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### A MODEL FOR ATTAINING BUSINESS PROCESS MATURITY

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### **ABSTRACT**

This essay proposes a Business Process Management (BPM) maturity model. The developed BPM maturity model is based on the review of existing models combined with the in-sights of BPM professionals. The developed model enables organizations to gain insight into their own operations, and also supports in setting up a roadmap for improvement. It offers a stepping stone with which organizations can determine whether their ambitions are in line with their initial situation. Overall this essay provides a first overview of a framework for a detailed analysis of BPM capabilities within organizations. Further research on this BPM maturity model should be done by empirically testing the model in multiple business environments.

**Keywords:** Business Process Management, Maturity, Model, Improvement

#### 1.0 Introduction

The services sector and its environment are changing rapidly. To withstand strong international competition and major changes, a higher level of organizational performance is required (Hammer 2004; Steiber and Alänge2016). Implementing changes in organizations is complex (Dawson 2019; Wee and Taylor 2018). This also holds for organizations that implement Business Process Management (BPM). BPM leads to a process-oriented organization set-up and assumes that processes are well embedded in the organization (Kerpedzhiev et al. 2020). Well embedded implies: broadly accepted by all and secured within the organization. However, this often requires a significant change in the ways of working (Binci et al. 2019). For measuring and securing the necessary change, a maturity model can be used (Röglinger et al. 2012; Rosemann and De Bruin 2005). BPM maturity is a measure to evaluate how professionally an organization manages its business processes. Previous research provides evidence that higher BPM maturity leads to better performance of processes and of the organization as a whole (De Waal et al. 2017; Hammer 2007).

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This essay presents a BPM maturity model for measuring and improving the business process competence within organizations. The BPM maturity model comprises maturity levels from a BPM vision associated with: Process; Governance; Risk and Controls; Technology; Data; People and Skills.

The model presented here was developed by combining many years of experience in implementing BPM with previously developed maturity models in the field of BPM (e.g., De Waal et al. 2017; Hammer 2007; Röglinger et al. 2012; Rosemann and De Bruin 2005; Tolsma and de Wit 2009).

### 2.0 THEORETICAL BACKGROUND

Multiple drivers - such as technological innovations, customer behavior, and regulatory demands - are continuously changing the way organizations do business (Higgs and Rowland 2005; Wagner et al. 2019). Organizations need to have proper insights into their internal organization to deliver consistent and relevant offerings to customers and meet regulatory demands. Change has become constant (Homan 2006). Therefore organizations need a faster and more flexible and agile way to fulfill stakeholder and customer needs (Burgelman et al. 2018).

### 2.1. Business Process Management

BPM is a management philosophy of process thinking that offers solutions to today's problems (Jeston and Nelis 2014). In fact, BPM is a comprehensive system for managing and transforming organizational operations (Röglinger et al. 2012). An important point of interest within BPM is: managing processes in such a way that customers receive products and services effectively and efficiently. Thinking in processes, as opposed to tasks and product divisions, is at the core of BPM (Dorr 2009; Spanyi 2006).

One of the most important reasons to focus on an organization's process orientation is to prevent sub-optimization, thus increasing the entire organization's performance (Tolsma and de Wit 2009). BPM is a valuable tool in a process of gradual change, advancing the chance of process improvement (Spanyi 2006; Melão and Pidd 2000). BPM systems influence the way in which company activities are managed, directly and indirectly. BPM solutions can be applied for many reasons, such as (Dorr 2009; Jeston and Nelis 2014; Schmiedel et al. 2020):

- Increasing efficiency and effectiveness;
- Increasing customer friendliness and customer satisfaction;
- Increasing predictability and manageability;
- Shortening throughput time;
- Quality improvement;
- Improved risk control and management.

BPM uses existing processes as a starting point for improvement and establishes a sound understanding of, and insight into, the present situation (Van der Aalst et al. 2016). Based on years of practical experience we developed a broader perspective on BPM which consists of various aspects: Process; Governance; Risk and Controls; Technology; Data; People and Skills.

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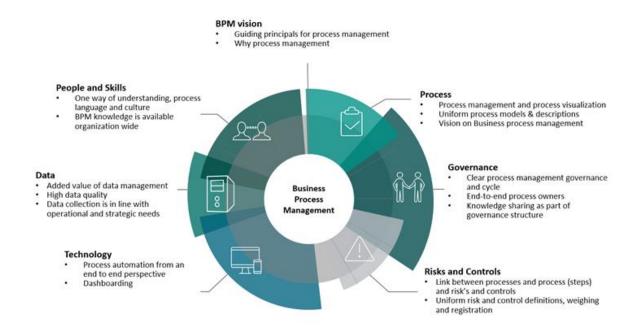


Figure 1. BPM-cycle Overview of elements Business Process Management

In fact, BPM covers all aspects related to business processes in all areas of an organization (Schmiedel et al. 2020; Vom Brocke and Mendling 2018). If process thinking takes place on a strategic level, it will be presumably followed by efficient execution on an operational level in well-organized departments. The fact that department efficiency can lead to sub-optimalisation or problem shifting within the organization, is one of the reasons for addressing the business from the BPM perspective (Tolsma and de Wit 2009). To illustrate, these aspects are combined in a BPM-cycle (figure 1) which supports process thinking in organizations. Using it as a methodological frame of reference will help organizations to work in a process-oriented way. In detail, these aspects consist of:

BPM Vision: According to Glykas and Kokkinaki (2018), BPM is "a set of methods, techniques and tools that can support the design, performance management and analysis of business processes". But BPM is more than a set of methods, techniques, and tools, BPM is a management philosophy that consists of managing, improving, and controlling an organization, the goal of BPM for the organization is to achieve a high-performance level (Jeston and Nelis 2014; Lamine et al. 2020). The fast rate of digitalization forces organizations to investigate and understand processes within their organization more fully and increases the need for BPM (Mendling et al. 2020).

Process: Processes are at the core of every organization and dictate the daily activities of employees. Process performance and a process-oriented organizational structure are positive drivers of organizational performance (Kohlbacher and Reijers 2013). A high maturity level implies the employees are not only focused on their own tasks but on the larger organizational context or even the whole supply chain. The level of process maturity describes to what level processes are identified and captured in process descriptions (Röglinger et al. 2012).

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Governance: A well-structured governance model provides clarity on policy, rules, and accountability within the organization. A high level of maturity implies the organization is governed centrally with a strong focus on accountability and responsibility for its conduct (Armistead et al. 1999). Governance is important since new levels of BPM have to be integrated in the organizational structure and specific rules and accountability have to be assigned for the BPM-related tasks (Tolsma and de Wit 2009; Vom Brooke and Mendling 2018).

Risks and Controls: Every organization faces risks. A high level of maturity implies the organization is aware of the risks that apply and actively monitors and controls these risks. Incorporating risk management into BPM helps organizations to prevent scandals, loss of reputation, and fines. The identification of risks provides the organization with a better understanding of the threats of its business activities and therefore, the opportunity to prevent harmful situations for the organization (Jeston and Nelis 2014; Lamine et al. 2020).

Technology: Technologies are the main driver of digital transformation. A high level of digital maturity implies a high level of digital competence for employees involved in the digital transformation process. Process modeling and automation are drivers of performance improvement of business activities and enable organizations to monitor and coordinate their BPM activities (Jeston and Nelis 2014; Ubaid and Dweiri 2020).

Data: Proper usage and management of data is the basis of digitalization, which includes the harmonization of data creation and generation, as well as other related processes. Increasing data volumes and their quality require organizations to focus. Properly managed, consistent and reliable data is not just the cornerstone of all financial processes, but the main prerequisite for digitalization. The use of data can help organizations to improve productivity, make the organization more flexible and compliant with rules and regulations. Furthermore, the use of data leads to increased knowledge sharing and reduced costs (Butt 2020; Wagner et al. 2019).

People and skills: Successful BPM relies on a dedicated and motivated workforce. Therefore, the organization has to dedicate time and resources to improve the skills and knowledge of their workforce regarding BPM and create a shared organizational culture (Armistead et al. 1999). Schmiedel et al. (2013) find that there are four aspects of an organizational culture that drive BPM. These drivers are customer orientation, teamwork, responsibility, and (operational) excellence.

Customer orientation is essential since every process within an organization has either an internal customer or an external customer. When working on process-related questions one must always consider the customer. Teamwork is the second cultural driver of BPM since processes cut through departments and cannot be thought of as activities limited to departmental borders. The third cultural value is excellence which is based on the understanding in the lean philosophy that every process can be improved. The final cultural driver of BPM is a responsibility which indicates the importance of strong process governance (Schmiedel et al. 2013; Ubaid and Dweiri 2020).

### 2.2. Change management and BPM

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The implementation of BPM not only demands a whole new way of working, it also implies looking at your organization from a different perspective; something which is often underestimated (Binci et al. 2019; Jeston and Nelis 2014). This asks for a clear change at the management level but it also requires change at lower organization levels (Jacobs et al. 2013; Rosenbaum et al. 2018). Thus, it is important to not only think about the technical aspects of implementations, such as the development of a new IT system to support the change, but also about whether people are still well placed in the organization, and whether they are sufficiently trained to handle the change (Binci et al. 2019; de Pádua et al. 2014; Rohloff 2011). This requires considerable time and attention in a change process. Old, existing ways of working and managing people must be changed (Binci et al. 2019; Tolsma and de Wit 2009).

When organizations decide to implement process improvements or BPM, they should not only pay attention to the new possibilities and the factors that stimulate successful implementation (Hardjono and Bakker 2006; Kerpedzhiev et al. 2020; Rohloff 2011). They should also be aware of the restrictions. These restrictions or barriers are often bound to the organizational culture, to the comfort one obtains from holding a certain position, and to power and status (Schmiedel et al. 2020; Spanyi 2006).

One of the tools that can be used to deal with these barriers is the BPM Maturity Model (Melenovsky and Sinur 2006; Pereira et al. 2019), which we discuss in the next paragraph.

### 2.3. Maturity models

### 2.3.1. Foundations of maturity models

A maturity model is a business tool in which different maturity levels are defined based on the best practices of organizations within the industry. The hierarchy of human needs model (Maslow 1987), is a prime example of a commonly used model using stages. Many contemporary models are derived from the Capability Maturity Model (CMM) which was developed by the Software Engineering Institute at Carnegie Mellon University. The CMM was developed as a measurement tool to assess the maturity of software development processes (Rosemann and De Bruin 2005). The CMM framework consists of five levels which contain predefined cumulative requirements (Rosemann and De Bruin 2005). These requirements state a certain maturity of business, behavior or process. The most popular way of measuring the level of maturity is a five-point Likert scale where 5 represents the highest possible level of maturity (De Bruin et al. 2005). The (current) maturity level corresponds to an organization's capabilities regarding a certain domain or application (Rosemann and De Bruin 2005).

Maturity models are widely used to assess the as-is situation of a company, also known as the descriptive function of a maturity model (De Bruin et al. 2005). It also supports in setting up a roadmap for improvement (prescriptive), as well as a comparison tool to enable benchmarking across different regions and industries (De Bruin et al. 2005). Maturity models can therefore be used to assess the capabilities of an organization regarding a certain discipline, in order to gradually improve their capabilities (Antunes et al. 2014). In this paper, we aim to develop a business process maturity model to assess the as-is situation of

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organizations and therefore primarily use the descriptive function of maturity models to improve organizational capabilities.

### 2.3.2. Maturity models in relation to BPM

The adoption of maturity models is relevant since De Bruin et al. (2005) state that the CMM has gained a globally accepted position in modern businesses: high maturity level scores are considered as a requirement to be selected for the outsourcing of business activities. The content of BPM offers a great application to capture in a maturity model since companies are progressively attempting to improve their business processes while trying to manage their customers, suppliers, products, and services and improve their efficiency in increasingly dynamic markets (Lee et al. 2007). Therefore, BPM can be seen as a growingly important discipline for larger enterprises and prominent benchmark opportunities lay ahead for the BPM maturity model.

Implementation of BPM is a change process that not only requires knowledge transfer but also changes in attitude and behavior (Schmiedel et al. 2020). BPM combines doing the right things (strategy and effectiveness) and doing things right (efficiency) with a change implementation plan, making it possible to secure lasting productivity improvement (Beerepoot et al. 2019). With the BPM maturity model, organizations can manage and plan their organizational development. BPM maturity models enable an organization to gain insight in their current BPM maturity level and highlight opportunities to further improve the implementation of BPM, by comparing the current maturity level to higher maturity levels.

Furthermore, Paavel et al. (2017) state maturity models help in analyzing the current as-is situation, they help to picture the future situation which is also known as the 'to-be' situation and they provide an overview and help to determine an organization's weak spots.

To evaluate an organization's maturity, we developed five stages of maturity which enable us to categorize and characterize the BPM maturity level of an organization. In the following section, we will introduce the structure and the method of development of the model.

### 3.0 BUSINESS PROCESS MANAGEMENT MATURITY MODEL

By applying the BPM maturity model, continuous attention is paid to improving the process organization and making sure it meets the set demands. The BPM maturity model enables organizations to gain insight into the – often complex – reality of their own company, and to apply process management concepts across all aspects of their organization, relating it to the desired organization and direction.

#### 3.1. Method

A first version of the BPM maturity model was set up based on one of the authors' extensive professional experience in combination with a literature review on maturity models (e.g., De Waal et al. 2017; Hammer 2007; Röglinger et al. 2012; Rosemann and De Bruin 2005; Tolsma and de Wit 2009). To ensure that the model reflects a realistic situation, the research team pre-tested the model. The test included five employees of a BPM consulting firm

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participating in this study. Based on their feedback, the model was further refined. This made the model stronger and more anchored in practice (Gherardi 2019; Saunders et al. 2009)

Furthermore, to ensure that the first version of the model would reflect a realistic situation, the research team also pre-tested the model at a large financial organization in the Netherlands. Based on the broad range of feedback the model (see table 1) was also further adjusted.

	Level 1	Level 2	Level 3	Level 4	Level 5
only focused on their own tasks but on the larger	visualization of the processes.  - Employees use different working methods and there is no organization wide uniformity.	within teams described in process descriptions. - Processes are analysed and controlled at the department level.	- Processes are visualized and documented in process descriptions within the business units. - Processes are analysed and controlled at the business unit exist at the business unit level - KPTs exist at the business unit level - People with the business unit level - People with one business unit are aware of the vision and goals of the processes but there is no organizational wide alignment.	- Process architectum with descriptions of the individual process is a valiable to individual process is a valiable to individual processes are analyzed and controlled from an organization with expressed two individual alignment over the business units.  KPI is exist at the organizational eval and are supported by performance measures throughout the processes.  There is organizational wide awareness about the vision and goals the processes serve.	-Process architecture is integrated with the processes of suppliers and customers.  -Processes are analyzed from an organization wide perspective. Additionally, there is a strong alignment with supplier and outstomer processes.  -Set of specific KiP Is based on the needs or demands of outstomers suppliers is formulated.  -There is organizational wide as wateriess about the vision and graits the processes serve. Additionally, the importance and benefits of cooperation with external parties are clear.
clarity on the policy, rules and accountability		manage processes on the Team is vel.  - Knowledge and skills regarding the core competencies are shared within the organization. But no formal training or guidance is facilitated.	- Processes owners are appointed to manage processes on the business will the Villille process managers are still working on the team level. A knowledge and skills are being shared on the business unit a well and training is provided. Data about the core competencies with the organization is used to determine tends and opportunities, and the competencies with the organization is used to determine tends and opportunities, established and is deressed. But the organization awareness and value for the organization has not yet been recognized.	processes supported by dashboards and continuous improvement initiatives. -The knowledge and skills required for the core competencies of the organization are managed	- Voice of outstmers/suppliers are part of end-to-end process attenting, including continuous improvement programs, the programs are focused on optimizing supplier processes as we las the organization's own processes. — Relevant two wedge and skills are actively shared with suppliers and outstomers if it benefits the with suppliers and outstomers if it benefits the — The organization accountability and responsibility exceeds organizational borders.
Nisks and Controls  Levry organization faces risks, a high level of maturity implication is aware of the risks that apply to them and actively monitors and controls these risks.	- Risks and controls are part of job descriptions, no overall framework.  - Organization is not aware of risks, risks are being taken without knowing the implications.  -Responsibility for risks is not clear.	- Keys risks and contols are part of the process documents for within iteams. - Adverse events are adressed and reacted to by specialists. - Responsible persons are adressed but there is no organization wide framework.	There is a clear risk and control framework for the BU.     Procedures, policies and risk authorities are defined and made public.     Responsible persons are addressed but there is no organization wide framework.	framework.  - A Dashboard for monitoring controls is a vailable. Performance linked metrics are used to	Risks and control framework takes external risks of suppliers and outstmers linb coopur.  - Dashboards are used to monitor risks at suppliers and outstomers as well. Lin addition to the organizations risks the organization also actively manages the risks originating from outstomers and suppliers.
Technology Technology Technologies are the main driver of digital transformation. A high level of digital maturity implies a high level of digital competence for employees involved in the digital transformation process.	There is no special attention for process automation.     Systems and applications are outdated.     No process measurement tools are used.	- Central reporting platform that enables outsime reports and insights Process automation initiatives take place manely for reduce costs Systems and applications are up-to-date-but very little synergy between these exist.	- Processes are automated as much as possible within the business units.  - Tools are defined and used by most departments Tools are defined and used by most departments Some tasks are automated via automate in tools Systems and applications are up-to-date and synegy is created between these for example via templates or conventions.	end process perspective.	-Process automation takes place from and end-to-end perspective with a stong flows on the objective/med of outstomers.  The most ad valence process-analysis methods are used (such as machine barring, artificial intelligence, virtual reality or siliniar automation tools) as a measurement source.  Outside in perspective is being followed so the focus is on oustomer value rather than sales or products.
related processes. Increasing data volumes and their quality require organizations to focus.	<ul> <li>Employees only have access to data if the have specific knowledge or experience.</li> </ul>	- Data is collected however no data collection plane exists The data is available to responsible departments however, data cannot be easily analyzed to support operational and strategio decision-making Data quality is bad and therefore much time state Some data management roles exist, but they are not formalized.	- Data and data analysis are people-driven for some data sets.  - Quality is of a coeptable quality, but it requires work to keep them that way.  - Some formal data management roles exist, primarily in operations	- Quality of data is measured via quality metrics	-Processes are highlypredictable due to data insights -investments have been made in predictive analytics to support decision making processes regarding the most important business activities are fully in line with operational and stategin needs.  -Data to election activities are fully in line with operational and stategin needs.  -Data quality a maintained at a high level via -The organization has a range of data supper-users to sustain data to be one of the most valuable organizational assets
People and Skills Successful implementation of the strategy imples successful implementation of the strategy the readings of the staff and their awareness of successing changes. Fraggament, notworksion, and participation of people in strategic changes within an organization is the key to success.	Low level of knowledge and experience regarding Business Process Management and distributions of the second of the process of the second of the process of the second of the process of the second of the second of the sec	regarding Business Process Management - Employees are aware of the importance of digitalization and act so by making efforts to implement technology in their daily job routines Employees are open to change in an opportunistic matter	Me dium la vei of knowledge and experience regarding Dusiness Process M anagement . The law represent of EMP stanling at the Dusiness . The law represents the standard of EMP stanling at the Dusiness of the standard sta	High level of knowledge and experience of business process management.  High several process management is produced in the organisation's are of vorting, and organisation's are of vorting, and organisation's are of vorting.  Periodic BPM of gital training at the organizational level   - Periodic BPM of gital training at the organizational level   - Employees see change as opportunities for development and grow th - M ost employees commit to improving business processes and submitting improvements is integrated in their routine.	Business Process Management browledge is fully integrated at an organization wide level integrated at an organization wide level integrated at an organization is suppliers within the organizations is supply of working.  -Confluency (digitally process training for both empty yees and business partners.  -Confluency improvement is a stached to all empty yee rotes.  -Knowledge sessions are organized with suppliers, users and other skelholders.  -Improving business processes is integrated in every empty yee's routine.

**Table 1 Business Process Management Maturity Model** 

#### 4.0 FUTURE RESEARCH

Further research can be done on how agile working within organizations is finding its way into BPM to make the maturity model more effective and more responsive to the changing circumstances (Badakhshan et al. 2019). It is important to understand the impact of an agile context on BPM in an organization. Furthermore, future research can focus on how BPM maturity models can help organizations become more agile (Kerpedzhiev et al. 2020).

Regarding the BPM maturity model presented in this paper, also further research should be done to empirically test the model in multiple business environments. Findings on how the

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model can help organizations become aware of their business process maturity would further improve the effectiveness of this model.

#### 5.0 CLOSING REMARKS

The business environment is continuously changing the way organizations do business. Therefore organizations need a faster and more flexible way to fulfill stakeholder and customer needs. BPM makes clear how all processes are linked to each other, and informs where change is needed to improve processes. Therefore, BPM is key in helping organizations to stay in control and reach strategic goals – including standardization and digitalization – and offers organizations many benefits.

However, setting up a process-centric organization entails more than describing processes and making these descriptions available to those involved. Setting up the organization, its management and an appropriate philosophy are equally important aspects. The degree of process-orientation and the degree to which the organization wants to manage processes depends on the organization's level of ambition. The BPM maturity model offers a stepping stone with which organizations can determine whether their ambitions are in line with their initial situation.

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