SUCCESSFUL APPLICATION OF PPM – AN ANALYSIS OF THE GERMAN-SPEAKING BANKING INDUSTRY

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Abstract

Process Performance Management (PPM), whose importance has increased as a result of the recent financial and economic crisis, is one of the major management concepts regarding business processes. Especially its ability to continuously supervise process efficiency and to discover potential for process optimization strengthens its importance. Although PPM application in the banking industry is widespread, there is still a lot of room for improvement. Only a few PPM applications are based on a consistent methodology and many different individual concepts are being used. The purpose of this paper is to identify factors for PPM success. Therefore, we distinguish between factors that are implemented by banks whose PPM application can be identified as successful vs. those banks whose PPM application is less successful. The analysis is conducted using different research methods – exploratory and confirmatory ones. Confirmatory analysis is used to prove that three indicator variables (‘net benefits’, ‘user satisfaction’, and ‘acceptance’) define ‘successful application of PPM’. Exploratory analysis is applied to identify linear correlations between given variables (e.g. ‘integration of PPM in corporate strategy’, or ‘complete and reasonable selection of key performance indicators’) and ‘successful application of PPM’.

Keywords: Process Performance Management, Process Performance Measurement, Process Controlling, Banking Industry
1 Introduction

Since the emergence of the global financial and economic crisis in the last years banks have been facing tougher competition for financially strong customers and, consequently, an increasing pressure to cut and control costs. As banking services are immaterial and require intensive use of Information Technology (IT), an effective and efficient business process management is crucial to a bank’s competitiveness. Monetary performance indicators like cash flow or cost reports delay the observation of impacts triggered by optimization efforts. Thus, validating their success is a challenge as well as implementing corrective measures to counteract less promising optimization attempts (Hoffmann, 1999). As a result, many banks implement Process Performance Management (PPM) by adding measurement and control mechanisms directly to their core business processes. These systems enable banks to permanently monitor process performance in or near real-time, to identify optimization potential, and to predict potential bottlenecks in process execution. As a result, banks can increase their responsiveness and strengthen their competitiveness. Additionally, medium-term optimization potential for process design can be discovered (Leist et al., 2010).

By intensively using IT, banks possess almost ideal prerequisites to implement indicator driven process capability and performance monitoring. However, banks apply PPM to very different extents. Especially well established PPM methods are hardly used. Instead, banks tend to apply their own concepts derived from internal requirements without having a sound theoretical background, or they concentrate solely on the technical realization of PPM systems and their functions (Leist et al., 2010).

Based on this knowledge, we conducted a study to determine the application of PPM in the German-speaking banking industry (see Leist et al., 2010). As German banks traditionally show high cost-income ratios (CIR) in global or European comparison, the German market can be seen as highly competitive. Therefore banks have a high need to increase their productivity and monitor their costs. These demands are the perfect starting point for applying PPM. The goal of the survey was to identify the status quo of PPM application, to gather current trends, and to generate hints to best practice applications. The survey was conducted in the first quarter of 2010 and it contains answers from experts covering all relevant banking types in the German-speaking area.

Accordingly, this paper shows a different perspective on the results of the study. To be more specific, the following questions will be addressed:

- How can successful application of PPM be measured?
- Which attributes show a direct link to successful application of PPM in the banking industry and to what extent can they be found at successfully acting banks?

To put it in a nutshell, this paper’s goal is to identify characteristic attributes that can be used to distinguish between banks successfully applying PPM and banks that are less successful in utilizing PPM, and further on serve as success factors.

Empirical research methods are being used to support this analysis (see Wilde and Hess, 2007). For hypothesis testing exploratory (structure discovery) as well as confirmatory (structure testing) data analysis techniques are used (see Backhaus et al., 2003) to find characteristic attributes of banks that apply PPM in a successful way.

This paper’s structure is as follows: After this introduction section 2 presents foundations of PPM in the banking industry and gives an insight into related work in this area of research. Section 3 creates the theoretical basis for the subsequent analysis and formulates the hypothesis. Section 4 presents a short summary of the survey results followed by the results of our data analysis that address the research questions. Additionally, this section covers the validation of the hypothesis. In section 5 we discuss and interpret our results. The closing section sums up the main points and notes the implications for future research.
2 Process Performance Management in the Banking Industry

2.1 Terminology

When searching for a definition for PPM many different, mostly overlapping definitions from various authors can be found. To clarify our definition of PPM, our understanding of performance as well as the underlying concepts will be explained in the following.

The term ‘performance’ contains a future-oriented approach (Krause, 2005; Lebas, 1995). In general, performance can be understood as a contribution of a company-internal or company-external individual or group to achieve a company’s goals (Chamoni et al., 2006). Machines (Gleich, 2002) or information systems can be used as support. Krause (2005) defines the term in the business realm as the degree of achieving company goals or the potential output of all stakeholder-relevant attributes of an organization (Krause, 2005). Pleier differentiates between three views (capability, process, result) which focus on different aspects of performance creation (Pleier, 2008).

Business Performance Management is an extensive approach for process-oriented and strategy-conform planning, measurement, and controlling of contributions to multidimensional organizational goals (Chamoni et al., 2006). These contributions can be derived from different corporate perspectives, e.g. employees, teams, offices, or processes. This is the reason why some authors suggest a focus of Performance Management on stakeholder utility (Krause, 2005; Otley, 1999). Performance Management is defined as a cycle (‘plan’, ‘improve’, ‘control’, ‘communicate’), each of whose steps affect performance and the underlying mental models of involved protagonists (Krause, 2005). Performance planning serves two goals: First, it aligns requirements of stakeholders with those of competition. Secondly, it defines requirements and a target range for performance. This is achieved by defining and concretizing Key Performance Indicators (KPIs) (Krause, 2005). Performance improvement can be supported by a vast number of methods, e.g. Total Quality Management (Stamatis, 1997), Continuous Quality Improvement (CQI) (Kostka and Kostka, 2008), Lean Thinking (Womack, 1996), and Business Process Reengineering (BPR) (Hammer and Champy, 2003). Performance controlling contains measurement, monitoring, and evaluation of performance based on predefined KPIs (Krause, 2005). The task of Performance communication is to process, prepare and release collected information to its target audience using IT-systems. A feedback loop should be established to identify deficits in report design or to replace non-beneficial KPIs (Krause, 2005).

PPM narrows the view of Performance Management and can be seen as the active management of business processes through planning, monitoring and controlling (Leist et al., 2010). The main goal is to identify optimization potential in business processes (Chamoni et al., 2006). A business process comprises a sequence of activities, focuses on fulfilling an organizational task and cuts across functional boundaries (Davenport and Short, 1990; Harrington, 1991). As a business process is performed by human beings and machines, it represents a socio-technical system (Shaw et al., 2007). Even though modeling of these processes with a semi-formal modeling technique is not a mandatory requirement for PPM, it is strongly suggested for transparency (Oehler, 2006) and consistency (Thomas and Fellmann, 2007) reasons.

2.2 Object of Research

By definition, banks seem to be perfect candidates for implementing PPM. The banks’ role as financial intermediary and, consequently, their transaction and transformation functions are based on the fact that financial services are immaterial (Thomas, 2008). The transformation function, consisting of risk, time, and batch transformation (Krotsch, 2006; Riese, 2006), further constitutes the importance of information flows. Given these characteristics, banking processes are especially suitable to be processed by IT systems. The used IT systems are the source for digital process information and simplify the collection of process data (Leist et al., 2010).
Along with the immateriality of banking services the integration of the external factor (customer) is another characteristic of value chains in the financial industry (Thomas, 2008). Although banking services for retail clients are more or less standardized, the individual requirements of corporate clients or of clients in wealth management generate an individual banking product for each customer. In addition and as a consequence, a large number of different banking products require different processes for their development, sales and transaction. Thus, planning and controlling banking processes is especially important (Leist et al., 2010).

Keeping the mentioned points in mind, banks can be considered as fitting objects to research the application of PPM. On the one hand, they fulfill important requirements to monitor the product lifecycle on a technical and organizational level using KPIs, while, on the other hand, the heterogeneity of banking itself forces them to efficiently and effectively control their processes (Leist et al., 2010).

### 2.3 Related Work

The successful application of PPM is not an intensely discussed topic in literature – despite its importance for the banking industry, especially after the global financial and economic crisis. In particular, investigations aiming to identify factors for a successful application of PPM can hardly be found. Nevertheless, there are several research studies which concentrate on similar topics containing valuable hints for our investigation.

A major topic of research is the impact of IS on business process effectiveness and organizational performance, not only since IT investments have grown rapidly over the years (Chang and King, 2005; Melville et al., 2004; Bharadwaj, 2000). Most prominently, the DeLone and McLean IS success model (DeLone and McLean, 1992) synthesized previous research (Ives et al., 1983; Mason, 1978) involving IS success into a more coherent body of knowledge and was a starting point of several following investigations (Molla and Licker, 2001; Seddon and Kiew, 1994). The theoretical foundation of this research is the resource-based view which argues that companies possess resources; these can be divided into two subsets, one that enables them to gain competitive advantages, and another one that leads to superior long-term performance (Wade and Hulland, 2004). While the contribution of IS to banks has been debated from several viewpoints in literature (e.g. Davamanirajan et al., 2006; Tallon, 2010), only little discussion has been dedicated to the contribution of Performance Management Systems, not to mention PPM. Examples for these contributions are the investigation of the influence of Performance Management on the overall performance of a company and the identification of success factors (Gleich, 2001; Gleich, 2002), or the relation between marketing communication and performance by identifying success factors (Janz, 2008). Other authors focus on development, implementation (Schreyer, 2007), and introduction (Krause, 2005) of Performance Measurement/Management Systems and examine their influence on a company’s performance. All these investigations provide a promising basis for potential success factors in our research.

A second research area consists of studies which have a narrower focus. They constitute user acceptance as the main factor for applying IT (e.g. TAM (Davis, 1989)). In consequence, user acceptance is an essential precondition for IT to be successfully applied and to gain an impact on a company’s performance (see Beaudry and Pinsonneault, 2010; Karahanna et al., 2006; Davis, 1989). However, none of the found studies place an emphasis on PPM. This is not a surprising result since PPM cannot be reduced to the underlying IT system. In addition, most of the studies assume the use of the investigated IT as optional for the user. In contrast, PPM requires the tool to be used in order to generate the next report or to conduct the predefined analyses. Nevertheless, the result of these investigations to regard user acceptance as a prerequisite for successful application of IT is considered in our research.

A third research area concentrates on characteristics of PPM. Based on empirical research publications these authors analyze the underlying factors of PPM. However, they do not close the link to the successful application of PPM. One of the most promising approaches in this area is the work of Bucher and Winter (2007) who identify four factors defining Business Process Management that are
mainly related to PPM. Their exploratory analysis shows that, in addition to the extent to which performance measurement is conducted, the use of established methods and standards is to be seen as a distinguishing feature of successful PPM users (Bucher and Winter, 2007). Cleven et al. (2010) analyze four stereotype problem situations of PPM and highlight optimization potential. For example, KPI enthusiasts define and implement a large amount of performance indicators, but only monitor and control a small number of processes using these KPIs (Cleven et al., 2010).

To sum it up, we found different research areas which provide a basis for potential success factors and give hints for the definition of a successful application. However, empirical research focusing on the successful application of PPM was not discovered.

3 Successful Application of PPM

3.1 Operationalization of PPM Success

Because of the multiple causes of corporate success and the resulting allocation problem (Fritz, 1995) it is not expected that the design of PPM can explain corporate success or its conclusion. Instead, the scope has to be limited on the area of PPM and especially on its application. Thus, in this paper success is defined as the successful application of PPM. Accordingly, the term ‘PPM success’ is used in the sense of the successful application of PPM.

PPM success cannot be represented by any directly observable or measurable variable in an empirical research study. Instead, success has to be defined as a latent variable representing the hypothetical construct of success (see Backhaus et al., 2003). This latent variable needs to be operationalized by several indicator variables which represent components of PPM success and not its cause (see Seen et al., 2007). This is due to the fact that PPM success can only be represented by its causes when these causes are known to their full extent and also their interdependencies are clearly identified. In contrast, components of PPM success represent their underlying factor by definition to its full extent. Taking these requirements into account, three indicator variables were derived from literature as indicators for PPM success: ‘net benefits’, ‘user satisfaction’, and ‘acceptance’. They are characterized as follows:

Net benefits: In economic research, an objective approach is widely used to define success as the degree of achievement of objectives (Fritz, 1995). These objectives can reach from a project level to an overall organizational level. In this paper, we focus on the overall approach. Since PPM by definition is not a self-purpose but an instrument to achieve certain goals (Amshoff, 1993), the degree of achievement of goals can be used as an indicator for its success. This indicator is equivalent to ‘net benefits’ in the D&M-ISS model (see DeLone and McLean, 2003).

User satisfaction: The second indicator for PPM success is the satisfaction of the individual user with the application of PPM. Gelderman (1998) points out a significant correlation between user satisfaction and success. Additionally, user satisfaction is the starting point for individual and consequently also for organizational productivity (DeLone and McLean, 2003).

Acceptance: The Technology Acceptance Model (TAM) by Davis (1989) describes why users of Information Systems use and accept new technologies. Acceptance of IS is the base for a high degree of success (DeLone and McLean, 2003). Igbaria and Tan (1997) found a significant correlation between acceptance and individual performance. Considering organizational performance (see Igbaria and Tan, 1997), this relationship allows to use the variable acceptance for PPM success. In contrast to user satisfaction this variable enhances the personal view of the individual user to the perceived acceptance of all organizational units.

To fully represent PPM success as many indicator variables as possible should be used, because multi-dimensional measurement ensures that the latent variable success is measured with high reliability. However, to focus on the most dominant indicators for PPM success, we limited our analysis to the 3 aforementioned indicator variables, which can be considered to be in conformance with literature as shown above.
3.2 Formulation of Hypothesis and Research Design

One major goal of this paper is to measure the successful application of PPM. For this purpose, we created a model that, on the one hand, contains the latent variable ‘success’ and, on the other hand, the three indicator variables ‘net benefits’, ‘user satisfaction’, and ‘acceptance’ that operationalize PPM success. Our research includes the following steps:

1) Testing of hypothesis H: The successful application of PPM is represented by ‘net benefits’, ‘user satisfaction’, and ‘acceptance’. Based on a reflective measurement model, hypothesis H can be tested by conducting a confirmatory factor analysis (Backhaus et al., 2003; Edwards and Bagozzi, 2000).

2) Correlation of potential success factors: In addition to H, we want to analyze which attributes show a direct link to successful application of PPM in the banking industry. A necessary, but not necessarily sufficient condition for the impact of a success factor is a linear correlation between these variables and the successful application of PPM. We conduct an exploratory research to prove the assumed correlations between variables and PPM success by calculating linear correlation values.

4 Survey and Results of the Empirical Research

4.1 Survey Design and Data Collection

The foundation for our study was an online questionnaire that was conducted in the first quarter of 2010 and its participation was restricted to banking experts in the German-speaking area. The questionnaire contained a total of 50 questions split into four categories. First, the participants were asked to provide general information about themselves (position, department, relevant expertise in Process Management and PPM) as well as about their institutions (type of bank, total assets, number of employees). Then the experts answered six questions about current and planned projects concerning PPM in their banks. Afterwards, we asked four questions that contained a general evaluation of PPM (e.g. importance, strategy, impact of financial crises…). These questions were followed by four questions regarding the knowledge and application of various PPM methods as well as the plans to implement those methods in the participants’ banks and their net benefits. The main section of the questionnaire consisted of 27 questions that were aligned to the phases of Krause’s PPM-cycle (Krause, 2005). The last section was composed of three questions about the acceptance of PPM in the participants’ institutes. We used a five-level Likert scale for most of the questions.

To acquire as many participants as possible, we sent out an e-mail invitation to join our survey to every banking expert we found through various sources (in total, we invited over 1,000 individuals within 705 different banks). Multiple experts per bank occurred as a result of addressing different departments of the bigger institutes. The position of the participants ranged from CEOs to PPM Managers/Users. When we closed the survey, 109 experts (from 89 different banks) had participated in the survey. To ensure a very high quality and to ensure that the results were comparable, we filtered this data set by applying strict criteria:

- All questions had to be answered
- Control questions were answered correctly
- Timing restrictions were met

After applying these restrictions we remained with a data set of 40 participants (34 different banks). This number may look small; it is, however, of very high quality due to our strict filtering. Also, a rather small sample size can be justified when results are statistically valid (Straub, 2009). It is obvious that a larger sample size would improve result quality; however, since our hypothesis is statistically significant (see section 4.2), our sample size has to be considered as sufficient. Additionally, our sample size also fulfills multiple statistical requirements as presented in the next section (e.g. Kaiser-Meyer-Olkin Measure, Cronbach's $\alpha$, factor structure).
4.2 Results of the Empirical Research

As an introduction to the used data set we will present some descriptive analyses before we start the hypothesis testing. Table 1 shows the absolute and relative frequencies for each of the three indicator variables which were formulated to operationalize the latent variable ‘PPM success’.

<table>
<thead>
<tr>
<th></th>
<th>Very High</th>
<th>High</th>
<th>Average</th>
<th>Poor</th>
<th>Very poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net benefits</td>
<td>6</td>
<td>12</td>
<td>14</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Percent</td>
<td>15.0</td>
<td>30.0</td>
<td>35.0</td>
<td>15.0</td>
<td>5.0</td>
</tr>
<tr>
<td>User satisfaction</td>
<td>1</td>
<td>10</td>
<td>14</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>Percent</td>
<td>2.5</td>
<td>25.0</td>
<td>35.0</td>
<td>35.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Acceptance</td>
<td>4</td>
<td>12</td>
<td>18</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Percent</td>
<td>10.0</td>
<td>30.0</td>
<td>45.0</td>
<td>12.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Table 1: Frequency table for indicator variables

Net benefits: The scale ranged from ‘very high’ (=1) to ‘very poor’ (=5). Looking at the frequency table shows a concentration on the two levels ‘high’ and ‘average’. The overall mean is 2.65.

User satisfaction: It shows a slightly negative tendency across all participants. The overall mean is 3.1.

Acceptance: It is seen rather negative by the participants of the study. The overall mean is 2.68.

Testing of Hypothesis H

Backhaus (2003) requires a correlation analysis as a first step to discover interdependencies among variables (Backhaus et al., 2003). Table 2 presents the Spearman correlation coefficients for the three indicator variables. The correlation between ‘user satisfaction’ and ‘acceptance’ is not significant on a .05 level. However, the correlation between ‘net benefits’ and ‘acceptance’ is highly significant on a .01 level (0.415). The highest correlation exists between ‘net benefits’ and ‘user satisfaction’ (0.693). High correlation values hint at a strong dependency of the three variables which is a requirement for the confirmation of hypothesis H.

<table>
<thead>
<tr>
<th>Correlation</th>
<th>Net benefits</th>
<th>User Satisfaction</th>
<th>Acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net benefits</td>
<td>Correlation Coefficient</td>
<td>.693**</td>
<td>.415**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.005</td>
<td></td>
</tr>
<tr>
<td>User satisfaction</td>
<td>Correlation Coefficient</td>
<td>.846</td>
<td>.899</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.811</td>
<td>.081</td>
<td></td>
</tr>
<tr>
<td>Acceptance</td>
<td>Correlation Coefficient</td>
<td>.492</td>
<td>.702</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.005</td>
<td>.081</td>
<td></td>
</tr>
</tbody>
</table>

**. Correlation is significant at the .01 level (2-tailed).
* . Correlation is significant at the .05 level (2-tailed).

Table 2: Correlation Matrix

Reliability testing of the model shows that the variables ‘net benefits’, ‘user satisfaction’, and ‘acceptance’ can be used to operationalize the latent variable ‘PPM success’. The Principal Component Analysis (PCA) shows high communalities for the three variables (see table 3). All of them are above the required value of 0.4 by Osborne and Costello (Osborne and Costello, 2005).

<table>
<thead>
<tr>
<th>Communalities</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net benefits</td>
<td>1.000</td>
<td>.790</td>
</tr>
<tr>
<td>User satisfaction</td>
<td>1.000</td>
<td>.716</td>
</tr>
<tr>
<td>Acceptance</td>
<td>1.000</td>
<td>.492</td>
</tr>
</tbody>
</table>

Table 3: Communalities

<table>
<thead>
<tr>
<th>Components</th>
<th>Component 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net benefits</td>
<td>.889</td>
</tr>
<tr>
<td>User satisfaction</td>
<td>.846</td>
</tr>
<tr>
<td>Acceptance</td>
<td>.702</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis

Table 4: Component Matrix
Additionally, the factor loadings are above the defined minimum requirement of 0.7 (see table 4) (Bortz and Weber, 2005). The total variance explained is 66.613%. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy which shows the extent of the connection between the initial variables and thus indicates if the factor analysis is reasonable (Backhaus et al., 2003) has a value of 0.619. This value is considered as ‘mediocre’ by Kaiser and Rice (Kaiser and Rice, 1974). Furthermore, it is above the minimum requirement of 0.6 (Schendera, 2010). Cronbach's α (Cronbach, 1951) shows a value of 0.746 which is above 0.7 as demanded by Nunnally (Nunnally, 1978).

According to Bortz and Weber (2005) another indicator for the correctness of an underlying model is the stability of a factor structure (FS). In our case, given a sample size of N = 40 and a minimum factor loading of 0.7, the factor structure is calculated as FS = 0.8441 which is above the minimum requirement of 0.8. This means we have an acceptable conformity between true and sampled factor structure which justifies further interpretation (Bortz and Weber, 2005).

As a result, Hypothesis H can be confirmed. The successful application of PPM can be represented by the three indicator variables ‘net benefits’, ‘user satisfaction’, and ‘acceptance’ The validity of the underlying model can be stated as confirmed based on its reliability and stability.

**Correlation of potential Success Factors**

After testing hypothesis H we also checked on correlations between further variables gathered from the initial questionnaire and the operationalized variable ‘successful application of PPM’. In this exploratory analysis, we calculated Spearman’s correlation coefficient for every variable. We found significant correlations at the .05 level for eleven variables. These are presented in table 5.

<table>
<thead>
<tr>
<th>Correlations to successful application of PPM (N = 40)</th>
<th>Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of PPM</td>
<td>.317*</td>
<td>.046</td>
</tr>
<tr>
<td>Integration of PPM into corporate strategy.</td>
<td>.567**</td>
<td>.000</td>
</tr>
<tr>
<td>Connection of PPM to employee compensation</td>
<td>.409**</td>
<td>.009</td>
</tr>
<tr>
<td>Need for a more useful selection of performance indicators</td>
<td>-.456**</td>
<td>.003</td>
</tr>
<tr>
<td>Need for proof of completeness of performance indicators</td>
<td>-.456**</td>
<td>.003</td>
</tr>
<tr>
<td>Degree of processes controlled using PPM (deposit transactions)</td>
<td>.398*</td>
<td>.011</td>
</tr>
<tr>
<td>Degree of processes controlled using PPM (payment transactions)</td>
<td>.375*</td>
<td>.017</td>
</tr>
<tr>
<td>Sources for PPM data – Process Management Tool</td>
<td>.332*</td>
<td>.036</td>
</tr>
<tr>
<td>Problems due to low automation in data collection</td>
<td>-.404**</td>
<td>.010</td>
</tr>
<tr>
<td>Visualization of process models with KPIs in PPM system</td>
<td>.315*</td>
<td>.048</td>
</tr>
<tr>
<td>Usage of methods for performance improvement - BPR</td>
<td>.387*</td>
<td>.014</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the .01 level (2-tailed).
*. Correlation is significant at the .05 level (2-tailed).

**Table 5: Correlations to successful application of PPM**

The list of significant variables can be separated into two groups: Variables reflecting opinions on PPM and variables reflecting characteristics of PPM. The first group contains only one significant variable (‘importance of PPM’). The other ten variables fall into the second group. Seven of them show a positive linear correlation to successful application of PPM: ‘integration of PPM into corporate strategy’, ‘connection of PPM to employee compensation’, ‘degree of processes controlled using PPM’ (deposit transactions and payment transactions), and ‘visualization of process models with KPIs in PPM system’. The use of a Process Management Tool as a source for PPM data and the use of BPR as a method for performance improvement also show a positive linear correlation to PPM success.

We identified three variables showing a negative linear correlation to the successful application of PPM: ‘need for a more useful selection of performance indicators’, ‘need for proof of completeness of performance indicators’, and ‘problems due to low automation in data collection’.

The described correlations of the single variables to PPM success can be analyzed in further detail. We analyzed the strength of the correlation between the given variables and the three operationalizing
indicator variables ‘net benefits’, ‘user satisfaction’, and ‘acceptance’. The results are presented in the following figures. They show a tendency towards the linear correlation for all three indicator variables.

Figure 1 shows the relationship between each of the three indicator variables and the variable ‘need for a more useful selection of performance indicators’ which is highly correlated to PPM success (-.456). Looking at user satisfaction in figure 1, the entire group of users who are very unsatisfied (--) with the current PPM sees the need for a more useful selection of performance indicators (100%). On the other hand, users who are satisfied (+) or very satisfied (++) with the current PPM in their organization see no or hardly any need for a more useful selection of performance indicators (10% and 0% respectively). As a result it can be stated that ‘user satisfaction’ is the higher the more the tendency for the need of a more useful selection of performance indicators decreases. This explains the negative correlation described earlier on (-.456). The same behavior can be observed with the other indicator variables ‘net benefits’ and ‘acceptance’. The higher the net benefits or the acceptance of the current PPM are, the lower the need for a more useful selection of performance indicators.

Another very interesting relationship can be found regarding the variable ‘integration of PPM into corporate strategy’, which pinpoints the highest positive correlation of all variables. Figure 2 shows that the high correlation of this variable to PPM success (.567) can be observed for the three underlying indicator variables as well. Except for a small outlier in the group of low acceptance (-), a positive correlation between the ‘integration of PPM into corporate strategy’ and the operationalizing variables for PPM success was found. Experts rating ‘net benefits’, ‘user satisfaction’, and ‘acceptance’ on a high or very high level (+/++) mentioned that their institutions had incorporated PPM in their strategy with a much higher probability than the remaining participants.

5 Interpretation of the Empirical Research

The results of our empirical research prove that Hypothesis H is valid. The indicator variables are correlated with each other and can be used to represent the factor ‘PPM success’. Furthermore, eleven variables from the study were identified that showed a linear correlation to PPM success – eight of them showed a positive correlation and three of them a negative one.

The highest value of a correlation coefficient was found with the variable ‘integration of PPM into corporate strategy’. We assume that an incorporation of PPM into a bank’s strategy will have a positive impact on successful application of PPM since it will require and motivate (top) management to apply PPM. As a result, all organizational units will be motivated to apply PPM in a useful way and increase its acceptance, user satisfaction and net benefits. This is the reason why the integration of PPM into corporate strategy is recommended to improve its successful application.
The two variables ‘need for a more useful selection of performance indicators’ and ‘need for proof of completeness of performance indicators’ also show high but negative values in linear correlations. Banks that see the need for a more useful selection of performance indicators tend to be less successful when applying PPM than their competitors that are satisfied with the performance indicators they have gathered. Banks that are unsure if they have collected all the necessary performance indicators are also less successful than their counterparts. As a result, it seems necessary to collect all important performance indicators without monitoring random, potentially useless, ones.

Additionally, we discovered a positive linear correlation between PPM success and the variable ‘connection of PPM to employee compensation’. As a result, we can assume that if a bank connects its employee compensation directly to PPM (e.g. by monitoring the achievement of individual’s goals), its application of PPM will most likely be more successful.

Data quality is another issue as regards PPM success that we discovered in our research. Low automation in data collection leads to a less successful application of PPM. This means, banks that successfully apply PPM already use a highly automated system for data collection hence minimizing the occurrence of data quality problems caused by manual tasks. Automation is a key to the successful application of PPM and should therefore be already considered when starting to design PPM.

There were certain variables that did not have any correlation with PPM success. For example, the variable ‘problems due to missing data sources’ did not show any linear correlation with PPM success. However, Figure 3 shows non-linear correlations between the mentioned variable and the three indicator variables.

![Figure 3: Problems due to missing data sources](image)

It shows as well that banks with either (very) low or (very) high PPM success do not or hardly face any problems due to missing data sources. However, banks with medium PPM success claim to struggle with the unavailability of the adequate data sources more often. While we would have expected more problems at the less successful banks, we assume that banks having little PPM success face deeper problems than only collecting more data. They will more likely be struggling with incorrect, missing, or an overload of data. Regarding the application of PPM, successful banks have no need to collect more data, since they will most likely possess all the necessary data they need for operating their PPM.

6 Conclusion

Achieving strategic goals while strictly adhering to the calculated budgets is one of the major challenges banks nowadays face as a result of the recent financial and economic crisis. Process Performance Management is a major solution to tackle this challenge. It combines data analysis and reporting based on historic or real-time data with forecasts and simulations for forecasting and controlling. The study we conducted in Q1/2010 showed a broad distribution of PPM among banks in the German-speaking area, but it also identified a big need for improvement.
In this paper, we showed how PPM success can be described as a factor of three indicator variables, and pinpointed the attributes that support a successful application of PPM. We could confirm that the three variables we selected to represent a successful application of PPM – ‘net benefits’, ‘user satisfaction’, and ‘acceptance’ – can actually be used to describe PPM success based on statistical evidence. Additionally, we found strong correlations between PPM success and several attribute variables, e.g. ‘integration of PPM into corporate strategy’, ‘connection of PPM to employee compensation’, ‘need for a more useful selection of performance indicators’, and ‘need for proof of completeness of performance indicators’, which could serve as PPM success factors. Interestingly, none of them are exclusively relevant for banks. Especially the problem to select the appropriate KPIs is known as a general challenge of PPM. We had expected that characteristic attributes like ‘regulatory compliance’ or ‘financial impact of violation of regulations’ would be of a higher interest for banks due to the consequences of the financial and economic crisis. According to our survey, banks do not express this need. Our conclusion is that the application of PPM is still in an early development state focusing on basic performance measurement.

The practical relevance of our research shows up in the problem statement and the importance of PPM in the banking industry. The definition of the indicator variables is – not only caused by the recent financial and economic crisis – of great interest in the banking world, since they can support a successful application of PPM and therefore help to support monitoring, controlling and managing banking processes. From a research perspective, we found dependencies between indicator variables and PPM success by applying our model. These variables can further on be used to define PPM success.

The following limitations have to be considered:

- The data set is rather small (N = 40). This is due to our very strict selection of useful data as explained earlier on in this paper. However, we showed that our sample size is sufficient and statistically relevant (see section 4.2).
- We analyzed a total of 99 variables of which eleven showed a linear correlation to PPM success. We have not yet entirely finalized our search for non-linear correlations, which means that correlations of the remaining variables with PPM success cannot be excluded.
- Moreover, since correlations only show dependencies, but not the direction of these dependencies, it cannot be stated free of doubt whether an attribute (e.g. ‘integration of PPM into corporate strategy’) is the cause for PPM success (and thus a success factor) or the effect of PPM success.
- We are aware that the definition of PPM success is biased by asking practitioners questions about acceptance, satisfaction and net benefits of their very own PPM. Thus the conclusion cannot be drawn whether banks that claim to successfully apply PPM actually achieve an objective and verifiable PPM success, e.g. a higher degree of process optimization.

Based on these limitations further research possibilities are suggested below:

- The purpose of our investigation could be extended and further analysis of the collected data could be done. It could be analyzed if the answers significantly differ depending on the banking type the interviewee belongs to, or on the interviewee’s position in the bank.
- From a practitioner’s perspective, PPM success can be seen as the achievement of predefined objectives which could be seen as an equivalent to ‘net benefits’. As a result ‘user satisfaction’ and ‘acceptance’ would only be considered as being success factors. Since this viewpoint contradicts literature, further research will have to be conducted.
- As the focus of our study we chose banks due to their perfect fit to the requirements of PPM. However, a broader focus on other industries would be beneficial for future research, especially because none of the identified success factors are banking specific.
- To further enhance the practical relevance of our research, we are planning on conducting case studies with PPM practitioners across various industries. This will complement our investigation with insights on how practitioners can manage PPM to be successful based on their individual experiences.
References


