analysis*

<b>Main Criterion</b>	<b>Sub Criteria</b>	<b>Supporting Statement</b>	<b>Frequency</b>
Process Effectiveness	Goal Achievement	“A process is effective when what you set out to do is achieved.” (Expert 1); “Effectiveness means that the intended result is actually delivered.” (Expert 5); “If the process does not deliver what it is supposed to deliver, then it’s not effective.” (Expert 3)	7
	Contribution to Business Goals and Value Creation	“Certainly contributes to the achievement of the company’s goals.” (Expert 1); “Effectiveness is strongly linked to business value creation.” (Expert 6); “Processes are effective if they move the company forward.” (Expert 11)	6
	Cycle Time	“Just calculate time, work time, how long those steps need.” (Expert 5); “If a process takes too long, then it’s simply not effective anymore.” (Expert 4); “Long processing times often indicate inefficiencies in the process.” (Expert 11)	8
	Stakeholder Satisfaction / Engagement	“We often see effectiveness issues when stakeholders are not satisfied.” (Expert 3); “Processes fail when people don’t accept or use them properly.” (Expert 12)	6
	Repeatable Project Success	“If outcomes vary too much, then effectiveness is questionable.” (Expert 6); “Effectiveness also means you can reproduce success, not just once.” (Expert 1)	4

Source: compiled by the author based on the conducted research

### **Resource Utilization Criterion Analysis**

Resource Utilization relates to efficiency and cost-effectiveness of a process, measured primarily in terms of time, manpower, and financial cost by the expert group. It is a important secondary criterion but consistently subordinated by Process Quality and Effectiveness. According to the experts, the criterion focuses on optimizing process inputs to achieve ideal process outputs to the business and its clients. The primary resource is generally identified as work time, followed by manpower and financial costs (Experts 1, 2, 5 and 9), so the amount of people contributing to actual productive time spend on projects and processes calculated by costs for and within these processes. Stated metrics involve utilization rate, planning accuracy, and cost-benefit analysis values. As mentioned above, the experts consistently rank Resource Utilization below Quality and Effectiveness, so, the pursuit of efficiency should not undermine central process results. Although, Expert 1, while considering Resource Utilization, identifies the core weakness of current process measurement systems as a persistent pressure to "save time" while potentially compromising quality. In addition, a revealed tension in the expert group with the criteria Resource Utilization and Digital & AI Readiness uncovers a investment dilemma. Experts are partially split which criteria is more important than the other. Some see investing in Digital and AI Readiness as a path to future efficiency growths (Experts 1 and 7), but others caution that achieving full AI readiness consumes significant resources, such as time, money and manpower, therefore making efficient current operations the more immediate priority for such a change (Experts 2, 4, 12 and 13). Resource Utilization is viewed by the expert group as crucial for profitability and scalability, but is framed as an optimization lever, not a primary objective in process measurement. Its pursuit is valid only after the criteria of Process Quality and Effectiveness are ensured. But the debate over priority on Resource Utilization compared to AI Readiness reflects the fundamental challenge of balancing run-the-business efficiency with change-the-business investment (Kotter, 2012).

**Table 27** *Resource Utilization Criterion Analysis*

<b>Main Criterion</b>	<b>Sub Criteria</b>	<b>Supporting Statement</b>	<b>Frequency</b>
Resource Utilization	Time	“For us, resources are primarily time.” (Expert 1)	7
	Workload Distribution	“Bottlenecks often result from poor workload allocation rather than lack of capacity.” (Expert 7);	5

	<p>“How many people contributing to actual productive time.” (Expert 1);</p> <p>“Balanced workload supports both efficiency and employee well-being.” (Expert 9)</p>	
Cost-Benefit Ratio	<p>“Processes need to be financially sustainable in the long run.” (Expert 11);</p> <p>“Cost transparency is essential to understand whether a process is sustainable.” (Expert 10)</p>	6
Efficiency of Effort	<p>“Human resources should be allocated where they create the most value.” (Expert 12);</p> <p>“Processes should not consume more human resources than necessary.” (Expert 6);</p> <p>“If people are constantly compensating for weak processes, resources are wasted.” (Expert 9)</p>	7
Avoidance of Waste / Redundancy	<p>“Redundancy increases cost and slows everything down.” (Expert 4);</p> <p>“Many process steps exist only because ‘they have always been there.’ (Expert 10);</p> <p>“Waste is often hidden in handovers and waiting times.” (Expert 13)</p>	6

Source: compiled by the author based on the conducted research

### Digital and AI Readiness Criterion Analysis

Digital & AI Readiness refers to an organization's preparedness to leverage technology, particularly AI, to enhance its processes. It is viewed not as a standalone goal but as a critical qualifier for future competitiveness which is defined by corporate infrastructures and culture. For the experts 4, 5 and 9, it requires structured, available, and semantically prepared data for AI utilization, workplace literacy and tool adoption (Experts 11, 12 and 2), and required digitization of all needed documentation and workflows (Experts 4 and 6). Its value is also seen by Expert 13 in enabling cost and time savings and enhance insights and their usage within processes. Across the available main criteria, the experts rank Digital and AI Readiness also below Process Quality and Process Effectiveness, it is not viewed as a replacement for operational excellence. Expert 12 stated representative that if a process is already effective and efficient, readiness is merely a "nice to have" for potential operational gains. But despite the criterion's lower ranking in direct comparisons to other criteria, a strong alternative positions is its essential role for survival. Expert 1 noted that in the modern world "you simply need [AI] or you stay behind", comparing it to the necessity of moving beyond old technologies still used in some companies such as fax machines. This frames AI as an criterion as the key to future Quality, Effectiveness and Resource Utilization.

In summary, Digital and AI Readiness occupies a dual, somewhat contradictory, position: In the short-term, operational hierarchy, it is the least important weighted of the four criteria within the global expert results. However, in a long-term, strategic context, it is considered as the most

critical factor for transforming and securing all other criteria. This creates the central strategic tension identified by the experts: the need to invest in essentials such as Quality and Effectiveness today, while investing in the capabilities like AI is needed to excel tomorrow.

**Table 28** *Digital and AI Readiness Criterion Analysis*

<b>Main Criterion</b>	<b>Sub Criteria</b>	<b>Supporting Statement</b>	<b>Frequency</b>
Digital and AI Readiness	Data Availability and Quality	“Data needs to be consistent across systems to be useful.” (Expert 2); “Data quality is the foundation for any AI-driven decision-making.” (Expert 3); “If data is incomplete or inconsistent, AI won’t help.” (Expert 11)	8
	Level of Automation (Potential)	“Manual steps make it difficult to track process performance.” (Expert 8); “Automation improves transparency and repeatability.” (Expert 10); “The more automated the process, the easier it is to measure.” (Expert 6)	6
	Digital Literacy and Training	“Digital tools are only effective if people actually use them.” (Expert 9); “Employees need training to trust automated decisions.” (Expert 2); “If employees don’t understand the tools, they won’t use them.” (Expert 5); “Change management is crucial when introducing AI.” (Expert 12)	7
	Technological Infrastructure	“Infrastructure maturity defines the limits of AI adoption.” (Expert 13); “Infrastructure determines what is technically possible.” (Expert 6)	6

Source: compiled by the author based on the conducted research

### 3.3.1 Determination of Sub Criteria and Indicators

The modern, data-driven process measurement framework is based on measurable, actionable components. By synthesizing the expert insights on sub criteria and indicators for the four main criteria, a clear structure for operationalization materialises. The experts were challenges to think beyond abstract definitions to propose specific, quantifiable elements that can be tracked, analysed and influenced in the context of process measurement. The sub criteria for the main criteria Process Quality are overwhelmingly oriented towards error management and output reliability. Experts consistently point to metrics such as error rate per process unit, frequency of bugs or incidents, and process rework quota, for example stated by the Experts 2, 11 and 12. This is complemented by indicators of consistency and accuracy, including the

replicability of results and the correctness of deliverable results, which are especially critical in research and analytics contexts (Experts 1 and 6). Furthermore, quality is linked to structural reliability, characterized by code construction quality which warrants for maintainability and flexibility within more technological departments (Expert 10), and the generation of reusable resources that add long-term value to organizational processes (Expert 4).

For the main criteria Process Effectiveness, the experts' focus lays on goal fulfilment and stakeholder value growth. Key sub criteria include the direct process outcome accomplishment measured by amount of sales, profit, market relevance, and the rate of project repetition, mentioned for example by Experts 1 and 12. Efficiency is also crucial for the experts 2 and 5 captured by the total time in finishing a process and the time required to conclude it from start to finish. Additionally, effectiveness incorporates stakeholder success, reflected in metrics like a user satisfaction scores such as a NPS (Net Promoter Score), adoption rates within customers and internal stakeholder conversion or engagement levels of the workforce (Experts 1 and 8).

Resource Utilization is broken down by the experts into financial, time-related, and human efficiency which aligns partly with the Process Effectiveness criterion. The primary sub criteria here are financial metrics, including cost-benefit analysis (input cost vs. output value), project margin, and characteristic measures like effort per successful sales lead or profit per analyst per day, based on Experts 2, 9 and 12). Time is as well identified as one fundamental resource, which leads to indicators which track manpower allocation, time saved as well as utilization rates within processes (Experts 1, 4 and 5). As by Expert 8 stated, more forward-looking sub criterion, involves a ratio of human to digital workers, indicating a shift towards automated resource allocation to save financial resources in long-term aspects.

Finally, the sub criteria Digital and AI Readiness which defines the technological and cultural prerequisites for a modern framework and is, according to expert, based on a solid foundation of data infrastructure, characterized by data availability, semantic preparation and the use of a uniform nomenclature (Experts 4, 5 and 9). Digital and AI Readiness is equally dependent on human capital, measured by the staffs' digital literacy so the ability to use digital technologies, AI tool adoption and training completion rates (Experts 2, 11 and 12). The ultimate proof of this type of readiness is the economic impact which is verified by realized cost and time savings after adoption, and the successful integration of new digital elements as evaluated through impact evaluations within organizational processes (Experts 3 and 13).

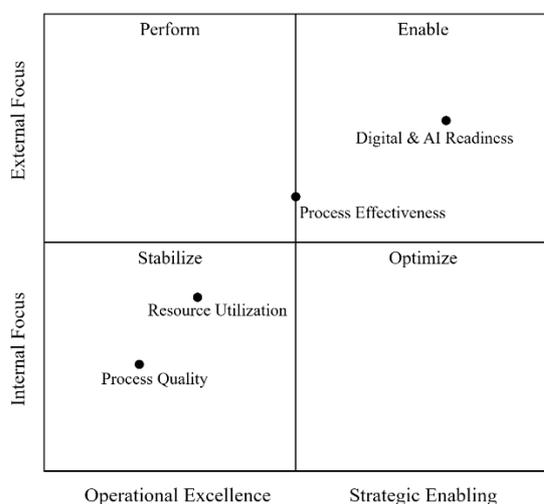
In summary, the expert-created sub criteria provide a defined outline for a framework development. They translate the high-level constructs into a hierarchy of measurable indicators, emphasizing output reliability for Process Quality), goal completion for Process Effectiveness, input optimization for Resource Utilization, and foundational capability for Digital and AI

Readiness. This structure ensures that a future framework is not only theoretically sound but also directly executable while allowing organizations to move from abstract principles to data-driven diagnosis and continuous improvement.

### 3.3.2 Developed Process Measurement Framework

Figure 11 visualizes the empirically acquired hierarchy of process measurement dimensions in this research in a simple visualized quadrant chart. Process Quality and Resource Utilization are positioned as internally oriented foundations of operational excellence, while Process Effectiveness lies in non of the quadrants, due to its fluctuation and presence across multiple dimensions stated by the expert group. Digital and AI Readiness is positioned as a strategically enabling, future-oriented dimension that strengthens other performance areas rather than dominating process measurement logic.

**Figure 11** *Quadrant Chart for the AI-Enhanced Process Measurement Framework*

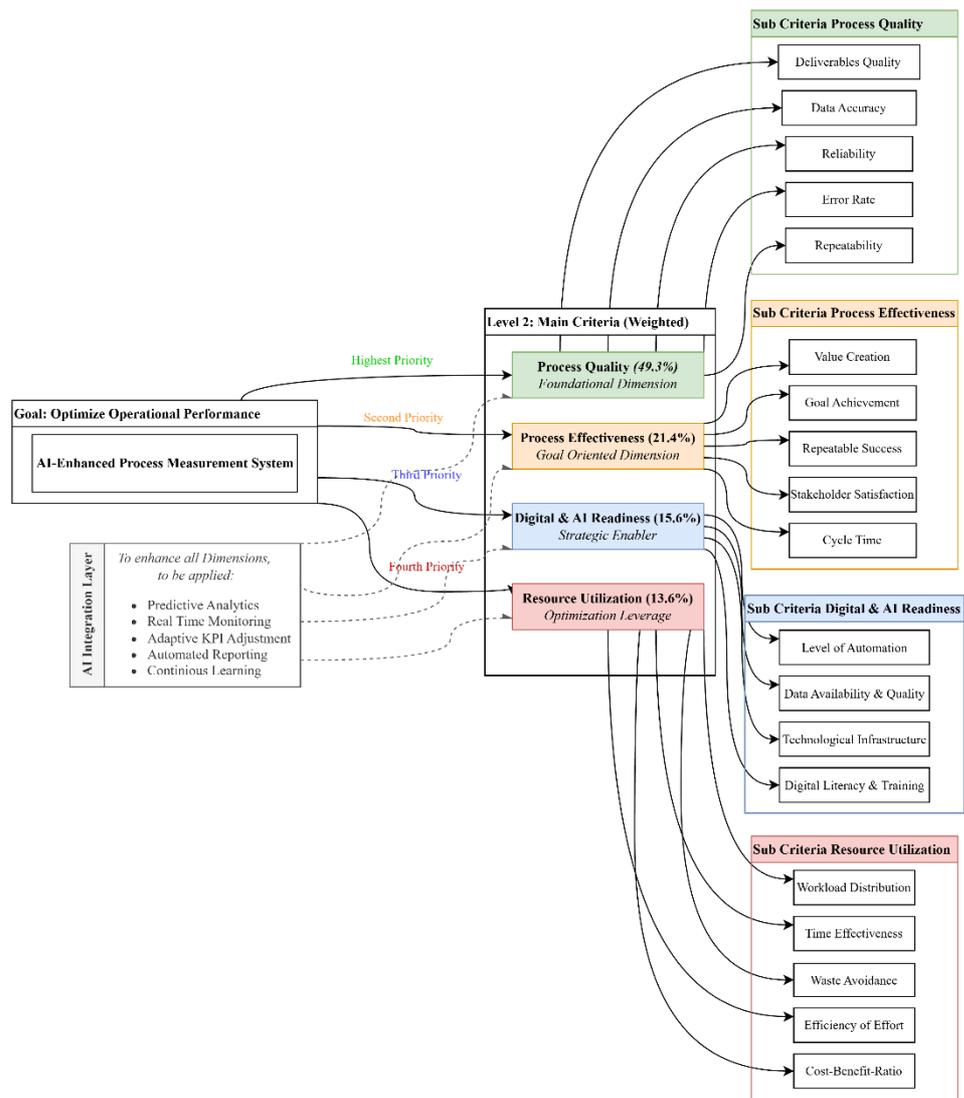


Source: compiled by the author based on the conducted research

The positioning of process measurement dimensions within the quadrant chart is illustrated based on the relative importance weights extracted from the AHP analysis combined with qualitative interpretation of their functional role. The positioning do not represent measured values but serve to visualize the hierarchical and strategic relationships identified in the empirical results. Figure 12 provides a structured visualization of the empirically validated process measurement system. It organizes the four main criteria of Process Quality (49.3%), Process Effectiveness (21.4%), Digital & AI Readiness (15.6%), and Resource Utilization (13.6%) in descending order of the priorities determined by the expert group. The framework is visually defined through colour coding, percentage labelling and arrow differences. Each criterion branches into its specific sub criteria, extracted directly from the expert interviews while an overarching AI Integration Dimension connects to all dimensions to illustrate how AI can support measurements, prediction,

and continuous adaptation. This framework synthesizes the AHP weighting results and qualitative findings into a single, actionable framework that answers the thesis aim and serves as the key research output for implementation in the information service sector.

**Figure 12** AI-Enhanced Process Measurement Framework



Source: compiled by the author based on the conducted research

### 3.4 Discussion

#### Interpreting of Results in the Context of Previous Research

Generally, this study’s findings reinforce prior empirical research on multi-perspective and data-driven process measurement systems by empirically validating the relevance of integrating multiple measuring dimensions through expert-based judgement. Prior studies with the Multi-Perspective Model Approach (MPMA) as base theory emphasize that organizational processes cannot be adequately evaluated through single-dimensional or efficiency and financial focused

indicators particularly in digitally transformed environments (Wijayanayake, 2025). The results of this research align with these findings, as experts consistently prioritized process effectiveness, quality or resources as interdependent dimensions rather than isolated criteria. Further, recent empirical research which applied MPMA in digitally focused contexts demonstrates that described measurement systems gain validity when strategic, operational, technological as well as human perspectives are evaluated simultaneously (Martinez Lopez et al., 2023). The presented study confirms these observations by showing that expert judgments naturally reflect a multi-perspective logic when structured through the Analytic Hierarchy Process (AHP) while overlapping perspectives in argumentations and their presented logic. The weighting results indicate that practitioners do not perceive digitalization or AI as separate process goals and thus performance improvement possibilities, but rather as enabling dimensions that have the ability to support process outcomes. Moreover, prior studies combining MPMA with multi-criteria decision-making methods emphasize the importance of transforming qualitative expert knowledge into transparent and comparable quantitative structures (Amor et al., 2019; Tavana et al., 2023). The application of AHP in this study support suitability for operationalizing multi-perspective process measurement as it enables a systematic prioritization approach while maintaining methodological consistency. Aligning for example with Sequeira et al. (2023), the results demonstrate that expert-based weighting improve practical relevance of measurement frameworks by reflecting real use cases for choosing between effectiveness, quality, digital readiness and resource constraints. Recent research also highlights that such MPMA based system can encounter several implementation challenges when factors such as cross-functional alignment and stakeholder integration are insufficient (Papulová et al., 2021; Komm et al., 2025). The qualitative findings of this study support these conclusions as well. Experts in this study partly emphasized system disintegration in their organizations, resistance to change in workforce and inconsistent KPI definitions as main barriers to effective process measurement. The present study advances existing research by explicitly integrating AI-enhanced analytics within a MPMA structure, addressing limitations identified in previous studies that largely treat AI as generally technical addition rather as a main structural component of measurement systems (Haefner et al., 2021; Andročec, 2023). In comparison to recent AI supported MPMA and AHP studies (Svoboda and Lande, 2025, Chen et al., 2024), this research applies a deliberately balanced approach to automation possibilities. While previous studies demonstrate feasibility of AI-assisted criteria development and consistency checks, the present study maintains human expert judgment as central decision making authority. This aligns with contemporary research cautioning against an over usage of automation and emphasizing the need for explainability and governance related reviews in AI-enhanced systems (Stoyanovich et al., 2025; Merhi, 2023).

In summary, this study contributes to the growing amount of applied MPMA research by empirically demonstrating how multi-perspective process measurement can be structured, weighted, and operationalized in data-driven organizations. Unlike many prior studies that remain conceptually focused, this research provides a framework integrating expert judgment, AI readiness, and dynamic performance logic, therefore, extending recent MPMA research from a descriptive and methodological exploration toward a practical framework development to aim for an evidence focused guidance for organizations seeking to implement adaptive, AI-enhanced process measurement systems.

### **Limitations**

The empirical sample was limited to medium and large organizations within the information service sector, which may restrict the generalizability of the findings to smaller enterprises and other industries such as manufacturing. In addition, while AHP supports a structured prioritization approach, it depends on subjective expert judgments which may introduce bias within the selected experts despite the use of data consistency checks and clustering techniques as well as prioritising reliability in experts statement during the interviews. Additionally, the cross-sectional research design further provides only a glimpse of expert priorities and does not capture their evolution over time as digital and AI capabilities mature. Further, expanding the empirical scope to include small-sized companies, as well as additional sectors such as manufacturing, healthcare, and the public sector, would strengthen external validity, so the generalization of the research results so they can be applied to other settings. At last, the integration of process mining data with dynamically weighted KPIs represents a promising path of the development of a fully automated process measurement system which could not explored further enough in this research due to thematical limitations. Unlike extracting information through surveys or interview, process mining can capture real-time process behaviour including variations, bottlenecks, rework loops and process compliance differences.

## CONCLUSIONS

### **Core Empirical Insights**

This study demonstrates that process quality is the fundamental prerequisite for effective process measurement in information service organizations. Across expert assessments, reliability, error reduction, and outcome consistency were consistently prioritized over efficiency gains or technological readiness. The findings indicate that without a stable quality foundation, other performance dimensions lose relevance, as neither efficiency improvements nor digital solutions can compensate for unreliable process outputs. The research further confirms the necessity of a multi-perspective approach to process measurement. Experts naturally evaluated process performance across multiple dimensions, including quality, effectiveness, resource utilization, and digital readiness. This empirical behaviour validates the Multi-Perspective Model Approach (MPMA) as a suitable theoretical foundation, as it reflects real-world managerial decision-making more accurately than single-dimension or purely financial models. Artificial intelligence and digital readiness emerged as enabling rather than dominant performance dimensions. Although Digital and AI Readiness ranked lower in direct comparisons, experts consistently emphasized its importance as a long-term strategic investment. AI enhances other performance dimensions over time by improving analytical depth, consistency, and automation. Consequently, digital readiness should be interpreted as a developmental capability that strengthens quality, effectiveness, and efficiency rather than as an isolated success factor. A key finding of the study is the contextual nature of strategic prioritization. The cluster analysis revealed distinct expert groupings with different weighting logics, confirming that there is no universally optimal configuration of performance dimensions. Instead, process measurement frameworks must be adaptable to organizational strategy, maturity level, and operational context. This adaptability is particularly relevant in dynamic environments characterized by varying degrees of digitalization and regulatory complexity.

### **Fulfilment of Research Goal and Objectives**

This thesis goal was to develop a data-driven and AI-informed process measurement framework to enhance organizational performance in the information service sector. Within the defined empirical and methodological scope, this goal was achieved conceptually as well as structurally.

The first research objective was addressed through a systematic literature review that examined the conceptual foundations, strengths, and limitations of established process and performance measurement frameworks. The analysis demonstrated that while rather traditional models provide strategic orientation and structural clarity, they are limited in their ability to support adaptive, predictive and also digitally enabled process measurement. The second objective

focused on determining the role of artificial intelligence and digital technologies in enabling adaptive, data-based, and predictive process measurement. The findings show that AI functions primarily as a minor assisting capability in current professional settings rather than a leading performance dimension. The expert group results indicate that AI possibly improves measurement quality, responsiveness, and analytical depth when embedded within a multi-perspective and quality centred framework. The third research objective of developing a multi-perspective process measurement framework was reached by integrating expert judgment with the Analytic Hierarchy Process. The developed framework systematically combines process quality, effectiveness, resource utilization, and digital and AI readiness by transforming qualitative knowledge into a consistent prioritization structure. The fourth objective involved the practical relevance and applicability of the framework. Empirical validation using AHP-based expert prioritization demonstrated internal consistency within the expert argumentations and convergence of judgments, confirming the framework's applicability within information service organizations.

Finally, the fifth objective was fulfilled by stating sector-specific recommendations for implementations that support an effective adoption and improved decision-making processes. These recommendations, to be found at the end of this chapter, emphasize quality-first measurement logic, adaptable multi-perspective weighting, incremental AI integration, and human centred governance.

### **Reflection on the Research Questions**

The main research question of this study asked which performance indicators should be included in an AI-enhanced process measurement system for data-driven organizations, and how should their relative importance be estimated to improve effectiveness, quality, and resource utilization. This question is directly addressed through the combination of qualitative expert interviews and the Analytic Hierarchy Process (AHP) part. The empirical findings, mainly established in the AHP weighting results, provide an answer to the research question regarding the relative importance of performance indicators. Process Quality with a group weighting of 49.3% emerged as dominant dimension, followed by Process Effectiveness with 21.4%, Digital & AI Readiness with 15.6%, and Resource Utilization with 13.6%. With that, the significantly low Consistency Ratio (CR) at 0.6 confirms the logical coherence of this accumulated group expert judgment. The high group consensus, validated by the low CR, indicates that this hierarchy represents a valid, sector-specific logic. It reflects a collective understanding that in knowledge-intensive but also service-based environments, the integrity of the process (Quality) and its alignment with strategic goals (Effectiveness) are essential. Digital and AI Readiness emerges as the key strategic differentiator for long-term competitiveness, essential for evolving the other three criteria but not a substitute for them. The dominance of Process Quality highlights its role as the

main foundation of a process measurement system. Within the group results quality was consistently framed as the fundamental driver of stakeholder trust, data validity and sustainable value creation. Additionally, these findings also align with the EFQM Model, reinforcing that excellence is built on a foundation of reliable processes and stakeholder confidence. The findings suggest that in digitally transforming environments, requirements for error-free, stable and also replicable outputs become more critical, and performing as necessary stage on which process effectiveness and efficiency are measured. The second important weighted criterion Process Effectiveness highlights the continues importance of goal fulfilment and customer value delivery. The results confirm that effectiveness related indicators remain essential but are causally dependent on process quality. Further, Resource Utilization and Digital and AI Readiness are positioned as supporting and enabling dimensions rather than primary drivers, which suggests that efficiency gains and technological sophistication are perceived as meaningful only once core process integrity and effectiveness are ensured. The expert discourse clarifies that efficiency within the scope of Resource Utilization should be pursued after Process Quality and Effectiveness are assured, while technological readiness in form of Digital and AI Readiness is seen as an investment in future capacities. The results show mostly views against a technology-centric measurement system. According to the research results, AI should enhance measurement and achievement of the process measurement criteria, to then automate quality control, predict effectiveness outcomes, optimize resource use and concrete process steps. Overall, the main research question is answered by empirically establishing both the relevant indicator dimensions and their relative hierarchy, providing a structured and evidence-based foundation for the developed framework.

The secondary research question examined how the integration of artificial intelligence and expert-based decision models can enhance adaptability, transparency, and strategic alignment of process measurement systems in companies. The empirical findings provide a differentiated answer to this question. The qualitative interview results reveal a cautious but consistent expert perspective on AI integration. While experts acknowledge the significant potential of AI for real-time monitoring, predictive analytics, and automation, the AHP results indicate that Digital and AI Readiness is not prioritized above core process dimensions. This suggests that AI is not perceived as a primary process performance objective, but rather as an supporting capability that strengthens measurement quality, effectiveness as well as efficiency. The findings support a complementary view of AI as improvement of process measurement when embedded within a human-centred, quality focused measurement logic, rather than replacing expert judgment or organizational learning processes. The secondary research question is therefore answered by clarifying that AI contributes to adaptability, transparency and strategic alignment when

positioned as a supportive mechanism within a structured, multi-perspective system.

### **Practical and Research Relevance**

From a methodological perspective, the combination of qualitative expert insights with the Analytic Hierarchy Process (AHP) in this research confirmed being efficient in translating subjective evaluation into a scalable measurement model. This mixed-method approach strengthens analytical accuracy and practical relevance. The proposed framework integrates EFQM's excellence logic, MPMA's multi-perspective structure, and the adaptive principles of Dynamic Performance Measurement Systems (DPMS) into a comprehensible AI-enhanced process measurement system, thus bridging the gap between theory and practice. Thereby this research provides organizations with a structured and actionable measurement system to develop and measure non-financial KPIs at process level, and to support managers in translating general strategic objectives into measurable process indicators, improving transparency and decision-making quality. By integrating AHP methods into KPI prioritisation, the framework addresses common organizational challenges such as KPI overload, subjective indicator selection, and misalignment between strategy and operations. Furthermore, the process-oriented design of the system enhances continuous improvement initiatives by making performance gaps visible and measurable. This is particularly relevant for organizations operating in service-oriented and knowledge intense environments where non-financial KPIs play a critical role.

From a research perspective, this thesis contributes to performance and process management literature by extending existing models of non-financial measurement with a prioritisation model. While previous studies emphasize the importance of non-financial KPIs, limited research has operationalized their selection and weighting in a structured and replicable format. The integration of process measurement, EFQM principles, and AHP offers a combined methodological contribution by bridging qualitative performance concepts with quantitative decision support techniques. This approach enhances methodological consistency and provides a foundation for future empirical validation and further comparative studies. Additionally, this research presents opportunities for further exploration of a dynamic application of multi-criteria decision-making methods in process management systems. Such further research could address long-term operational implementation, cross-industry comparisons, or full integration of digital analytics tools to automate KPI assessment and updating processes.

### **Recommendations**

Based on the findings, several recommendations can be formulated for organizations aiming to improve their process measurement practices. First, organizations should establish process quality as the foundation of their measurement systems by prioritizing metrics such as error rates and output consistency. These quality indicators should go before efficiency or

technology focused metrics to ensure measurement validity and credibility. A quality focused logic could be further examined in future research by investigating how the sequencing of measurement dimensions affects long-term performance outcomes of a company.

Second, organizations could be guided to implement multi-perspective performance dashboards that integrate quality, effectiveness, resource utilization, and digital and AI indicators. The weighting of these dimensions should be tailored to organizational strategy and digital maturity rather than applied uniformly. Future research could explore how different weighting configurations influence decision quality across industries or organizational process stages. Related research questions may include how a multi-perspective weighting approach can be evolved as organizations increase their digital maturity and AI adaptability or how strategic priorities reshape measurement hierarchies over a specific time period. To support contextual customization and organizational acceptance, an expert-based decision model such as AHP can be used internally through cross-functional workshops for examining the effectiveness of AHP-based process measurement design within single organizations.

Regarding technology adoption, AI integration should be pursued gradually rather than disruptive. Applications such as automated reporting, descriptive analytics, and anomaly detection can provide a low-risk entry option before advancing toward predictive analytics and optimization. Future research could investigate which available AI applications generate the highest value at different stages of process measurement maturity or how AI-supported insights influence managerial trust and decision behaviour within the workforce of a company. Lastly, the study highlights the advantages of implementing AI-generated insights within human-centred feedback loops. To ensure transparency, accountability, and learning, AI outcomes must complement, not replace, management judgment. Future research could focus on how different governance structures, reporting mechanisms, or interface designs affect the acceptance and performance of AI-based process measurement systems.

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# INTEGRATION OF AI FOR ENHANCED ORGANIZATIONAL PERFORMANCE: DEVELOPING A DATA-DRIVEN PROCESS MEASUREMENT SYSTEM

Saskia CORNELSEN

Master Thesis

Business Process Management Programme

Faculty of Economics and Business Administration, Vilnius University

Supervisor Assoc. Prof. Dr. A. Ulbinaitė, Vilnius, 2026

## SUMMARY

176 pages, 29 charts, 12 figures, 88 references.

The main purpose of this master thesis is to design a **data-driven process measurement system (PMS)** that integrates **AI** and expert knowledge to identify key business process indicators which support organizational performance. In addition, the study examines motives and benefits that encourage organizations to adopt process measurement systems, with focus on how AI-enabled approaches can improve adaptability, transparency, and decision-making. The thesis is structured in four parts: (1) a **literature review** that analyses PMS theories while locating the **Multi-Perspective Model Approach** as primary conceptual framework; (2) the **research methodology**, combining a qualitative research design in a **Analytic Hierarchy Process (AHP)** setting; (3) the **development of a conceptual framework** that synthesizes findings from literature and empirical research; and (4) the **results, conclusions, and recommendations**. Empirical data were collected through **semi-structured, in-depth interviews** with professionals in senior or leadership roles, including Data Analysts, Audit Managers, AI Specialists, Performance Managers and Project Leads. Their insights were analysed using AHP to structure and prioritize key performance indicators across multiple organizational perspectives. The results contribute to both theory and practice by presenting a **multi-perspective, AI-enhanced framework for process measurement**, demonstrating how organizations can align strategic objectives with dynamic, data-driven performance indicators to improve effectiveness in an ubiquitous digital environment.

**DIRBTINIO INTELEKTO INTEGRAVIMAS SIEKIANT GERESNIŲ  
ORGANIZACIJOS VEIKLOS REZULTATŲ: DUOMENIMIS PAGRĮSTOS PROCESŲ  
VERTINIMO SISTEMOS KŪRIMAS**

**Saskia CORNELSEN**

**Magistro baigiamasis darbas**

**Verslo procesų valdymo programa**

Vilniaus universiteto Ekonomikos ir verslo administravimo fakultetas

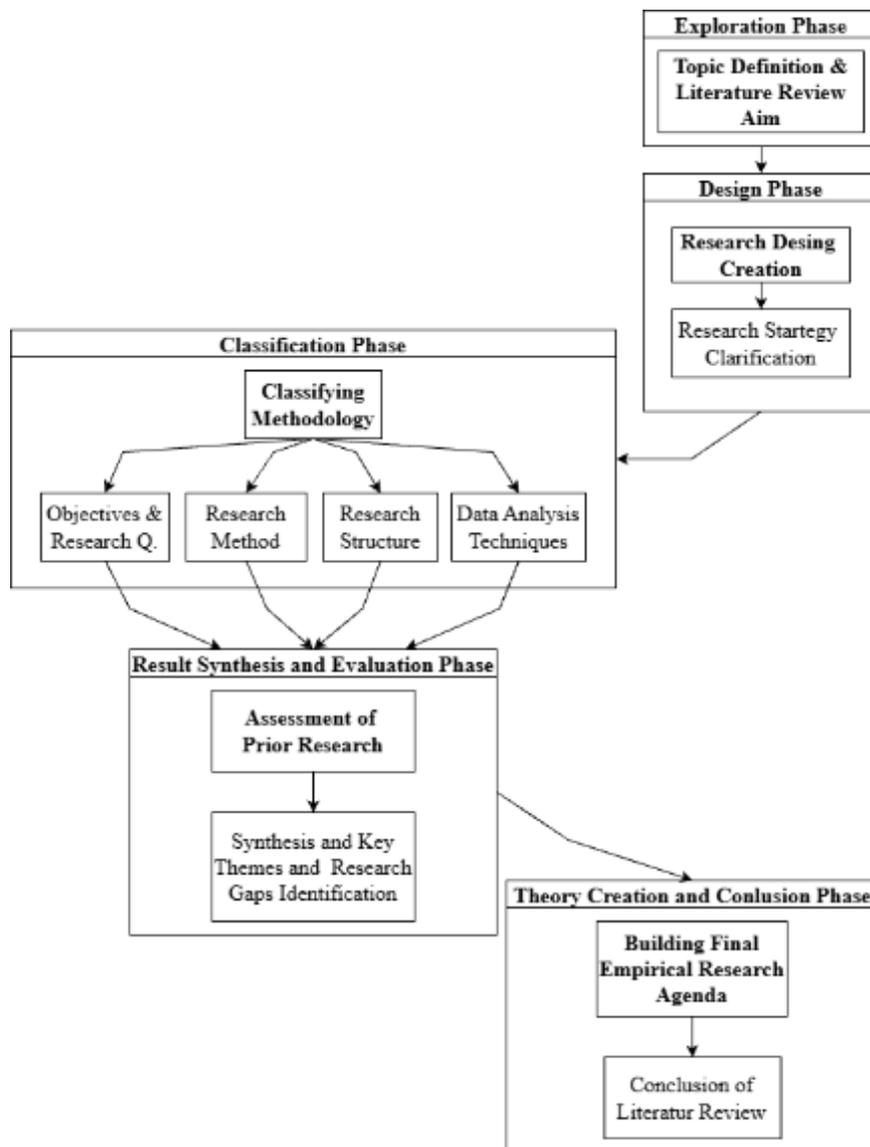
Darbo vadovas - doc. Dr. A. Ulbinaitė, Vilnius, 2026

**SANTRAUKA**

176 puslapių, 29 diagramų, 12 paveikslai, 88 nuorodos.

Šio magistro darbo tikslas – sukurti duomenimis grįstą procesų matavimo sistemą (PMS), integruojančią dirbtinį intelektą (DI) ir ekspertines žinias, siekiant nustatyti prioritetinius verslo procesų rodiklius, stiprinančius organizacijos veiklos rezultatyvumą. Taip pat nagrinėjamos priežastys ir naudos, skatinančios organizacijas diegti PMS, ypatingą dėmesį skiriant DI metodų galimybėms didinti sistemų pritaikomumą, skaidrumą ir sprendimų priėmimą. Darbas susideda iš keturių dalių. Literatūros apžvalgoje aptariamos tradicinės ir modernios PMS teorijos o daugia-perspektyvinis modelio metodas išskiriamas kaip pagrindinė konceptuali prieiga. Metodologijoje taikomas kokybinis tyrimas, naudojant analitinės hierarchijos procesą (AHP). Trečiojoje dalyje sukuriama koncepcinis modelis, apjungiantis teorinius ir empirinius rezultatus, o ketvirtojoje pateikiamos išvados bei rekomendacijos. Empiriniai duomenys surinkti atliekant pusiau struktūruotų interviu su vadovaujančias pareigas užimančiais specialistais – duomenų analitikais, audito vadovais, DI ekspertais, veiklos rodiklių ir projektų vadovais. AHP analizė leido struktūruoti ir nustatyti svarbiausius rodiklius įvairiose organizacijos perspektyvose. Rezultatai prisideda prie teorijos ir praktikos, pateikdami daugia-perspektyvinį, DI sustiprintą PMS modelį, kuris padeda organizacijoms suderinti strateginius tikslus su dinamiškais, duomenimis grįstais rodikliais, taip didinant efektyvumą skaitmeninėje aplinkoje.

# ANNEX 1 RESEARCH DESIGN OF THE LITERATURE REVIEW



Source: compiled by the author based on the conducted research

## ANNEX 2 QUESTIONNAIRE FOR MASTER THESIS RESEARCH

### Introduction

Thank you for participating in my study for my master's thesis on "Integration of Artificial Intelligence for Enhanced Organizational Performance: Developing a Data-Driven Process Measurement System". The goal is to develop a modern, data-driven framework for measuring business processes that can integrate artificial intelligence.

The interview will last about 30 minutes and consists of two parts: First, a qualitative **discussion about your experience** with process measurements and usage of digital tools. Second, an exercise in which we will **compare the importance of performance criteria**. All answers will be anonymized.

*For clarification: Business processes are structured steps or activities that your organization follows to achieve a specific goal, like fulfilling a client order or implementing a new tool.*

**Table 1** Main Terms

Concept	Description
Business Processes	A structured sequence of interrelated activities / tasks that transform inputs, such as data and resources, into outputs that serve customers or support organizational objectives to achieve strategic and operational goals.
Data-Driven Process Measurement Framework	A performance management system utilizing real-time data analytics, AI, and non-financial KPIs to adjust metrics based on gained, predictive insights.
Process Measurement System (PMS)	Collection of metrics utilised to quantify effectiveness and efficiency of and within organizational processes.
Analytic Hierarchy Process (AHP)	A multi-criteria decision-making technique that transforms qualitative expert judgements into quantitative priority weighting within a clear hierarchical structure. It uses pairwise comparisons on a 1-9 scale.
Key Performance Indicator (KPI)	A measurable value used to demonstrate how effectively an organization is achieving business objectives.
Process Effectiveness	The ability of a process to successfully achieve its intended outcome and strategic goals.
Process Quality	The consistency, reliability, and standard of a process's output.
Resource Utilization	The efficiency and effectiveness with which an organization uses its resources (e.g., human, technological, financial) in its processes.

Digital & AI Readiness	The given and needed technological and cultural foundation for leveraging data, AI, and digital tools.
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Source: compiled by the author based on the conducted research

### **Participant Background**

1. What is your job title?
2. What are your primary responsibilities in your current role?
3. How many years of experience do you have in your current Role and sector?
4. What is your company size by employees?
5. What is your company's core area of business?

### **Qualitative Discussion**

#### **Part 1: Qualitative Exploration of Process Measurement**

#### **Current State of Process Measurement**

6. How does your organization currently collect, process, and analyse data related to business process performance?
7. In your opinion, what are the biggest strengths and weaknesses of your current process measurement in your company?
8. For you, what are the most critical aspects for evaluating the success of a process? How could these aspects be measured?

#### **The Role of AI and Data Analytics**

9. To what extent does your company use AI or advanced analytics to understand or improve business performance?
10. What would be the greatest potential for AI or automations in improving process measurement / management in your daily work?

#### **Challenges and Chances**

11. What are the biggest technical and organizational barriers to implementing a fully data-driven process measurement system?
12. In your opinion, what key factors support success when integrating AI-driven analytics into existing process performance?

### **Structured Exercise**

#### **Part 2: AHP Criteria Definition and Pairwise Comparison**

#### **AHP Exercise**

Now, I will present four main criteria and will ask you to compare them in pairs to determine their relative importance. Considering the goal of optimizing organizational performance, which criterion is more important, and by how much.

Please use this scale for reference:

#### **AHP 1-9 Scale:**

- 1 = Equal Importance – Both factors are **equally important**.
- 3 = Moderate Importance – The factor on which you have given this number is **slightly more important** than the factor on the other side.

- 5 = Strong Importance – The factor on which you have given this number is **more important** than the factor on the other side.
- 7 = Very Strong Importance – The factor on which you have given this number is **much more important** than the factor on the other side.
- 9 = Extreme Importance – The factor on which you have given this number is **extremely more important** than the other factor.
- 2, 4, 6, 8 are intermediate values – When it’s not possible to decide for one factor.

13. Which criterion is more important, and how much more on a scale 1 to 9?

A	1 = equal, 3 = moderate; 5 = strong; 7 = very strong; 9 = highest grade																		B
Process Effectiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Process Quality	
Process Effectiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Resource Utilization	
Process Effectiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Digital & AI Readiness	
Process Quality	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Resource Utilization	
Process Quality	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Digital & AI Readiness	
Resource Utilization	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Digital & AI Readiness	

**Sub-Criteria and Indicators**

14. What are the most important sub criteria to be able to measure / scale the main criteria? Name 1 - 3 sub criteria for each main criteria

**Finalising Questions**

15. From your view, what is the most important change data-driven organizations need to make to improve how they measure and manage business processes?

a. What role will modern technologies play in this change?

## ANNEX 3 EXPERT INTERVIEWS

### Interview Expert 1 Transcript

Saskia Cornelsen

What is your job title and what are your professional responsibilities in your role?

Expert 1

Senior Analyst but technically also Project Manager. In general, as a project manager, the entire project process, i.e. from planning the capacities of the individual employees to scheduling to coordination of implementation and interaction with relevant stakeholders.

Saskia Cornelsen

How many years of experience do you have in your current role and the industry?

Expert 1

Almost 6 years with the current company, and almost eight and a half years in the market research industry.

Saskia Cornelsen

How big is the company you are currently working for in terms of the number of employees?

Expert 1

1000, 1200, I think.

Saskia Cornelsen

What is the core area of business of your company?

Expert 1

On the whole, market research, so we have different departments. One department simply deals with statistics in general, which also has a portal for the provision of data, primarily B2B. Although you also have B2C in it to some extent, but B2B is our target group. Then we have the classic market research area, really contract work. Where some customer comes to us and says, I want to know this, and then we put people on it to find out or calculate models or something like that. And then there is the ranking area, where we look at companies in a wide variety of industries and rank them according to criteria. Those that stand out or enjoy a very good reputation on the market.

Saskia Cornelsen

The first question is: How does your company currently measure the performance of business processes?

Expert 1

Primary by revenue divided by effort. In other words, a process is profitable if the work invested is as low as possible. It is preferred if the work invested decreases every year, while maintaining the same quality, i.e. it is always aimed at taking x percent less time every year to create processes and projects. Logically, this applies to all expenses. In other words, it's not just time that plays into it, but if you manage to do it with fewer data points, i.e. even if you commission a panel and you get the same results with 20000 respondents as with 40000 respondents. Then, of course, it's also a more efficient process if you get the same results, but less effort, in this case it's monetary. Primarily, people really go according to the amount of time invested in it to look at employee costs x euros per hour. How much revenue per employee hour is generated? How

much revenue does the hour cost? And then you end up with some value where you say: Ok, the employee costs €200 an hour, the revenue generated per hour is €1000. Accordingly, you have 800€ in sales per hour.

Saskia Cornelsen

If you were to define something like KPIs or metrics that you use, it would be budget and work resources, work performance, working hours?

Expert 1

Yes, exactly that.

Saskia Cornelsen

And that was also the case in the past or has it changed a bit?

Expert 1

That was the case in the past, it hasn't changed much. In the meantime, many processes are being questioned as to whether they are still necessary or whether they can somehow be automated. Logically, however, the aim is of course simply to reduce the working time invested.

Saskia Cornelsen

But quality as an aspect is not questioned or tried to improve?

Expert 1

Quality should remain the same, at least, no matter how much you save. The quality should not suffer as a result.

Saskia Cornelsen

What do you think are the biggest weaknesses and strengths of the current process system?

Expert 1

So of course, you could call it a strength that it's relatively simple. Everyone understands what it's all about and it's also easy to plan, because then you just say: OK, you have the following processes - processes A, B and C take so long. C, D or D, E and F take so long and so on. Then you look at the processes and know if you can optimize something somewhere, you have x percent efficiency gain. In other words, if you have a process that somehow took 80 hours before and you can reduce it to 40 hours through automation, you have simply saved 50% of working time, which you logically then have free to invest in other processes or projects. So everyone understands that and it's just very simple from a logical point of view.

That would be a strength, but you could also call it a weakness at the same time, because it's just so simple and you say every time: OK, we want to save x percent every year and at some point when you don't have any new opportunities, you simply can't reach that x percent. Some processes, especially if they are still manual in nature, just take a long time and if you don't get them automated, which we can't do in many places yet. But then you know that the process cannot be changed and yet the guideline from above is always "Save a little time". But then you can also argue that you can hardly save time. The only way I could save time would be if I compromised the quality and of course you don't want that. Accordingly, it's always a balancing act between 1. the quality must remain at least the same, so better quality is of course always welcome, so it just can't get worse, but 2. you have to be able to carry out the existing processes, no matter how established, faster.

Saskia Cornelsen

From your professional point of view, what are the most important aspects for evaluating the success of a work process?

Expert 1

Just like the above, by and large. It's really quality, measured in terms of time spent.

Saskia Cornelsen

To what extent does his company use data analysis, machine learning or AI to observe and improve processes?

Expert 1

I don't know if we really use this to observe processes. I think this is still done in an old-fashioned way: Let's see what the processes are and see if we can do something with AI. So AI itself does not flow directly into the observation of the processes, at least for me. The improvement of processes definitely through automation, so a lot. We do a lot of research. Things that you used to have to search for in documents for a long time, you can now give to Perplexity, for example. But the quality is sometimes miserable because all the AI models often come up with answers. Then you click on the link and see that this information is simply not there. But as a first step, it's always relative to practically say: OK, I'm looking for this and give me that for it. Data and sometimes the sources are still good. So 50% of the time you get something much faster than if you had searched for the document or information yourself forever. If you look at any company data that is somewhere in a CSA report, you will search forever, but the AI gives you the direct link and you have to ask where exactly within this file is what you need.

Saskia Cornelsen

It has also been found out that AI often invents things itself, so what would you say in relation to the past, before you used AI: Which aspects have improved or deteriorated?

Expert 1

So the time required definitely improves, because you just find some things much faster. You would be with all the false statements that are there. You click on it once, look at it no, that's, give me a new source or you look at another source and say OK. Automation also works relatively well, considering how we work a lot with scripts, for example. So be it Java Script, because we need some data from the net or for our old evaluations, which are not yet based on Python, simply used VBA macros or still use some of them. Of course, this is also practical when people who have absolutely no idea about the subject call up Chat GPT and say I need a VBA macro that does this and that. And Chat GPT writes this macro. I just did that today and it worked well. Or if I have written any scripts and I just can't find the error why this script doesn't work. I can then throw that into Chat GPT and ask for the error. In the past, I would have taken it to some colleague. Then sometimes 2 people sat there and looked at the code line by line and in the end a semicolon is missing somewhere, which is why the whole thing doesn't work. If you throw that into Chat GPT, you have the solution after 10 seconds and he then said: Here you forgot a semicolon, by the way, you can also make the code 30 lines shorter if you use the following wording.

Accordingly, the time savings are certainly given and massively. I've had scripts that I started writing minimally that would have taken me maybe 8 hours to finish in the past. Then I now say to Chat GPT: This is my draft should do the following, write it to the end. Then I was done after 2 hours instead of 8.

Saskia Cornelsen

Then you use it more for a concrete process, but not to measure a process, how good or how bad the quality of the time required is.

But would you see potential to do that?

Expert 1

Theoretically, yes, so the AI is developing pretty rapidly anyway, if we look at where they were a year ago, where they are now, a lot has already happened. I mean, if you can ask an AI which points would make sense for my questionnaire on topic XY, and can add to already existing points, why can't we do the same with processes? So in general for generating ideas, that could already be done now. There are also various AI models, I think some of them are relatively good at actually evaluating data. I recently heard from my senior director that he actually uploaded a complete data set to an AI for some data, I don't know which AI. But we have something more than perplexity. We have a few different AIs anyway, including our own, that are all connected to us and that we can use and that have access to employee data. And he uploaded the entire data set and indicated that he wanted certain information out and the AI just picked it out for him. If you do this for an efficiency measurement, let's say you take the hours that were invested in a project in the individual items, upload it and say: Give me an evaluation of how much went in where and when. And here is the data from similar projects, compare with the efficiency measurement of the 1st project and tell me where you notice strong differences or significant deviations or something like that and then generate an overview of where there is potential to carry out optimizations.

It would probably also work that project XY has the same procedure as another project, but project XY somehow only needs half as much time for a certain step – What is done differently? Then you would have to go deep dive today to see, what's the difference between the projects?

Saskia Cornelsen

In your opinion, which factors are most crucial for the success of the process? If you have a process measurement system like this, what would help make it efficient?

Expert 1

Pattern recognition I would say. Like with big data, where you really have a lot of data and want to have a solution for it or want to have this data analyzed, which was also done before AI. I can well imagine that this has now become much more accessible to the layman, because you just don't need all this understanding anymore, but have the AI that lets you evaluate the whole thing, for which you used to have someone who somehow had 5 years of study behind him and did all the stuff.

Saskia Cornelsen

What do you think would be the biggest obstacles to implementing a process measurement system?

Expert 1

General resistance from the workforce in any case, because people often don't like change. If you look at every major change in history, you'd probably see that every revolution of any kind has created problems for the people who came before it. How many people have lost their jobs because things have been automated? This was just as true in the industrial revolution as it is now happening with AI, that many companies are repelling employees and saying we don't need them. You can give tasks to the AI and it does it for the equivalent of 0.03€ an hour, while the employee somehow costs you 20€ an hour. So why do you still need the employee? But I still believe that AI is not advanced enough to replace an employee in all respects. But if you take something like research departments, which researched a lot of things, but then had to summarize what in many cases was just blunt copy-paste to carry out the evaluation - the AI can

do that completely. Accordingly, resistance from the workforce, in any case. You have to look at the error tolerance, we are using more and more AIs to automate some processes and our data scientists have of course also looked at the error rate, i.e. they have taken data that has been viewed and verified by someone from the analyst team and then they put the AI on it and I think the last report, that I saw was just under 20% false positives, i.e. in 20% of the cases the AI said yes fits, although the analysis showed that it was not correct. Accordingly, quality is also such a point.

Saskia Cornelsen

Then we are now at the application part. I will introduce you to 4 main criteria and ask you to compare them in pairs to determine their relative importance. It is then a matter of which criterion is more important and also to what extent more important than the other. It goes on a scale from 1 to 9. The 4 criteria are: Process Effectiveness, Process Quality, Resource Utilization, and finally Digital and AI Readiness.

For the first row, process effectiveness or process quality?

Expert 1

Process Quality. In the end, even if you have a more ineffective process, that's bad in the end, of course, but it's still better than compromising quality.

Saskia Cornelsen

How much more important is it then?

Expert 1

So quality is actually always the highest level for us, quality is above all, but of course you can't go to 9, because then you would say that effectiveness doesn't matter at all. You always have to make sure that the quality has a reasonable level. Accordingly, I would really take the 5.

Saskia Cornelsen

Then Process Effectiveness vs. Resource utilization, i.e. resource use, something like working time or material costs or all other resources.

Expert 1

I would just have to ask, to what extent is a process still effective if you don't use the necessary resources? Isn't that somehow part of each other?

Saskia Cornelsen

What would be your opinion of that?

Expert 1

So my opinion is that a process is effective if you also use the necessary resources for it? Accordingly, it is difficult to say. Do we take working time? If you don't invest a working time calculation, the process can't take place at all.

Accordingly, for a process that takes place and is also effective because it makes a difference, because it is a process, it depends on you investing resources in it. That's why I find the comparison very difficult.

Saskia Cornelsen

It's still about creating a process management framework, so it's pretty theoretical. It's not a matter of eliminating process effectiveness. It's about how it can be weighted, because all of these 4 criteria will show up in the framework, but the weighting is crucial.

Expert 1

In that case, I would say effectiveness of the process is more important now from the point of view that if you had to invest fewer resources in it, that would actually be good. So Effective is more important than Resource Utilization.

Saskia Cornelsen

By how much?

Expert 1

I think I'll take another boring two.

Saskia Cornelsen

Then process effectiveness vs. digital and ai readiness.

Expert 1

That's tough, because in our company there is a total AI hype just like everyone else. Accordingly, to make a process more ineffective at times in order to make it more effective in the long run. By the fact that you are AI ready. That's a smear that people at work would certainly watch. Accordingly, I believe that in the long run, digital and AI readiness would really be more important than process effectiveness, because process effectiveness would go hand in hand with it later. But it's pretty intense, so it's difficult to say that, because you really have these interfaces everywhere and one plays into the other, but here I wouldn't go up that much, probably really something like a 3.

Saskia Cornelsen

Then process quality vs. resource utilization, what are you saying? Which has more weight?

Expert 1

Quality, that has more and more weight and here really much more weight, whether you use your resources sensibly or not remains to be seen, as long as the quality is given. I would go to 7.

Saskia Cornelsen

Then process quality vs. digital and AI readiness.

Expert 1

Still quality, so quality is the highest good for us. Theoretically, you can somehow ruin everything else. As long as it's not the quality, because we live from the fact that people trust the data. Accordingly, the quality simply has to be there, so as important as AI readiness is, quality is still higher and I would go to 5.

Saskia Cornelsen

Then resource utilization vs. digital and AI readiness.

Expert 1

Definitely AI, unfortunately that is now much more important at work for us. They are even considering whether to provide us with free space every week, only for further training and of course more in the direction of AI.

Saskia Cornelsen

Interesting, but in this case I ask for your opinion, not what your company tells you think.

Expert 1

But true in the long run, that will make more sense. In the past, it was purely digital readiness before AI became big. If you look at a company, it simply hasn't digitized anything. Then we also end up with the German state with its fax machines and you know yourself how miserable the processes are. Accordingly, this is our modern world and you simply need it. It's either: you go along with the whole AI thing or you stay behind and are left behind. Here I would say 7 at least.

Saskia Cornelsen

OK, then your values are automatically ranked by the tool here, I'll say now that you have now entered your highest rating, in this case now Process Quality and then Digital and AI Readiness apparently.

If it should be optimal, then these values could be adjusted, but in this case that's your decision. We can leave it that way.

Expert 1

Yes, sounds good.

Saskia Cornelsen

OK, but I'll leave the screen shared, because then you can still see the main criteria. Level 1 still the main criteria and then it would go on with level 2 as sub criteria. Then it's now about sub criteria, if you look at the main criteria again. What sub criteria, let's say 2 or 3 maybe only 1, would you give to these main criteria, let's say process quality? What could be the sub criteria of this? So I now have the criterion of quality, how could you measure that?

Expert 1

In the end, you want to have a definition of quality in this case.

Saskia Cornelsen

Yes, so to speak, as a form of sub-criticism to build up quality.

Expert 1

Yes, so something like data accuracy. That would be one of the points for data. Methodological cleanliness would be a different process, a different sub-process, if you like, although these are really just sub-points. Is this still something in your interest or is it going in the wrong direction?

Saskia Cornelsen

That's the right thing to do, because it's about defining criteria that can be used to measure the processes. I can't say I'm measuring the quality now - by what? What is quality? Then you said data accuracy and methodical cleanliness.

Expert 1

Yes. And replicability. In the end, if you do such a project by looking at companies and every year something different comes out, even though your target groups are very homogeneous, then you know that you have a problem. Because if the best and greatest from last year suddenly somehow doesn't even appear in the list anymore and now some other one is great, then you have some problem in your data collection, because how can it be that someone who was very good before according to clean criteria, but suddenly performs miserably or is ranked this year? Although nothing has changed. That's why I would also include replicability as a feature of process quality.

Saskia Cornelsen

OK. Do you have any sub criteria for another main criterion?

Expert 1

I can try to find something to the others, so if we just start at the top. When is a process effective? Then when he accomplishes what he is supposed to do, by and large. This means, in the end, that, how do I put it best, the result is achieved, but there is certainly a nicer name for that. Result, something with result, so now I can't remember the German language.

Saskia Cornelsen

So to achieve the goal of the project or corporate goals?

Expert 1

Both, also a good point, so I mean, what is the company's goal in the end - sales. If you then go further, of course, profit, because a lot of sales, if you have more expenses, just doesn't bring you anything, you also have bills to pay. You have employees to pay. You have potential dividends to pay out and so on. The achievement of corporate goals. Certainly contributes to the achievement of the company's goals, you contribute to the achievement of the project goals. When else is a process effective? On the whole, what really is effectiveness when what you set out to do is achieved. And I can't think of many more clever things on the subject. Flexibility is somehow such a standard term.

Saskia Cornelsen

But it's OK, so 2 to 3.

Expert 1

Yes, so I can't think of anything more about effectiveness, at least spontaneously. If you sit down and think forever or ask Chat GPT for a definition, surely you can think of more?

Saskia Cornelsen

Then think for yourself rather than ask Chat GPT?

Expert 1

Well, so that we are referred to AI to do something, then AI must be more intelligent than us, right?

Saskia Cornelsen

Is that the case at work?

Expert 1

So a lot of things, let's say you have a cover letter to heaps of potential survey participants. I write the thing down and if I put Chat GPT on it, then I say, at best check for grammar and spelling, maybe better wording or something similar. But we also have people who just sit down and say I want to have the following statement in it, write me that. Or they throw in an existing text that I wrote before, for example, and say then rewrite it in such and such a style, rewrite it more like marketing speech. And I personally hate that kind of thing, because I think my lyrics were better than what they somehow rhymed together. But enough people in leadership positions do the same, like "Oh look, that's a nice formulation". I look at it and think to myself, all the relevant points that I had in it before are missing and now it sounds like we are not talking to one of the most important law firms in the world. But somehow send a newsletter to people who should take part in our next raffle for iPads.

Saskia Cornelsen

OK but then you couldn't also see that as a criterion for addressing stakeholders in this way?

Expert 1

Yes, if your goal is to engage stakeholders, then yes. Theoretically, your goal can be anything. Do you know what I mean?

Saskia Cornelsen

Yes. But to the specific point, would you classify it in quality or effectiveness?

Expert 1

Effectiveness. You can only achieve quality with AI with quality assurance. I don't really have the feeling that if you put any AI on it, especially in the textual area, that the text quality will really improve.

Maybe, if you speak or write in another language, I mean if I throw an English text into Chat GPT and say smooth it out a bit, then the text reads cleaner or more fluently, because Chat GPT then simply writes like people who speak it as their native language also speak more casually. In English, some of these are terms that no one else would use. We try to be much more eloquent than anyone who would naturally express themselves.

Saskia Cornelsen

Yes, for resource use, what sub criteria would you use to be able to measure it?

Expert 1

Well, for us, resources are primarily time. And in some cases there are still external expenses, but primarily we have time. Time in general, logically, as a resource. But I mean, that still doesn't say anything, because a project that brings in 50,000,000 € logically has more on it than a project that brings in 200,000 €, so you would have to do resource measurement again, i.e. in relation to the time spent to the result. That would be an efficient or effective measurement of resource use. In addition, in general, which available resources were used and to what extent did they contribute to the success of the project? In other words, you have to factor the effectiveness into the use of resources again, because if a resource has no effective advantage, then he doesn't have to use it. Of course, you can sit someone down and say, here do this task for 20 hours or you say, do something else for 20 hours, because there is an AI that does this task in 10 minutes. So in the end, it actually makes sense of the resource that is used in a process.

Saskia Cornelsen

Now as a stand-alone sub-criterion in relation to resource expenditure or all of the above? Because you started with the effort.

Expert 1

Yes, so the effort was generally just the time component compared to the effectiveness. That was in perspective, meaningfulness is actually a stand-alone feature, I would say. Because if something makes sense, then it can theoretically and is then automatically logically effective. Because it contributes at least partially or completely to a company, process or project success. Perhaps it is also the only feature that is relevant. So yes, I would take that as a standalone feature.

Saskia Cornelsen

OK, if you have nothing else, I would go to the last criterion. Then digital and AI readiness, how would you measure that? With what sub criteria?

Expert 1

Funnily enough, with which digital or AI resources are used and how do they become effective. In other words, who and how effectively they are used. In other words, a simple example if we take an AI and can tell the AI I want to have this and that, build that. It's a much better use than telling the AI that I need a step first, so take that one step for me, then you do something yourself again without AI and then you say, OK and now do this with it. You are not exploiting the full potential of AI in this case. Sending the same thing with digital components using the example of our beautiful German state is simply not as effective as sending an e-mail. And accordingly, to point out resources again, which jumped back and forth a bit, but that's what counts for me - It's just the digital or career resources that you use. You need to master AI and know how to use it to get what you want.

Saskia Cornelsen

OK, the jumping back and forth, that's perfectly OK, because it's not such a rigid level structure now, but that everything can flow into each other and that's my job to create. Do you have any other sub-points for AI Readiness on how to measure it? If not, can we move on?

Expert 1

I think we can move on.

Saskia Cornelsen

Then I would conclude with the last questions about the sub criteria you mentioned: What measurable indicators would you use to track or track these sub criteria?

Expert 1

I've already forgotten half of what I said, but you also took notes, didn't you?

Saskia Cornelsen

Yes. Data accuracy for quality, for quality also replicability. Methodical cleanliness for effectiveness. I also can share my screen again. Here then effectiveness. Here was resource use and here was AI.

Expert 1

How do you measure data accuracy, if the data is researched, logically - through accuracy. I mean, that's just a euphemism for accuracy of how accurate the data is. And in general, of course, let's say reputation of the data, if you like, the source if you have data that comes from no idea of the website eltern.de for the use of lawyers - I wouldn't add much to that. So of course, data accuracy logically needs a source that has collected the data sensibly and is based on something that is valid. How are you supposed to measure it? That's difficult, so when it's researched, you just have to look at the source, that the data actually comes from a reasonable source and that what you have in your data also corresponds to what comes from the primary source. What would the AI do? The AI could verify the data. But that's a control mechanism in this case and so yes, so theoretically practically, I've already done that. I gave data that we checked to the AI and said, check if this is correct. And thus outsourced any checks, so to speak, where I thought we had checked it once, I don't feel like checking it a second time. Should the AI do that? Is that reliable? I don't know. The main problem is, I really did this once in a project and then told the AI, check and the AI told me fits. So I asked the AI again the next day and the AI said the following companies suddenly don't fit anymore. Yesterday they still fit, what's the problem? And it turned out that the first check was via Chat GPT 5. And the second check via

Chat GPT 4. And you've already received different ratings, everything is good for the first year and not for the second. But Chat GPT 5 was correct here.

Saskia Cornelsen

Interesting. For effectiveness, achieving company goals and addressing stakeholders, how could you measure that? Again, the question here: What measurable indicators would you use to track or track these sub criteria?

Expert 1

And how you could measure that. Achieving corporate goals depends on what your company goals are, but in this case let's start from the simple point that you want to generate sales or profit in the end. You can measure that monetarily, you look.

Saskia Cornelsen

Let's not go into financial matters, because addressing stakeholders is not financially charged in principle. Whatever integrity or diversity is, how can you do that, for example?

Expert 1

Addressing stakeholders.

That's an attitude. Either you have business integrity or you are a politician.

Saskia Cornelsen

And you could address stakeholders directly?

Expert 1

Yes, that's what we're doing here, so let's say we're doing a project with lawyers, purely theoretically. But how do you measure effectiveness? So if you do that in the course of the project, you do it through interaction, of course, you say you write to people, you talk to them, you call them. Whatever how much interaction you have. How many go along with it and do what you want them to do. In the end, this would be interaction for addressing stakeholders and there is a term for it: conversion rate, that is the term in the end. How many do what you want? So, for example, if you're a business that sells stuff, the conversion rate is logically the percentage of those who buy your product after you've promoted it to them.

Saskia Cornelsen

OK. What do you think is the most important change that companies in your work sector should make to their process measurement practices?

Expert 1

So in itself, as I said, the current approach is not so stupid to say that you really look at how much added value you generate based on what you invest in it. It's quite rational to look at it that way. To then see where you need to take action. I mean, you can always include more uniform components, theoretically, so that might be a really interesting idea. Everyone measures their processes in their own way, which they think makes sense. It probably wouldn't be stupid to somehow do a little deep dive and see what relevant KPIs could theoretically still exist for us that we could take into account but don't do yet, but other projects do that might give a more holistic picture.

## **Interview Expert 2 Transcript**

Saskia Cornelsen

Thank you for participating in my study. For my master thesis it's Integration of Artificial

## Intelligence for Enhanced Organizational Performance: Developing a Data-Driven Process Measurement System.

The goal is to develop a modern, data-driven framework for measuring business processes that might integrate AI based on your expert knowledge.

Expert 5  
OK.

Saskia Cornelsen

It will take about 30 minutes and consists of two parts. At first the discussion about your experience, exploration of the topic itself and then secondly an exercise to compare the importance of performance criteria that are selected based on my literature analysis where we dive in deeper afterwards. In case any term is not clear for you in between, just tell me I have a table prepared for main terms and their definition. Just tell me like overall what is your job title or role and your primary responsibilities?

Expert 5

I'm a project manager but as senior analysts as my professional level in the financial and IT company I work for. I tackle various tasks from project managing specific projects to doing daily reporting which also includes incident management.

Saskia Cornelsen

What are your primary responsibilities in your current role, but you already said that or do you have anything to add on that?

Expert 5

I said everything. What, yeah I said everything.

Saskia Cornelsen

OK, what are your years of experience in your current role, but also in the sector overall?

Expert 5

A year and a half in the current company and as project manager for like 7 ish years.

Saskia Cornelsen

What is your company size?

Expert 5

Oh, 9000 people.

Saskia Cornelsen

What is your company's core area of business? If you have multiple, you can say this as well.

Expert 5

We're provider from market platforms, market accesses like stock exchanges specifically to various countries. We're the second biggest in New York and we provide various other business, banking and IT solutions from cloud solutions to data analytics tools to compliance to policies, legal policies, trading policies and all that. So many, many various financial and IT sector solutions.

Saskia Cornelsen

So I will dive into the topic discussion now. This was just about you. The first questions are more about current state of process management, but also your view.  
So, how does your organisation currently measure the performance of its business processes?  
What are the main KPIs or metrics, if you have such?

Expert 5

What exactly do you mean the business process?

Saskia Cornelsen

I have a description, so I will read it to you, so tell me if it's clear for you then. Business processes: a structured sequence of interrelated activities or task that transform inputs, such as data and resources, into outputs that serve customers or support organizational objectives to achieve strategic and operational goals.

Expert 5

Can you repeat the question?

Saskia Cornelsen

Sure. How does your organization currently measure the performance of its business processes?  
How is it measures?

Expert 5

Well, we usually when we have specific goals, we have certain attainment criteria. Let's say there has to be a specific thing achieved, a achieved approach like not physical, but like a subjective objective criteria achieved.

Saskia Cornelsen

Can you name some of those criteria?

Expert 5

Like a certain product must be under a certain compliance measurement. For example, if a specific product is the cloud issues, STIGs [Security Technical Implementation Guides] for example, STIGs standards are measured for that.

Saskia Cornelsen

What is that? It's really abstract for me.

Expert 5

Let me restart here. When it comes to qualitative, processes are measured against a certain percentage points. So, if something is achieved, it will give us 200%. If something is partially achieved, we give somewhere between 100 and 200%. If it's less than everything that you've did, it's less than 100%.

Saskia Cornelsen

And can you name a few of those? I would label them as KPI, some metrics.

Expert 5

Well, they're very specific and they're very certain for a certain goal, like they're very based on for a specific field of department. So let's say we have a goal that we want one of our new products in the company to be measured based on the measurement system. We want one of our projects, our new products, to be a part of a specific cloud issue measuring system and then if that product is for example onboarded into that system, then we consider that fully achieved with

200% reached. It also is measured against time. So example we have one specific goal and the goal has the floor level, ceiling level, target level. Then we also accordingly measured what they have achieved, if like let's say it's target level. Then it's 100% of ceiling level, 200% of everything is achieved.

Saskia Cornelsen

In your opinion, what are the biggest strengths and weaknesses of your current process measurement system at your workplace?

Expert 5

A weakness is the calculation, the attainment percentage can be very subjective. Some are very specific qualitative numbers, but others are very subjective. So, it can be very subjective, but I mean they are thematical. I'm speaking about thematic goals, thematic goals of the company here, measurements, they can be very much subjective if, let's say, we have a very qualitative thing like you have a product in our incident system for example, it's either is or either isn't. There are certain elements of the incident management system that the product can be in, but then certain element it's not there. So then you have to make a percentage point of between 100 and 200.

Saskia Cornelsen

You mentioned only weaknesses, so you have one strength?

Expert 5

I mean they're the way we make them or the way we prepared the goals there. There's a whole lengthy process involving goal levels like upper manager and the people who are actually gather the data for the goals.

Saskia Cornelsen

When you say this is how it always is, it is not a strength, it's a fact.

Expert 5

You want a strength. I said that the strength is that there's a long process for drafting goals and getting a confirmation from various levels of the company.

Saskia Cornelsen

How is this a strength?

Expert 5

Because we have a clear map, map strength.

Saskia Cornelsen

OK, that was more clear. And from your professional perspective, what are the most critical aspects for evaluating the success of process?

Expert 5

Time. I mean, if we're speaking specifically about processes but not KPIs like I was talking about before, if it comes to evaluating processor, we see complexity and time. Let's say we have a process compared to when we don't have a process and we can achieve that one thing faster. I think that's a success. For that, I mean, just calculate time, you know, work time. Like if I don't know the process has five steps, just look how long those five steps you need to do to achieve the same goal in a timeline compared to let's say before having the process for example. You

can compare financially. I assume like this is, just my thinking out loud here. You maybe can do financial comparisons with the process.

Saskia Cornelsen

Now we would go into the role of AI and data analytics. To what extent does your company use data analytics, machine learning or AI to observe and or improve processes?

Expert 5

Well, in this case I cannot speak for processes. I can speak more of the goal achievement attainment. We're not using AI for that at all. We're doing it by hand, you know, but AI is used in many processes. We have a certain platform called Gen AI platform. We have capabilities to create our own tools using AI capabilities that we can process every day, every processes of our everyday activities. Like you can create your own data sets and you can for example chat with them. So let's say you upload 10 documents about, I don't know, some sort of a policy and you can use our creative AI platform just to chat with about those documents. So there was never the idea of putting in process data like a record of time spent on the process on step and let it be evaluated by AI. We don't do that, but let's say if a single team wants to do that, they have all the tools for that to automate that. Maybe we don't apply it for as I said, I'm talking about company wise, a certain teams, they can apply tools to their own needs.

Saskia Cornelsen

OK. What do you see as the greatest potential of AI and measuring processes?

Expert 5

They can everything. They will be able to do everything, from measure work time, measure effectiveness, measure improvement. I mean, AI is going to take over the whole thing. It's going to be fully automated to the process measurement and stuff like that. In like be able to compare, they will be able to give advice how to improve the process. Compare the results of let's say how you do certain process, how I do a certain process, something like that.

Saskia Cornelsen

OK. What are the most significant barriers to implement an effective data-driven process measurement system in your opinion?

Expert 5

For small sized companies, it's too expensive for them. To a certain level, just going to be too expensive for a certain size companies. So manufacturer, I would say, because that that's that costs money.

Saskia Cornelsen

What factors are most critical for the success of implementing such a system?

Expert 5

Human expertise, I would say, and good data.

Saskia Cornelsen

Human expertise in in what way?

Expert 5

Because you need to always attune. Like if you have a language learning model, you need to attune to your needs to program it. Yeah, human resources, as in programmers, as in people who can create such tools. So it would give you the result as you want, what you want specifically for

it to create. You can have a chatbot like chat GPT putting your numbers and all that, but it's just going to be basic chatbot. If you want something better, you can do a deeper analysis, deeper comparisons of results.

Saskia Cornelsen

So next we move on to the exercise and I'll present you 4 main criteria and ask you to compare them in pairs to determine their relative importance. So considering the goal of optimizing of an organizational performance: Which criteria is more important and by how much? Here we work with a so-called AHP method, so a 1 to 9 scale. In this case when you would select 1 it would be equal importance between the two criteria. When you would go 3 on one criteria, it's slightly more important than the other criteria. Same with like 5, it's then more important than it goes up to much more important as 7, than extremely more important as 9, but when you select like intermediate values, in this case 2, 4, 6 and 8, it's not possible to decide a clear importance. I will share my screen so it's a more clear overview.

So all in respect that we're developing a process measurement framework. We would just start with the first row process effectiveness vs. process equality. You select one which is more important in your opinion and then you continue with how much more important compared to the other criteria in the same row.

Expert 5

So if I choose process quality and I choose 9, then I think process effectiveness means nothing compared to the quality.

Saskia Cornelsen

In this case, not nothing, but significantly less. It just means significantly, significantly or in this case extremely more important than effectiveness. So process effectiveness vs. process quality, which one would you choose and then the rating?

Expert 5

What is process effectiveness and process quality in this case?

Saskia Cornelsen

So process effectiveness is the ability of a process to successfully achieve its intended outcome and strategic goals. And process quality is the consistency, reliability and standards of a process output.

Expert 5

Not say that both equally important because they're equal. Just equal. Both of them are core of having a good process.

Saskia Cornelsen

OK, then process effectiveness vs. resource utilization. So which of those criteria, process effectiveness or resource utilization, is more important for you, like in your professional experience?

Expert 5

I'd say maybe a little bit like 3 for process effectiveness because, you know, you utilize processes, you utilize your resources to have effectiveness to have a good outcome of the process.

Saskia Cornelsen

OK. And then process effectiveness vs. digital and AI readiness.

Expert 5

I don't know if I understand correctly, but you can have a process effectiveness without digital or AI readiness in my opinion. But click on digital and AI readiness. I just said that, because look at the logic, you utilize resources and you utilize the resources. So you would have digital and AI readiness because when you have a digital and AI readiness then you have effectiveness. I mean, that's the logic I would say.

Saskia Cornelsen

So we are in row three and what is your decision?

Expert 5

Digital and AI readiness, that's 3.

Saskia Cornelsen

Then process quality vs. resource utilization?

Expert 5

Can you show me the definition of quality for a second?

Saskia Cornelsen

Sure. The consistency, reliability and standard of a process of process output.

Expert 5

I say process quality at 5 because by the end of the day it's about the end result.

Saskia Cornelsen

So then process quality vs. digital and AI?

Expert 5

Process quality at 5 again because the whole point is to have a good result.

Saskia Cornelsen

So then research utilization vs. digital and AI readiness?

Expert 5

That's a hard one because you need a lot of resources to have digital and AI readiness. So I would say digital and AI readiness, and I say 3 because you cannot spend too much resources.

Saskia Cornelsen

OK. Then we would move on and see. This would be about sub criteria, continuing thematically on the main criteria from the exercise but discussing specific indicators for them.

In this case, sub criteria are specific detailed components that make up the main criteria. The 4 main criteria we just talked about, they break down a general standard or an area of evaluation into smaller measurable parts. For example, process quality. It's really abstract, right? Let's break it down into sub criteria. Or in this case, I ask you what do you think are the most important sub criteria? You can name one up to three or more even to be able to measure those main criteria. Let's start with process quality, how can we can measure quality proceed?

Expert 5

Error rates. If you can measure something like errors. But in my workplace, it's not possible, depends on the area.

Saskia Cornelsen

So let's go to process effectiveness.

Expert 5

Time. Time to conclude the process from start to beginning to get the final results. There's a special type of time boundness, something like that. For like benefit analysis including like how much cost per task or process. For me, it's an effectiveness, yeah. I mean, it also can be in resource utilization. It's both, like how much if we're spending like \$100 per process. Does the end result of that process mix up for us that \$100 that we spend on the process? You know what I mean? I think I mentioned that before better regarding to resource utilizations.

Saskia Cornelsen

OK, so you can say a combination. It can be mapped to multiple main criteria.

Expert 5

I don't know if it makes it, but the complexity of it regarding the process effectiveness, I'm not sure. But how do you measure complexity of a process? Like how do you measure if it's complex or not? I don't know if that's possible. Is it effective when it's high complexity or low complexity? It should be easy to understand. So, yes, the easier to understand, the more effective it is, yeah, but check if there's a like a some sort of better term for that. I mean like understandable or accessible. But also easy to replicate in process quality terms, repeatability. If you can repeat the results which are positive, I think that's a good one, like stability. Actually, also error count, error measuring. That's a thing that I never went through, but I know it's a factual thing. So error, error rate, count. But I think it depends on the process and the end result.

Saskia Cornelsen

Do you want to continue with quality again or go on to the other main criteria we have left?

Expert 5

Let's go on others.

Saskia Cornelsen

We have resource utilization and digital and AI readiness. How could you measure it?

Expert 5

For resource utilization, I mean cost benefit analysis that covers everything, it covers resources. Whenever speaking resource utilization, we mean like how much money we spend on something and what's the output of it. The resources that we spend to conclude this specific process, not necessarily to complete. But start to install, everything included for processes. For digital and AI readiness like training rate, how many people have like learned and understood how to work with AI and other digital tools.

Saskia Cornelsen

And then what measurable indicators would you use to track the mentioned sub criteria?

Expert 5

Well, in my case, they're quite literal. The sub-criteria is kind of like the measure here. Time is time cost benefit analysis. The beginning and the end from a process when I started doing the process and when I'm finished. How much time I spend on that. Yeah, then cost benefit analysis usually comes in the form of cash or economic value, which is in cash.

Let's say we're using two people to implement a certain process and by the end of which we're going to create a product X and then we use the coded benefit analysis to measure the time.

Time measured in this case, including the time measured, the costs that are involved in this process, create a product and then measure to the value of the final product. Which usually comes again in the form of economic value cash. So we have those on this one.

For complexity, it's very subjective. I would say, like opinion based rating like let's say you've had two people implementing using a process. I would just directly ask them how do you rate from 1 to 10 the complexity of this process. So, feedback.

Error rate is error rate, it is what it is. You just calculate how many errors per process per time.

Whatever measure you count is an error. Whatever error you count according to another calculation, count like how many errors per minute in that process. Or how many errors per start and finish of a process. So error compared to something. And also, of course, defining what an error is. It's compared to another quantitative data. If it's time, you divide the minutes by the error and you get for example 1 error per 30 seconds. And then you just have an amount, but then you have to state which amount is still OK.

I want to sum up with repeatability. With that, you just look at the end result. If you did the same process five times and five times you got a good or successful result in the same way, that means it's repeatable.

Saskia Cornelsen

OK. In your opinion, what is the single most important change organisations in the sector you work in need to make to their process measurement practices to improve them?

Expert 5

Can I speak for the whole sector, for the whole industry?

Saskia Cornelsen

Of course.

Expert 5

I think AI it's going to be bigger and bigger. So that's something I'm pretty sure we will have in the future, AI integration. For example in data analytics, to do data links specifically, for gathering data, comparing data, calculating the data, if it's up to comparing effectiveness of the process and the end result to replace humans or to make it faster. Both. I mean, in some cases you cannot replace humans but sometimes it's so easy, you can replace humans completely.

### **Interview Expert 3 Transcript**

Saskia Cornelsen

What is your job title and what is your primary responsibilities in your current role?

Expert 4

So many descriptions actually that's like falls under my position I guess, but mainly operations, head of operations and product owner of panel platform. And, regarding the tasks and responsibilities, probably managing a team of panel operations to support all client needs, onboarding new clients, also pitching ideas. And selling our products, then getting feedback from clients about the system itself and planning new features of development.

Saskia Cornelsen

How many years of experience do you have in your current role and also in the sector overall?

Expert 4

Current position I guess seven years and in general sector itself it's now 19 years.

Saskia Cornelsen

OK. And what is the core area of business of your company?

Expert 4

As tech company concentrating on market research and data analysis tools.

Saskia Cornelsen

OK. Then let's jump into the current state of process measurement.

The first question would be: How does your organization currently measure the performance of its business processes? If you have KPIs or metrics that you can name, go for it. If not then description is also fine.

Expert 4

Mostly we measure of course from financial perspectives because, to be honest, it was a mess before and now we're getting more structure I think, but still like far away from where we want to be. So, each product probably has like financial lines and accounting, not trying to separate at least because technically all products are interconnected. So like for instance, one department uses other departments resources. Using internal resource of course is cheaper, so we are trying to do that as much as possible, but then sometimes we got to untangle actual costs and like assign properly the cost of project or client. So I think we're getting better there and at the end of each year we have reports how much each product earned us, how many costs each department had and so on. So just to evaluate how it performs compared with costs.

Saskia Cornelsen

OK.

Expert 4

From some points from organization, we also like have KPIs like how big we want to grow that year, for instance panel department also has KPIs for how many panellists we should aim to onboard, clients onboarding and so on. These goals also needs to be taken into account and reached over the year. But not much about the efficiency itself.

Saskia Cornelsen

OK. And in your opinion, what are the biggest strengths and weaknesses of your current process measurement system at your workplace?

Expert 4

Well, so far we don't have much actual control over that. Probably the company's more concentrated on selling stuff naturally because all our owners are in sales departments, so of course the main goal for them is to sell as much as possible. But then probably they sometimes doesn't care how the process are structured. We do have now a person dedicated to that in our company who's probably doing more in that area, but I think we just started, so long road to optimize everything to write everything down as well and puts everything in a structure.

Saskia Cornelsen

OK. Do you have a strength of your current process measurement system?

Expert 4

Well, at least we're doing something. I mean, we're getting better because we're starting to have reports, before it's just numbers taken from accounting and that's it. Now we do have other reporting tools that shows how good the way of performing is at least in some areas because there are a lot of ways where to use that, for instance balance support procedure or process evaluations. So for each department or if some department can use some, most of them too have reporting.

Saskia Cornelsen

OK. From your perspective, what are the most critical aspects for evaluating the success of a process?

Expert 4

Of course it depends on the tool or department because, like we have panels, so we have key metrics like churn rate of panellists. So you can sit on this and then take only that into account. But there are very different aspects from where you can look at the things. Most of what we don't want to have, of course, are like errors or incidents, first like that the platform is not working from like downtimes and so on, but that's related to particular department and the work they are doing. So of course we have some things even written in the contract with clients that for instance our platform will be up and running on like 99% of the time. So most important for us to at least grant these kind of things.

Saskia Cornelsen

OK. Then I would go the direction of AI and data analytics. And my question is: To what extent does your current company use data analytics, machine learning or AI to observe and improve processes?

Expert 4

So now, we do have like coder and stuff like that in for instance, but not much more at the moment. I know we plan to look into ways for doing some other things like ways how to improve or remove manual work and let that things to be done by AI.

Saskia Cornelsen

Then what do you see as the greatest potential of AI in measuring processes in your department?

Expert 4

OK. So JIRA is one of the task management platforms for us. It also contains its own AI tool for like descriptions, optimizations and probably finding new tasks or offering insights for new tasks and so on. So that's one of the areas that we use. But for the panel support we don't have AI there yet. I delegated that thing for the team, but it's not happened yet. But I know that we can improve in that area because AI could remove lots of load from our support team because AI would crack it down and handle and offer help for many panellists and just get in touch like a real person if that's actually required.

Saskia Cornelsen

OK. Let's say you already have such system that you can implement and work on. What do you think are the most significant barriers by implementing so?

Expert 4

I guess now it's time resources that we don't have because you need to analyze, you need to select the module, then probably test, do a pile of analyzed data and so on. So time can be tuning procedure, we're busy with other things like surviving. So maybe in the near future we'll find some time to do that, because that obviously should save some time in general.

Saskia Cornelsen

OK. Then I would switch to, I would say the exercise and present you 4 main criteria and I will ask you to compare them in pairs to determine their relative importance. So considering the goal of optimizing organizational performance: Which criteria is more important and by how much? Wait, I'll share my screen. OK. Can you see?

Expert 4

Yeah.

Saskia Cornelsen

As I said, it's all really theoretical and it's about developing a process measurement framework. But there are those four main criteria that I extracted from literature analysis: process effectiveness, process quality, resource utilization and digital and AI readiness.

And you have to weight them compared to each other. You choose one of those and then say how much more important is it compared to the other or one is equal to the other. But keep in mind that this is not like weighting them individually overall. You also have to think about all of those as one concept. So let's start with the first, process effectiveness vs. process quality. Which would you weight more as more important and by how much?

Expert 4

I just need to define and then see which processes we're including here because for some quality is not super important but effectiveness but then other things that happens in the department itself. And of course quality is top notch thing that you need to take into account. So I try like understand or select which options to measure.

Saskia Cornelsen

So it's better to think overall or generally less about your product specifically and more about department, company wise.

Expert 4

Yeah, so probably quality then is more important.

Saskia Cornelsen

How much. What would you give from 1 to 9?

Expert 4

Uh, let's take the middle, five.

Saskia Cornelsen

OK. And then effectiveness vs. resource utilization?

But this takes all in account like working hours, product time etc.

Expert 4

That's probably effectiveness. But then only by three.

Saskia Cornelsen

OK, then effectiveness vs. digital and AI readiness, because I have the factor of including AI in such framework, that's why such criteria is mentioned here.

Expert 4

Yeah, so effectiveness is like 4.

Saskia Cornelsen

OK. And then quality vs. resource utilization?

Expert 4

Quality, of course. Probably 6.

Saskia Cornelsen

Quality vs. digital and AI readiness?

Expert 4

Quality by 8.

Saskia Cornelsen

OK. And then last, resource utilization vs. digital and AI readiness?

Expert 4

Resource utilization, 3.

Expert 4

Will you calculate?

Saskia Cornelsen

Yes.

Expert 4

Well.

Saskia Cornelsen

No, this is fine, it calculates mathematically if there is consistency in your argumentation. So, because humans tend to have a loop in argumentations. If you have like free arguments, then you say A is better than B, but B is also better than C and then say yeah, but C is better than A. So it turns into a loop and this calculation controls if it's consistent, but all good with yours here. So then I would leave it open so you can see the main criteria.

Now we would build on to the main criteria as the so called sub criteria. So, detailed components to make up those main criteria to break them down to a general standard or how to evaluate them into smaller parts. So let's look on process quality. What are the most important sub criteria to measure this main criteria? When you look at quality, you can say like one up to three sub criteria that you come into your mind. Because it's hard to say, let's measure quality, but what is that?

Expert 4

Yeah, error. I have to say percentage of error.

Saskia Cornelsen  
Error rate?

Expert 4  
Yeah.

Saskia Cornelsen  
OK.

Expert 4  
Then, like feedback from users or else like from related parties, especially clients.  
Yeah, I just think what's important and where to and how to measure that.

Saskia Cornelsen  
You can only name 2 sub criteria. That's totally fine. You don't have to give me free, so we can move on to effectiveness if you want.

Expert 4  
Probably the measurement of task size vs. resources put into that. In a way, it's also related to quality, because it's effective if the quality rate is sufficient. With that I glance to error rate as well. Or like error rate vs. the resources put into the process. Just thinking how to formulate that right now: Ratio of resources used to reach low error rate.

Saskia Cornelsen  
Do you have anything else for effectiveness? If not, then we can go to resource utilization.

Expert 4  
Yeah, OK.

Saskia Cornelsen  
Then resource utilization. What sub criteria do we have in mind here?

Expert 4  
Need to for allocation of resources for a particular process or task and that includes, of course, the software, and manpower.

Saskia Cornelsen  
But what do you mean by that? Because it's about how to how to make it possible to measure resource utilisation, when you say software, what do you mean by that as a sub criteria?

Expert 4  
I think it's different per product we have. For instance, you're having 1,000,000 panellists but that doesn't mean that you utilize them properly. So like survey complete count vs. panellist count. This could be an example. But in other areas like our small panel department, we have sub criteria in a way of that many people are there and you do that many tasks over a time. So I don't know how to mash everything together into like one thing.

Saskia Cornelsen  
You don't have to think about your panellists or what they're doing, how you utilize them, the process itself etc. Like before you do this, we have processes, you have processes to do your task. And how can you measure the utilization of it, the resources that you use for that?

Expert 4

So kind of task tracking and resource allocation. How much your company spends on one or another task like by using or reusing particular resources and utilizing that. Or the effective or not effective way.

Saskia Cornelsen

Understood. We can go to the last criteria. If you have nothing much to say for resource utilization anymore.

Expert 4

That was something difficult for me, the one where I have to describe that.

Saskia Cornelsen

No, I have to say, what you said it's really usable. So it's not that I don't understand what you mean. It's totally OK to describe it. So I already hear a lot of things that I can use. And it's also totally OK that you cannot give me that much detail.

Then let's see what you have to say for digital and AI readiness. How can you measure that main criteria in sub criteria, as process in general terms?

Expert 4

Impact assessment because you need to like measure it somehow, how it will impact your processes. Usually we do that with piles or something, and in general how much resources you need to put into the product or the module that fits your needs.

So sometimes it's like out-of-the-box tool or something that you can just start easily using replacing one of your own procedures, but sometimes you need to tweak and modify or ask to do some changes to feed your needs.

Saskia Cornelsen

OK. Do you want to add something? If not, I would go to the last questions.

Expert 4

I think we can. We have all of those.

Saskia Cornelsen

So what measurable indicators would you use to track dimension sub criteria, the one that you have still in mind by looking at those or just generally what indicators would you use to track it?

Expert 4

Yeah, one things are some things can be monitored through reporting, of course, because there are PPIs and everything for ongoing processes, but some things, at least in our company, are not all done yet like AI integration, so it's just the initial phase for evaluation of impact. Then of course, when it's going to be done, then we should probably also do a kind of reporting of how much work hours it removes from our team and handles by itself.

Saskia Cornelsen

Last question actually already. In your opinion, what is the single most important change organizations in your sector you work in need to make to their process measurement practices?

Expert 4

Well, definitely I think that AI is the future everywhere. So the sooner you integrate that in your process chain, the better because that must give you benefits compared to your competitors.

Saskia Cornelsen

In what way would you use AI?

Expert 4

So from user panellist, client support to internal processes for either reporting or data analysis. Probably even for service scripting, like there are a lot of areas where that can be used and I understand that some other companies are already using that, but sometimes, yeah, either you stick to the more traditional ways of doing things than just monitoring the market, seeing how others are doing, but then reacting on what's happening and if everything goes well for others, you need to also do these kind of things.

Saskia Cornelsen

And for AI, would you have it to support or to take over processes even?

Expert 4

Still more supportive.

Saskia Cornelsen

Where would you set the limit?

Expert 4

It depends of course on the area. Like I'm still not sure if current AI models are capable of fully replacing the human because sometimes you need some context and everything that AI doesn't have yet, unless you feed it a lot of information. So it's more like help from outside to especially do more manual tasks by it. But then like all the decisions should come from humans. But probably more or less depends on the procedure process that you're trying to integrate the AI into.

Saskia Cornelsen

OK. Then that was my last question. Thank you very much.

## **Interview Expert 4 Transcript**

Saskia Cornelsen

The interview will last about 30 to 40 minutes. First, a discussion about your experience. Second, a little exercise for weighting performance criteria which I have extracted from my literature analysis. That's why I will also share the screen later. I'll show you later when we're there. Let's start with your background. What is your role or your professional description?

Expert 2

My professional designation lays in data science as the head of data science in this company. Basically, that means that I lead a team of analysts. And I'm responsible to the managing director, the CEO and the executive director for all processes in data science.

Saskia Cornelsen

What exactly are your tasks in your current role?

Expert 2

My tasks are setup and monitoring of work processes in the team. That means monitoring of employees in terms of their motivation, in terms of their goals, in terms of their further

development. Strategy in terms of data. So, data strategy is part of the AI strategy. And where it is necessary, the creation of the documentation. But also hands-on tasks.

Saskia Cornelsen

How many years of experience do you have in your current role, but also in the industry in which you work?

Expert 2

So, in my current role as head of data science in this specific company, which really stands directly after the managing director, I've only had experience for a month. But as a leader of data science and data teams, I have about five years of experience.

Saskia Cornelsen

Okay, then I would go into the qualitative discussion and ask you questions.

In the current state of the process measurement in your company, how does your company or your department currently measure the performance of business processes? What are primary KPIs?

Expert 2

That's a very complicated question. Especially with regard to tasks in the field of analytics and software development, because it is very difficult to measure these areas objectively via KPIs. So, we can implicitly say that employee X is a good, efficient programmer, but employee Y is not. But it is difficult to measure this in numbers or in objectively measurable values, because one could perhaps measure this in terms of speed, how the tickets are processed by the respective employees. However, this does not say anything about the quality. The quality of the code is very subjective and difficult to measure. One could, as very approximate KPIs, measure the processing time of tickets in a certain phase, the amount of tickets processed during a sprint, the performance of the team, but also the planning quality of the team, including the team leader. These are probably the two KPIs that I could list.

But as I said, they are very inaccurate and do not reflect the overall picture.

Saskia Cornelsen

Do you see this more as a strength or a weakness? That it is more subjective to measure the processes?

Expert 2

With regard to the AI revolution, I see it more as a strength, because of course I am less replaceable by the AI. That's true. But of course it is a serious factor in terms of management and the business economy. It is a serious overhead that does not make the use of a relatively expensive manager necessary. That is of course the main problem.

Saskia Cornelsen

What do you think are the most important aspects for the successful evaluation of a process?

Expert 2

For the successful evaluation of a process in general?

Saskia Cornelsen

Yes, in general. And also if you could apply this to your department, to your work.

Expert 2

When we talk about the process theory, there are of course theoretical values such as throughput, utilization, etc. Everything that belongs to the theory. But as I said, because these values are very poorly translated into practical visual scripting, people do not understand it.

Saskia Cornelsen

But how could you measure that?

Expert 2

You could not measure that. That is exactly the problem. It is all very qualitative.

Not quantitative. In the end, I blame my department or the managing director for achieving the goals of the company in an acceptable way, preferably within a reasonable time. But these are not really quantitative values that are measured. These are milestones. They are either achieved or they are not achieved. You cannot say, okay, we have achieved the milestone of 75% or we aim to achieve the milestone of 80% in the next quarter. That is not the level at which these conversations are conducted.

Saskia Cornelsen

I understand. To what extent does a company use data analysis, machine learning or AI for observation and improvement of processes?

Expert 2

For observation and improvement of processes. We use data analysis to track financial KPIs. That is probably the most important thing. We do not use AI at all.

Saskia Cornelsen

Okay. What do you think is the greatest potential of AI in the measurement of processes? Where do you think it could be implemented?

Expert 2

I believe that the greatest potential is that AI could enable processes to be quantified. As I just said, the whole application of processes in the field of software development and data science is very difficult. Because of this, a quantification is very contradictory. It is very subjective, ephemeral, qualitative, etc. Theoretically, AI could contribute to the fact that these processes are really evaluated in certain KPIs.

Saskia Cornelsen

Let's say we would implement such a process measurement system, effectively data-driven. What do you think would be the biggest obstacles for such an implementation?

Expert 2

If there is such a system?

Saskia Cornelsen

Yes.

Expert 2

I cannot say that. It depends on the properties of the system. I know people where I see the differences in the development of such a system. Shall I?

Saskia Cornelsen

Yes please.

Expert 2

The problem is that the current tools that are used in AI are not very good for the mapping of processes. In the context of AI, machine learning was understood until about 2022. Especially deep learning, i.e. fully connected neural networks. Then from 2022 onwards, the so-called LLMs, large-scale neural network models, are used in AI. Both are not designed to evaluate processes due to their structure. Classical machine learning anyway not because classical machine learning works best with data that can be read. Or at least with picture or text data. But less with data that is composed of processes and structures. Large language models are designed for unstructured data. Especially for human languages. Of course, there is a certain attempt, due to the very good performance of large language models, in the context of the task of text summarization, the answer to our questions, to apply these large-scale neural network models to the analysis of processes. However, this is a dead end. It is a certain deception of intelligence. Due to the fact that artificial intelligence can handle human text so well, we have the impression that artificial intelligence also analyses just as well. It works just as well analytically as our human brain. But it's a dead end. This is often seen in the very simple mistakes that AI makes in analytical tasks. That's why the current LLMs are not designed for this. Where I see potential, however, is the class of algorithms, the so-called GNNs, Graph Neural Networks. These are neural networks that primarily work with graphs. Since a process flow can be represented as a graph with a certain approach, I believe that such algorithms also have a future for processing in AI.

Saskia Cornelsen

Thank you for the insights. I would like to continue with the exercise. I will present the four main criteria and ask you to compare them in a few ways. I'll show you again to determine their relative importance. If you look at the goal of optimizing corporate or business processes, it is about which criterion is more important and in what extent. The four criteria are Process Effectiveness, Process Quality, Resource Utilization and Digital and AI Readiness. These weighting is on a scale from 1 to 9 due to a specific methods used. So also while you choose, which criterion is more important than the other by how much?

Expert 2

More important for what?

Saskia Cornelsen

For developing a process measurement framework.

Expert 2

Which criterion is the most important for me as a potential user of such a framework?

Saskia Cornelsen

You, as an expert, do not want to create a framework in this respect. In general, you are the expert and work with process measurement. Which criterion is more important than the other? How important are they both? Do we have one equal here? Are they all opposite to each other? Therefore a pairwise comparison. Pay attention to the fact that they also play together. Do not think here is the first row and then it is limited to the others.

Expert 2

Instead, they all play together.

Saskia Cornelsen

Yes. Let's start with the first one. Process Effectiveness vs. Process Quality.

Expert 2

I would say 5 out of 9. For me, the most important criterion would be process quality. For reasons already mentioned. Because it is so difficult to quantify. Process quality is significantly more important than process efficiency. But process efficiency is still important.

Saskia Cornelsen

Then processes effectiveness vs. Resource Utilization.

Expert 2

Effectiveness vs. Resource Utilization. I would say 3.

Saskia Cornelsen

Which criterion?

Expert 2

Process Effectiveness is more important than Utilization.

Saskia Cornelsen

Process Effectiveness again vs. digital and AI readiness?

Expert 2

I would say 9. To be honest, I do not think digital and AI readiness is a criterion in this context. Because through such a framework, digital and AI readiness is already implicated. That means, if we are able to measure processes, then it makes us much more digital and AI ready. On the other hand, I can not really start with the term AI readiness. For me it is a buzzword.

Saskia Cornelsen

I have also written down main terms. In the case of AI readiness, it is the technological and cultural readiness for the use of data processing, AI and digital tools. So also the readiness in the framework. Then also cultural readiness for example. I mean, you can not really talk about digital or AI readiness if you write everything down manually with Excel and that's it. But whether modernity has arrived. We will then subdivide that into sub criteria later. So that's what it's about. Not that the framework is now suitable for implementing these things. It's about measuring them [processes]. But is it also divisible into sub criteria? And then what would built up digital and AI readiness? It's pretty much out of the blue what that is. We'll talk later after this exercise how to measure this readiness. But that comes later.

Expert 2

Okay, good.

Saskia Cornelsen

Okay, then that was effectiveness. And then on to 9. And then process quality vs. resource utilization.

Expert 2

7 for process quality. Process quality is still the most important thing. Process quality vs. digital and AI readiness, yes. 9 for process quality. Resource utilization vs. digital and AI readiness, let's say 5. For resource utilization, yes.

Saskia Cornelsen

I'll leave it at that, because you still see the main criteria. Then we would now move on to sub criteria and evaluation-specific indicators. What are the most important sub criteria to be able to

measure these main criteria? Then I would ask you to give me 1 to 3 for each main criterion. If we now go to process quality, how would you be able to measure it with sub criteria? Because that's a pretty high main term. At what points would you measure quality?

Expert 2

Good question. Do you think that I should subdivide process quality into sub-areas? Or that I should give a definition of what process quality is?

Saskia Cornelsen

Divide it into sub-areas. Let's say an example, error rate. If you had to divide that. A low error rate is equal to high quality.

Expert 2

I would divide process quality into the quality of deliverables. The quality of what comes out at the end of the process.

Saskia Cornelsen

Okay.

Expert 2

Then generation of reusables. To what extent are observations generated in the course of the process that can then be reused? Then the system's impact. To what extent does the process have an impact on the company as a whole? Positive or negative.

Saskia Cornelsen

If we go on to process effectiveness, what would you say?

Expert 2

I would say throughput. The throughput of the process on the one hand and management overhead on the other.

Saskia Cornelsen

Do you want to go to the next one or do you have something else to say?

Expert 2

No, I have nothing else.

Saskia Cornelsen

Okay. Then resource utilization.

Expert 2

Resource utilization. Utilization rate. That's my utilization rate. Then at the beginning I say resource exchangeability. How far are the resources that are used in the process exchangeable compared to other resources? Then degree of collaboration, probably. To what extent does the process require collaboration?

Saskia Cornelsen

Together with other teams? Or simply as a whole?

Expert 2

As a whole.

Saskia Cornelsen

Okay. If nothing else is added, then we can move on to the last criterion. Digital and AI readiness. How could you measure that?

Expert 2

Digital and AI readiness, Digitalization.

Saskia Cornelsen

And what would you be able to see that?

Expert 2

Which part of the process documentation is digitally active. I don't know if paper documentation is relevant somewhere. But I would still call it that. Data availability, so to what extent are the data that arise from the process measurement available to other teams? How well is the data management integrated with respect to this data? AI readiness. Data structuring. The more structured the data, the better it is suitable for AI. And in the same way, data completeness. I won't say anything about the corporate culture in this respect. Because I honestly don't believe in corporate culture in this context. I don't believe that a company uses digital and AI tools or doesn't use them, because there is a culture for it or not. I believe that a company uses digital and AI tools, if these tools bring an added value. Of course, there is a situation where the management sees an added value in the use of these tools. But the company doesn't or vice versa. The company sees an added value, but the management doesn't. In my opinion, this is a general problem of communication within the company. Or the alliance between the team and the management.

Saskia Cornelsen

I understand. Then I have a few final questions. First of all, thank you for the insights.

Which measurable indicators would you use to get the so-called sub criteria? You don't have to say anything for everyone, just what you have in mind. How would you be able to track it?

Expert 2

Well, I would think it would be really, really cool if I, as the head of a team of technical specialists, a data scientist or developer, had an objective criterion for the quality of the work of each person. That would significantly reduce the subjectivity of my evaluation, my performance assessment, and also reduce the biases that I, like every other person, have. So, if I had a dashboard where I had all my team members and a number for each team member that could represent their performance, maybe with 2, 3, 4 sub-categories, like quality, speed, efficiency, and so on. If I would see something like that, that would be really, really cool.

Saskia Cornelsen

I understand. A mix of subjective and objective.

Expert 2

Exactly, that I would have an objective criterion that I could trust and with which I could compare my subjective evaluation.

Saskia Cornelsen

I just showed you my screen with the criteria. Then I calculate it and there is a percentage value that tells you how consistent your evaluation or weighting is. Below 10% means your input consistency is optimal. Above 10%, I would ask you to change values to something different.

Expert 2

I understand.

Saskia Cornelsen

In that case, you can say that you want to leave it that way and or change something.

Expert 2

I would say process quality vs. process effectiveness to 3. Does that make sense?

Saskia Cornelsen

Let's have a look. Okay, now everything is okay. I just wanted to clarify that. The method was recommended by my supervisor. In order to ensure consistency and that there is no feedback loop with those multiple criteria. My last question is then: In your opinion, what is the most important change that should be made in companies in your sector to improve practices for processes measurement?

Expert 2

I can't say that because there are no frameworks like that yet. At least I don't know anything about these frameworks. That will depend on the state of science and technology.

Saskia Cornelsen

But in general, the question is not about frameworks. It's just about what you think could be changed to improve or support these practices to measure processes, regardless of the framework. It doesn't have to be this company, because you haven't been here for a long time. What do you think could be improved?

Expert 2

If I compare my current company to my previous company, I would say that my former company is much more documented. It has a lot to do with conversations, brainstorming, etc. I think that would be something that could be improved in order to prepare the company for these processes. Ultimately, it's about data that are recorded somewhere and not just in the head.

Saskia Cornelsen

Okay, than you.

## **Interview Expert 5 Transcript**

Saskia Cornelsen

What is your current job title and your main responsibilities in your current role?

Expert 7

The current job title for me is the Data Governance Expert and I am part of the IT and Data Platform team in the company, while we are building the internal data architecture, Data Metro, Data Lake, so to speak, in order to put all data exchange in the company here locally in Vienna, but also with the country locations on a somewhat newer, more modern footing. Above all, flowing structures, you can imagine that in the company, the individual elements and the individual departments are very modern and sometimes really state of the art, the problem is the communication. Systems among each other is a bit old, to put it nicely, and while the technical is being created, they also want to help the people now, how they will handle data sensibly in the future and also build clear roles in the course of this data. So who owns the data, who is the data owner or who is responsible for quality. That means I'm there at the moment to look at how the systems work, what kind of data is exchanged, where is the problem, where is there

miscommunication or none at all in some cases and what has to happen to untie these knots and everything that is currently being created? For example, the accounting department needs a new billing product, it needs special data for production from the country locations for employees and the like. We set this up technically and I clarify who in the individual country locations ensures that the data is transferred correctly - Who manages the whole thing, who owns the whole thing, so that a uniform? Organization-wide, but also on individual projects, structure is slowly being established, so that everyone always knows in which role which contact person is there and how data has to be communicated.

Saskia Cornelsen

How many years of experience do you have in the current industry in which you work?

Expert 7

When it comes to data, I'd say 14 years now.

Saskia Cornelsen

OK. How big is your company and what is the core area of the company?

Expert 7

Oh God, how big is that? The core area is media, public broadcasting, i.e. public broadcasting in Austria. In total, however, you can say a total of about 4000 employees, without externals, which is also a decent number.

Saskia Cornelsen

OK. Then thanks for the information first. I would go into the discussion and just ask you the questions. If something is unclear, I'm happy to repeat. How does your company currently measure the performance of business processes? Do you have something like primary KBIs or metrics?

Expert 7

Yes and no. A special area, without me going into too much detail, is performance for a certain department. We've recently built a few different dashboards and a few different data metrics to track performance. It's about how quickly inquiries are routed to certain channels, how many inquiries come in, how many are assigned, how many of them are processed? Especially the processing has been the problem here. And since the whole thing of this subsidiary was very confusing and there was no overview and no tracking and monitoring beforehand, we looked at what kind of data flows are there? There have already been a number of initiatives in which we have set up a dashboard to somehow compile what we have done as an information pool, so that we can now measure what is coming up, what is being processed where, what is being processed in what context? Top Level Overview to Department Overview to Individual Granular Subsystems over 120 subsystems, in which performance can then be tracked.

Saskia Cornelsen

OK, what do you think is a strength and a weakness of the current system?

Expert 7

A strength is a very quick daily overview that compares plan and actual status. What was very important with the one that was originally a weakness, although it has since been solved, was that no direct data connection could take place immediately. In the speed of the time that it was necessary and that this is working via an [Excel] Macro, Excel Sheep that is fed from one on their side, is up to us and we have basically built Power BI on top of it. That means Excel is a bit of a bottleneck for me at the moment. Ideally, afterwards with a continuous data structure, data

should be retrieved directly via a query, via SQL or in whatever form and flow directly into this dashboard. This means that it is not yet ideal because the infrastructure is not yet permeable enough at this point. What is written there and how it is presented, I am very satisfied with, those at work have also been able to work very well with it the last few months.

Saskia Cornelsen

OK. What do you think are the most important aspects for evaluating the success of a process?

Expert 7

Success rating for the process, I would also include the specific project and the process, what it is about, specifically speed, overview, measures, how quickly they can be taken and on what basis they are taken. Are better performance-enhancing measures being taken? Based on the data that is available or not? If the data floats somewhere in a beautiful system landscape in a map somewhere around it? Nobody looks at them, no matter how perfectly you put them on, it just doesn't help. In this case, at the moment they are really looking and measuring where they are performing well and where they are not. Where does intervention need to be taken? Here it actually helped, speed and the thrust and the overview of the measures that are currently being taken live. Then also, I would say, will the goal be achieved, will it be achieved quickly enough and will the development of monitors keep up to date during the day? I think I would measure the performance itself by how well and how quickly it helps to make decisions. And it helped a lot there.

Saskia Cornelsen

OK. If we now move more in the direction of AI: To what extent does a company use data analysis, machine learning or AI to observe and improve processes?

Expert 7

A lot and very little at the same time. We have our own instance of an AI, which is called Hugo, but it is only superficially there at the moment to look for forms to submit an application. It clarifies how can I apply for access to it and it explains pretty well in the meantime what you have to do, gives in the intranet and the corresponding registration areas, the linking, also directly, sometimes with pre-filling of the documents, that's very, very nice, so for Everyday News. Then we have AI tools that are there for image generation and the like. That's for presentation. For some things, some of which are then also aligned with corporate identity, and these are the internal integration and AI for me personally and for my colleagues in everyday work is a lot. Either those who are active in the script and coding area, scripts are checked or checked. Although this only happens partially, because completely new things are being built, it only helps to a limited extent. Partly, and for me especially, when it comes to summarizing notes, possibly providing things with a bit more overview and deriving a few conclusions from them, for example for governance, for various studies and also guidelines. In summary, however, I have always under the premise that I look through everything again completely, because fantasies in AI is an issue.

Saskia Cornelsen

That's right. This has also been a big topic in the news recently. Where do you see the greatest potential of AI in the measurement of processes?

Expert 7

In the measurement of processes with AI. I'm just thinking about whether I can think of a real case where AI measures something, I didn't have one. A live connection would be exciting afterwards, if we also have some kind of UI [user interface] reference and a digital database. How could I imagine that success is measured with AI? I think AI would contribute incredibly

well to success at the moment if it had direct access to data. If it could analyze social media posts, resonances, the performance of such posts. For example, if I could connect it to the system, landscape maps and overviews and have it analyzed, it would be permeable. Where are there errors? Where is the potential for a bottle neck, where does data get stuck afterwards? So it would have to be more deeply integrated, in my opinion, first into the general data infrastructure, but also into the semantic form, in order to really be able to generate performance there, if you will.

Saskia Cornelsen

Yes, I understand. What do you think are the biggest obstacles to implementing an effective data-driven system for process measurement?

Expert 7

2 Challenges: One, it has to run completely locally and internally. It must no longer have an external interface, especially in special processes, because there are some infrastructure areas that are too critical in our company. This would have to be sequenced very clearly, which means that it has to run locally, it has to be learned, trained and developed locally. This involves a huge amount of effort and an insanely long learning process, which can probably be accelerated as time progresses and AI models improve. Nevertheless, as with Hugo, we have to develop in-house and that costs time and resources on a very large scale.

Saskia Cornelsen

What factors would be most important for a successful implementation of an effective data-driven process measurement system? Whether with or not with AI. Not necessarily necessary to include AI, but just what factors would be most important for you to implement it?

Expert 7

Reliability, timeliness, speed and scalability.

Saskia Cornelsen

OK, that was in a nutshell.

Expert 7

Yes, that's the most critical thing, when we're talking about a data infrastructure, it's critical, absolutely critical, if the points can't really be fulfilled reliably, unfortunately it doesn't help much.

Saskia Cornelsen

Then we are now at the second part, the exercise. Then I will now introduce you to 4 main criteria and ask you to compare them in pairs to determine their relative importance. Because if you look at the goal of optimizing business processes, it is about which criterion is more important and to what extent more important, we will work with a 1 to 9 scale. I'll share my screen. OK, can you see it?

Expert 7

Yes, I can.

Saskia Cornelsen

OK, it's all done using the AHP method. That's when you have several criteria or even several, let's say opinions, that you can then weigh them. But then always with the aspect that it is about Developing a Process Measurement Framework, not for processes in general. But if you now do process measurement, which criterion would be more important for you, then you select that and

you can also say value 1, it is equally important or you say effectiveness and then much more. But to emphasize again, it is not possible to look at this individually but everything together uniformly, so that there is no inconsistency in the argumentation, something like a feedback loop. If we were to start now: Processes effectiveness vs. Process quality, what would you choose or equate it?

Expert 7

Very briefly, 2 questions. Process effective is how effective the process is, so Process Quality means the quality that the process, i.e. the result of the process, what quality it has? And how much more multiplicative or is that additive?

Saskia Cornelsen

Yes, exactly. What do you mean by the second?

Expert 7

That means that if I say 3 now, it's 3 times as important, if I say 9 times as important, if I say 9 times as important?

Saskia Cornelsen

No, not three times, but simply by 3 Points. It is not multiplied.

Expert 7

I see. OK. 9 would then be the maximum higher importance on one side over the other? OK. And 1 is the same, I understand. For the first pairing Process Effect vs. Process Quality, I would definitely take Process Quality and use it with a 4.

Saskia Cornelsen

OK. Then Process Effectiveness vs. Resource Utilization?

Expert 7

I would go to utilization, but only set it to 2.

Saskia Cornelsen

OK. Then Process Effectiveness vs. Digital and AI Readiness? I have to include this factor with Option AI as a modern measurement framework. That's why I pulled the criteria out of the literature analysis.

Expert 7

Exciting, Digital and AI Readiness. I think I'd actually set Digital and AI Readiness to 3, here at this point.

Saskia Cornelsen

OK. Quality vs. Resource Utilization?

Expert 7

Process Quality in any case, I would put it on 4.

Saskia Cornelsen

OK. Then Quality vs. Digital and AI Readiness?

Expert 7

Quality of 3.

Saskia Cornelsen

And then finally Resource Utilization vs. Digital and AI Readiness?

Expert 7 I'm

Thinking about it right now, let me think for a moment. My colleagues would punish me if I didn't emphasize resource utilization strongly enough. But digital and AI readiness is actually something that we also have to think about, especially when it comes to semantics. I want to leave it on Equal actually.

Saskia Cornelsen

OK. Click Equal, OK. Then, that's all, you could also do that with Excel. But I have this wonderful website, so when you press Calculate something changes. Wonderful. The point here is that it is mathematically calculated how consistent your argumentation is in your weighting distribution in order to then have no feedback loop. And if it's below 10%, everything is consistent. I'll leave that open and get my questionnaire back to my side. So that you also have an overview of the main criteria, because I would now ask you to name sub-criteria as a continuation. One to 3 pieces that could give me an exclusion on how to measure this main criterion. For example, process quality is quite a generic term that you can't do much with. What would you take as a sub-criterion to measure quality?

Expert 7

It is about quality in the context of a process of data processing in general or on what dimension? I try to differentiate.

Saskia Cornelsen

I have a table here for such a case. Process quality is then the consistency, reliability and standard of the results of a process.

Expert 7

Yes, OK. Do you remember the responsibility I mentioned so quickly earlier? It all comes back here. It is precisely quality. As such, of course, we don't include it now, but it's exactly that, the correctness, the scalability and I would almost compare it with the scientific method. The repeatability, the data must not lead to different results when used repeatedly. Should this be used in an advanced process. These would be, according to the 3 criteria.

Saskia Cornelsen

OK. Then we can actually move on to effectiveness immediately. What would you say?

Expert 7

On effectiveness. Definitely speed, i.e. at what speed can the processes take place. I don't know how to describe it better. The end-to-end process takes place that they still have to be made between steps and adjustments at different points. The process should be set up so cleanly. Example, this is a common problem that I have heard in the meantime, which many companies have: You have SAP as management software and that is very rigid and strict with what you can do. You can work with it, but it's time-consuming. People need time to implement things. And if you have to do a quick calculation, and you have to do it maybe once a year, there may not be a sample solution for it and you have to do exports. Further exports between billing and even more additional processing of the data, that is not effective. For me, end to end means the process not only in speed, but it must also be complete. This means that the process can be carried out completely from A to Z without the need for further intermediate steps.

Saskia Cornelsen  
I see.

Expert 7  
Otherwise, let me think for a moment, as a third one. I now had the speed, and once the completeness.

Saskia Cornelsen  
You can also stick to 2 sub-criteria.

Expert 7  
Let's stay with the two, I think the 2 is just right.

Saskia Cornelsen  
OK. Then Resources, Resource Utilization. How could you measure that?

Expert 7  
I give two kinds of resources, so to be honest, 3 that come to mind. One is the budget costs. What are the costs of the lawsuit? Of course, the less, the more popular you make yourself with it. The next manpower. How much time and manpower is tied up in the process or how much can be saved? Let's compare how we did it before, compare after and before. Now we need 2 fewer people who do something else full-time. Energy that we can then direct to other processes, i.e. both costs and manpower, I would say, and that would be ad hoc in any case, what I would say about it.

Saskia Cornelsen  
OK. Then the last one, Digital and AI Readiness, how could that be measured?

Expert 7  
Digital and AI Readiness would mean: how much is semantically prepared and usable? I now imagine a metric in my head. I have a data catalog, I have a metadata management system, how well can I integrate it? If I have a semantic connection, I have clear structures in this data set and have I also paid attention to comparability and networking in the semantics, so that an AI can also work with it sensibly and content-wise, optionally even on several levels. You have a high-level ID networking, then a semantic top-level networking with key KPIs and you have a description of the content of the individual building blocks of a data package, for example.

Saskia Cornelsen  
OK. We noticed that there were a few repetitions, of the one at the beginning of the introduction, which is perfectly OK. Now that you have the sub-criteria in mind again: What measurable indicators would you use to track the mentioned sub-criteria?

Expert 7  
For all 4 once do you mean?

Saskia Cornelsen  
No, for the sub-criterion, there were a few more.

Expert 7  
OK. In general, I would like to ask the question again, so that I don't digress.

Saskia Cornelsen

What measurable indicators would you use to track the sub-criteria mentioned?

Expert 7

OK. To measure quality, I would say how accurate is the data that is used or output. Then how deep can I go into the data and then evaluate it. That is, I want exactly that, I want to have a top level metric, correctness. When I see there are problems, quick, easy access. Where is a problem? How to fix it? This also means a kind of failure detection. If you want it that way. How do problems arise? How else would I want to know? Of course, it would be ideal if I could build a, if I could build a dream world, then I would like to have a dynamic dashboard where I could build a quick overview with key levels for which area of the company carpentry, studio production, cost allocation, I could build a quick overview with key levels. That is, my wish would be a dashboard where I could define via AI. Via the segment and for the grading, the overview of the data names, have all data packets been received in full? It's comparable and what happened in the previous month, are there any gaps in the data and completeness? That would be a kind of wishful thinking.

Saskia Cornelsen

OK. Unfortunately, I can't offer that here, but listening to the thoughts is very interesting Then as a final question: What do you think is the most important change that companies in your sector are making to practices for measuring processes?

Expert 7

Most important measures for measuring processes: Permeable overviews and comparability and I would not limit this to just one location, but nationally, but even internationally. There are various ways to exchange modernization efforts and improvements with each other. Better networking and better communication, but also the learned to derive the respective cases and the specific case learnings and then be able to implement them for your own company.

Saskia Cornelsen

OK, then I don't have any more questions.

## **Interview Expert 6 Transcript**

Saskia Cornelsen

Can you tell me your job title and what primary responsibilities you have?

Expert 3

So, my job title is data scientist officially, but work we do I think with more fit the definition of data analyst. I do basically fetching, transforming and visualizing data of service, plus related data like additional data that you give the customer or to use for ourselves to match the survey data to we create also automations, data pipelines and processes to streamline the data in a more efficient and faster way and support that system more or less so I would say so.

Saskia Cornelsen

How much years of experience do you have in the current role and also in the sector you work in?

Expert 3

Five years in my current role, plus in data analytics and the research field working for like 8.

Saskia Cornelsen

Okay, I will ask you now about the current state of process measurement, what you experienced, also in your company: This can be really theoretical later, if you have nothing to say you can also give me your honest opinion or move on and maybe I will sometimes ask you to clarify answers. First how you're your organization currently measure processes?

Expert 3

The data that is collected are the things I mentioned. But managers initiative like chief of operations team, so she had some initiatives on fetching some data on how many projects are being delivered and the state of delivery, also there are some initiatives of inputting your time how of much you worked on what projects. So it's not a company wide strategy, you show some initiative and some people find it more important, so they push it to people that are willing. So those people they do it but in terms of company wide like rules, we are not enforced, and not to mention like there's no strategy on how to use that data what we are like what are hypothesis about our processes we want to check with this data and so on. So I would say it's like in a very raw beginning stage right now.

Saskia Cornelsen

From your perspective, what do you think are the most critical aspects for evaluating the success of a process?

Expert 3

Defining it, defining the process, the inputs and outputs of it that are expected and defining so that it's the most important thing. Like what do you do or have to do and what you don't do.

Saskia Cornelsen

Okay. What about AI? To what extent does your company use AI also advanced analytics to understand or improve business process?

Expert 3

Can I go back to question one? So talking about processes we do have actually parts of the company that do work on more processes, IT and data science did implement sprints and uses Jira, so basically the agile approach of working process bound, so it does define it and it does gather some data in it, it has own its own analysis. Seeing how many tickets are created, how long they were done, more or less and I don't know how much IT spends like actually analyzing those but you do have like types of tasks and how many and so on. In terms of that there are processes because it's been described and you have to create a task before creating a ticket, who creates a ticket more or less. It's the project manager kind of things, then they assign the ticket to somebody. Yes. So in the departments internally it's a bit defined and then kind of gets blurry between the departments.

Saskia Cornelsen

Okay. Understand. Then to what extent does your company use AI or advance analytics?

Expert 3

It depends on what you mean by AI, of course if you mean generative AI like CHP and stuff, so people use it as a tool to get quick tips how to do their work better.

So that's going on, we use it in our platform, like algorithms determine coding of open answers and categorizing those depending on logic. But general not a lot intelligence and for our processes we are so far from like implementing artificial intelligence because we don't really yet even implement advanced analytics. So I think advanced analytics would be first step because what's the difference between those?

Saskia Cornelsen

So, AI is more for machine learning, but analytics includes process mining, forecasting whichever ways you see it.

Expert 3

If we talk about like process wise there is no ne advanced analytics like AI so far here but I think you cannot do one without first doing the other. You start with some analytics then advanced analytics then you can already do machine learning.

Saskia Cornelsen

As expert so many years in the field, what do you see as greatest potential for AI in improving process measurements and management?

Expert 3

I think it's not a very good application of like actually of machine learning because you know processes is a thing that really has to be defined. Well, yeah, let's say like in a company like ours processes is really depends on very human things like you have to get down to how people act and really encourage certain kinds of behavior patterns and make sure everybody is following them and if you derive from that, if you try to apply some technological solutions to these human problems, it tends to just complicate stuff and we actually get further away from the problems. It's like if you want statistics to analyze truth you have to kind have a layer between it, like practical reality will affect. So basically if you like want to do time tracking but if you will try to just learn about people's behaviors and study them it's one thing but if you try to make like okay we have this data and let's like make some quick business decisions on it, okay so if you don't enter enough like connected reality with statistics then reality will make quick work with statistics and people will start entering time when it's actually not working and so on. And then it will have this loop between them and you won't be able to make real insights into how people work and how much time they spend because you connected data too much. So in terms of adding model for machine learning on processes it's really hard probably to do it on that level but you know if you start automating processes, really automating them like with excluding humans from them, then that's a whole different think. Machine learning can really help out when you have a huge infrastructure and already have a lot of things going on and it's too process for human to go and check like kind of people kind of videos and then he would go and code it and so on because it's just too big you know you want algorithms to do this kind of things already and also adjust on the fly depending on people's behavior. So at some point it becomes very valuable tool but I think it's just for like huge enterprises. For companies like smaller and more dynamic processes it's like you really have to cover the basics first until you move to the next advanced step.

Saskia Cornelsen

Let's do the rating of the four main criteria now, in respect to developing a process measurement framework, so keep that in mind. It's all really theoretical. It's also like just you a data scientist, data analyst in your experience also working with processes. Which criterion is more important and how much more on a 1 to 9 scale.

So you choose one of the criteria compared to each other and state which one is more important. Keep in mind, the rows are all still being connected, being together in one framework. So, I would start with process effectiveness vs. process quality, which one would be more important in respect of process measurement?

Expert 3

Can I have your definitions first?

Saskia Cornelsen

Of course. So effectiveness is 'the ability of a process to successfully achieve its intended outcome and strategic goals'. For process quality it's 'The consistency, reliability, and standard of process's outputs'. Resource utilization here is the 'efficiency and effectiveness with which an organization uses its resources (e.g., human, technological, financial) in its processes'. And lastly, digital and AI readiness as 'the technological and cultural foundation for leveraging data, AI, and digital tools. This can be measured by indicators like data availability & data quality, AI integration level and technical maturity'.

Expert 3

All right. So I would emphasize process quality opposed effectiveness by like five.

Saskia Cornelsen

Yes, to be more important by 5. Then effectiveness vs. resource utilization.

Expert 3

I think about it.

Saskia Cornelsen

Take your time.

Expert 3

I would still take probably utilization by like three.

Saskia Cornelsen

Okay. And lastly, effectiveness and digital and AI readiness.

Expert 3

Also digital in my hand the effectiveness of a process is kind of like process analytics are more like those other aspects, like the most effective process seems to be no processes, like in a narrow term. So my emphasis is a bit more on that in my opinion, because of that.

Saskia Cornelsen

But after that we will go deeper into that, I will ask you to give me sub-criteria that could measure quality.

Expert 3

Yes. So, okay. So, let's keep process quality. Okay. So, digital readiness also give it a three.

Saskia Cornelsen

Okay. Then three.

Expert 3

Then this is equal, process quality and resources. I think this is equal, number five. Yes.

Saskia Cornelsen

Okay.

Expert 3

This is hard to compare but then let's say I would lean towards quality by like three. Yes, so let's make it three. Also for resources.

Saskia Cornelsen

Okay. No, that's all okay. So, it's your expert judgment and the rating in percentage is just a mathematical way to have the consistency in your argumentation statistically solid in a way, to have it more logical linear. So when under 10% then it's all good right now. Then I will stop sharing my screen now. continuing the main criteria in discussing specific indicators split into sub-criteria - What is the most important sub-criteria to be able to measure, scale main criteria?

Expert 3

So quality probably is like depends on the complaints customers like if you are working like in production or something it would be like how many like output is like bad quality unacceptable

Saskia Cornelsen

Keep in mind, it's not about production, it's only your sector.

Expert 3

All right. So for us very simple like the numbers that we provide for our customers have to be more or less right. So we are particularly sensitive for it because you know in research that's what people are basically buying from us is like precision in our calculations and like they are interested in us with making the creating like the calculations and checking the numbers and yeah, so me of times when the customer returns back and says that something was not correct. Volume like how many orders you get and how fast it's done worked on.

Saskia Cornelsen

Okay. Process effectiveness, do you have sub-criteria in mind?

Expert 3

The delivery time and how to deliver, that's it basically.

Saskia Cornelsen

I know that some clients are having a deadline but if not are you setting yourself deadlines and compare the effectiveness on that like how fast before the deadline you finishing processes?

Expert 3

For more repetitive task that could be the strategy but in our line of work because this type is also you know connecting I just try to you know skip with management and trying to enforce people managing themselves and that doesn't work you set deadline and then follow it okay I will set the deadline accordingly you know research.

Saskia Cornelsen

Checking for resource utilization. How would you measure, with which sub-criteria?

Expert 3

Utilization would be costs it could be like time as well as more variable.

Saskia Cornelsen

So the main one would be cost as the most important one from those?

Expert 3

As I understand it, yes.

Saskia Cornelsen

Okay. Then digital and AI readiness, with what sub-criteria could you measure that scale?

Expert 3

I think harder to measure just like it's kind of at this point following a template and the closer you are to it the more ready you are but kind hard to measure I think because and I think it just really on some level is built on other aspects of it. So especially on quality I think you need to have high quality outputs. Basically they should be very consistent then you can digitalize them. If they're not you cannot digital them and AI is the same. Basically that's at least how I see it like how to measure

Saskia Cornelsen

For such data-driven companies, digitally, how can you see that for each criteria?

Expert 3

Like if digital is it digital readiness you know AI readiness yes because if you're already digitals that means kind of you can't measure readiness because you're just scrambling and trying to do it anyway I guess there is like I said specific method to it and but I would measure it by just consistent inputs and outputs and the processes should be okay, you can measure it by the let say amount of human touch points that you are necessary and just variability of outputs should be lower and should be in consistent format. So kind you measure compared to others a bit more sophisticated way of measuring the KPI are kind of more broader and like more like soft.

Saskia Cornelsen

What is the most important change data driven organizations need to make to improve how measure and manage business processes in your opinion?

Expert 3

So first of all they need to make conscious decision to be a data driven organization know just because company works with a lot of data doesn't mean it's driven by data our company is driven by other mostly sometimes driven by data but mostly driven by the sales team and like and that's it. So I think the most important change is to make the conscious decision from now on we are a data driven company so we and set up a process for that as well process being we make like the word hypothesis data and then get insights and repeat and of course test out like accordingly like if the hypothesis and the inside actually proved useful and have results and then repeat refined.

## **Interview Expert 7 Transcript**

Saskia Cornelsen

What is your role and your responsibilities?

Expert 6

So I'm a Senior Vice President of Data Solutions at company 1 and what that encompasses is obviously working very closely with our measurement product audience in which we measure ad campaigns and then send surveys for ad effectiveness and or brand lift, following ad exposure with a control group. I also look at connecting data sets that we have in our data cloud. So library and other data sets to prove things like ROI with the sales data. So it gives the client a better view of kind of the whole conversion funnel. At company 2 and company 3 I am focused on AI and innovation. So there I focus on agent building for certain processes to streamline efficiencies and also oversee kind of new data vendors and AI vendors that could come into our ecosystem and focus a lot on AI optics which is really generative search optimization and looking at how brands are showing up in the LLM answers in the sense of visibility. So, how often are they showing up? Sentiments, so if they show up, are they showing up in a positive

light? And AI safety, so if they show up in the answer, is every part of what the LMS are saying actually accurate to their product? And so on.

Saskia Cornelsen

Interesting, you are quite occupied in life. How many years of experience in the sector you have then?

Expert 6

Yes. So I started I guess 20 years ago looking at consulting for a group called the Kreller Group. So we looked at how companies were utilizing reports, so those B2B reports and seeing if we could find efficiencies and savings on the products they were actually buying.

Saskia Cornelsen

Okay. How big are the company you work for by employees?

Expert 6

Company 3 has I think 75,000 employees globally, so pretty big. Company 2 has about 900 employees. And company 1 like 80, so much smaller.

Saskia Cornelsen

Okay. Then I would into the current state of process measurement ask you questions anything unclear I would repeat myself deeper in. So how does your organization currently collect process and analyze data related to business process?

Expert 6

Okay. So with company 1, we specifically or I specifically with my clients look to collect to see if there any is any brand awareness lift. So meaning after an ad has been served and we know that people have been exposed to that ad if people recognize the brand. So it's called aided awareness and then also if they were exposed to that brand and recognize the brand, how likely are they to purchase a product or the services related to that brand?

At company 2, primarily from a business kind of measurement perspective, I do the analysis on four brands on how they're showing up related to visibility, sentiment, and AI safety for those audits, then we come up with solutions to increase visibility, favorability or sentiment based on the sources that the LLMs are pulling data from for the answers. So by partnering with certain influencers or certain media outlets um we can increase visibility and sentiment because we can see that the LLMs are actually learning from the data from them. And then also um that also ties into some more technical stuff as well in formatting um information on the client's website. So LLMs like an example of that it would be if there's text within an image the LLMs have a harder time reading that. So making suggestions like that um having FAQs, metatags, schemas, that kind of thing.

Saskia Cornelsen

Okay. And in your opinion, what are the biggest strengths and weaknesses of your current process measurement in those companies? You can also just choose one too much.

Expert 6

I would say I'll stick with company 1. I would say that current strength is that we are very agile because it is a smaller organization compared to the others where we can really reach out directly and there's not a lot of paperwork or silos with the organization to make changes. And I would say also that sometimes because of people's bandwidth because it is a smaller company sometimes those changes really have to be scheduled in sprints because there so very

few people to do the work.

Saskia Cornelsen

And for you, what are the most critical aspects for evaluating the success of process?

Expert 6

So for me it's being able to track the process. So being able to see those changes in kind of within either a platform like a Jira and then also testing the output to make sure that the data aligns in a correct manner.

Saskia Cornelsen

OK. To what extent are your companies using AI and advanced analytics to understand and improve business processes?

Expert 6

So, how do we use AI to improve business processes? First I would say we use AI for processes sometimes when looking at creating graphs for market research, which can be tedious, we can build agents to do that for us more efficiently for research. So if you're just searching things, usually they would leverage like an intern for that which we can leverage AI to do that more efficiently.

Saskia Cornelsen

What do you see as the greatest potential for AI automations in improving process measurement management?

Expert 6

So obviously when you're leveraging AI if you have a good data set in the knowledge base and you have very clear instructions or configurations to build the agent then I think especially for sort of more mundane task it can really accelerate to insights much faster. Of course you always need that human oversight. AI does make mistakes especially in dealing with numbers. So, there's definitely many things that AI can speed up as far as efficiencies, but then also making sure that you have that human component along with it.

Saskia Cornelsen

So for you understanding what are the biggest technical and organizational barriers to implement fully data driven process measurement system?

Expert 6

Usually, especially in Europe, it is GDPR and compliance. We have to make sure that the data that we're using has all been consent data. We can't use respondent data or measure across people that have not consented for us to activate against that activity. So it's a good hindrance in the fact that you know we are very cognisant of protecting people's data and from an AI kind of compliance perspective it's making sure again you have clients consent to leverage their data in an AI environment and if you do so you should make sure it's a closed environment that AI and the LLMs can't learn from that data.

Saskia Cornelsen

Okay. I will present criteria to compare them to determine their relative importance considering the goal of optimizing organizational performance - which criteria is more important and by how much? With a scale from 1 to 9 because a specific method, AHP, is used. So, criteria are process effectiveness, process quality research, utilization and digital and AI readiness. So we would have a scale for it and always on respect to developing a process measurement framework for

organizational processes, not only about the outcomes directly like what we get out of this also things like step one to 100 for implementing a tool or fulfilling a client need. So more like a view on processes you would weight the criteria but just keep in mind, it would all be unified together in a framework. The first is then process effectiveness vs. process quality.

Expert 6

So I would say process effectiveness or process quality. So does it mean like the output is quality or just the quality of the process?

Saskia Cornelsen

I have terms clarified. Effectiveness term is The ability of a process to successfully achieve its intended outcome and strategic goals. For process quality: The consistency, reliability, and standard of a process's output.

Expert 6

So process effectiveness I would say is more important because it directly relates back to process quality. If it's very effective, the quality part should be incumbent to that.

Saskia Cornelsen

Okay. By how much?

Expert 6

Let's see. I would say 3, I think if a process is effective then the quality will be good.

Saskia Cornelsen

Okay. So process effectiveness vs. resource utilization?

Expert 6

Utilization should be equally is kind of good. So I think that is kind of equal, so 1. Like if it's an effective process then by default the resource utilization should be low.

Saskia Cornelsen

Okay. Then resource utilization vs. digital and AI readiness? While digital and AI readiness is: The given and needed technological and cultural foundation for leveraging data, AI, and digital tools.

Expert 6

So I think digital and AI readiness will directly have a positive impact on process effectiveness. So I would say that one is more important to the process effectiveness and I would say four.

Saskia Cornelsen

Okay. Process quality vs. resource utilization?

Expert 6

So I would say process quality is more important than the resource utilization because quality of the output and like the whole process. So I would say that one is 3.

Saskia Cornelsen

Okay, then process quality vs. digital and AI readiness process quality and also resource utilization vs. digital and AI readiness?

Expert 6

I would say that digital and AI readiness is more important because it's going to directly affect the process utilization, so 3. And you can say that for row 5 as well, so quality and AI readiness.

Saskia Cornelsen

Okay. We can also click on calculate now. So, that is based on mathematical calculations, the consistency rate [CR], that checked how consistent is the judgement given by the expert in this case you and suggest you to adjust your weighting, not because answers are not valuable, but to get it more consistent and not into a loop.

Expert 6

I mean, if you want to put the process quality and digital AI readiness as 1, that's fine. And then the first one as 1, that's fine. Because those weren't so off anyways. So, the first row you can equal that one too.

Saskia Cornelsen

The first one. Okay.

Expert 6

Yes.

Saskia Cornelsen

Now it says okay.

Expert 6

That's great.

Saskia Cornelsen

Yes. So what would be the most important sub criteria to be able to measure or scale the main criteria? So would we go to process quality first, it's like hard, what would be more of a foundation of quality process?

Expert 6

So I would say specifically for the work that we do in measurement that the outputs are consistent and that our data matches demographically across the exposed and control group that the formatting of the outputs of the reports is the same and that the hours that it takes operations to do these is also consistent. So for project process effectiveness is the volume of measurement.

Saskia Cornelsen

Okay. Then process effectiveness. How would you measure that in sub criteria?

Expert 6

Studies that we are able to actually conduct at the same time have the same SOPs [Standard Operating Procedures] that run across all of them, the standard operating procedures, so that we are able to leverage a smaller group of operational people to actually execute these projects.

Saskia Cornelsen

Okay. Resource utilization, how would you see that? Or scale?

Expert 6

So it goes back to the process effectiveness where we have limited resources that we use to actually run. I mean, I think we're running 40 different projects right now and have what like five people fully working on them. So I mean not counting me but like from an solely operations

perspective which says that we have streamlined the process effectiveness and process quality related to that which lends us to leveraging the resources in an effective way.

Saskia Cornelsen

Okay. For digital and AI readiness, how would you measure it? How would you see what is in the process?

Expert 6

So for digital like in this specific example we don't use AI. So for digital readiness is having the actual pixels be easily created, having them fire across different channels effectively, having that data show up correctly within our platform environment. All of those things are related directly back to our digital readiness which gives us the power to then measure and execute the surveys off the back end targeting on IDs and IP addresses, that we see of people exposed within two different platforms even outside of the platform itself.

Saskia Cornelsen

To keep the sub criteria that were mentioned in mind, what measurable indicators would you use to track those dimension, like tools to work with, or on the database. Like how to track?

Expert 6

So we actually have that data that's piped in directly, so we can see how many matched respondents that we have from the campaign, the frequency of the people that have been exposed to that campaign, how many impressions that we see from an actual ad and then we can break that down per ad channel. So if it's on a podcast and on control CTV [Connected TV] campaign on a display enriched that exposed to that study.

Saskia Cornelsen

Okay. From your view, what is the most important change your organization need to make to improve how you measure and manage business processes?

Expert 6

So obviously like for instance with measurement that we work with, we work with Ukrainian development team, we work with OPS [Operations] partly from Cancun as well as in Vilnius so it's really keeping those lines of communication open and making sure there's full visibility on any changes that are made to the product and that it's documented so we don't lose track, so documentation communication and breaking I think are the three things I would say for operational kind of and measurement efficiency.

Saskia Cornelsen

What role will modern technologies play in this change like AI agents automatic? In a process measurement process scenario.

Expert 6

What we get to is we will leverage AI in the ways of reporting. We might even be able in the future to leverage AI in the pixel creation. So that's not a manual process for the OPS team to do for gaining efficiencies there. And then also probably being able to use AI to look at benchmarking that we have for certain industries against the measurement in campaigns that we do.

## **Interview Expert 8 Transcript**

Saskia Cornelsen

Should start now. OK, then to start with the most important thing with you, I would like to hear what is your job title and your responsibilities in your current role.

Expert 8

OK, so officially my job title is Director of Software Engineering for the generic platform at my company. I guess my responsibilities lie within the intersection between engineering leadership. People management and I guess product, I don't want to say product requirements, but maybe product strategy and that's what I do on basically on a daily basis. It involves way more task. If you start, you know, understanding what each of those tracks entail, but just as an overview, that's basically what I do.

Saskia Cornelsen

OK, interesting. And how many years of experience do you have in the role and also in the sector?

Expert 8

OK. So the sector is a bit tricky because I guess some people will say that the sector will be finance for my company, but I guess I move around in the tech sector, particularly with AI. So I would say around 10 years in total.

Saskia Cornelsen

Then I would just move forward with like the current state of process measurement processes in general where you work. And then my first question would be how does your organisation on a technical side collect and process operational or process related data?

Expert 8

OK. That's a tough question because I guess it will depend on each of the business units.

Saskia Cornelsen

And just concentrate on your core business unit. Like if you are not sure what others do, then you don't have to give me the information and also if it's sensitive one, then just describe it.

Expert 8

OK. I don't think it's sensitive. I just wonder more like what exactly like what type of operational data because even within the same business unit it could quite vary. So I don't know if you have any like specific questions regarding that.

Saskia Cornelsen

It's less about like financial wise. I will concentrate on more non-financial criteria, so also more technical wise. So you can just start like what you're doing in your core area and then we see how we can move this forward.

Expert 8

Yes. OK. It's I guess a bit again a bit tricky. So we have different type of processes. So first of all the process that I move in, it's more technical wise and managing developers. So I don't know if you want to move to that area or more or less you know how, how basically. We collect everything from software development processes, if that makes sense.

Saskia Cornelsen

Yeah, but that makes that that. Sorry, that makes sense and also sounds great. I'm also more on the technical side, also data or data analysts and specialists I interviewed and also have other developers on my line. So that's quite the direction I want to go. So all good with that.

Expert 8

OK. So oh, that's a lot. So where to start? OK. So I mean we, we do have a lot of processes in line in regards to how we collect information regarding product requirements and how we translate that into how developers are structuring their work. So that will be like our. I guess operational cycle, all that we're doing collecting with different tools. I don't know if you need the tools or just how it's.

Saskia Cornelsen

No, maybe for later we will browse a bit. I will ask you, but not for now.

Expert 8

Yes. Then we also collect information about our users. That's not sensitive. It's most like the business processes of it. So how users are basically, you know, using our platform because eventually we're building a platform, right? So we're platform builders, so we have. The processes of how we build and also the processes on how people are consuming our platform. So we are collecting information on, you know, use cases. We're collecting things like maybe like business value.

If it can be measured, for example, and then of course there will be people above myself, which is that's outside of my scope, but are connecting more I guess financial data with respect to everything that I have just mentioned.

Saskia Cornelsen

OK. And from a technical also maybe architectural perspective, what are the strongest and the weakest aspect of your current process measurement setup?

Expert 8

OK. That's another good question. You've been good, really good questions that I think we have not made ourselves throughout the process. I guess, definitely governance and quality.

Saskia Cornelsen

As strongest or weakest?

Expert 8

I would say governance. Well, that's the weakest I would say. I mean for now basically we the platform is very new for example. So we do have like it's difficult to connect the technical processes with the business processes. And the value. So that's why it makes the governance a bit weak. So we have a lot of business units who need to report to their leadership and for that they need to rely on our data and sort of like it's not really connected. Our processes internally, so it's difficult for us to report to them and then eventually it's difficult for them to report to their leaders.

Saskia Cornelsen

But is it a process to improve or?

Expert 8

Yeah, definitely. It's something we have in the road map, yeah.

Saskia Cornelsen

Do you have a strong aspect? What's like better than in the past for example?

Expert 8

I mean, it's difficult to say, I give you a bit of context. So I've been in the in the team for about 6 months. The team in itself has been ongoing for like a year and a half. So there is something better because obviously, you know, we're creating these processes as we go, like as we speak. So, I'm not sure actually, but we're just still, it's like a process ongoing. So This is why it's easier for me to spot what's weak and how to improve it. But actually to think back in the day if something was broken, it has been improved already. So some of the things are well, maybe like we were not collecting all the proper information, so we have made extra integrations with other tooling who are helping us, you know, get more metrics and eventually get the governance in place for example.

Saskia Cornelsen

Yeah, I understand. OK. And then when evaluating a process from your perspective, which performance aspect matter the most in your opinion?

Expert 8

It depends on the process. So I would say that I can give you an example. So again if I go back to. To how much like the business value has been created, this process regarding acquiring the data from the business technical perspective, I will focus on things like is it possible to measure you know how much hours like people have saved in their job and things like that. So that would be like one of the examples, but I guess it depends on the process.

Saskia Cornelsen

OK. I understand. OK, then I would if your question would dive deeper into more a I topic I would say which AI automation or advanced analytic techniques does your organization currently use in the system of monitoring or process optimization? If not, then you can also say you don't use them in this context.

Expert 8

Well, the thing is that we're building platforms itself. So we have a lot of agentic workflows for this and I know a lot of business units are using our tools to improve their processes.

Saskia Cornelsen

What is I guess is something like ML model to also LLM based agents or what's it doing?

Expert 8

So we move in another realm. So we are Gen AI. So if you're familiar, there's a bit of difference between just machine learning models and Gen AI. So generative AI is basically creating content for you as one of the examples. So machine learning are more like statistical base. That's not what our core competences are, if I can say that. So you were just integrating a platform to be able to have people automated more their jobs. So yeah, so our. We are focused on that agentic AI framework more than traditional ML.

Saskia Cornelsen

To see it a bit more further, what do you see as the greatest potential for AI automations and improving process measurement and also management?

Expert 8

This rework allow people to focus in terms of management. People management is very interesting because it will help you also get your the people under you focus more on important things that they that they need to deliver.

Saskia Cornelsen

I understand. Then let's focus on a few like challenges or changes. In your opinion, what are the main barriers when implementing a fully data-driven or even a I supported process measurement system? Like I mentioned, we already have something and want to implement it like barriers. I would have an example like data, silos, silos, or maybe even skill gaps. When you look at the workforce, would you agree or would you see other barriers?

Expert 8

No, I think I would. I would agree definitely. Maybe the one I'm not sure what you mean exactly. If you can elaborate on the skill gap, is it with respect to like is this like a comparison with some of the employees?

Saskia Cornelsen

More like just like the of course you have to I'd say train your workforce to use specific systems and then then maybe there the skill gaps will then be more clear evolving. I would even say not that they were there before because you did not have such system like process measurement system before and that you that then.

The skill gap is like created and this could be one of the barriers on employees. Some employees are not be able to use such systems.

Expert 8

Yeah, that's more like a we do see that, but it's more like a cultural resistance, I would call it. A lot of people are not trusting the system specifically regarding with generative AI.

Saskia Cornelsen

That's also a good point. And for like a successful integration of a AI based analytics into like your existing systems or in general, which technical and organizational factors are most critical from your perspective?

Expert 8

OK. Could you rephrase that question a bit?

Saskia Cornelsen

I when you want to, let's say we have the system, we want to put it in the existing system. What could be a perspective that could not hinder it to be implemented, but could? Take it aback, like let's say you have a legacy system and you have to change fully to have such AI based process measurement system implemented.

Expert 8

I mean, this one is, it could go very broad. I mean, I can only think more about like technical challenges here most like, but it's very, yeah, OK. So that will be more.

Saskia Cornelsen

Yeah, that's what I mean, yeah.

Expert 8

Yeah, we'll go around technical challenges, but it will be very specific on depending on the system that you have and the system that you want to integrate. It's a bit difficult to say without knowing exactly what you have and exactly what you want to put in.

Saskia Cornelsen

Yeah, for example, what before like Gen. A I was created and you build it from scratch in a way. What were the critical perspectives that you had to?

Walk your way through I would say like the data government's perspective that you did not set up fully yet or architectural like maturity in a way. Do we have to development side build up for that?

Expert 8

I mean you're comparing whether if I build some, if something is built from scratch and then you want to integrate something that has been built by AI.

Saskia Cornelsen

Yeah, the explanation. It's kind of off to explain it to you. I totally get it.

Expert 8

Sorry, because I'm a bit lost in this one. Because it feels like the question is very broad and trying to be specific.

Saskia Cornelsen

The GenAI did you, Ddd you build it from scratch or did you put it in an existing system?

Expert 8

No. So nobody builds GenAI from scratch, so there are LLM's that are in the world. So if you have used Chat GPD or if you have used Google providers or if you have used. I think everybody uses ChatGPT probably or Microsoft Copilot. Actually Microsoft Copilot is using ChatGPT models. So the models are built by providers. So in this case for ChatGPT is open AI and then the only thing that we do is consume it. So these are APIs, right? So you just integrate an API to the system. That is technically not a problem, if it makes sense. So there's no challenge in bringing that in regardless if your system is, you know, if you have a legacy system or not. So that is why it's very particular question depends what you want to bring, but. We're not in our system because we're Gen. AI, we have not built anything from scratch. It's not like we have question learning models that we built and integrated inside the platform and then we brought the models in which maybe that's what you're saying like how can you like control maybe the governance or the data quality if you have to upgraded type of models. But that, yeah, so that's not what we have. We only have APIs consuming generative AI.

Saskia Cornelsen

And that that's a better explanation now. I totally understand that's, it will also continue to be more broad and theoretical because it's also about building a framework that it's theoretical like Balance scorecard or EFQM are also models that are really technical. They have their perspectives and then you could build a strategy on that. This is more the goal than that because now I would also share my screen with you and show you 4 main criteria and ask you to compare them in pairs to determine their relative importance calls considering the goal of optimizing organizational performance. Which criteria is the more important and by how much? And this scale would be from 1 to 9 because it's based on a specific method. Always with the aim on developing the framework the criteria are process effectiveness, process quality, research utilisation and digital and AI readiness. It's all about measuring processes. Further on we will see how to measure those factors like what makes our process quality. They will be all included, so they're all in one comprehensive system. So it's not that one row is separate to the next one. Therefore I ask you to think through it, to see the comparison, then choose one. You can also say it's equal important for you, or you choose one and then say how much more is more important in your opinion than the other one. Like this is effectiveness and you can say it's the most important one for me. I give it a nine. Or a tool or whatever.

Expert 8

OK. Do you have extra explanation of exact categories?

Saskia Cornelsen

Yes, I have. I have a table ready for those criteria. Do you need any specific or all four of them?

Expert 8

The four of them, just to know, just to compare and see.

Saskia Cornelsen

For process effectiveness, I described as the ability of a process to successfully achieve its intended outcome or strategic goal that that you set or company set. Then the quality, it's the consistency, reliability and also standard of a process output. Resource utilisation is efficiency and effectiveness with which an organisation uses resources like human resources timewise. You can also think about financial aspect, in this case also technological resources to be used within the process. And digital and AI readiness, it's the given and needed technological foundation for leveraging data analytics, AI, digital tools and further on. So it's not about improving it. It's about measuring it all for them.

So if we would start at process effectiveness, I'll say versus quality, process quality, which one would you see as more important?

Expert 8

I would definitely say process quality, by something around six.

Saskia Cornelsen

OK. Even they say like 2, 4, 6 and 8 are in between values, it's your opinion and it doesn't mean you cannot set them. It's just that you tend in between like strong independent and very strong independent. And then process effectiveness versus resource utilization, what would you choose?

Expert 8

I think resource utilization will still be stronger importance. Maybe it's a bit more closer to the process effect. I just think that process quality and resource utilization are very important to actually achieve the process effectiveness. So I would say something around 5 probably.

Saskia Cornelsen

OK. And process effectiveness versus digital and AI readiness?

Expert 8

I would say process effectiveness is more. So since you have it here, it's not inverse. So process effectiveness will be, I would say something like 3 here. More important there.

Saskia Cornelsen

OK. Then process quality versus resource utilization. What will you choose?

Expert 8

I think it's equally important.

Saskia Cornelsen

OK. Yeah, we we'll leave it like that. Then again, quality vs. digital and AI readiness.

Expert 8

Quality is more important. I would say something like 6 as well.

Saskia Cornelsen

OK, then last, research utilization and digital and AI readiness.

Expert 8

Resource utilization is still more important around 4.

Saskia Cornelsen

OK. Then if I will click on calculate, it would give me a consistency rate. If it's below 10% then it says mathematically, your arguments are consistent. It does not say anything about that your arguments or your knowledge is not valuable, it looks at the consistency about human arguments, I would say. I would just leave that open then so you can see the prioritization that you set and the main criteria. As I said, when you think about sub criteria like considering your experience of course and looking at the main criteria having like a breakdown of those main ones to see how can we evaluate them? How can we measure those parts? Could you then name sub criteria for evaluating each main criteria from your perspective? Like let's see process quality. How would you rate that like with let's say one up to three sub criteria that you have in mind. I can give you examples if you need.

Expert 8

Yeah, that will help.

Saskia Cornelsen

So for example error rate, it's like when you when you have something like this or amount of tickets or also defect density. That's of course depends on the company.

Expert 8

That's for process effectiveness?

Saskia Cornelsen

No, for process quality. I started with the first one.

Expert 8

That's not what I had in mind though.

Saskia Cornelsen

OK, no, you can give me different ones. That was just an example.

Expert 8

OK. So process quality, I will go back to with regards to the data. So data quality, governance, explainability, things like that.

Saskia Cornelsen

OK, already a lot said, so then process effectiveness. What's sub criteria would you have in mind for that?

Expert 8

So I guess the outcome value, I guess if we can measure improvement. I'm sure that to consider I guess, it's something very specific. Satisfaction scores, for example, things like that.

Saskia Cornelsen

From which perspective? Satisfaction of whom?

Expert 8

So for example, we do send a lot of surveys. They're actually like surveys to try to understand how people are taking AI or GenAI or how they are perceiving our platform. So that will be like NPS core with respect, you know how much they're actually adopting AI. So that will be part of that process effectiveness.

Saskia Cornelsen

OK, interesting. Then resource utilization, which sub criteria would you have for that in mind?

Expert 8

If I will have to, well, I guess employees, I think of human people working. I mean maybe some sort of trade off between how many humans, we actually work with respect of how many like agents we have. So now there's like this new term called like digital workers. So that's going to be one of those I think resource utilization kind of like KPIs if we want to think of. So for how many digital workers we can create for. How many people we have, let's say that's what I was thinking.

Saskia Cornelsen

I understand. If you have nothing more for utilization, then I would go to the last one to digital and eye readiness. What would you have in mind for this main criteria?

Expert 8

I guess trainings. Like adoption, AI adoption, digital transformation, things like that.

Saskia Cornelsen

OK, let me check. I have a few like finalizing questions for tele optional. I will just check for it. I could I can stop that for now. Thanks for this right now so. My last question on the questions, from your perspective or from your view, what is the most important technical or organizational shift companies must make to improve data-driven process measurement?

Expert 8

I can go very straightforward and say maybe agentic AI.

Saskia Cornelsen

That other companies should adopt that more? What do you think?

Expert 8

Yeah, they should adopt AI more, but it comes with a very big, I mean it comes with more, how do you mention like subtasks, sub processes, that they need to follow before getting there. But that's what I would say, that's my main answer.

Saskia Cornelsen

Which subtest do they have to follow before?

Expert 8

AI adoption in general. So I don't even know what is the rate right now of companies that have

actually successfully adopted AI from everything infrastructure perspective, cultural wise in the company, so things like that.

Saskia Cornelsen

So you think overall modern technologies like AI, AI agents and do things we talk about will play a more critical aspect in the future or just for niche aspect?

Expert 8

No, it will be critical, definitely. It will be part of if it's not already part of each processing companies, it will definitely be part in the near future. I cannot give you numbers right now because I haven't actually seen what's the latest on how companies are adopting and it really depends on the country and also the company sector but I think it's going to be critical and if companies will not have that in place, it will pretty much be left out.

Saskia Cornelsen

OK. So thank you for joining me in that. I really appreciate that and. It was quite a lot and I hope it's all good with that. So I will keep you updated what the status will be at the end or maybe Clemens as well. So we will see about that. So thank you again. I really appreciate it and wish you a nice day.

Expert 8

Same. Thank you. It was really nice meeting you.

## **Interview Expert 9 Transcript**

Saskia Cornelsen

What is your role description and what are your main responsibilities in your role?

Expert 9

So my title is V.P. and I manage the entire analysis area, without healthcare, you have to take that out. And that is the ranking production, i.e. in the business area the part, where the whole thing is created after it has been developed, in terms of content and then sold.

Saskia Cornelsen

How many years of experience do you have in the current industry?

Expert 9

In the current industry, many. 13, but at different levels each.

Saskia Cornelsen

OK, then I would get into the questions about process measurements in the company. How does your company currently measure the performance of business processes? What are primary KPIs or metrics if you have that?

Expert 9

Exactly, for me there is now the question of what we see as a company, if we now look purely at the analysis level or also in our business area, are there key figures like when you go to production, such as capacity utilization. Capacity itself, how much capacity do we have, what is the capacity utilization, i.e., how much work is really being done on the projects. Then what is the efficiency of the projects, different key figures at the level. For example, where you look at how much effort per lead we create, we have different lists [subject areas] and if we then have more effort, but also more leads, then you can take that as a key figure. How much effort per

lead do we have, how much effort do we have in general? How has the effort been reduced compared to the previous year? What are the differences of the different process steps that we have? Where are the biggest drivers of effort? There are various analyses that we are doing in this area. And then let me think about that. I had already thought about a few things about it earlier. Of course, sales, so that also comes with profitability. We measure costs, stakes per what we have in it. And then, of course, the revenue from it. With the whole thing, we also calculate the profit or what we have per analyst day afterwards to see how sensible it is to do this project, so that we don't do regular projects now that don't contribute to the profit or contribute to covering costs.

Saskia Cornelsen

What do you think is a strength and a weakness of your current system of process measurement?

Expert 9

One strength is that we have a lot of knowledge in there and a lot of details and have set everything up very cleanly and the people who do it, each have a lot of knowledge in there and then dive in again and can all understand it. One weakness is that there are 5 different files or evaluation types. So in other words, you have [person X], they measure of how the projects change compared to the previous year. In other words, efficiency at one point. Then there is another tool that keeps an eye on the capacities and can plan with them. Then there is another tool that distributes the capacities among the people so that they go together. Then there is a profitability calculation, where the sales and the hours and so on come back in and what is then linked to each other. And that there is very, very much to such things on Excel and various similar sources that come back in at different places, that come back in there, so to speak, so for advantage, that there is a lot. The weakness is, and here you can certainly also talk about, how business processes can be optimized and AI can also be used at some point, how to standardize it and how to set it up so that everything comes from the same side, so to speak.

Saskia Cornelsen

This all sounds very manual.

Expert 9

Yes, it is. So, we can also look at processes that are already very automated. But if we now really look at success management, so to speak, then they are different things. And from there I picked out something where I can tell you later where we can optimize things.

Saskia Cornelsen

In your opinion, what are the most important aspects for assessing the success of a process?

Expert 9

Wait, I can also open this in parallel, the aspects.

Saskia Cornelsen

OK. A few or maybe just one aspect, if you have several for measuring the success of a process, that you say that the process was now more successful, now compared to the other, or in general?

Expert 9

So for me, that's basic business management. So, I have to, for example, calculate the capacity, i.e. these efficiencies. I plan the capacity for next year and if the processes are not controlled in such a way that we regularly save efficiencies, then this must also be parallel to personnel costs

and all kinds of things. It is essential that it runs smoothly and that I have numbers on which I can build, that I can do all the strategic planning.

Saskia Cornelsen

OK. Then, if we now go to AI, to what extent does your company use AI or advanced analytics to understand or improve business processes?

Expert 9

So, there are different levels, what I just told you. There is not so much AI in it yet, because of course it is also very sensitive data and because it really has to be standardized in such a way that it can be read. With other processes, if you go to the individual steps, there is a relatively large amount in the automations for individual evaluations carried out at different levels. So the teams are different, but there is a lot in it and there is also a lot in the direction of AI, how to research, how to make comparisons and things like that. The company itself has a lot in the meantime, including for our customers themselves, because our company is actually a platform where you log in. Many people use this, but basically companies or people want a lot in the AI tools and then also want a direct connection and for this it is also created that there is a direct connection, for example, so that they can then come in directly. That's why it's implemented at different levels and you can certainly do a lot more.

Saskia Cornelsen

I would skip the fifth question, because you have already said a lot and later we would come back to it a bit. That's why I would go to the sixth. In your opinion, what are the biggest technical or organizational hurdles in such an implementation of a completely data-driven process system? Let's say we already have one and want to implement it.

Expert 9

Of course, it depends on which process you want to focus on, but the biggest hurdles are data protection, so what do you have to do for data protection. In part, the knowledge of what is sometimes purchased from outside, so to speak, which sometimes has to be worked out internally. Time is still an issue, if you have a running machine and then you want new processes, then you have to somehow free up capacity somewhere else so that you can set it up and standardize it. Because if you want to do it completely data-driven and ideally automated, then of course it has to have a very high quality standard and for that you have to set up a lot so that it can be successfully implemented afterwards. Well, that's actually what I just said. In other words, that you have a standardized, uniform data situation. But if, for example, we want to exchange data from projects with each other and all teams have different IDs. Then no AI or automation will help us, because you can't connect things with each other at all and therefore have to set up a nomenclature for uniform data, so to speak. These are the basic requirements for you to get there and have all that.

Maybe I can give an example, for question 4, even if I'm jumping now: An example of the Licensing Team [Sales] of ours, where, AI is really being used directly, is with Salesforce, where we have various options. If the sales managers have spoken to someone on the phone or whether a company has already been awarded in one of our rankings or any other information, and the AI calculates a score according to a certain logic and calculates A. how likely is it that the lead will be closed or B. which company should be approached first, because the probability that they buy is greater than others.

Saskia Cornelsen

OK, interesting. Then I would now move on to the little exercise, for which I would share my screen. Then I'll show you 4 main criteria and ask you to compare them in pairs to determine their relative importance. This is not about improving processes, it's about measuring processes.

Goal 1 is: Development of a Process Measurement Framework. And then the 4 main criteria are: Process Effectiveness and Process Quality, Resource Utilization and Digital & AI Readiness, I would just say that in English, which is in German, because just the words don't come, or digitally in. And then it's all a coherent system. So, that doesn't mean that if you evaluate effectiveness last, it will fall out. That all remains. The point is that they have different weightings. And to see it all together. If we now go to the first bar: If we now go to Process Effectiveness vs. Process Quality, which would be more important and how much on a scale of 1 to 9 during 1 means that both are equally important.

Expert 9

9 would then say that process quality is more important, right?

Saskia Cornelsen

Yes, exactly.

Expert 9

Then 5, more in the direction of project quality.

Saskia Cornelsen

And then Effectiveness vs. Resource Utilization. Everything plays into it, including what you mentioned with workforce.

Expert 9

Let's take Process Effectiveness and a 3.

Saskia Cornelsen

And then Effectiveness again, but then vs. Digital and AI Readiness.

Expert 9

Digital AI readiness is more important to me. Do a 5 too.

Saskia Cornelsen

And then Process Quality vs. Resource Utilization.

Expert 9

Process quality, also a 5.

Saskia Cornelsen

And then again Quality vs. Digital and AI Readiness.

Expert 9

Also a 5, so for process quality.

Saskia Cornelsen

And then Utilization vs. Digital and AI Readiness.

Expert 9

Digital and AI Readiness and also a 5.

Saskia Cornelsen

The consistency rate [CR] is about whether the reasoning is consistent and if it is above 10%, it

is recommended to adjust it. Here is the green, gives you recommendations on how it would be more consistency in your argumentation.

Expert 9

I had already noticed it. For me, things all belong together a bit. So, at row 3 you are welcome to click on the number 3.

Saskia Cornelsen

Okay, then we can look again, because it is not yet consistent, but we can leave it as it is or if you want to change something.

Expert 9

Wait, let me take another look. Process quality and digital readiness, you are also welcome to click on the 3, I'm in.

Saskia Cornelsen

Then it says OK now, because below 10% and then the argumentation is consistent. That's the only thing that is said. I'll leave that open again, because then you can also see your priorities and also the main criteria in general. And then I would go further in the questions, because I would now ask you to say something about sub-criteria. What are the most important sub-criteria for measuring the main criteria? So, for each main criterion you could give me one, maximum three, sub-criteria. Let's say Process Quality, how would you measure that? With what sub-criteria?

Expert 9

Regarding process quality, for me is definitely the susceptibility to errors, i.e. the error rate and what you call it, so to speak, what really comes out and how it is used and whether it is used. So you can do lawsuits and they won't be used in the end. Do you also have things that you pretend and I can answer them? No, just kidding.

Saskia Cornelsen

You can also name just one aspect. Well, now you've already said two, we can leave it by that.

Expert 9

Yes, I would have said error and then usage, so to speak.

Saskia Cornelsen

OK. Then, Process Effectiveness. How could this be measured?

Expert 9

In the end, how fast the process runs. But now the use of resources comes back into it. So that's why, you notice, not everything is overlap-free for me.

Saskia Cornelsen

But that's also OK, the whole framework, there will be overlaps, because it all works together.

Expert 9

OK, exactly. Then what is used, how the resources go into it and whether it really saves anything compared to before the process was set up.

Saskia Cornelsen

And then Resource Utilization. What would you say?

Expert 9

Yes, the use of resources. So for me, that's part of effectiveness again, so how many people do I need for it or how much or what do I need in terms of servers and stuff like that. And how sensibly is it used.

Saskia Cornelsen

Then digital and AI readiness. How could this be measured with sub-criteria?

Expert 9

For me, these are things like what I said about the ID database, for example, things that, like a uniform nomenclature. What percentage of projects or products, it doesn't matter if that's related to us, but are they designed in such a way that they can be transferred into a system? So it is read out. Or, for example, with AI Readiness, that there are also explanations for it. So if you have a database that has only one header called A7, then the system doesn't know what to do with it, there's no meta description, so I have to measure how much of it is ready and how much of it can be used.

Saskia Cornelsen

OK. Then I would stop sharing my screen, because the part is finished. But thanks for the input. Then I have final questions. What do you think are the most important changes that data-driven companies need to make to improve the measurement and management of business processes?

Expert 9

This brings us back to the point of unification. So what wasn't so important in the past, in the sense that it didn't matter in the sense that you now really only look at my company, but where you don't know there are 150 projects and we put more emphasis on teams having the freedom to develop things and think about things, that used to be more important. But of course you need something to unify things. We have a huge treasure trove of data, how can you make such a treasure trove of data available to others so that you can benefit from it. That's why, of course, for me, it's essential, it's digital and AI ready. In other words, to make it readable for everyone.

Saskia Cornelsen

What role do modern technologies play in this? Something like AI Agent now, is it so necessary to include AI?

Expert 9

Absolutely, because you can save a lot with it. So, AI can do things that other people can do, partly if you do preliminary research or something like that. So AI can do things much faster in many places than humans cannot. That doesn't mean that we don't need people, because people have to be able to verify it and increase due diligence and thus there is a meaningful output. But if it is done correctly, you can save a lot and save a lot more new work and find very good support to optimize things and optimize yourself. That's why I still see a very big role there. Or like with the Einstein Score [Salesforce], for example. So of course that's the case, you can calculate such models yourself, because if you train your system all the time and at some point it can do that. But output things automatically and now in this case you don't need a mathematician, or a data scientist who somehow derives it for you over 5 days, the system itself can do that, then there is already very, very much created.

## **Interview Expert 10 Transcript**

Saskia Cornelsen

The interview will take like 30 minutes and is split into two parts. First, I want your opinion about your knowledge, a little discussion, and then I would go with a little exercise. So, to start with you: What is your job title and your primary responsibilities?

Expert 10

I am a software solutions architect, and my responsibility is software quality delivery. I'm responsible for solutions. How we are implementing one or another decision solution for our products. So that's my primary role according to the title.

Saskia Cornelsen

How many years of experience do you have?

Expert 10

I started first job actually maybe in 2003. I was still at university. I was responsible for software license and solutions for big companies. Basically, they wanted to have some better packages in Microsoft servers and stuff like that. So, I was responsible for that but after that it was kind of like selling but not creating things. And I was still at university. So, I then switched to my first job closer to coding. That was at Vilnius Technical University. I was responsible for servers and created first the help desk system which was allowing to collect data and at the end of the year make decisions for the budget let's say that people need more training, we need new licenses, new laptops and etc. Basically, it was collecting but at the same time helping people to look after the infrastructure and make decisions and later what are the main causes and after that coding, coding, coding. Pretty much 20 years of writing code.

Saskia Cornelsen

Okay. Well, I would now dive into the main questions. The main thing is the exercise to be honest, but the questions are about your opinion for process measurement, to go better into the topic as well. So, the first question would be: How does your organization on a technical side collect and process operational or process related data for process?

Expert 10

How are we gathering data and what we're doing with it?

Saskia Cornelsen

Yes. But everything is here process measurements related to business processes which are the structured steps that an organization follows to achieve let's say a specific goal, e.g. fulfill a client's order or implementing a new tool. Everything that I'm focusing on is more non-financial. So, everything that you can imagine in process in between, every step, the data that you have for that because my goal is also to develop framework to measure processes and then I ask you how do you collect and process that.

Expert 10

Well, the way our business works is yeah, you're collecting answers. It's mostly a market researching company. First of all, obviously you collect in one place and then the success or the good or bad I mean the quality of your products depends on how you distribute that data. So we distribute into many other different databases in order to speed up things because basically with collecting data it's not just only like how you aggregate but the speed is also important. So big amounts of data obviously sooner or later it becomes a big problem because you cannot process it in a good time matter. You need to distribute how, I call it distribute, the data into smaller pieces through different databases that they have own dedicated role. So that's what we do and our final product could be created from maybe one last source of database or it could be created from two different or even more sources of data because delegated parts of the data goes into

one database and another aggregated data goes into different database and some bits and pieces we put on a separate database in case we'll need it. That's how our products mainly work, so what you see in the manager, on our platform, is basically feed through many different databases.

Saskia Cornelsen

I understand. It's quite a broad question, but then also straightforward. From a technical perspective, what do you think are the strongest and the weakest aspect of your current process measurements setup?

Expert 10

Strongest is that we keep data simple to understand. I think that helps us because with lots of chunks of data with lots of data you end up in a situation when it's difficult to understand what you have when big amounts of data is like this. I think the logic that we divide data into different databases, into different sets of collections, I think that definitely helps us but at the same time sometimes having too many smaller pieces it's harder to make sure that you have all you needs. Some products might need too many connections. So you might end up that your final product will need many sources of data. The question is always how small you need to divide aggregated data in order not to create other problems later. For example it might be a case like you have 99% of data in one place, in one database, and you can take it all but that one missing percent that is critical for you and you must have it is somewhere completely else and it becomes a little bit painful and causes time in product delivery. So it would be nice if you could always know what's going to happen after 2 or 3 years but unfortunately you cannot because that's why we're flexible so that we can give solutions to our clients. We are not faster than big corporations but at the same time there are a lot of things going on in our department and we need to keep things also generic not specific to some client needs. So that part is probably the toughest. I wouldn't call it weakest, but I mean the toughest to handle. So maybe in a way it is like most sensitive thing but the way we are distributing data across the different sources I like that concept. And after many years working in different situations you sooner or later end up with a performance problem. There are things that you can sort out with the hardware. There are things that you can sort out with software, some solutions, there is one way to sort performance problems by changing the way your data looks like. Like in databases there is a very, very popular term: normalization. Data normalization and there is denormalization. Normalization it's a negative action, you put data in you flatten data in order to get it quickly and in a structure you need.

Saskia Cornelsen

Okay. You have all the time that you want or need to think about answers. I understood your previous point, and I would go now more into AI. You already told me you don't use it at work. I just want your opinion: What do you see as the greatest potential for AI in improving process measurement and also management?

Expert 10

Some of the fancy nowadays solutions, they are great but they also come very quickly and you need to allocate a lot of time in order to apply them. And we're not that big, I guess, that we could say we're going to implement some sort of AI layer on top of what we have and it will magically solve our all problems because it's constantly changing. You would have to spend a lot of time on figuring out the rules, maybe, let's put it this way, to apply it. For us at this company size and the workload that we have, AI helps to bring some code changes faster. One thing for sure it helps to review big amounts of files to find the problem. It's more like a daily extra pair of hands that helps us at the moment which is good but for sure we need to add more of those solutions and we have some proof of concepts how the final data, aggregated data, could be prepared using AI. For example, surveys could be analyzed by AI and looking through

the structure to help to find human errors and save time and make sure that we collect as much as possible data. That solution is bit complex because you have lots of unknowns for example randomization conditions, logics underneath how you showing something because surveys for example they have to be built in a different way each time for the group that you're targeting. So, if you're targeting all the people and you're showing some brands, you need maybe specific fonts or layouts of the survey to keep the people interested not to leave the survey in the middle. Younger people need maybe more different filters how you display data in order to give them faster go through the survey because they usually in a rush. Like the way you're showing and analyzing is the first question that causes problems, is it boring or it's not boring, how you approach, how you keep? So there are like different concepts how you can do things. Then AI needs a lot of training at the same time also if you want to understand it because it's not just plain structure of some questions and that's it not just from first to 10 but it's underneath, there are more things that too difficult even to explain or to show because what are you targeting could be nicely built but could be boring for the people that you're going to be targeting and AI at that point will not help. There are many different ways like a compound of different AI solutions that can help you at the end to increase the data quality that you're collecting. We are doing those things. For example, inside a survey there is data coder, right? So, people add brands and those are checked because there are functions that do similarly check for the matching word because like Volkswagen could be typed with a wrong letter or mistyped letter, something like that. Similar text is not enough but you need to check more like phonetically, how it's being pronounced and things like that. Those things help people to prepare data. There is also another thing that AI helps us. For example, you have open ended questions like 'How you feeling today?' and you want to collect the answers and analyze that person the way he described that he's angry, he's happy or whatever. So, data analyzing, that's where AI helps us for sure, helps faster to do the job. The way I see it at the moment is more like AI could be more integrated and used for final data preparation for our clients.

Saskia Cornelsen

You said a lot that you already answered my following questions, but that's a good thing.

Expert 10

Great. But that, I'm not going to lie, it is sometimes scary for me to think that for integrating one or another AI solution that will do many things on a lower level and it will split data, but without checking because how my experience so far shows you need to look after AI, how and what it does. You cannot trust it 100%. You still need constantly double check things how they are doing it because of course you can teach it, but there are specific cases where the error might happen and there is a scary thing that you will lose control of how you deal with one or another input and by losing it later on it will become very difficult and time consuming to figure out where the problem started. So having control of things is good. It creates a lot of work for you but at least you know more what's happening.

So, for me, I don't know, maybe it sounds like elder person but for me, I am scared that you quickly might lose control, and it will become even difficult to handle the situation independently from it [AI]. I'm looking it through a magnifier what it does and why it does and what it needs and where it sends because like I said it's powerful but it's like a big truck that can go really fast from zero to 100 and you don't know how long is the breaking distance is? In the concept I could say it like this. So let me stop here because otherwise it won't be enough for you, half an hour.

Saskia Cornelsen

Okay. All good. I totally understand that and this is completely okay if you have more like a negative opinion on AI. I'm not fishing for only positive. I would go then to the I would say exercise. I will present to you four main criteria that I have extracted from my literature analysis

in respect of creating a process measurement framework with the possibility to implement it in an organization with AI or not, that we will discuss, and I will ask you to compare them in pairs to determine their relative importance. I would share my screen for that. It would just look a bit better on the way I have it. So still in respect to developing a process measurement framework. You do not have to go into like the structure of a survey or the detailed process of creating a survey for participants. It's theoretical, if you want to say it that way. So, the criteria are process effectiveness, process quality, resource utilization and lastly digital and AI readiness. If you would put it in the scale how it should look like don't be scared about that. It's just that you have to choose one of the criteria and then say how much more important is it compared to the other. Well, you also can say it's equal for example for quality and effectiveness, it should stay the same or you say quality is more and then for example by 9. If you have any questions about the terms, we can look into them.

Expert 10

Yeah, let me read it first here.

Saskia Cornelsen

You can select whatever you want. You do not have to focus on the scale description above.

Expert 10

Process effectiveness. First one maybe equal.

Saskia Cornelsen

The first one.

Expert 10

Yes.

Saskia Cornelsen

Okay, we can leave it that way.

Expert 10

Process effectiveness or process quality. Process effectiveness and resource utilization. Damn it. That's a bit difficult.

Saskia Cornelsen

Yes, they're overlapping a bit.

Expert 10

Give me a moment. I'm going through all of them. Just trying to understand.

Saskia Cornelsen

Of course. So, it's less individually per row. It's all a unified system at the end. So thinking about that, but for that we have a measurement where we control if I would say your arguments are consistent at the end. Not that I question your opinion at the end but we calculate then I will see if the rating that you gave is consistent. We can just continue with the second one then.

Expert 10

Actually, select on the first one process quality and strong importance, five. Then process effectiveness and resource utilization. I would actually say process effectiveness could be slightly more like two something and process effectiveness and digital and AI readiness, I leave it equal. Not sure about process quality and resource utilization. The row four I would say I

would leave also equal if process quality is good. And resource utilization could be also a process quality. How do you explain digital and AI readiness? How do you understand digital and AI readiness?

Saskia Cornelsen

I have my table for definitions: The given and needed technological culture foundation for leveraging data, AI and digital tools.

Expert 10

Okay. Choose for row five and row six digital and AI readiness. And put it on 2.

Saskia Cornelsen

Okay. Then if I click on calculate it, you don't have to adjust anything, but it asks to adjust to improve the consistency about your judgment. So it will not go into I would say feedback loop, that you contradict yourself in your argumentation and in this way you're weighting you do not have to use anything that it suggested in green but if you want then we can do that with one or two or we just leave it by that.

Expert 10

Yeah, the biggest difference is probably in number one, but process quality is very important in my point of view.

Saskia Cornelsen

But then you can change others.

Expert 10

If it's a good quality process, quality I mean is really high. Then process effectiveness is kind of like more or less covered I would say.

Saskia Cornelsen

What about let's say row four? Its quality and uses utilization and it suggests to go not equal but to 2 so that quality is a bit more important than resource utilization.

Expert 10

Well, in a way, yeah, I could agree if good quality then, yeah, a little bit more important, to 2.

Saskia Cornelsen

We can check again. It still has to adjust.

Expert 10

Yeah, let's leave it like this.

Saskia Cornelsen

Okay I would leave it open so you still see the criteria.

Expert 10

And priorities.

Saskia Cornelsen

Yes, here is also your priority list. If you would think how to I would say track them like let's say the first one that you choose quality with what type of sub criteria could you track this

because quality is really umbrella term. What would it be for you?

Expert 10

In my work quality comes straight to how the code is written. So for me it's very important the engineering part of the code because if it's good well engineered it gives us flexibility to make changes make sure that it works without bugs or with less as possible bugs. So for me this quality thing is always very critical because it saves time in the long run.

Saskia Cornelsen

Okay. And we look at effectiveness. How would you measure that, with what type of sub criteria?

Expert 10

I mean if effectiveness also depends in our work the way you understand the system. So you can't be effective if you don't understand how the data is used or where it comes from, you don't understand the code base. So in a way it's a bit weird. Well, I would put effectiveness lower in the rank because I think the number, the effectiveness value I mean, later on it will be self solved if the quality is good then effectiveness will automatically depend on that because quality is for sure more important for me.

Saskia Cornelsen

But in this argument, should it be lower in your priority list here? Then this should be adjusted now because you said here process effectiveness stands over a few other criteria.

Expert 10

So number one that's why I put that.

Saskia Cornelsen

What do you mean?

Expert 10

With resource utilization for example, people and their work. Can I compare like to people this whole thing? So if people are effective, I don't have to worry about you know planning, how to put them where because they are the source of some product creation process. So if quality is good effectiveness of those people is growing automatically and I don't have to worry about where they to divert now. This or that automatically things are getting solved out of the box. So, if you have bad quality, anywhere basically, then you lose effectiveness automatically because you can't be productively doing things faster and then obviously everyone gets loaded with more and more things to do and that's when you start thinking where should I put resources today where should I put resources tomorrow. In a way process quality is actually good. If I would rank here results like priority who's first and who's last. Like I said, quality for me is very important, then saves time obviously. It's kind of effectiveness but it helps to bring good quality by using like tools like AI chat bots and things like that. In a way you bring better quality and effectiveness automatically comes after because AI helps to be good in quality and effectiveness because it helps find some solutions or figure out some problems faster and create a solution to understood more things but you have 10 different scenarios for using like Chat GPT and such tools we have or can have in our development environment. So, quality is that what brings other results, also it helps to others to make higher performance.

Saskia Cornelsen

But then when you say quality is more important than AI and digital readiness, why did you rate it more important than this? At row six for example?

Expert 10

Because for me I don't want AI readiness to become higher than what we actually writing or creating on daily basis. It has to be like a helper but not the replacement. It helps a lot obviously but I would say still process quality is higher for me.

Saskia Cornelsen

But then it should be selected above it. It does not mean that it will fall out and it's not important. See, it was like this.

Expert 10

Oh, it was the other way selected. Oh, no. Sorry. I missed that one. Quality should be number five.

Saskia Cornelsen

Okay.

Expert 10

Yes, it should be.

Saskia Cornelsen

Now I understand your point, I was a bit confused because of that.

Expert 10

Ah, no, no, no, no.

Saskia Cornelsen

Okay.

Expert 10

Sorry, it was a bit difficult too.

Saskia Cornelsen

I know, I understand completely. So good. I see we are above our time right now and I think that's it. I already got a lot of insights from you. I would stop sharing and checking my questions. Let me check my last question. Maybe from your view, what is the most important shift companies in your sector must make to improve data-driven process measurement? What would be your suggestion?

Expert 10

Repeat the question again.

Saskia Cornelsen

What is the most important technical shift companies must make to improve data-driven process measurement? If you say all good, then it's also okay.

Expert 10

I would say probably it's never all good. Let me think. It's a tough one actually. I can't list one big one. It really depends on how fast the business is growing, it depends on a budget a lot. If you can find some tools that would save one or two people in your team you could have less

people. In a way it sounds good, but if you would see the vision clearly how things will look in five years that would be a great, unfortunately you can't. So, I think every company needs to value good experienced people that think and care about, again, quality, the delivery, the proper use of tools they have because I think those small bits and pieces at the end of the day they help to deliver better results but at the same time share the knowledge which is also important. For a longer working team and when I don't know certain data solutions, they [AI tools] help you to predict what could happen after couple years with much bigger clients because you keep things stable. And working with a certain set of tools is not enough. One or two years you need to work longer in order to see very important points that actually causes like 80% of your problems. So 20% [of your processes] could create 80% of all your problems. I think these things like what I value every day at work I think they are important and now the technology in programming for developers, it let constantly upgrade yourself. It is also very critical in order to value your work but also making the right decisions during the writing code and engineering applications.

## **Interview Expert 11 Transcript**

Saskia Cornelsen

So first it's about like a small discussion about your experience and then the second part is like the rating, like a little exercise we will do together about the criteria that I already have and I ask you to write them and also give me sub criteria in the main ones, but we will look into this later together.

Expert 11

OK.

Saskia Cornelsen

So what is your job title and your responsibilities?

Expert 11

Right now I'm working as a project manager. So I'm helping developers and coordinate work between different departments in my company. So everybody's connected with everyone, but still I mostly work with the engineering manager and engineering team.

Saskia Cornelsen

And what is the core area of business?

Expert 11

We developed tools for education and most of our customers are universities, colleges, so different educational institutions. We also have a platform for those clients. So all technological.

Saskia Cornelsen

OK. Then how does the organization currently collect and process data related to business process performance?

Expert 11

So most of the data is collected automatically when customers interact with the platform. For example, when someone opens the door using their phone, the system records whether the attempt was successful, how long it took to authorize in the system. Where it happened and whether the user needed to try again. We also collect some information about peak usage times. So for example, Monday mornings are usually much busier because people are returned to the office, returned to the institutions and this data arises arrives in different dashboards we have, so I don't have access to all of them, but just to a couple of them. So for example, if a particular

building suddenly has more issues than usual, when there are more problems than usual. We notice this on the same day, but we usually can't predict if it will happen or not, if it hasn't happened yet, and in the dashboards we also can see if certain times of day cause slower performance. So we can adjust their capacity.

Saskia Cornelsen

Do you also track the performance when you have projects going on like internally wise? How's performance, quality, efficiency and stuff like this?

Expert 11

When we are just working on the project, you mean? Yes, on this stage as well.

Saskia Cornelsen

How do you collect? This is also automatic.

Expert 11

Yes, it's also automatic.

Saskia Cornelsen

Do you have a system for that like Jira or something?

Expert 11

So we usually work with Jira, and Trello as well. And we have some of the internal automations just designed for our platforms which are not connected to any other external networks.

Saskia Cornelsen

OK. What do you think are the biggest strengths and weaknesses of those process measurement system that you have in your company?

Expert 11

Regarding strength, I would say that we have fast awareness of problems, so if something breaks down or slows down, we usually can't see when it happens almost immediately, and this helps a lot to prevent some long-term disruptions in the system. And we also have automatic data collection which I have already mentioned and teams don't need to manually gather reports on their business performance and this reduces a lot of errors and also helps to speed up the troubleshooting. And regarding the weaknesses, data spread across different systems, across different tools. We don't have unified space, so most of the time when something breaks, we don't get all of the information, not the whole overview of what the problem can be connected with. So for example, system usage data can be in one tool, customer complaints in another tool, and when we need some hardware maintenance notes. They can be find in the third tool, so it's not automated yet. Yeah, and we also need some manual checks in some areas. So for example, physical hardware, some sensors, servers and so on sometimes can require some manual inspection and in this case it can delay problem detection.

Saskia Cornelsen

I understand. To what extent does your company use AI to understand or improve business performance if?

Expert 11

I would say that our use is quite limited. It is not deeply integrated yet, but they we have such plans because it's especially very useful for educational institutions, but we don't have an ongoing project yet in this area. And we mostly use AI for pattern recognition and alerts when

something happens in the system. But yeah, I personally don't have access to such tools, so I cannot say a lot.

Saskia Cornelsen

If you would like fantasize a bit, what would you think would be like the greatest potential for AI or automatics in improving process management for your daily life?

Expert 11

As I have already told you, we lack a unified platform with all the information, all the dashboards about everything which happens inside our platform and I suppose that some early warnings with help of AI would also be quite useful for our company so AI could inform us before something breaks and it would help to save a lot of time and a lot of money, of course. Then it would also helpful if AI helped us to spot unusual patterns to predict busy times as well. It would help, yeah, would help us prepare for some heavy usage like Monday mornings, as I said before, yeah.

Saskia Cornelsen

I understand. What do you think would be the biggest organizational barriers, so to say, to implement such fully data-driven process measurement system?

Expert 11

I have a feeling after my career experience and after my experience of writing my thesis, the main problem everywhere is usually people's culture, so people's characters and so on. And not everyone is ready for some change and it's necessary to convince the upper management level managers. There's something that's really needed. And in all the other areas, I think we're quite ready for innovation in this field.

Saskia Cornelsen

Understand. I want to already jump to the exercise because your points already answered a few other of my questions, which are more optional, but good in a way I mean. It's in respect of developing a process measurement framework. So less thinking about actual client needs or in your case, you know like or downtime that will be later because this is really theoretical. So it's more about your general understanding and my criteria in level one are process effectiveness, process quality, research utilization and digital and A I readiness for my literature analysis. And then we would go down to the rating. Well, rating. It looks horrible, I know.

Expert 11

So I should choose between the two, right? So in each row I should choose which one is more important, right? OK.

Saskia Cornelsen

Yes, exactly. So it's with respect to developing a process measurement framework. Of course it's a scale from to based on the method AHP you if you feel like more seen with those names of those numbers and it's OK, but you can also go with your feeling and you can also say it's equal important for you. I just have to know note that this is like all of those criteria will be in the framework, so they're like 1 unified system, so no row. So it's like standing on its own, but for that we can at the end click on calculate and then we see a rate. It gives out a consistency rate like how consistent was your judgment of that and we can still adjust it at the end. It's only about like correcting, like human errors in a way, I'm not questioning your opinion. We just see that everything is consistent at the end. So if we would, if we would start with process effectiveness versus process quality, would you rate, would you rate one more important than the other and if, how much more?

Expert 11

Probably they are quite equal for me, so I would say 5 for this pair, because I have a feeling that effectiveness cannot exist without quality and quality cannot exist without effectiveness.

Saskia Cornelsen

So you would say a one. I mean it would be equal.

Expert 11

OK, so it looks like this. So I had a feeling at first that if I choose in the middle, then they're equal.

Saskia Cornelsen

And in this case, one is always equal. It's just like a bit weird system, but I didn't choose it. It's not mine. So, but OK, yeah, we can leave it like that. And then process effectiveness versus resource utilization. What would you give or choose?

Expert 11

So I would choose effectiveness because effectiveness is probably just user experience and reliability of the platform. So it always comes first and saving resources is secondary.

Saskia Cornelsen

Would you give it a much higher rating or also equal?

Expert 11

It's a high rating, so it's, yeah, I don't know, probably it's 7.

Saskia Cornelsen

Yeah, that's OK. That's your feeling about it. It's totally OK then process effectiveness versus digital and AI readiness. If you have troubles with the with the names of the criteria, I have a few terms in the description if you need them.

Expert 11

Yeah. OK. So let's talk about the effectiveness. What involves effectiveness?

Saskia Cornelsen

So I have the description really broad, but the ability of a process to successfully achieve its intended outcome and strategic goals. And I should I continue with the others?

Expert 11

Yeah, we can continue now. So probably effectiveness is still more important than digital readiness because I feel that digital readiness helps in the long run and AI is also very important nowadays, but still process success matters more and it's just the very basic step for each company. So probably it's more like 3.

Saskia Cornelsen

OK. I can also give you the other description of the terms if you want.

Expert 11

Yeah, probably. I don't see a lot of difference between effectiveness and quality, as I said, so if we can discuss quality, it would be nice.

Saskia Cornelsen

OK, for quality I have the consistency, reliability and standard of a process output. Do you also want to hear the last two ones or is it OK for you?

Expert 11

Yeah, if it's possible, I would like to hear.

Saskia Cornelsen

Then research utilization, I have there the effect, sorry, efficiency, effectiveness with which an organization uses its resources in its processes, for example, human technology, technology or financial resources and digital and AI readiness, the given and needed technology, technological and culture foundation for leveraging data, AI and digital tools.

Expert 11

Thank you. So process quality and resource utilization.

Saskia Cornelsen

What for you would be more important and how much more?

Expert 11

Quality is still more important because I have a feeling that fixing quality issues later can cost much more than doing things right the first time. So quality is still more important. And probably 5.

Saskia Cornelsen

OK, then quality versus digital and AI readiness, what would you give there?

Expert 11

Quality is more important because it is foundational and AI cannot fix when a process is poorly designed when it doesn't function well. So it's also 5.

Saskia Cornelsen

OK. Then resource utilization versus digital and AI readiness, what would you say there?

Expert 11

Digital readiness is more important. It's probably well because it will help in the long run.

Saskia Cornelsen

Which number did you said?

Expert 11

4.

Saskia Cornelsen

Ah, four. I'm sorry, I couldn't hear. OK, four. I can click on calculate and when it's below 10% then everything is OK. So your argumentation and your rating is consistent. That's all what it says. So all good on that. I would leave it open for now because then you see also like the criteria and also like your priorities just to see them. Because now I would like to ask you how would you, I would say track also measure those criteria because they're kind of umbrella term of something else. It's like hard to hard to catch them. So when you go to your number one like

process quality, with what type of sub criteria would you measure that like in your workplace? You can use terms from your workplace of course.

Expert 11

So it's probably about the frequency of some bugs and errors in the system, how often different incidents happen and how often are users struggle. Then it's probably the stability. It's also about some technological stuff, and a stable process should be predictable and trustworthy. Probably it also should follow some unified standards, so compliance, let's say.

Saskia Cornelsen

Yeah, that makes sense. That would already be enough like one up to three. When you have just one, it's also totally fine. So when we then move on to process effectiveness, what sub criteria do you have in mind for that?

Expert 11

Speed of entry. So I mean in general how quickly the service is working. And needs for some external supports, so again. How often the users struggle and this metric would indicate hidden usability issues of the platform.

Saskia Cornelsen

Makes sense for resource utilization. What sub criteria we have in mind for that?

Expert 11

So probably it's mostly about finances. I have a feeling, yeah, that's probably about finance. About certain metric, I don't know how to track it.

Saskia Cornelsen

Well, it's OK. It's like if you only have that to say, then it's all totally fine. When we go to the less digital and AI readiness really broad, but how would you measure that?

Expert 11

It's probably not only about the modern tools, which is also important, but it's also about staff digital skills, about broad skill sets of the employees that are ready to adapt new processes, new tools. And new ways of working. Also some data completeness because AI cannot exist, cannot function well without some reliable data and about modern tools, of course.

Saskia Cornelsen

OK. Then that would be it with the criteria part. It's like the hardest part is over, I would say. And I have one finalizing question for your view, what is the most important change? Organizations like yours need to make to improve how they measure and manage business processes.

Expert 11

So I assume that the most important thing will be to change the mindset, to move from a reactive mindset to a proactive mindset. And right now, as I told you, we often learn about problems when they have already happened.

And it's requires a lot of time, a lot of energy from the employees and a lot of money as well, because users can get unsatisfied with the platform and not use it anymore after something happens. And a data-driven organization like ours should concentrate on their.

To predict some potential issues, detect some early signs of trouble and respond quickly using data, and it's also very important to provide a unified.

And easy to access overview for all of the employees so that everyone will be aware of something which happens and what they themselves can do in order to prevent it.

## **Interview Expert 12 Transcript**

Saskia Cornelsen

What is your job title and what are the responsibilities in your current role?

Expert 12

I am a senior director at my current company, where I lead a team of analysts with a total of 16 employees. Of these, 3 are executives and we are active in the field of rankings and top lists worldwide for market research purposes.

I'll take a look here at what you wrote there. By the way, I have your questionnaire on it.

Exactly, I've been working in market research in the field for about nine years now. Before that, the same number of years in management consulting in different companies. We currently have around 1400 employees, maybe 1300. The core area for us, at least for us in this area, is market research and analysis. Focus in my B2B department, partly also B2C in the company.

Saskia Cornelsen

OK. How does your company or department currently measure the performance of business processes?

Expert 12

I believe essential KPIs are something like lead times, so how long does a project take. How long does a project phase need something like adherence to deadlines, i.e. I have a deadline, do I meet it? The essential core is always a kind of efficiency in the area of resource use. So, I have a plan for how many employees I will use for the task or project. Do I stick to it? Where do I have a lace? What is the use of resources? Which employees, analysts, students, researchers we need in projects?

Saskia Cornelsen

OK. What do you think are the strengths and weaknesses of the current system?

Expert 12

I think we have a very, very strong focus on deadlines and resource evaluation. So, that's also what I think we monitor systematically, i.e. deadlines and especially resources. It's essential for us in the ranking business, because our project outcomes are primarily cost-driven. We actually have a relatively good project controlling system by now. This means that we actually know our margins and have a pretty good transparency or general profitability of the projects. Which we also compare once in regular bi-monthly appointments. Where we look at the projects and look, are they efficient, do they want to continue? Weaknesses, I think that's just so typical. It is a detail level of the collection of KPIs or monitoring. It's just partly different in the teams. Of course, we have a generic tool that applies to everyone, but when it actually goes down a level, each team is also set up for itself. And the limit here, I see a bit of the benchmarking possibilities. If we have a certain level and can't go deeper because it's different, it's certainly not easy. So I think you can call it the level of detail of the project documentation.

Saskia Cornelsen

OK. In your opinion, what are the most important aspects for assessing the success of a process?

Expert 12

If you have done the project management training with me, you know that there are 3 topics in

particular. That's efficiency, quality and, let's say, effectiveness. So let's start with process effectiveness. The classic: Do I deliver what I wanted? Yes, so this is a methodologically clean project that we are delivering? For process quality, is it error-free? Do I have to adapt to the topics somehow? The time I have planned, is there a big variance, maybe beyond the same projects for comparison? And resource use last, i.e. classic. I have a plan for how many employees I use at different hierarchy levels. Do I stick to it? The target is comparison. Here the margins fit, does the deviation that the capacity utilization fit? Et cetera.

Saskia Cornelsen

I understand. If we were to go to AI now: To what extent does your company perhaps simply use AI or automated analyses by your department?

Expert 12

I think we are currently focusing primarily on improving business processes and less on measuring. These are tools that we use, i.e. very specifically for non-free naming, which we are now doing very strongly with LLM support. We certainly do the classic 'text and sentiment analyses', any text modules that are generated, be it for e-mails or methodological texts. But also what I am increasingly using for myself is quality control. In other words, I read all the material, all the result documents, all the analysis documents and have them evaluated for me. I ask questions, go deeper, which of course can also be done very nicely. Of course, always with the take 'with a Grain of Salt'. But it does help to get some new inspiration from it.

Saskia Cornelsen

Where do you see the potential of AI in measuring processes in your daily work?

Expert 12

Very specific direction processes. So the one thing I just said last time, that certainly goes in the direction of root cause analysis. So I somehow have a topic here and what is the reason behind it. So I somehow have a methodology document or the result documents of a project and want to have them evaluated, and I just get a result and can also question it, what is the reason for that. What I think is a big advantage of LLMs in principle is the topic of communication. I can exchange ideas in normal language, I can just have it prepared in such a way that it is easy to understand for questions about why KPIs have changed, which measures make sense. So this is actually a communication topic. When I now think about the future, and that is certainly more in the direction of integrating AI into tools, we are certainly talking about something like monitoring, early warning systems, everything automated. But I think that's very, very far in the future and these tools are wonderful because they can recognize patterns and derives from them.

Saskia Cornelsen

And you would also use something like that, something like monitoring?

Expert 12

If there is something like this automated and I think you have a question later: If you can install something like this, so that it doesn't destroy the flow, then certainly yes.

Saskia Cornelsen

OK. Then the question would be: In your opinion, what would be the biggest technical or organizational hurdles in such an implementation of a data-driven process measurement system, for tracking and monitoring?

Expert 12

I think two essential issues. One is that we have a very fragmented tool landscape. These tools to integrate the processes there is then a corresponding challenge. The second, tool or data or AI literacy, so really classic: the employees, do they have the appropriate depth of understanding, do we have the depth of data to do something like this accordingly. These are certainly 2 topics.

Saskia Cornelsen

I'm looking right now, you've actually already said a lot that you've actually already answered the seventh question. Then I would move on.

Expert 12

To 7, wait a minute, let me read briefly. In your opinion, what key factors support the success of integrating AI-driven analytics into your process flows? I don't want to do it longer than it is. Only an analysis with existing process flows. Maybe 2 things that I find very important to do. One is, this is a big problem for AI. We have really great ideas. But we usually really lack a use case. So I think really concrete project-related use cases are extremely important and good, that's a classic German problem. There are not just any guardrails, especially in the direction of data protection, i.e. methodological, organizational guardrails, also of a legal nature, I think that's important again. I don't think I really mentioned that before, but these are 2 points that I personally consider very relevant.

Saskia Cornelsen

Okay. It occurred to me now: It is also strongly assumed that AI comes up with a lot of ideas. So Black Hole was called. Do you think that would also be a problem if you asked AI to suggest improvements or analyze processes? That it often just comes up with something?

Expert 12

Anyway, of course. So certainly the tools have gotten better over time. What is clear, of course, as I just said, 'Take with a grain of salt'. I see LLMs more as sparring partners, as initiators. But definitely not as someone who does my work for me, not yet. It's certainly a matter of time. The biggest concern that I think we should all have is how the knowledge society will be affected by this next transformation. So classic, we have access to the complete knowledge and of course we can bring in many more perspectives. And then it is up to us to classify and evaluate them.

Saskia Cornelsen

OK. Then I would move on to the little exercise I mentioned. I share my screen for this. It all looks more overwhelming than it is.

Expert 12

Excellent.

Saskia Cornelsen

The aim here is to compare four main criteria in pairs in order to determine their relative importance. And at level one, the goal is simply described. In English, that's all. That's why Developing a Process Measurement Framework is the goal. Quite theoretically, too. The criteria I have are process effectiveness, process quality, resource utilization, and digital and AI readiness. I also have the terms again as an explanation, if you would need them, just in case. And that would then look like this as a comparison [sharing screen], always in relation to Developing a Possess Measurement Framework. And that all plays into the framework, no quality aspect is left out, because you now rate it worse compared to the others. For example, row 1 is not individually standing by the others. Therefore, everything is to be understood as a uniform system in relation to your following evaluation. We'll take a look at it later. If we were to look at it then, it's also a scale from 1 to 9, while 1 means it's equal, the [criteria] are worth the

same. If we were to go to the first one, Process Effectiveness vs. Process Quality, which is more important to you and how much more?

Expert 12

Nice, subjective rating. I would have said that process effectiveness is slightly more important than quality. I'll give it a 3.

Saskia Cornelsen

OK. And effectiveness vs. resource utilization, what would you give?

Expert 12

I would actually give the effectiveness a 5 compared to utilisation. Well, I think that's much more important.

Saskia Cornelsen

OK, then Process Effectiveness vs. Digital and AI Readiness?

Expert 12

Exactly, you have to help me a little bit with what is meant by that. Well, so readiness is only for now, I could theoretically, but in the future it is just not relevant now. But at some point in the future, that could be the case. Or how do you define that?

Saskia Cornelsen

I have the definition: The technological and cultural readiness for the use of data processing, AI and digital tools.

Expert 12

Yes, so very, very abstract theoretical, so it's more of a kind of framework of the whole. So right there, in the end it only has an influence on whether everything will somehow be better, more beautiful, better through AI. But if I can be effective or can be efficient or can use my resources well, then readiness for digital and AI is nice to have if I have already achieved my goal, so to speak. It is certainly interesting to know whether this corresponds to reality or whether I somehow cannot evaluate it correctly. Yes, but classically, if I'm efficient and effective, then I don't need digital AI readiness, because I've already achieved that with what I can achieve at most, and then it's at most a time aspect. That's why I would say that process effectiveness is more important, definitely more important than readiness. No, as long as I keep the process effective, then it might be nicer, but it is already effective. So, can I get it even more effective with it? So, let's give it a 6.

Saskia Cornelsen

Okay. Then process quality vs. resource utilization.

Expert 12

Absolutely. Of course, it is always important that the result is of high quality. This is what we stand for as a company, and must also stand for. I think we are also the market leader in this respect, not cheap, but quality. And I give a 5 more important for the quality.

Saskia Cornelsen

OK, then again process quality vs. digital and AI readiness.

Expert 12

Same line of reasoning as above with effectiveness. I consider process quality to be more important than readiness. So I would also give it a 6 here.

Saskia Cornelsen  
OK.

Expert 12  
Hoping to be more stringent.

Saskia Cornelsen  
Resource use vs. digital and AI readiness, what would you give?

Expert 12  
Same game, resource use, but I would give it a 3 here, so I think the resource use makes more sense or is more important than the AI readiness.

Saskia Cornelsen  
OK. So in the case of the Consistency Rate [CR], if that's over 10%, then the system recommends taking another look and either taking the green marks or rethinking in general to improve your consistency in your reasoning. But you can also say you want to leave it that way now. That's an argumentation and you're fine with it.

Expert 12  
We can go one higher in row 3 from 6 to 7.

Saskia Cornelsen  
All right, process effectiveness vs. AI readiness changed to the 7.

Expert 12  
That's my first impulse. In fact, I'd like to stick with the rest. As I said, I think it's primarily a matter of how you define the business model on the one hand, i.e. especially with question 4, I think quality for the use of resources is, I think, very, very simple. If you say that somehow you want to have an optimum over all 3 areas, then a 3 might make more sense. We just say for our business model that we want to deliver high-quality products. Accordingly, it is OK to use resources inefficiently or more than is needed. In this respect, I'll stick to the 5 in row 4.

Saskia Cornelsen  
OK, if you go to row 2 or row 4, for example, then both criteria of resource use are compared. Then there is a 5 for both. So they are of equal value in that sense. Would you still support it or would you say that quality is generally more important than effectiveness in relation to resource use.

Expert 12  
Well, I'm not comparing all three with each other, but a few at a time, and I'm saying that.

Saskia Cornelsen  
But nevertheless, it all comes together. In the end, however, this is something like a feedback loop that arises here, if you then evaluate them all the same in relation to a certain other criterion.

Expert 12  
Yes, I now read that I rate effectiveness and quality as higher than resource use, in every case.

Saskia Cornelsen

But that's OK. I mean, you have already described that you value effectiveness and quality equally.

Expert 12

Yes, exactly. Somehow we have higher process effectiveness there. Probably because I gave a 3 above in question 1. I would actually leave it that way, I continue to maintain that I would always set the rating differently compared to the other tool and with Digital and AI Readiness I think it's more of a question of how do you define that? Personally, I have a hard time there, but I would stick to the 3.

Saskia Cornelsen

OK. Then I leave the screen as it is. Then you will also see the priorities you have set. And then I have final questions.

Expert 12

Yes.

Saskia Cornelsen

If you were to look at these main criteria now, they sing quite generic terms, not easy to grasp. Which sub-criteria would you assign to the main criteria in order to be able to measure them? Let's say, quality, if you now have one to 3 examples of what you can use to measure quality in your work environment?

Expert 12

E.g., how many errors do I include in the analysis. In other words, the number of errors that somehow appear in quality assurance. And if you want to take it to the extreme, something like a kind of rework quota. That means that if everything is rubbish, I have to do everything new. That would be 2 things that I would think of.

Saskia Cornelsen

OK, then for effectiveness?

Expert 12

Sales-driven market relevance, i.e. it is assumed by the market. And certainly something like a repetition of the project. That just goes very much to the end. So, if it has a relevance, the turnover is right, we repeat the project. And it is certainly valid on a methodological thematic level that the methodology of the project, what we are delivering, has methodological validity.

Saskia Cornelsen

I understand. Resource use, how could you measure that? With what sub-criteria?

Expert 12

That's profitability, project margin. What I originally planned is also true. Planning accuracy.

Saskia Cornelsen

OK. Then Digital and AI Readiness?

Expert 12

Certainly something like a level of digitization, perhaps within an area. Use of LLMs, use of

tools that can be assigned in this area. I think I've said that before, a kind of literacy in the areas of AI, data literacy.

Saskia Cornelsen

OK. Understandable. That's all your opinion, I'm not questioning anything here. I'm just asking. Then as a final question: What do you think are the most important changes that data-driven organizations need to make to improve the measurement and management of business processes?

Expert 12

I think the classic is standardization, uniform KPIs, uniform level of detail, i.e. for recurring processes. I think that's extremely important.

And it goes a little further. Maybe at the end a kind of reviewing lessons, so that in case of doubt I also evaluate what I have done and if I define changes, then take them with me to the next project version.

Saskia Cornelsen

Okay. What role do modern technologies play in this? Do you think we've already touched on that a bit, something like AI Agents, AutoML, LLMs, that they will have a pretty bigger factor, also a critical factor, than before?

Expert 12

Absolutely, i.e. that's what AI will get, they may not have yet, especially when it comes to business processes and the monitoring of them. But basically, I see such tools classically as enablers. So if I think about the future, monitoring of projects, from the field phase, any management summaries that it can give me from the tools, already prepared, that a classic dashboard, which is very rigid, may not be able to offer. Yes, general preparation, a pattern recognition, all the topics, yes.

Saskia Cornelsen

Okay. But not the implementation of a field phase?

Expert 12

Of course, in the long term, yes. I think that's what we discussed at the beginning. The question is, how good will LLMs be? Will they really take over everything with AI models at some point? I see it differently, what they have now is not AI, depending on the definition, but still Large Language Models for me. But it depends on how you apply the definition when we really get into a world where these tools create their own content that is much further along than what they have learned at some point. In other words, really creative and not just statistically.

Absolutely, then that's also what we would consider in ourselves. That is, which process steps can you automate? Whereas we used to do manual research with students as workers who just went to a website or leafed through books, it's now a bit completely automated, where you have to look over again at the end and that's more a question of the development of the models. This means that to a certain extent, the human operator is still important to ensure quality. But this goes through all phases, whether it's creating a questionnaire, translating, writing an email cover letter.

Saskia Cornelsen

OK.

Expert 12

The possibilities are gigantic and now we come back to it. How can I integrate this into the tools

I have? How can I make this available to users so that they can work with it? How can I do this as flawlessly as possible, without hallucinations of the AI? So there are still many points open, but potential, definitely.

Saskia Cornelsen

OK, then thank you for your input. That was also my last question. Then we are now done with the interview and I would end the recording.

## **Interview Expert 13 Transcript**

Saskia Cornelsen

So, my goal here is to develop a modern data-driven framework for measuring business processes that can also integrate AI. In the first part we will have a qualitative discussion about your experience and then later on a little exercise, but nothing overwhelming. It's that I have criteria that I will include in my framework. So I ask you later to weight them and then we will move on with defining them.

But to start with the most important thing, you: Can you tell me your job title and your main responsibilities?

Expert 13

I am an AVP. I've been at my company for about 13 years now, running a team of five people who are across the globe. Our focus is on strategic technology programs within global technology. So we report directly to the CTO and CIO of Global Tech and we're really focused on a few strategic programs like the Operational Excellence Program, which involves like our PDLC, Change Management and Incident Management. We created this program about 10 years ago. We set policies and processes in place and right now we have a monthly OpEx [Operational Excellence] governance meeting to track those metrics. All of that right now is being done manually through spreadsheets [Excel] and things like that.

We also run a technology risk program focused on addressing and just mitigating risks that we have within our systems at the company. So we have a committee of members that's really made-up of different people within the organization. Like we have our head of internal audit there, we have legal representation, we have the CTO and we have multiple people under the CTO that make up that committee. And so we'll have different topics come up all the time that are risky that be related to reputational risk or internal risks. We touch a little bit of everything in that tech risk program. Most recently the AWS outage. So we're helping with that disaster recovery working group program. We're helping impacted systems like to track action items to be more resilient and to improve processes. We're tracking all that through tech risk.

We also support our AI program. So we work with a strategy team similar to my own team. Mine is for global tech. The strategy team has a wider area, it works like across the business and technology. So we're working with them and we also work with our AI core team on policies. I have one direct report who created a AI tool usage Dashboard to track usage of AI tools throughout the company. We support a lot of initiatives within the AI program.

We also do cloud solutions. We have a cloud program that we're restructuring now. So we do a little bit of everything.

Saskia Cornelsen

It sounds like you have a lot of things on your plate.

Expert 13

Yeah. And we're a very small team, but like everybody helps with something. One colleague helps with our OpEx program and he's recently taken over incident management, which is very

important. And then I have another person who does AI topics, another person who does stocks related stuff. So, we do a lot across.

Saskia Cornelsen

OK. Then I would move on with the questions.

How does your organization currently collect process and analyse data related to business process performance?

Expert 13

So I guess when you say business process performance, how do you see that relating to performance because we are a technology group. So just tell me a little bit more about business process.

Saskia Cornelsen

So let me check. I have a table with my definitions and for business process it's: A structured sequence of interrelated activities that transform inputs such as data or resources into outputs that serve the customer or supports solely the organizational objectives to achieve strategic or operational goals.

Expert 13

I would say within our operations, but it it's not AI related, right? Doesn't have to have AI, just general?

Saskia Cornelsen

You can include AI if you want, if you have something to say to that. But we also have later on more specific AI questions.

Expert 13

I would say our OpEx program supports the resiliency of the company. We track system uptime. So our systems have to perform in a certain way, they have to be up for a certain time, we have SLAs [Service Level Agreements] that we have to meet. So we track system uptime for the different divisions. So within the company we have three different divisions. You know we work in the beginning of the year. We work with the different chief technology officers of those divisions to understand what products should be. Part of that uptime tracking and then we track like incidents throughout the year and downtime. So, so that's one I think that's related to the business that we track. Everything else is really more internal.

Saskia Cornelsen

OK.

Expert 13

For example change management, whenever an update is being made to a system in production, we have a change management process that has to go through certain people, it has to go through a PDLC [Product Development Life Cycle] process. So I think the one that's most related is probably system uptime.

Saskia Cornelsen

OK. Then in your opinion, what are the biggest strengths and weaknesses of your current process measurement in your company? You mentioned some things are pretty manual, but others you have a clear structure.

Expert 13

I think ideally we can use more like AI and more automation to track this, it would be easier. Right now a lot of it is very manual. So we are whenever an incident occurs really manually tracking that we have a spreadsheet that we put that incident in. One colleague is managing this now, so he can tell you more about it. And I know he's looking into making improvements to it for next year, but right now all of that is very manual. Also let's see tracking downtime, we don't have a system that easily calculates it, I have my team working with the owners of those systems to calculate downtime for example. So a lot of it is pretty manual, we need somebody from the team to consolidate data, do the formulas, get information.

Saskia Cornelsen

OK. For you personally, like work aspect wise, what are the most critical aspects for evaluating the success of a process?

Expert 13

People ask this for evaluating success of a process. Definitely KPIs, like determining some metrics to evaluate success. So you should come up with that upfront and then track that you know throughout your process. That's what we did with our OpEx program and with our goals at our company, we're very goal-driven and our goals also drive our bonuses. So we do well with the goals and our bonuses look much better. So those KPIs, exciting them up front, super important. Also making sure you have the key stakeholders involved in understanding and also just contributing to that process. I think those would be the top two, like setting KPIs and tracking against them and then also making sure you have key stakeholder representation.

Saskia Cornelsen

OK. Does your company use AI or advanced analytics to understand or also improve business performance at the moment?

Expert 13

So I am not aware of how AI is being used for analytics. I will say that we have a GenAI platform that we've created and every week it's becoming better and better. I do think some people are using it to help with their processes, analytics and things like that. I know one colleague in my team, participates in the GenAI platform in a project manager role. He also tries to use AI to understand more about what was being put into JIRA, like our tickets. So usually our incidents are also tracked in JIRA, also our requirements are tracked in JIRA. So whenever there's a new requirement we need to create this requirement in JIRA, you need to create tickets, all of that lives in JIRA. So this colleague, he started doing that. I don't think it worked that well yet. There were some things he had to tweak around to make it work a bit. We're starting to use it. Like we're trying to get insights and things like that from using AI. It's still a work in progress.

Saskia Cornelsen

OK. Understand. What would for you be the greatest potential for using AI in your daily work? In measurement or management?

Expert 13

In terms of measurement, like really automating our OpEx metrics, I mentioned before, our incident management is a very manual effort. So ideally I think that would save a lot of time. For change management, we also track change management things and I think they extract information from JIRA and other tools. And there's still that manual step, it's not automated yet. So I think within our team, OpEx is a huge place where we can use AI to automate.

Saskia Cornelsen

Understand. Then let's imagine we already have such system ready to implement. You know, without manual steps to follow, you have data-driven measurement processes. What do you think would be the biggest technical but also organizational barriers trying to implement it?

Expert 13

So with tracking usage, I mentioned it before that we created a AI tool usage dashboard, so we can tell that people are still not using AI even though we have a huge AI program. It's a priority for our CEO, she talks about it all the time during our all hands. And there's still people who are resisting, I don't know if they're afraid of it. I don't know what it is. But within our team we are double clicking into that and see where these people are, maybe they're admins, maybe they don't really need to use it. Maybe they are within departments that don't need to use AI. But I would say the biggest barrier is just that. So we're getting better at it, having AI, it is about making sure that people are using AI on a day-to-day basis .

Saskia Cornelsen

Yes, I understand. Then I would move on to the exercise and share my screen. Give me a moment. So it looks much worse than it is. This is based on a specific method. It's called AHP. The goal here is to develop a process measurement framework as I already said. And my criteria are process effectiveness, process quality, resource utilisation and digital and AI readiness based on my literature analysis. And if we would go into it, it's a pair wise comparison to determine their relative weight. Everything is in respect to develop a process measurement framework. So it's less about the specific processes that you do at work. It's more about a general understanding, it's really theoretical, I would say.

So while you then choose per row one criteria that is more important for you, you will also give them a weighting on how much more is it important while you also can say it's equal. All of the criteria will be in the framework. So even row one and row two, as single rows, they still will be all integrated. I would say they're also partially overlapping but we talk later about it to define those main criteria. But for now I would ask you to compare them.

So process effectiveness versus process quality? Which one is more important and how much more?

Expert 13

Let me see. Alright, developing a process measurement framework. It's OK, process effectiveness versus process quality.

Saskia Cornelsen

It is just general information above the table.

Expert 13

Can they be equal or does one have to be more than the other?

Saskia Cornelsen

No, it can be equal here. To choose the number 1 would mean equal and then it doesn't matter what criterion to select.

Expert 13

OK. All right. For row one, I do think it's equal. I think in order to be effective, it has to be a good quality process.

In terms of resources vs effectiveness, are resources like technical or like people resources like what type of or both?

Saskia Cornelsen

It's both. I have some definitions, but it's both. It's like manpower, work hours, but also technology or financial in processes to use.

Expert 13

OK. I would think process effectiveness would be a little higher on the scale than resources. I would say 3.

Saskia Cornelsen

OK. Then process effectiveness versus digital and AI readiness, I can give you descriptions about digital and AI readiness and also effectiveness if you want that.

Expert 13

Yes. I would say process effectiveness is a lot higher just because with digital and AI readiness it's not fully there and I mean we can still have a good process measurement framework without AI. I mean we've done it without AI before AI. So I would say 6.

Saskia Cornelsen

OK. Then quality versus resource utilization, what would you give?

Expert 13

Process quality would be a 3.

Saskia Cornelsen

OK. Yeah. Then process quality versus digital and AI readiness?

Expert 13

I would say 6 for quality.

Saskia Cornelsen

Then lastly, resource utilization and digital and AI readiness?.

Expert 13

6 for resource utilization.

Saskia Cornelsen

OK. Then if I click on calculate, it calculates the CR, the consistency rate. It's mathematically calculating how consistent your arguments are by giving the rating you just set. When it's below 10%, everything is OK, like now. It's all your decision but with that it looks at the consistency because there could be always human errors in argumentations.

Expert 13

Yeah. Understand.

Saskia Cornelsen

If we would continue looking at the main criteria, how would you measure them or scale them? Could you give me one up to three sub criteria per main criteria? Let's say process quality, it's kind of an umbrella term. What criteria would you use to measure quality?

Expert 13

To measure quality. Incidents, for example, if there's less incidents, then that means your quality is better, it's more performant and reliable.

Saskia Cornelsen

If you have nothing else to share, then we can move on to effectiveness. How would you measure that with what sub criteria?

Expert 13

Effectiveness. I think like usage, meant tracking usage would be one. Process effectiveness usage. I'm thinking in terms of our OpEx program. It might be financial as well, so like attaining. Savings synergy.

Saskia Cornelsen

Interesting. OK. Then resource utilization? We already talked a bit about it, but just like to say it again.

Expert 13

Yes, for that one, like tools and people.

Saskia Cornelsen

Do you mean with tools, how many you use?

Expert 13

The types of tools you use, it doesn't have to be AI, but like JIRA. Within JIRA we can create for example dashboards to help track certain things. So if we can create a dashboard for JIRA to track change management, that would be a useful way to utilize a resource.

Saskia Cornelsen

I understand. Then we can go to the last one. Digital and AI readiness. How would you measure that?

Expert 13

Digital AI readiness. This one is definitely tied with like financials. So how much time people would be saving. So time savings. Maybe also some type of resources with that, like we don't have to hire X amount of resources because the current resources are productive in their area, like they can do more. So cost savings and time savings.

Saskia Cornelsen

OK. I would stop sharing for now. I have a finalizing question and then I think we're also already above our time limit.

Expert 13

Actually, I'm sorry but for one of them, for quality or even for AI think speed too, the speed at which you do things is another measurement. By comparing it to before we had different processes or before we changed it. I guess speed would also fall within time savings.

Saskia Cornelsen

OK, I have one last question.

From your view, what is the most important change data-driven organizations like yours need to make to improve how they measure and manage business processes?

Expert 13

I would say just using AI, like finding a way where AI can help facilitate a lot of these processes. We already have good processes in place when it comes to like measuring and things

like that and also communicating it across collaborations. We also have this bonus program where we come up with KPIs, metrics, but if we can use AI to automate a lot of this tracking, that would be beneficial.

Saskia Cornelsen

So do you think it's not avoidable anymore to use AI?

Expert 13

I think it's getting better. I don't think it's completely there yet. We still talk about AI, about their hallucinating and us having to cross check things because it's not always right. So it's not completely there. I still think we need that human intervention just to cross track and make sure that numbers are making sense, that the data is making sense and there is no hallucination. But I think every month AI is getting better.

So, AI would be a huge opportunity area for us and others and I do think our processes work well as we have been doing this for a long, long time. My company has a good program in place when it comes to the process and frameworks and all of that, but automation is where we can be better.

Saskia Cornelsen

OK. Then that was my final question and we are also a bit above our time limit. I think that's not bad, I hope you don't have a meeting after that.

Expert 13

I'm good. Thanks.

## ANNEX 4 AHP RESULTS

Session Code: Ebe9A9

Project: Developing a process measurement framework

Description: “The aim of the research is to develop a data-driven, AI-enhanced process measurement framework that integrates expert knowledge to enhance organizational performance. Experts are asked to compare four key performance perspectives in pairs, reflecting their relative importance in optimizing organizational performance. The resulting weights will be used to design and prioritize key indicators.”

Author: Saskia Cornelsen

Created: 03/11/2025

Evaluation: Hierarchy

Number of Participants: 13

Scale: 0 - Standard AHP linear scale

Global weights by nodes and participants

Node: Developing a process measurement framework

Weights: Process Effectiveness (PE); Process Quality (PQ); Resource Utilization (RU); Digital & AI Readiness (DA); CR (Consistency Rate)

	PE	PQ	RU	DA	CA
Group result	0.214	0.493	0.136	0.156	0.006

By participants:

Expert_13	0.386	0.386	0.177	0.05	0.057
Expert_12	0.546	0.304	0.099	0.05	0.082
Expert_11	0.385	0.424	0.055	0.137	0.061
Expert_10	0.176	0.481	0.133	0.21	0.093
Expert_09	0.122	0.544	0.064	0.271	0.073
Expert_08	0.107	0.442	0.386	0.064	0.074
Expert_07	0.164	0.316	0.116	0.404	0.095
Expert_06	0.081	0.399	0.36	0.159	0.042
Expert_05	0.093	0.536	0.169	0.203	0.032
Expert_04	0.265	0.588	0.11	0.036	0.08
Expert_03	0.203	0.642	0.103	0.052	0.07
Expert_02	0.17	0.163	0.073	0.594	0.047
Expert_01	0.121	0.606	0.042	0.23	0.142

AHP Consensus: 0.671411

Consolidated Decision Matrix

1	0.421692	1.843236	1.198265
2.371399	1	3.470225	3.232013
0.542524	0.288166	1	0.980236

0.83454      0.309405      1.020163      1

Node pTot

Weights: Process Effectiveness (PE); Process Quality (PQ); Resource Utilization (RU); Digital & AI Readiness (DA); CR (Consistency Rate)

	PE	PQ	RU	DA	CA
Group result	0.214413	0.493026	0.136453	0.156108	0.005539

by participants:

Expert_13	0.386365	0.386365	0.177091	0.050179	0.056583
Expert_12	0.54622	0.30412	0.099455	0.050204	0.082174
Expert_11	0.384624	0.423874	0.054902	0.1366	0.061058
Expert_10	0.175881	0.481125	0.133182	0.209812	0.093102
Expert_09	0.12191	0.543903	0.063641	0.270546	0.07259
Expert_08	0.107363	0.442238	0.38608	0.064319	0.074183
Expert_07	0.163578	0.316326	0.115784	0.404312	0.095164
Expert_06	0.081209	0.399405	0.359943	0.159443	0.042308
Expert_05	0.092622	0.535781	0.169005	0.202592	0.032074
Expert_04	0.265207	0.588412	0.110057	0.036325	0.07958
Expert_03	0.202576	0.642122	0.103461	0.051841	0.069644
Expert_02	0.169803	0.162609	0.073389	0.594199	0.047275
Expert_01	0.120975	0.606195	0.042409	0.230421	0.142459

AHP Consensus: 0.671411