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# Open Innovation and Public Sector Business Process Management – A Multi-Method Study

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## ABSTRACT

Open Process Innovation provides a framework for studying how to systematically make use of knowledge that lies outside of an organization's boundaries for process innovation initiatives. Here, we seek to investigate into variables that impact on the qualities of Open Process Innovation taking the example of the public sector domain. This paper examines how a lack of resources impacts on BPM. Specifically it investigates how personnel resource scarcity exerts influence on the involvement of i) customers (here citizens and local companies) and ii) consultants (here management and software consultants) in public sector BPM. Our multi-method analysis shows that personnel resource scarcity has consequences for BPM-related collaboration schema as it restricts the involvement of customers. Based on our findings, implications for theory and practice are discussed, including implications for studies on BPM maturity or on business process design. We call for a governance-theory perspective on process innovation as a fundamental basis for understanding and designing the institutions that shape collaboration in open process innovation.

## Keywords

Open Process Innovation, Business Process Management, Governance, Public Sector

## INTRODUCTION

External actors play an increasingly important role in public sector reforms. Due to the high pressure, the diversity of demands, and new areas of responsibility, local governments increasingly rely on innovation networks (Rethemeyer 2007). A wide range of external actors is involved in public sector reform processes, such as software and management consultancies (Pratchett 1998) or individual citizens (Wollmann 2000). Here, Open Innovation can be regarded as a management paradigm addressing related challenges (Chesbrough 2003a, 2003b) as it studies the role of external actors in extending the pool of capabilities of a (government) organization (Feller et al. 2008). Specifically, Open *Process* Innovation can be regarded as a management perspective on process innovation which promotes the study of how BPM activities could be more successful when making use of BPM knowledge which lies outside of the organizational boundaries (Niehaves 2009). Research on process management maturity discusses two major types of external actors for BPM collaboration, customers and BPM experts (for instance, Rosemann et al. 2006). Against this background, we seek to investigate into variables that impact on the qualities of Open Process Innovation taking the example of the public sector domain. This paper addresses the following research question: Does personnel resource scarcity exert influence on the involvement of i) customers (here citizens and local companies) and ii) consultants (here management and software consultants) in public sector Business Process Management?

In order to achieve this research aim, we undertook a comprehensive multi-method study. First, within a 22-months time frame, 16 interviews were conducted with experts in local government BPM in Germany. As a second step, a quantitative analysis of BPM-collaboration with customers and consultants was carried out, taking into account the answers of 357 local governments.

The paper is structured as follows: Section 2 builds the theoretical foundation of our analysis. Subsequently, the discussion of the research methodology applied takes into account issues of method selection, interviewee selection, and data collection and analysis. Following the result discussion, we seek to reflect on the implications for theory and try to open up new vistas for BPM practice. The final section contains conclusions.

## THEORETICAL FOUNDATION

### Open Innovation

The paradigm of ‘Open Innovation’, first described by Chesbrough (2003a, 2003b), tries to address the high demands of innovation processes. Companies find themselves exposed to constantly rising pressure due to higher competition, increase of acceleration and rising customer demands. Research and development divisions are often dysfunctional in coping with such increased pressure. Hence, in contrast to ‘Closed Innovation’, companies focus on acquisition of external knowledge, e.g. by know-how buy-in or the support of universities. This results in blurring enterprise boundaries, in particular the boundaries of processes in product and service development. While Chesbrough (2003a, 2003b) originally examines private sector product innovation, the approach can be applied to the public sector as well. Here, various forms of collaboration can already be found, including collaboration with consulting companies (Pratchett 1998) or individual citizens (Wollmann 2000).

### BPM and Process Innovation

BPM describes the efforts of an organisation to manage its processes, for instance, to monitor, analyse and optimize them. BPM can be considered to subsume fields like process innovation, optimisation, improvement or reengineering (Hung 2006, Hammer & Champy 1993, Davenport 1997, Zairi 1997, Breyfogle 2003). BPM habitually includes methods to automate tasks, define processes as a sequence of work steps, and to define responsibilities (for a comprehensive overview of IS and process innovation see Tarafdar & Gordon 2007). Major characteristics of public administrations, in contrast to private companies, are a high density of legal rules and a larger variety of goals: guarantee of proper legislation and jurisdiction, promotion of economic development, defence of public rights or environmental protection are only some of them (Lenk et al. 2001). For BPM in local governments, these issues imply more complex processes that contain a multitude of decision points and that are rarely well structured.

Actor	Authors (Examples)
Customers	Zirger & Maidique 1990, Hammer & Stanton 1994, Venkatraman 1994, McAdam & Donaghy 1999, Bhatt & Stump 2001, Wu 2002, Rosemann et al. 2006, Hammer 2007
BPM Consultants	Davenport, 1993, Klein 1994, Boyle 1995, Grover et al. 1995, Willcocks & Smith 1995, Shabana 1996, Khoong 1996, Dennis et al. 1999, Rosemann et al. 2006

**Table 1. Customers & Consultants in BPM**

External actors play an integral role in BPM (de Vreede 1998; Dean et al. 1995; den Hengst & de Vreede 2004, Magdaleno et al. 2008, Sarker et al. 2006) and especially in models of BPM maturity. For instance, Fisher (2004), Rosemann & deBruin (2005) and Rosemann et al. (2006) develop BPM maturity models with the intent to assess and evaluate BPM activities in organizations. Following these frameworks, openness – in terms of systematically involving stakeholders in BPM activities – is a major characteristic of high BPM maturity. Here, consultants can contribute specific skills, experience, and know-how to the BPM project and which were both too time-consuming and too expensive for maintaining these competencies internally (Boyle 1995, Shabana 1996, Al-Mashari & Zairi 1999). Against this background, we seek to investigate into the question of other variables than that of BPM maturity – in the context of this paper personnel resource scarcity – exert influence on BPM-related collaboration with consultants and customers (see Table 1 for related work; in our public sector study: citizens and local companies).

Resource scarcity impacts on BPM implementation. A lack of resources can have negative impact on BPM implementation and might prevent projects from succeeding. Literature discusses different areas of resource scarcity that impacts on BPM (for an overview Ahadi 2004): (1) lack of technical resources (Davenport & Short 1990, Parker 1996), (2) lack of financial resources (Johansson et al. 1993), (3) lack of time (Willcocks & Smith 1995), and (4) personnel resource scarcity (Marchand & Stanford 1995, Willcocks & Smith 1995, Ahadi 2004). In the course of this paper, we will focus on personnel resource scarcity and analyse in how far it exerts influence in BPM collaboration with consultants and customers.

### Open Process Innovation

Accordingly, Open Process Innovation can be regarded as a management perspective on process innovation which promotes the study of how BPM activities could make use of BPM knowledge that lies outside of the organizational boundaries (Niehaves 2009). While such understanding opens up for an analysis of a variety of potential BPM-collaborators (for an

overview, for instance, Niehaves & Kobayashi 2009), we focus in our analysis on BPM-related collaboration with consultants (management and software consultants) and customers (citizens and local companies) on the level of an individual process.

## RESEARCH DESIGN

### Qualitative Method

**Method selection.** A series of 16 semi-structured expert interviews was conducted within a 22 months-timeframe. Here, qualitative expert interviews allowed for gathering rich data and for building up a deeper understanding of the phenomenon under investigation. The involvement of external actors in public sector BPM initiatives has not yet been studied intensively – neither with qualitative nor quantitative means. Against this background, we sought to reflect insights derived from the literature analysis as a first step for a subsequent quantitative study.

**Interviewee selection.** Interviewees include public officials that are responsible for BPM-related reforms in German local governments. The researcher's professional network and recommendations by other study participants have been the basis for potential interviewee identification (snowball sampling). Regarding the size of the administration represented in this study, the set is representative (regarding the German setting) as it covers small(est), medium-sized and large(st) organizations. Moreover, it covers data from public organizations from all parts of Germany. Thus, reflections on a representative organization size and geographical distribution have been major criteria for the interviewee selection.

**Data collection and analysis.** The interviews were semi-structured, meaning that a part of the interview was shaped by questions derived from the literature analysis, while an additional free part allowed for an open discussion of other relevant aspects brought up in the interviews. All interviews, conducted from June 2006 to March 2008, were tape-recorded and transcribed afterwards resulting in 150 pages of transcript, comprising about 95,000 words. Experts interviewed were local government officials responsible for BPM-related reforms, including mayors, department heads, CIOs, and project managers. The transcripts were then analyzed and coded against the background of the variables/constructs in the research model.

### Quantitative Method

**Data Collection.** The quantitative part of our study was carried out in 2008 and covers 357 cases of German local governments in the sample. A questionnaire was posted online and a random sample of 8.000 government officials, each responsible for (BPM) reforms in a single local administration, were invited to participate in the study. Out of about 12.250 local governments in Germany, thus, ~65% have been contacted and ~3% answered the questionnaire. The answers comprise local governments in 13 out of 13 large-area federal states – plus Berlin. An additional non-response analysis did not reveal any biases in the study participants.

**Data Analysis Technique.** In order study the impact of personnel scarcity on BPM collaboration schema, the two samples test of significance (also known to as independent samples t-test) was chosen. Such statistical test examines the difference between two sample means and here indicates if an independent variable (grouping variable for the samples) exerts influence on a specific dependent variable (for details regard this statistical test see, for instance, Argyrous 2005).

As for this study, the independent variable (grouping variable) is the personnel resource scarcity of an organization while the dependent variable represents the importance of a particular actor in BPM networks. Regarding the independent variable, the degree of agreement on the statement of “There is a lack of personnel resources to conduct desirable reforms in our public administration” led to two different groups (not agree; agree). Regarding the dependent variable, the study participants were asked “How important was ACTOR\_X for business process management in your local public administration in the last five years?”. The questionnaire allowed for an answer by five degrees of importance, ranging from 5 (=“Very important”) over 4, 3, 2 to 1 (=“Not important at all”). Consequently, a code 5 means that the actor is at the core, while a code of 1 indicates that the actor is in the periphery of a network. Following the results from our literature review and our qualitative part of the study, here, four external actors were analyzed for their importance in BPM networks: citizens (customers), local companies (customers), management consultancies, software consultancies. Accordingly, for example, the answer to the question of “How important were citizens for business process management in your local public administration in the last five years?” was included with a 5-point likert scale in the group-comparative independent samples t-test. Therefore, four dependent variables (each actor) were analyzed for their dependence on personnel resource scarcity.

## RESULTS

### Qualitative Study Results

External Experts in Public Sector BPM. Business Process Management (BPM) activities cover a broad variety of issues ranging from selecting process modeling methods, defining process documentation standards, implementing IT support for BPM activities, establishing a process-oriented culture, BPM training, BPM governance to concrete process analysis, optimization, and design (Rosemann et al. 2006). Such topics might be very challenging as they require comprehensive, but very specific BPM know-how. Against the background, that BPM activities are comparably new to the public sector, the majority of public organizations do not feature this know-how and their staff is most frequently better educated in other areas, such as law, regulations, or task-specific aspects, rather than in BPM. Here, a public official states:

*Due to the size of our organization, we often don't have the necessary in-depth know-how [for BPM reform issues]. Our staff has to deal with a broad range of topics rather than being a very expert [... in BPM]. Therefore, we might sometimes run into situations in which we have to seek for support by professionals, by external experts.*

Thus, the need for BPM specific know-how often requires that local governments seek external BPM expertise. To give an example, a public official identifies BPM-related communication action as a potential field which requires support from outside of the organization:

*Process design and implementation heavily relies on effective internal communication. Against this background, several departments in our organization have already carried out communication analyses, tried to identify potential to improve BPM-related communication, and provided specific training for the department heads and staff members. Here, we did receive support by an external expert.*

Citizens in Public Sector BPM. When it comes to innovating those processes which feature points of interaction with organization-external entities citizens are seen as a potential cooperation partner. A public official argues:

*20 years ago, we could observe an attitude among our colleagues like 'The government is in charge and has to define what is to be done'. However, this attitude changed pretty much. Today, we perceive our administration as a public service provider. And as we provide services to our customers, we don't want to be disconnected, but to stay in close contact with them. This also means that we do want to exchange ideas with the citizens.*

The administration understands itself as a service provider to its customers, the citizens. In that role, innovation of external business processes, here service innovation, is considered as a mean to enact citizen-oriented service design. Another argument to involve citizens in process management activities is concerned with the acceptance of BPM-related change efforts:

*[Process innovations ...] need to be accepted by the stakeholders. I'm not sure, if it's efficient to involve that many people, but I do know that if you want to implement successfully, you have to have the people on board. My experience shows that it's way easier to achieve acceptance for certain change processes in case you've involved people beforehand than in case you're just ordering to do something.*

To sum up, the interviewees identify the necessity to involve citizens in BPM activities. However, the arguments provides – customer-orientation in service design and acceptance of BPM-related change effort – do apply mainly in the context of innovation external rather than internal business processes.

Personnel resource scarcity and the involvement of consultants. The involvement of external experts is seen from a critical perspective, especially with regard to employee motivation:

*In general, we prefer to involve internal know-how and internal ideas. Employees have a totally different identification with those ideas they have created themselves than to those ideas that came from others, for instance, external experts.*

However, the interviewees identify a multitude of factors, related to a lack of resources, which necessitate the involvement of external experts. A major argument is that of a lack of BPM-specific know-how among the local government employees. This argument becomes even stronger in case of a lack of personnel resources as the public administration employees are already working long hours and do not have the time to educate themselves in BPM. A public official formulates:

*Many of our employees, including myself, are engineers. We're experts on different content than [BPM] reforms and we, thus, have to familiarize ourselves with specific reform know-how ... but that's besides everything else we do.*

Additionally, arguments are found that BPM projects often exceed the personnel capacities available in the local government. Such capacity deficit necessitates the involvement of external expert, here consultants:

*In my opinion, it is very important to involve know-how and to get capacity support by external experts. Regarding the in fact little personnel resources we have available, it wouldn't be possible to conduct such large [BPM] projects on our own.*

*We've just completed a large organizational redesign project where we had wide-ranging support by a consulting company. That project would have been far too capacity-intensive for the personnel resources available within our own organization.*

When considering different ways to achieve necessary BPM know-how, public administration might have two basic options: first, to hire new people or to educate existing staff (internal solution), second, to hire external experts, consultants. Here, arguments are found that economic necessities might support that external experts are involved instead of hiring additional staff: BPM know-how is often too specific and too expensive to have experts working as employees in the local government. A public official argues:

*We look for cooperation with external experts in case we aren't able to solve a specific problem on our own ... or if it's just cheaper to involve external expertise.*

*For the future, I do believe that cooperation [in process-related reform activities] will increase. This is due to pure economic necessity and we won't have too many other options.*

To sum up, the qualitative data indicates that a limitation of personnel resources makes it necessary to involve external experts, meaning to hire consultants. To local governments, such cooperative solution to BPM efforts tends to be more cost-efficient than hiring new employees with such BPM expertise or to comprehensively educate existing staff in BPM.

Personnel resource scarcity and the involvement of citizens. Regarding the effect of a lack of personnel resources on citizens cooperation in service innovation, a public official states:

*One of the main reasons to not involve citizens [in our BPM activities] is that we're not able to manage too many projects at the same time. We have 80 employees working in our organization [...]. The big project we're working on at the moment is concerned with shared service structures. Before that, it was the implementation of a managerial accounting system and this involved the work of all the employees of our administration. Thus, we're only able to operate with the limited personnel resources available and this in fact means doing one project after the other.*

Here, it becomes clear that the involvement of citizens requires personnel capacity and that such cooperation effort has to be seen in the context of increasing legitimacy and transparency of public services and the administration.

**Quantitative Study Results**

The independent samples t-test and additional descriptive analyses were processed applying the SPSS 16.0 software package. Table 2 shows the Independent Samples t-Test Group Statistics, Table 3 provides the Independent Samples t-Test Results.

	Personnel Resource Scarcity?	N	Mean	Std. Deviation	Std. Error Mean
Citizens (Customer)	Not Agree	109	2,38	1,095	,105
	Agree	238	1,98	1,006	,065
Local Companies (Customer)	Not Agree	110	2,20	1,107	,106
	Agree	237	1,93	,954	,062
Management Consultancies	Not Agree	110	2,62	1,196	,114
	Agree	238	2,48	1,165	,075
Software Consultancies	Not Agree	111	3,05	1,205	,114
	Agree	235	3,02	1,136	,074

**Table 2. Group Statistics**

The results show that the influence of personnel resource scarcity, here the group-difference, is significant for both customer groups (citizens and local companies) at 0.95 confidence level! However, group-differences are not significant for consultants (neither management nor software consultancies). The lower and upper limits of the 95% confidence interval (last two columns, Table 3) span the range in which the difference between the population means is to be expected. If such interval does not include the value of 0 (here: applies to both customer groups), we can reject the hypothesis that the population

means were equal. This reads as: With a confidence of 95%, we can assume that the importance of customers (both citizens and local companies) is different in organizations depending on personnel resource scarcity.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Citizens (Customer)	Equal variances assumed	3,033	,082	3,283	345	,001	,393	,120	,158	,628
	.. not assumed			3,181	194,372	,002	,393	,124	,149	,637
Local Companies (Customer)	Equal variances assumed	7,458	,007	2,307	345	,022	,268	,116	,039	,496
	.. not assumed			2,185	186,875	,030	,268	,122	,026	,509
Management Consultancies	Equal variances assumed	,142	,706	,997	346	,320	,135	,135	-,131	,401
	.. not assumed			,987	207,139	,325	,135	,137	-,135	,405
Software Consultancies	Equal variances assumed	,537	,464	,278	344	,782	,037	,133	-,225	,299
	.. not assumed			,272	204,789	,786	,037	,136	-,232	,306

Table 3. Independent Samples T-Test

**DISCUSSION**

The independent samples t-test reveals that there is a significant group difference in the importance of customer (both citizens and local companies) in public sector BPM depending on the scarcity of personnel resources in the organization. Customers play a less important role in BPM networks of organizations in which personnel resources are perceived scarce. Against the background of the qualitative study results, we understand that, in general, the involvement of customers in process innovation is regarded as a desirable action. Such insights confirm the BPM maturization of an organization towards and intelligent operating network where processes are innovated on the basis of an extensive involvement of stakeholders (for instance, Rosemann et al. 2006). Personnel resource scarcity, however, is a (new) variable to be considered in the BPM maturity and governance discussion. A limitation of personnel resources has an impact on the cooperation schema in BPM initiatives. Literature on BPM maturity (for instance, Rosemann et al. 2006; see also Fisher 2004, Rosemann u. de Bruin 2005) discusses the importance of external actors in BPM. Here, the heavy reliance on external expertise is identified as a characteristic of early maturity stages while the involvement of stakeholder, especially customers, is regarded as a characteristic of high maturity. However, personnel resources do have an impact on this picture. Here, we can interpret that the involvement of customers in process innovation, and thus the maturization of BPM initiatives, is hindered by personnel resource scarcity. This opens up for follow up questions of how customer collaboration in BPM can be designed more resource-efficiently.

Taking a governance-theory perspective (Williamson 1975, see also Rowley et al. 2000), potentially fruitful avenues for future research could include the study of how to design the institutions that govern the involvement of customers (and other actors) in process innovation. How could institutions of open process innovations be designed in order to allow for a more effective and efficient involvement of customers? For instance, such studies could include the design of business process modelling methods or toolsets – in terms of design science (Hevner et al. 2004; Niehaves 2007a) – in order to reduce transaction costs of collaboration. Such might not primarily focus on the optimization of business processes on a very detailed level, but rather provide a more general understanding of the processes, their aims, and their context. Here, modelling could take place on a higher degree of abstraction, containing modules or building blocks instead of detailed description of each minor step. This approach ensures an increase of transparency and, hence, legitimacy. In addition, management-oriented studies could examine methods for improving quality and costs of customer-collaborative BPM, for instance, drawing from methods of open innovation (Chesbrough 2003a).

Moreover, we consider it potentially fruitful future research to examine the effect of personnel resource scarcity – and other variables – on the involvement of additional external actors (for instance other local governments (Becker et al. 2003; Algermissen et al. 2005) or superordinate organizations such as central governments (Niehaves 2007b)) and, thus, to provide a more holistic picture on BPM networks and Open Process Innovation. Too, a comparison of Open Process Innovation in the

public and private sector could be regarded prolific future research (for network structures and innovation in the private sector see, for instance, Capaldo 2006).

## SUMMARY

BPM requires specific expertise and knowledge, assets which might not be available inside of an organization, here local governments. These organizations may seek to involve external actors in their BPM activities. Here, Open Process Innovation – drawing from the literature on Open Innovation and Business Process Management (BPM) – promotes the study of how to systematically make use of knowledge that lies outside of an organization's boundaries for process innovation initiatives. Open Innovation has been heavily studied for product innovation, however, process innovation has not yet been researched from such perspective. Against this background, we investigated into variables that impact on the qualities of Open Process Innovation taking the example of the public sector domain. This paper specifically examined how personnel resource scarcity exerts influence on the involvement of i) customers (here citizens and local companies) and ii) consultants (here management and software consultants) in public sector BPM. Our multi-method analysis shows that personnel resource scarcity has consequences for BPM-related collaboration schema as it restricts the involvement of customers.

Such insight opens up for future research. Here, we call for a governance-theory perspective on process innovation as a fundamental basis for understanding and designing the institutions that shape collaboration in Open Process Innovation. How can organizational BPM benefit from knowledge outside of the organizational boundaries without immense increase of transaction costs? Determinants/Institutions could be addresses, for instance, by management-oriented studies as well as by design science studies (e.g., on the design of business process modeling methods or tools). Too, the analysis of the influence of other variables on BPM collaboration, also taking into account other actors than customers and consultants, can be considered potentially fruitful future research.

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