2. THEORETICAL BACKGROUND AND LITERATURE REVIEW

This chapter clarifies key concepts for the answering of the research question and scrutinizes relevant literature with respect to deployments of process formalizing systems and activities. Laying the base for subsequent empirical work, this chapter searches to answer the sub-research questions – How does a successfully formalizing SME and its environment look like? How does a successful formalization of a process or a procedure look like? by drawing on existing research.

Identifying and specifying the areas that cannot be answered with existing research, the chapter concludes with a summary of identified factors allowing the reader to better appreciate the subsequent empirical part.

2.1. Distinction PF, BPR and ERP

The terms Process Formalization, Business Process Reengineering and Enterprise Resource Planning are tightly interwoven, however they are not synonymous. Business Process Reengineering lends focus to Process Formalization and an Enterprise Resource Planning system can be the IT-expression of an undertaken Business Process Reengineering (Hammer, 1990; Huq, Huq, & Cutright, 2006).

Additionally to the distinction between PF, BPR and ERP, it is of crucial importance to recall that Process Formalization or the deployment of formalizing systems are hardly an end in themselves; they are rather the result and expression of efforts undertaken to improve the company in a certain respect (e.g. implementing a CRM to improve customer service is a mean to achieve higher customer satisfaction and results in a formalization of the customer attendance process) In the following I will lay out the definitions of formalization and process to capture the term Process Formalization.

2.1.1 Formalization

The need to formalize springs from a fundamental organizational requirement. Organizations, even if small and comparably simple, are communities of individuals that aim to achieve a certain goal. As such they are built on the fundamental yet opposing principles of *division of the total labor* into individual tasks and *coordination* of those individual tasks to obtain a goal the individual couldn't obtain (Mintzberg, 1979). The division of total labor and the coordination of individual tasks require rules. Rules and the specific form of division of shape form the structure of the organization (Mintzberg, 1979).

The concept of formalization refers to precisely these abovementioned rules and to whether or not they are explicit, applied and orientated towards an end (Welker, 2004). As early as 1963 researchers tackled the issue of formalization (Pugh, Hickson, Hinings, Macdonald, Turner, & Lupton, 1963) trying to define it. The definition of formalization – so the idea – would help to gain insight into how a company would have to organize.

However, as Bodewes shows in his paper, early definitions came short in exactly defining the concept (Bodewes, 2002). Influential research such as the findings of the group around Pugh (Pugh, 1968 as cited in Bodewes, 2002), Organ & Greene (Organ & Greene, 1981 as cited in Bodewes, 2002) and Podsakoff *et al.*(Podsakoff, 1986 as cited in Bodewes, 2002) understood formalization as the mere existence of formally laid down rules (Bodewes, 2002). Other researcher such as Hall (Hall, 1963 as cited in Bodewes, 2002) and Walsh & Dewar (Walsh & Dewar, 1987 as cited in Bodewes, 2002) added to Pugh, Hickson, Hinings, Macdonald, Turner, & Lupton's (1963) definition by stating that not only the codification of expected behavior but also its enactment are important to in order to speak of formalization. Again referring to Bodewes (2002), the proposed definitions of formalizations still lacked the ends to which rules were enacted and applied. In his paper "Formalization and innovation revisited" where he aims to provide a common ground to research on innovation in organizations Bodewes (2002) proposes that

> *"Formalization is the extent to which documented standards are used to control social actors' behavior and outputs."* (Bodewes, 2002, p. 221).

Bodewes (2002) furthermore strongly suggest that formalization is not to be measured on the aggregate level of the organization as such but rather on department- or process-level as those units and their requirements with respect to formalization may vary considerably (Bodewes, 2002).

Welker (2004) in her dissertation on the formalization of order process in the manufacturing companies extends the definition of formalization, adding decisions, activities and working relations as dimensions referred-to by formalization (Welker, 2004). Drawing from Daugherty, Stank and Rogers (1992) and from the original work of the *Aston*-group (Pugh *et al.* 1963) she identifies a formalization of decisions (Welker, 2004). The formalization of decisions refers to "the operation of procedures that deal with decision seeking and conveying of decision" (Welker, 2004, p. 39).

Activities as a dimension of formalization are understood by Welker as a formalization of the actual work flow such as instructions or information (Welker, 2004) whereas working relations refer to tasks and responsibilities (Welker, 2004 drawing on Daugherty, Stank, & Rogers, 1992).

Augmenting Bodewes (2002) definition by the dimensions identified, Welker develops the following definition of formalization: Formalization is

"*the degree to which decisions, activities and working relationships are controlled and coordinated by formal, explicit rules and procedures*." (Welker, 2004, p. 39).

The degree of formalization mentioned in the definition depends on the organization-specific necessity, possibility and desirability of formalization (ibid.).

As Welker's (2004) definition augments Bodewes (2002) definition of formalization and is suitable for a manufacturing environment, and to not jeopardizing the comparability, this paper adopts Welker's (2004) definition.

Earlier structure was delimited from formalization, making reference to Mintzberg who understands the structure of an organization as "the sum total of the ways in which it divides its labor into distinct task and then achieves coordination among them" (Mintzberg, 1979, p. 2). To avoid misunderstandings formalization has furthermore to be delimited from standardization. Standardization refers to an in advance programmed behavior of actors whereas formalization refers to the *rules laid down* for the advance-programming of the behavior (Welker, 2004).

2.1.2 Process

According to Lindsay, Lunn & Downs (2003) there is no generally accepted definition of business process, particularly the focus of such business process and what it comprises or not comprises are defined differently in each work. As Bodewes (2002) mentioned in his paper on formalization, missing common ground in terms of definition dooms attempts of comparability. Lindsay, Downs & Lunn (2003) in their paper outlines the existing differences and challenges in defining Business Process. The main arguments are on the focus of Business Process and its view by internal and external actors (Lindsay, Lunn, & Downs, 2003).

Hamper and Champy (1993) focus on the way a process is performed whereas Davenport (1993) and more recently Eriksson and Penker (2000) emphasize on a processes outcome. Lindsay aptly reconciles both postures by defining a process as

> *"a specific ordering of work activities across time and place with beginning, and end and clearly identified inputs and outputs: a structure for action."* (Lindsay, Lunn, & Downs, 2003, p. 2).

However, there is not yet a solution to the challenge of defining a process or a Business Process in a holistic way, encompassing internal structure and external view and use. Melao and Pidd (2000) make an attempt to better *understand* the holistic nature of Business Processes, even though they do not yet forge the improved understanding into an improved definition. They identify four dimensions of Business Processes: The business process as

- Deterministic machines, i.e. structure for actions

- Complex dynamic systems, i.e. shaped by several actors and influences
- Interacting feedback loops, i.e. based on the flow of information and accounting for / accommodating evolving goals
- Social constructs, i.e. shaping the view and action of external actors.

Drawing upon and augmenting Lindsay Lunn & Downs' (2003), proposed definition of business process and accounting for the holistic character the term Business Process should encompass, this paper suggest to understand a Business Process as a internal structure for action and information flow to obtain evolving goals and shaping perception and actions of external actors.

2.1.3 Process Formalization

Joining the two definitions developed above, Process Formalization refers to formalization of the internal structure for action and information flow. In other words PF refers to the degree to which the activities, the flow of information (decisions) and the working relationships that form the internal structure an organization has in order to achieve its goals are controlled by formal and explicit rules and procedures.

After defining the affected constructs process, formalization, business process and process formalization the next section s examines the decisive constructs of PF, i.e. constructs that determine the outcome of PF efforts.

2.2 Factors affecting Process Formalization in SMEs

Process Formalization is concerned with the rules governing the internal structure of an organization; such rules can, amongst other factors spring from BPR, ERP and ICT deployment. That mean, that for identifying factors that drive, hinder and generally affect the likelihood of a successful formalization of a procedure, the implementation of systems that affect the rules governing the organization's structure can be scrutinized. As IT-deployment, ERP-deployment and BPR all affect the rules and the internal structure of an organization factors facilitating or

obstructing, jeopardizing or fostering such deployments can be scrutinized to identify drivers, inhibitors and Key Success Factors (KSFs) of PF. Consistent with the aim of the present paper, the relevant literature is scrutinized with a special emphasis on factors that affect particularly SMEs in their attempts of PF.

2.2.1 Drivers of PF in SMEs

Drivers for PF and in the particular case drivers for ERP are frequently aligned around wishes, requirements or needs (Ross, 1999; Oliver & Romm 2000; Barba-Sánchez *et al.* 2007); Laukkanen , 2007).

The intention or the wish to reduce uncertainty and ambiguity related to decision making was identified as a driver of ERP by DiMaggio & Powell in 1983 (DiMaggio & Powell, 1983 as cited in Laukkanen, Sarpola, & Hallikainen, 2007). With respect to decision making Barba-Sánchez *et al.* identified the wish to increase relevance and efficiency as a driver of ICT adoption in SMEs.

Barba-Sánchez *et al.* furthermore identified the entrepreneurial spirit of the manager and management improvements as drivers of ICT adoption in SMEs. Also related to the person of the manager, Chaw (1994), Mitev & Marsh (1998), Malone (1985) and Proudlock (1998) identify the external advice by impartial 3rd parties or from peers as driver for ERP adoption in SMEs.

Inter-organizational integration (Davenport & Brooks, 2004) and requirements along the SME's supply chain (Laukkanen, Sarpola, & Hallikainen, 2007) are suggested as antecedents favoring ERP adoption.

The wish to develop the business and integration capabilities, together with the quest for efficiency improvements and cost reductions drive ERP and ICT adoption according to Raymond *et al.*(1998), Barba-Sánchez *et al.*(2007) and Laukkanen *et al.* (2007) with Raymond *et al.*(1998) furthermore mentioning the quest for higher product & service quality. Concluding, Laukkanen *et al.* (2007) suggest the wish or need to replace old IT systems as a driver for ERP adoption in SMEs.

Robey, Ross & Boudreau (2002) identify six groups of drivers for ERP implementation, five of which are of continued relevance, as the sixth refers to accommodating the Y2K problem in computer systems:

- Infrastructure such as integration of multiple sites or acquired organizations
- legacy replacement
- Process re-engineering initiatives
- Support of growth
- Improvement of decision making and reporting

Oliver and Romm (2002) build on that and detail as factors that drive the implementation of an ERP system the wish for:

(1) Improving performance of the company

(2) Integrating existing systems and information

(3) Avoiding competitive disadvantages

Attaran (2004) drawing from Hammer *et al.* (1995), Verespej (1995) and Wellins and Murphy (1995) aligns the drivers of BPR efforts also along needs:

(1) The need to speed up processes

(2) The need to decrease employed resources

(3) The need to improve productivity and efficiency

(4) The need to improve competitiveness.

(5) The need to integrate front-end web-sites and back-end legacy systems

(6) The need to accommodate organizational databases

Furthermore, Attaran identifies the reduction of cost for IT as an important driver of BPR. He understands IT as an enabler and driver of process change as the improved availability of IT allows for organizing processes following parameters other than organizational constraints (Attaran, 2004).

Ariss, Raghunatan & Kunnathar (2000) augment the notion of needs and whishes as drivers of adoption of advanced manufacturing technology, counting IT as part of that advanced manufacturing technology, and group the drivers into

- Financial factors
- Managerial or organizational factors

- Product or Market factors

- Industry factors

considering the particular SME context (Ariss, Raghunatan, & Kunnathar, 2000). Connecting named factors with the SME context allows appreciating better for example the enormous financial burden of IT systems, the exposure of management to new technologies, the decisive position of the owner-manager has on the adoption of new technology and availability of IT competences within the company (ibid).

Caldas and Wood (1999), following their call for a holistic perspective of ERP understand the drivers of technology adoption not as singular factors but as a dynamic interaction of

- Substantive factors such as opportunities and threats that can be faced adequately with the adoption of a ERP system

- Institutional factors such as external forces that usher the company towards adoption of an ERP system

- Political Factors such as the articulated interests of power groups within the company.

Koh and Simpson (2005) add to this extensive list of drivers for IT adoption the important notion of the type of production employed by the company (Koh & Simpson, 2005). They differentiate between the degree of input- and output-diversity and consider whether the final product is made-to-order or not. Adding those dimensions allows Koh and Simpson to concretely recommend the use of ERP systems to companies with a low input but high output diversity and a made-to-order production as only the ERP permits controlling the Supply Chain *and* the production scheduling (ibid). In a study on niche SMEs Olsen & Saetre (2007) second the usefulness of ERP for low-input diversity and high output-diversity companies (Olsen & Saetre, 2007).

Van Wezel *et al.* (2006) also write on the balance between flexibility and efficiency. They cite Braglia and Petroni (2000) when stating that SMEs consider flexibility as their most important competitive tool. Making reference to De Toni and Tonchia (1998) van Wezel *et al* state planning as one of five mechanisms to actually control flexibility and thus as a strategic asset, a notion support by the study of Adam & O'Doherty (2007). Van Wezel *et al.* make the

leap from focusing on production capacities to control flexibility towards focusing on planning capacities, identifying a *planning flexibility bottleneck* (Wezel, Donk, & Gaalman, 2006, p. 293) stating that planning reactivity, planning abilities and communication abilities can all be

> *"improved within hierarchical structure using advanced planning systems and rescheduling algorithms [e.g. SCHEDUL]" (ibid.)*

thus making the existence of a *planning flexibility bottleneck* a factor that favors the implementation of an ERP system.

To summarize the results of drivers of PF mentioned, a table is provided. The factors mentioned in the chart can be understood as whishes or needs to be achieved.

Table 1. *Drivers of Process Formalization as identified in literature*

Factor	Author(s), year	Comment
Reduce uncertainty and improve relevance and efficiency of decision making.	DiMaggio & Powell (1983); Barba-Sánchez, Pilar Martínez-Ruiz, & Jiménez-Zarco (2007)	
Entrepreneurial spirit of manager.	Barba-Sánchez, Pilar Martínez-Ruiz, & Jiménez-Zarco (2007)	
Impartial advice by 3rd party.	Barba-Sánchez, Pilar Martínez-Ruiz, & Jiménez-Zarco (2007)	
Integration along the supply chain.	Davenport & Brooks (2004); Laukkanen, Sarpola, & Hallikainen, 2007	
Cost reductions, efficiency improving.	Raymond, Bergeron, & Rivard (1998); Barba-Sánchez, Pilar Martínez-Ruiz, & Jiménez-Zarco (2007); Laukkanen, Sarpola, & Hallikainen (2007); Attaran (2004)	

Higher product and service quality.	Raymond, Bergeron, & Rivard (1998)	
Replacement or integration of (legacy) systems.	Robey, Ross, & Boudreau, (2002); Oliver & Romm (2002); Attaran (2004)	
Reduction of cost of IT.	Attaran (2004); Barba-Sánchez, Pilar Martínez-Ruiz, & Jiménez-Zarco (2007)	Refers to the concept that less expensive IT allows a greater number of organizations to acquire it.
Production type: low input-diversity, high output-diversity.	Koh & Simpson (2005); Olsen / Saetre (2007)	
Control of company's flexibility by improving planning.	v. Wezel *et al.* (2006)	Improvements in planning as opposed to improvements in production to maintain / improve flexibility.

The identified drivers are grouped into financial, managerial and individual factors by Ariss (2000) and divided into internal and external factors by Caldas & Wood (1999). Koh & Simpson (2005), v.Wezel *et al.* (2006) and Olsen & Saetre (2007) draw on existing research to affirm that ERP not only permits to control the company's flexibility but rather is the adequate instrument for doing so. Caldas & Wood's (1999) notion of drivers not as independent but rather as interdependent factors is of particular importance to understanding the issue.

PF in SMEs is facilitated by drivers; however, so-called KSFs condition the outcome of PF adoption efforts. The following section scrutinizes relevant literature to identify KSFs for PF in a SME context.

2.2.2 Key Success Factors for PF in SMEs

Key Success Factors or Critical Success Factors determine the PF-efforts outcome. Existing research is extensive and named and grouped the factors. After introductory statements to each paper used the KSFs identified in the literature are laid down in a chart to facilitate reading. Existing research on grouping or categorizing of the identified factors is presented in continuous text below the table.

Umble *et al.* (2003) identify factors that allow for successful ERP implementation basing themselves on reviewing the relevant literature and backing their findings by a single-case study.

Somers & Nelson (2001) identify KSFs for ERP across different stages of implementation based on quantitative analysis of a random sample of 86 US-companies that completed or are in the process of completing an ERP implementation. The resulting KSFs are ranked according to their importance for a successful implementation.

Barba-Sánchez *et al.* (2007) conduct a review of relevant literature regarding KSFs, benefits and drivers of information and communication technology (ICT) adoption in an SME context.

Laukkanen *et al.* (2007) investigate in their study constraints and objectives of ERP adoption with respect to different company sizes, basing their research on quantitative evaluation of 44 questionnaires in the Finish context.

Fang & Linn (2006) propose in their study to measure the ERP deployment's success using the more meaningful Balanced Score Card as opposed to mere financial indicators. A qualitative study was conducted in Taiwanese context to show the applicability of the Balanced Score Card.

Table 2. *KSFs for PF deployment*

Concept and Description	Author(s), year	Comments
Clear understanding of strategic goals - "compelling vision" (Umble *et al.;* 2003) of how stakeholder satisfaction should be achieved - Vision why and how ERP achieves goals - Full awareness of system's capabilities - "Management of Expectations" Somers& Nelson (2001) - Clear goals and deliverables.	Somers & Nelson (2001); Umble *et al.* (2003); Barba-Sánchez *et al.* (2007)	Considered the 4th most important KSF by Somers & Nelson (2001).
Commitment of top management - Moral support and resource commitment - Participation in PF efforts - Moral and financial commitment - Participation.	Somers & Nelson (2001); Umble *et al.* (2003)	Considered the single most important KSF by Somers & Nelson (2001).
Excellent Project Management - Established objectives & plan for adoption project - Plans aligned to company's experience, background etc. - Defined scope of adoption project - Tracking of adoption project's progress	Somers & Nelson (2001); Umble *et al.* (2003)	Considered the 5th most important KSF by Somers & Nelson (2001).
Organizational Change Management "even the most flexible ERP imposes its own logic" that has to be accounted for by organizational change (Umble *et al.* (2003), p245).	Umble *et al.* (2003); Paper & Chang (2005); Quiescenti, Bruccoleri, La Commare, Noto la Diega, & Perrone (2006)	
Skillful implementation team - Responsible and empowered for critical decision making.	Somers & Nelson (2001); Umble *et al.* (2003); Laukkanen *et al.* (2007)	Considered the 2nd most important KSF by Somers & Nelson (2001).
Data Accuracy - Accuracy of data input into the system.	Somers & Nelson (2001) Umble *et al.* (2003); Laukkanen *et al.* (2007)	

Extensive education & training - Win the understanding and buy-in of actors - Create sufficient understanding that actors can solve a problem within the system's framework.	Somers & Nelson (2001); Umble *et al.* (2003); Barba-Sánchez *et al.* (2007).
Focused Performance Measures - Project evaluation must be included from the beginning - Relevant stakeholders must share a clear understanding of the goals.	Umble *et al.* (2003); (Fang & Lin, 2006)
Identification of critical business needs in order to select the best matching system - System has to accommodate business' particularities	Somers & Nelson (2001); Umble *et al.* (2003)
Knowledge Requirements - Users' IT competence	Elbertsen, Benders, & Nijseen (2006); Laukkanen *et al.* (2007)
Communication of adoption effort's goals	Somers & Nelson (2001) Paper & Chang (2005)
Project Champion - On executive level - With authority to effectuate required changes (cf. Umble *et al.* (2003): skillful implementation team)	Somers & Nelson (2001); Fui-Hoon Nah, Zuckweiler, & Lee-Shang Lau, 2003[2]
Vendor / Customer partnership - Strategic partnership between system's vendor and customer with focus on improving competitively of the latter	Somers & Nelson (2001); Caldeira & Ward (2002)
Steering committee - "superusers" to verify that Project Management's decisions are applicable	Somers & Nelson (2001)
Use of external consultants - Acquiring specific implementation related knowledge	Somers & Nelson (2001) Caldeira & Ward (2002)

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[2] Ms Fui-Hoon Nah and Ms Zuckweiler are associated to J.D. Edwards, an ERP-developer forming part of Oracle Corp. Their association with a industry party has, in the authors opinion little influence on KSFs identified in the study cited.

Definition of Architecture - Centralized vs. decentralized structure	Somers & Nelson (2001); Paper & Chang (2005)

Interdepartmental Communication
  - Communication between implementation team and rest of company
  - Communication within implementation team
	Somers & Nelson (2001);
	Paper & Chang (2005)

Interdepartmental Cooperation - Sharing of common goals between departments	Somers & Nelson (2001); Caldeira & Ward (2002)

Ongoing vendor support
  - Technical assistance
  - Emergency assistance
  - System updates
	Somers & Nelson (2001);
	Caldeira & Ward (2002)

Proposing a categorization of the identified KSFs, Paper and Chang (2005) reviewed relevant literature, augmented by one in-depth case study to improve the understanding of organizational change in conjunction with ERP deployment. They identified five overlapping categories for KSFs for BPR efforts: Environmental Success Factors, People Success Factors, Methodological Success Factors, IT Perspective Success Factors and Transformation Vision Success Factors.

The Environmental Success Factors, congruent with the "external context" mentioned by Caldeira and Ward (2002) comprise:

- Top management support
- Risk disposition as a newly identified KSF
- Organizational learning,
- Compensation and reward system as a newly identified KSF
- Information sharing
- Resources assigned

People Success Factors, congruent with the "internal context" mentioned by Caldeira and Ward (2002) include the following concepts:

- Training and education

- Politics resolution, referring to how issues such as the employees fear of change are dealt with, as a new concept
- Ownership, as congruent to the already identified top management support
- Empowerment, as congruent to decision making capacities identified under the 'skillful implementation team' concept

Methodological Success Factors comprising:

- Customized implementation methodologies, as opposed to customized systems
- Resources assigned
- Overall organizational strategy

IT Perspective Success Factors, congruent with "process context" identified by Caldeira and Ward (2002) containing the following concepts:

- IT architecture
- IT believe system as a new concept, referring to the creativity allowed and encouraged by the system

Transformation Vision Success Factors comprising:

- Communication and enactment of vision
- Open communication channels that allow for feed back with respect to the BPR efforts undertaken as a new concept
- Holistic vision that aligns the organizational and individual goals of the employee.

Caldeira and Ward researched in 2002 factors and factor combinations that contribute to the successful adoption of IT in manufacturing SMEs. Their work is of particular relevance to this paper, as they deliberately choose to place their research in the context of the

"less well-developed county [...] Portugal." (Caldeira & Ward, 2002, p. 122),

thus augmenting the transferability of their findings to a country such as Mexico.

The researchers stated success of IT adoption as

"the extent to which users believe the information system available to them meets theirs information requirements"

following the definition of Ives *et al.* (Ives, Olson, & Baroudi, 1983 as cited in Caldeira & Ward, 2002, p.125). They consequently differentiated between the success of IT adoption and the

degree of IT adoption, the latter starting with IT adoption only as administrative tool and ending with IT being adopted as administrative, manufacturing and business system with integration of external systems of customers and suppliers. Twelve case studies of Portuguese manufacturing SMEs were mapped according to the degree and (perceived) success of adoption (Caldeira & Ward, 2002).

In identifying factors and factor combinations of successful IT adoption Caldeira and Ward grouped factors that influence the degree and success of IT adoption in SMEs into four areas:

(1) Internal Context such as:
   a. IT knowledge and attitudes of (future) users
   b. Attitudes and involvement of top-management towards IT adoption and use
   c. Availability and development of IT competences within the company
   d. Power relations between implementing party and rest of company

(2) External Context such as:
   a. Company's relationship with IT vendor
   b. Availability of external IT expertise and service
   c. Quality of available software
   d. External pressure to adopt new IT

(3) Process such as:
   a. IT knowledge of people charged with deployment of the IT
   b. Training available to users of IT

(4) Content such as:
   a. Availability of specific types of IT solutions
   b. Objectives and expectations towards the outcome of IT adoption
   c. Time of IT adoption

Of this exhaustive list of factors that contribute to the successful IT adoption in SMEs, Caldeira and Ward identify the management's perspective and attitudes (cf. 1b) and company's IT competences (cf. 1c) as "*determinant*" (Caldeira & Ward, 2002, p. 142). The remaining factors are then grouped as *situational factors* that influence the degree of adoption but not its success,

and as *consequential factors* that influence the degree of adoption and its success but are dependent on one of the *determinant* factors (ibid). Caldeira and Ward's research allows to assess whether or not PF efforts can be successful in an SME environment of a lesser developed nation. Their research by identifying *"determinant"* factors goes beyond mere describing and listing of factors, allowing for practical application of the findings.

Raymond *et al.* (1998) contribute to the existing body of research by differentiating between the determinants of BPR success for SMEs and those for LEs. The researchers are able to show that organizational support with its 'sub-constructs' of *compliance with the BPR principles* and the *diversity of project resources* determine for a SME context whether or not an organization obtains advantages from BPR (Raymond, Bergeron, & Rivard, 1998).

The 'sub-construct' of *compliance with the BPR principles* refers to three fundamental dimensions or principles of BPR:
- The BPR-projects organizational perspective of designing business processes organizational goals such as customer service.
- The autonomy of the newly defined business process that ensures its implementation; a concept that augments Paper & Chang's (2005) notion of "empowerment".
- The integration of information into the newly defined business process by capturing the data on the source.

The principles of BPR ensure that the ideas for new processes and their actual adoption are in line with the company's strategic goals (ibid).

The 'sub-construct' of *diversity of project resources* requires considering all possible stakeholders when designing a new business process, i.e. including customers and providers and can be understood as a step beyond the "skillful implementation team" mentioned by Somers & Nelson (2001); Umble *et al.* (2003) and Laukkanen, Sarpola, & Hallikainen, 2007.

Raymond *et al.*'s research shows furthermore that the aforementioned 'sub-constructs' have a greater impact on the success of BPR-efforts of SMEs than on the success of BPR-efforts of LEs (ibid).

Summarizing the findings for KSFs of PF six crucial 'meta'-concepts that together ensure success can be identified:

- a clear definition of the PF efforts' goals, taking into account all stakeholders, but particularly the customer
- a clear understanding of why the PF efforts are undertaken
- a clear understanding of the PF efforts implications on all areas and stakeholders
- ongoing communication prior and during the PF efforts
- an organization that is apt, committed and prepared for change
- a PF-favorable environment that exerts certain pressure and provides certain advise

These concepts and the concept comprised within them are grouped in the scrutinized literature according to their 'origin', i.e. the area where the individual items spring from. Raymond (1998) examines in detail the origins of organizational support, thus identifying the most crucial concepts for successful BPR in SMEs: *compliance with principles*, i.e. the strategic scope of the PF attempted and *diversity of project resources*, i.e. organizational requirements for successful PF.

2.2.3 Obstacles of PF in SMEs

Considerable less research has been conducted in obstacles of PF in SMEs than in drivers and KSFs. Obstacles in this context comprise drawbacks as well as stoppers of PF. Relevant obstacles to formalization efforts are summarized in a table while categorizing attempts will be treated in continuous text below the table.

Besides the already mentioned studies, Bendoly & Cotteleer (2008) contribute to the knowledge about obstacles or problems of PF by investigating how and when ERP deployments are circumvented by managers (Bendoly & Cotteleer, 2008). Their findings suggest that the factors determining circumvention of deployed systems are the perceived misfit between deployed technology and set tasks, and the ease of circumvention (ibid.). The circumventions are furthermore conditioned by the time passed since deployment (ibid).

Process Formalization is concerned with rules imposed upon actors (see e.g. Welker, 2004). Focusing on a different notion than Bendoly & Cotteleer (2008), Crozier & Friedberg's (1980) book "Actors and Systems, The Politics of Collective Action" is concerned with how this actor behaves in the system (of e.g. a SME). They state, not un-contested (see e.g. Zald, 1982) that a system's actors intent to maximize their personal gains to the extent that just not threatens the survival of the system (Crozier & Friedberg, 1980). For the concrete case of ERP deployment, that translates e.g. into not shared information in order to safeguard the own workplace (see e.g. Paper & Chang, 2005 for the fear of change and consecutive job protection).

Table 3. *Obstacles to PF deployment*

Concept and Description	Author(s) and year	Comments
Poor planning and management of implementation efforts	Somers & Nelson (2001); Umble *et al.* (2003)	Reason for failure of IT-related projects, identified by IT managers surveyed by *Information Week:* 77% (Davis & Wilder, 1998)
Change of business goals during implementation phase	Somers & Nelson (2001); Umble *et al.* (2003)	75% (Davis & Wilder, 1998)
Lack of management support	Somers & Nelson (2001); Umble *et al.* (2003)	73% (Davis & Wilder, 1998)
Poorly defined strategic goals	Somers & Nelson (2001); Umble *et al.* (2003)	
Top management not convinced of system	Somers & Nelson (2001); Umble *et al.* (2003)	
Poor implementation project management - Lack of achievable schedules - Mismatch between system and business requirements - Efforts to automate redundant and non-value added processes	Somers & Nelson (2001); Umble *et al.* (2003)	

Organization not committed to change
  - Members not convinced of leaving their 'comfort zone'
  - Fear of change (jobs could get more difficult, less important or erased)
  - Fear of improved control by upper management
	Somers & Nelson (2001);
	Umble *et al.* (2003)

Lackluster implementation team	Somers & Nelson (2001); Umble *et al.* (2003)
Inadequate training - Users unable to run the system effectively	Somers & Nelson (2001); Umble *et al.* (2003)
Inaccurate data within the implemented system	Somers & Nelson (2001); Umble *et al.* (2003)
Absence of performance measures - Progress is not measurable and tracked and thus not ensured	Umble *et al.* (2003)
Technical difficulties such as control of legacy systems, system failures, software bugs etc.	Paper & Chang (2005); Umble *et al.* (2003)
Risk associated with resource intensity	Laukkanen *et al.* (2007)
Limited compatibility with existing business procedures	Everdingen (2000) in Laukkanen *et al.* (2007)
Inappropriate use of consultants that leads to loss of knowledge and / or overrun of budget or schedule	Paper & Chang (2005)
Availability of ICT competences within the SME	Barba-Sánchez *et al.* (2007)

Perceived misfit between technology deployed and task required and following circumvention of deployed system.	Bendoly & Cotteleer (2007)
Information retention by employee to safeguard position	Crozier & Friedberg (1980)

Shehab *et al.* (2004) conducted an extensive literature review on ERP systems, categorizing their findings. With respect to drawbacks of ERP systems they identify four categories: cost and implementation related drawbacks, functional, technical and usability drawbacks. The categories comprise the following concepts:

Cost and Implementation related drawbacks:

- Company's processes to be matched to ERP processes
- Long implementation processes
- Costly

Functional drawbacks:

- Missing costing functions
- Limited accounting functions
- Limited scheduling functions
- Limited report functions

Technical Drawbacks:

- Lackluster integration between ERP systems and non-ERP systems

Usability Drawbacks:

- Learning curve too high, i.e. too much training required
- Limited user friendliness for occasional user
- Lacking ease of use (e.g. lacking cut-and-paste ability)
- Difficult to understand terminology and logic (e.g. for accounting)

2.3 Conclusions from the Literature Review

The relevant literature was examined, revealing extensive descriptions of successful PF's antecedents. However, in the perception of the authors it is challenging to draw from descriptions of successful deployment of formalizing systems direct conclusions on when to deploy such systems.

Furthermore existing research seems to consider the factors that affect Process Formalization in SMEs as rather digital factors that are either absent or present. The researchers suppose that the PF-affecting factors are measured more adequately on a continuous scale, than on a 'digital scale'.

Extending the critical perception of the existing research in respect to the research question of when SMEs should formalize a procedure it appears to the authors that the interrelation between the affecting factors has not sufficiently been taken into account.

Attempting to overcome current literature's shortcomings in answering the research question the authors attempted to use the case study conducted to propose a categorization that allows for more precise assessment on when a SME should formalize its processes. With this attempt, the authors positioned their work in the realms of an exploratory study, as Carlile & Christensen (2005) consider observations of anomalies and subsequent new categorization as part of descriptive theory.