5. DISCUSSION

As outlined in chapter 1.3 Structure, in this part the theoretical findings of the literature review will be synthesized with the empirical findings of the data collection. In a second step, the so identified Drivers and Stoppers, Benefits and Drawbacks and Key Success Factors will be grouped into factors that affect formalization-ability of the process and the formalization capability of the SME. Or, with the words of Carlile and Christensen (2005) the phenomena is classified into categories (Carlile & Christensen, 2005). These newly proposed categories will then be visualized on a two-dimensional scale, allowing the identification of concrete managerial implications.

5.1 Interview Data

Drivers of PF in SMEs

The literature identifies as drivers of PF or of formalizing efforts performance related issues such as the wish to reduce cost, improve decision making, improve fulfillment of customer requirements (Robey, Ross, & Boudreau, 2002), improving the overall performance of the company (Oliver & Romm, 2002) and exploiting opportunities and evading threats (Caldas & Wood, 1999), infrastructure related issues (such as integrating existing systems (Oliver & Romm, 2002), integrating legacy systems (Attaran, 2004), widespread availability of IT (Barba-Sánchez, Pilar Martínez-Ruiz, & Jiménez-Zarco, 2007), external issues such as pressure from customers (Caldas & Wood, 1999), and finally internal issues (such as power issues or articulated interests of groups within the company (ibid.). The production type employed by the company and whether production capacity or planning capacity is considered the adequate mean to obtain and maintain flexibility (Wezel, Donk, & Gaalman, 2006) are furthermore mentioned as drivers.

As the categories proposed by previous researchers are defined rather broadly, the drivers mentioned by the interview partners seem to fit within those already defined categories.

The legal requirements and the wish to obtain certification mentioned by the GenDirGER, the informal exchange between owner-manager and PF practioners, mentioned by the NetOrg as well as the pressure from customers to improve the process, mentioned by the GenDir easily fit

into the category of external issues, and more precisely can be seen as part of the institutional factors mentioned by Caldas and Wood as. GenDirGER's notion that PF is to cut cost and the notion that lead times should be cut, mentioned by the ProjMng and by the GenDir for the SCHEDUL implementation fit into the performance related issues such as the need for improving the company's performance (Oliver & Romm, 2002).

The GenDir's statement that

"[t]he idea behind the implementation of the ERP [was], to have a better reporting and control on worked hours, on purchases to a specific project etc […]; things [that] were reported before, but [that] were by no means readily accessible […]"

seems to fall into the category of infrastructure-related drivers such as the need to integrate existing systems and information, identified by (Robey, Ross, & Boudreau, 2002).

Stoppers of PF in SMEs

For factors that impede or significantly difficult attempts of PF the interview partners show a great congruence with literature.

A lack of strategic alignment of PF efforts is identified by the GenDirGER and by the NetOrg as an important stopper, similar to the poorly defined strategic goals mentioned by Umble *et al.*(2003).

Non-established and non-measurable goals, cited by Umble *et al.* (2003) as PF-inhibiting factors are named by the GenDirGER as a reason for lackluster PF adoption. Missing communication of goals and progresses is mentioned by the ProjMng as a currently experienced problem; a problem that is well documented in literature (Umble, Haft, & Umble, 2003). The ProjMng also identifies 'comfort zones' as inhibitor of successful formalization, together with the tendency to protect one's job, mentioned by the ImplConsl an indicator of the tendency of actors to attempt winning against the 'system' or organization, mentioned by Crozier & Friedberg, (1982).

The NetOrg and the ImplConsl underline the problem of process change that is not pushed far enough, the danger of "sacred processes" (ImplConsl) as an important contributor to less-well-than-expected PF adoption, a notion that receives support from literature with Umble *et al.* (2003) stating the problem of organizations that are not committed to change.

Apparently, as for the other factors scrutinized, there exists a significant congruence between literature and empirical data with respect to drivers. More than confirming literature, this suggested, that the company under examination is suitable for research by not being an idiosyncratic example, upon which drawing conclusion would be farfetched at least.

Drawbacks of PF in SMEs

The ImplConsl, NetOrg, GenDirGER and the ProjMng mentioning resistance to change as a stopper could be understood as congruent to Umble *et al.'s* (2003) notion of lack of management support and conviction.

The language barrier, a stopper or drawback brought forward by the AdminDir concurs with Umbl *et al.'*s (2003) concept of a mismatch between the system and the business requirements, itself being rather a sub-concept of poor implementation management. The system's possible rigidity, mentioned by the NetOrg and discarded by the GenDir falls into the same concept as well as limited compatibility of the deployed system.

With respect to the financial and personnel resources required, the NetOrg's and concept of high cost and the ImplConsl notion of labor resources required can be found in literature e.g. by Laukkanen Laukkanen, Sarpola, & Hallikainen, 2007.

Augmenting the rather limited literature on obstacles of PF the study identified, as mentioned above, incomplete planning, including insufficient definition of goals and lackluster communication of them, reluctance to effective change and insufficient resources assigned as the principal inhibitors of PF.

The GenDirs understanding of a slightly increased vulnerability or dependence is a more specific expression of what Umble *et al.* (2003) and Paper & Chang (2005) term technical differences.

The technical drawbacks of the systems seem not to be mentioned by the interview partners, neither intern nor external.

Concluding the analysis of obstacles suggests that literature maintains are more general point of view while to the interview partners that seem to be more concrete about problems, although the areas identified in both were congruent with the exception of technical drawbacks that were not mentioned in the interviews.

Key Success Factors for PF in SMEs

Existing literature identifies a company's attitudes towards PF and the company's capabilities to master the deployed system as crucial to adoption success.

The empirical data collected during this study seem to confirm the constructs of a company's attitudes towards PF, e.g. with the GenDirGER stating:

> *"99 % of the success of formalization efforts depends on the top management backing the attempt."*

The GenDirGER's notion is seconded by a party external to Z, the NetOrg

> *"The director general has to give the ERP top priority […]"*

From within Z's top management there is no direct statement to the importance of top management backing, however the GenDir's statement:

> *"Initially I planned to do it myself [referring to the ERP implementation, the author] and not to hire someone."*

seems to indicate that PF does have a high priority within Z. The fact that the three top-most employees were involved in selecting the system points to the same conclusion.

Going beyond ‘mere’ top management backing the GenDirGER, consistent with the NetOrg’s and ImplConsl’s perception notes:

> *“I recommend to bring all the employees into the boat and to avoid imposing standardization on them.”*

With respect to a company’s deployment capabilities various parties mention the importance of ‘understanding’ system deployed, e.g. the ImplConsl stating:“The most important aspect of improving the production planning process is to take an objective view of current procedures and to become well-educated on capabilities of the new system.” The AdminDir and GenDir both mention the importance of training and the severely felt absence of the intern who implemented the system:

> *“When you [referring to the intern responsible for deploying the ERP, the author] left, there was no-one in charge of JobBOSS [the ERP system, the author]. The training of the new person in charge takes plenty of time.”*

seconding the notion of the crucial importance of a company’s deployment capabilities. Amplifying the notion of ‘deployment capabilities’ by introducing financial capabilities the GenDir notes:

> *“I would suggest that anyone attempting such an implementation considers the cost of the system.”*

5.2 Conclusion Interview Data

Analyzing the data obtained from the interviews and summarizing it allowed establishing whether or not the company in question, Z, appeared to be a suitable research object. Furthermore it can be established which factors affecting PF were only mentioned by the 3rd party experts, thus providing a better view on the case data collected.

The interviews showed great congruence between the literature and the interview partners’ statements. With minor exceptions, such as for example the different perception of the influence of cost on PF adoption, with GenDirGER holding the posture that limited financial

possibilities did not jeopardize the PF adoption's success, a position challenged by AdminDir, GenDir and NetOrg, the interview partners stated the factors mentioned in the relevant literature.

This allowed concluding that examining the company Z in order to propose a new categorization of factors affecting PF was a feasible approach as Z didn't seem to constitute an idiosyncratic organization that would not allow drawing broader conclusions.

As for differences between interview partners internal to Z and external to it, it became apparent that the external interview partners emphasized strategy and goals or in general a more planned approach much stronger than did the company members.

The next section will analyze the case of improvement efforts at Z under the light of the findings from the literature review.

5.3 Case Data

In the following the findings of the literature review will be matched with the data obtained from research in order to identify if the categories mentioned in literature allow for assessing when a SME should formalize processes.

Drivers

As mentioned in Part '4.1 Description of Case mSME in Mexico' Z was a company whose output was made to order. The resources employed to produce the fixtures were comparably low in variety (two types of aluminum and four steels make up the vast majority of raw materials used). According to Koh and Simpson (2005) low input variety and high output variety is a driver for ERP implementation.

Being a company that was founded seven years ago and has been run ever since by comparably young former students and that has been experiencing constant growth can be seen as an indicator for entrepreneurial spirit. Considering the statements of GenDir:

"From personal experience I know about the importance of an ERP" and

"Initially I planned to do it myself [referring to the ERP implementation, the author] and not to hire someone."

indicate what Barba-Sánchez *et al.* (2007) coin as "management improvements", a driver of PF in SMEs.

For improved clarity the drivers and their "fulfillment" in the case of Z are listed in the table below. To exemplify that the drivers of PF identified seem to appear rather on a continuous than on a 'digital' scale, the items are grouped with respect to their 'degree of existence', as either "given / met", "partially given / met" or "not given / met"

Table 4. *Drivers of PF at company Z*

Drivers given / met	**Drivers partially given / met**	**Drivers not given / met**
Reduce uncertainty and improve relevance and efficiency of decision making	Control of company's flexibility by improving planning (partially given as ERP and SCHEDU were deployed – improvement of planning - as well as a new CNC – improvement of production – was acquired)	Integration along the supply chain
		Replacement or integration of (legacy) systems
Entrepreneurial spirit of manager		
Impartial advice by 3rd party		
Cost reductions, efficiency improving		

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Higher product and service quality (particularly delivery on promised date)	
Reduction of cost of IT	
Production type: low input-diversity, high output-diversity	

Stoppers

Literature considered stoppers to be in their vast majority the opposite or absence of KSFs (cf. particularly Umble *et al.* (2003)). In other words, stoppers in Umble's (2003) perception were a different value for the same item, negative instead of positive, or absent instead of present. These 'different values of the same characteristic' are expressed in the table concluding the 'KSF-part'.

Additional to the type of stoppers described above Laukkanen *et al.* (2007) and Shehab (2004) identified the risk associated with the implementations effort's resource intensity as an important stopper of ERP-adoption. Resource intensity seemedo have been a great concern for Z, as the AdminDir states on the question why the efforts weren't undertaken earlier:

> *"Well, you [would have] need[ed] one extra person to just put all the data into [Microsoft] Project and into the ERP"*

The GenDir states with respect to constraining factors:

> *"Well, foremost there is the financial issue, such an ERP is relatively expensive and not always do they [referring to the software developer or vendor, the author] financial plans."*

Barba-Sánchez *et al.* (2007) added to the list of possible stoppers of ICT adoption the availability of ICT competences within the SME. Drawing from the researches experience in his function as InternDa the deployment of the ERP selected by Z, did not require an extensive amount of IT knowledge as the ready-to-install package gets merely installed on the client / server architecture of the company. Changes to the software itself are not required. With respect

to the user's IT capabilities Z certainly profits from an ever more widespread use of PCs for private application and a thus increased familiarity of users with the interfaces. As the deployed software for the case of the ERP requires from the majority of users mere data input only limited IT capabilities are required. For the case of the SCHEDULE, a software that requires, as stated above, profounder IT knowledge, the GenDir states:

> *"They [referring to the US competition of Z he visited in spring 2009, the author] use SCHEDUL only on the project leader level, as a tool for the individual and not for all the shop. I think I will adapt their ideas for us here."*

The ProjMng, the person most likely to be in charge of maintaining up-to-date the SCHEDU files, received training on the software in fall 2008.

Bendoly & Cotteleer (2008) make the case for considering circumventions of deployed systems due to their perceived misfit with the actual tasks to be performed. As the ERP is currently not yet deployed circumventions would amount to the fact that the entire process is still performed in the traditional fashion with the by far most frequently cited reason being the as time consuming perceived manner to perform the task in the ERP as well as a acknowledged lack of ERP training. For the SCHEDU deployment and its circumventions, staff of Z mentioned that the software doesn't help solving the problem of prolonged lead and production times:

> *"[…]We do not apply the SCHEDU the way we should. I don't say that the software doesn't work but we are not using it adequately[…]We are still presenting one-week timelines besides knowing that it is impossible to meet "*

With respect to Crozier & Friedberg's (1980) issue of information retention in order to safeguard 'fringe benefits' enjoyed – such as a perception of job security or control – AdminDir and ProjMng concur that the GenDir retains or requires an undue amount of control and information:

> *"The important thing for [the GenDir] is that he knows everything. He wants to know everything about every fixture and I don't think that it is right that the General Director is 100% involved into the operational processes ('no creo que es lo correcto que el Dirctor General se involucres al 100% a los procesos").*

However, in the perception of the researcher in his function as InternDa ‘sub-conscious’ information retention could proof a problem as adoption progresses as probably the majority of future users is not even aware of all the information they hold exclusively and that could proof very useful if put into the deployed systems.

In Chapter 2.2.2 KSFs for PF in SMEs Wezel, Donk, & Gaalman (2006) are stated noting that a driver for ERP adoption is the fact that top management understands the planning of production as a key to control the company’s flexibility. Highlighting the production-centered focus of Z’s top management is the GenDir’s statement:

“The problem with the prolonged lead times stems from a bottleneck in production […]”

The notion can be read as an indicator that Z’s management has failed to fully understand the deployed system’s importance for fulfilling customer orders.

Concluding, the risk associated with the resource intensity is the major stopper of PF in Z, or more concretely the major drawback of the ERP and SCHEDUL adoption. As both to-be-adopted systems are self-contained, complete software packages and require no manipulation, limited IT competences are no stopper.

The following table summarizes the results of matching existent literature with data of the cases. Again, to exemplify that the stoppers of PF identified seem to appear rather on a continuous than on a ‘digital’ scale, the items are grouped with respect to their ‘degree of existence’, as either “given / met”, “partially given / met” or “not given / met”

Table 5. *Stoppers of PF at company Z*

Stoppers given	**Stoppers partially given**	**Stoppers not given**
		Clear understanding of deployed system’s strategic nature
Poor planning and management of implementation efforts		

(continued on page 83)

		Lack of management support
	Poorly defined strategic goals	
		Top management not convinced of system
	Poor implementation project management - Lack of achievable schedules (no schedule established) - Mismatch between system and business requirements (system did match the business requirements) - Efforts to automate redundant and non-value added processes (business process was straight-forward)	
		Change of business goals during implementation phase
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		
Lackluster implementation team (lacking experience and empowerment)		
Inadequate training - Users unable to run the system effectively		

(continued on page 84)

		Inaccurate data within the implemented system
Absence of performance measures - Progress is not measurable and tracked and thus not ensured		
		Technical difficulties such as control of legacy systems, system failures, software bugs etc.
Risk associated with resource intensity		
	Limited compatibility with existing business procedures	
Inappropriate use of consultants that leads to loss of knowledge and / or overrun of budget or schedule (in the case of Z interns were responsible of implementation)		
	Availability of ICT competences within the SME	
Perceived misfit between technology deployed and task required and following circumvention of deployed system.		
Information retention by employee to safeguard position		
		Limited software functionality with respect to company requirements

KSFs

Univocal strategic objectives, clear goals and a comprehensive vision as to why and how the deployed system is supposed to support goals and objectives is critical for PF success (Umble *et al.* (2003); Somers, T.M. & Nelson, K. (2001); Barba-Sánchez *et al.* (2007)). Asked about the objectives and goals yield somewhat diverging answers:

> *"We wanted to organize ourselves better"* (AdminDir),
>
> *"[w]e wanted to achieve a reduction of downtimes in production […]"* (ProjMng) and
>
> *"[…] our goal was to have a better control over work […] [and] a better insight into […] data"* (GenDir).

While a reduction of downtime was to be achieved by better controlling the third (night) shift's performance, the statements still indicate rather unclear objectives.

Closely related to the issue of goals and vision established is the topic of a concrete adoption plan, including goals and deliverables. With respect to plans and deliverables Z's top management noted:

> *"We never set goals, [we had] rather 'fluid' goals [in this case referring to goals to achieve / deliverables, the author]" (ProjMng), "[…] we didn't establish any milestones [referring to milestones to achieve / deliverables, the author] for the implementation of the ERP" (AdminDir) and "We hadn't an adequate planning of the implementation."* (GenDir)

Apparently Z had rather diffuse objectives, no vision for ERP adoption, little to none goals and executed rather a day to day planning.

Strongly affected by objectives and plans are the topics of deployed system's architecture (Somers, T.M. & Nelson, K. (2001)) and the definition of performance measures for adoption (Umble *et al.* (2003)). With diffuse objectives, no established vision and no comprehensive long-term adoption planning, architecture was not defined, but rather the structure of the acquired system was adopted. In the perception of the researcher, drawing from his experience at the company, the system's structre – a client / server architecture – suits Z well (cf. also critical business needs issue below). As for the performance measures, the GenDir's statement of non-existent implementation planning may serve as indicator of their absence.

Umble *et al.* (2003) and Somers, T.M. & Nelson, K. (2001) note the identification of critical business needs in order to adopt the most suitable system as crucial for PF success. Drawing from the above-mentioned diffuse definition of objectives and considering the GenDir's statement:

> *"[with the ERP] we [wanted] tofind out where the money was lost on the way [referring to the fact that it was not know whether a project generated profits or not and if not, where the losses occurred; the author]"*

and, with respect to the ERP selected,

> *"I knew of some Mexican companies that were using the [ERP we acquired], I had read interviews with users and it seemed to be the most popular system in that range."*

as well as the AdminDir's notion

> *"There was the option I wanted, an ERP from Microsoft with everything, including the training in Spanish. The Microsoft ERP would, furthermore, have worked in terms of projects, just like we do."*

It becomes apparent that business needs might have been identified, however there doesn't seem to have been a consensus on whether the established system supported the identified requirements or not.

Commitment of top management, expressed in moral support and resource commitment as well as in participation (Umble *et al.* (2003); Somers, T.M. & Nelson, K. (2001)) is considered the single most important KSF for ERP adoption (Somers, T.M. & Nelson, K. (2001)). The GenDir's statement with respect to ERP implementation:

> *"Initially I planned to do it myself and not to hire someone."*

indicates strong support, at least on moral basis. On the other hand,

> *"To be honest, there is not even budget to pay for a full-time employee to implement the system."*

shows somewhat limited resource commitment. Considering that a SME in general has rather limited resources, and the SME in question has been experiencing severe cash-flow problems before and during the adoption efforts, and especially taking into account the crucial role played by an owner-manager of an SME, epitomized in the GenDir's statement:

"aqui todo depende de que ejerzo una especie de patriarcado" ("everything here depends on me exerting or establishing a kind of patriarchy")

the researcher concludes that top management support was given under the constraints applicable to the Z. It should be taken into account that the researcher himself worked at Z, implementing the ERP, and personally perceived top management as supportive.

Excellent Project Management and a skillful implementation team, in other words, adoption plans that take into account the company's particular characteristics and a team comprised of all relevant areas ("resource diversity" in the words of Raymond *et al.* (2008)) that has crucial decision making power is considered a KSF by Umble *et al.* (2003); Somers, T.M. & Nelson, K. (2001) and Laukkanen *et al.* (2007). For the case of Z where the adoption team comprised of InternDan, and after his departure from the company of InternMa succeeded in March 2009 by InternRu a highly skilled team cannot be seen. Given the vertical structure of Z (cf. GenDir's statement "[…] everything here depends on me") and the implementers' background as students their decision making power can be considered limited. As noted earlier, there are no indicators of an implementation or adoption plan whatsoever; however the day-to-day base on which the adoption was executed implies taking into account the company antecedents. In other words, while there was no plan, company characteristics such as openness to change *(GenDir: "So far our employees are rather open to new things […]")* or limited proficiency in English language by the majority of staff *(AdminDir: "Yes, certainly, [the GenDir] and me we can speak English, but the rest can't")* influenced the work on a daily base as for example the trainings had to be adopted to Spanish language.

Related to the skillful implementation team Somers & Nelson (2001) noted the need for a Project Champion and a Steering Committee. The GenDir can be considered as the project champion, particularly because of his already mentioned dedication *("Initially I planned to do it myself and not to hire someone."*, also visible throughout the researcher's time at Z) and his executive position. Somers' & Nelson's (2001) call for a Steering Committee, encompassing a "superuser" (Somers, T.M. & Nelson, K. (2001) can be seen reflected in the interns' role. The initial idea, according to informal talks between the researcher in his role as InternDa and the

GenDir in summer 2008, was that the intern acquired profound knowledge on the system and transmitted it later to the users.

Also with respect to the actual implementation Umble *et al.* (2003), Somers & Nelson (2001) and Laukkanen *et al.* (2007) mentioned the need of accurate data as an important factor of success. Given the comparable low resource-diversity –albeit somewhat offset by a high number of possible categories, i.e. sizes, for each resources, i.e. alloys – and the anyways changing character of prices the data input into Z's system is accurate. The sizes have to be set once for each alloy, a process that, as noted in the researcher's journal in his function as InternDa, required a number of trials but is set now, translating into accurate captured materials. The materials' prices have to be adopted for each order as providers charge depending on world market quotes.

Umble *et al.* (2003) mention Organizational Change Management as a KSF in ERP adoption stating that *"even the most flexible ERP imposes its own logic"* that has to be accounted for by changes in the organizational structure (Umble *et al.* (2003); 245). Z, drawing on its rather 'ERP-enthusiastic' GenDir can somewhat balance its lacking adoption objectives and thus ability to controlled and deliberate organizational change by the outstanding position the owner-manager GenDir enjoys: organizational change deemed necessary by him can be executed straight forward.

For the implementation itself the ongoing vendor support and the adequate use of external consultants is considered crucial in order to attain benefits from the PF efforts (Somers, T.M. & Nelson, K. (2001); Umble *et al.* (2003)). In the case of Z, the system's package includes 24 work hours of consulting by an implementation specialist from the software developer (ImplConsl). With respect to the notion of *ongoing* support, the ImplConsl's statement:

> *"A normal customer with a5-user system and not using [the ERP's] accounting module will have an implementation lasting three to six months after the process begins. It is common to have a follow-up visit after first year of implementation in order to optimize project."*

sheds light on Z relation to its vendor and the support it receives as well as on the use of consultants with specialist knowledge. Taking into account the follow-up calls and emails by the

sales representative of the software developer in order to assure the system's deployment and to schedule the follow-up visit by the ImplConsl, that relationship can be considered of strategic nature.

Communication and cooperation, between the implementer and the affected departments with respect to plans and goals and their achievement as well as within the implementation team itself was considered important for PF effort's success by Somers & Nelson (2001). Z's high orientation towards the owner-manager GenDir and the staff's heightened disposition towards working extra hours in order to finish production jobs can be seen as indicators of interdepartmental cooperation referring to a common goal or to the sharing of goals. As the implementation 'team' consisted of little more than the respective intern on the operational side and the GenDir on the executive side, inter-team communication was not an overt difficult issue. With respect to inter-departmental communication of the adoption efforts or its progress the researcher's recollections that there has been very little communication coincides with the AdminDir's statement:

> *"The staff is very suspicious whether or not an additional employee would help us. They are convinced of SCHEDULE but they are not yet convinced of the ERP. That is because they have not yet seen it and don´t see or understand its benefits."*

indicating too little communication.

Extending the concept of communication of the system, training of how to use the system and the related issue of IT-competences of the users are important to a system adoption's success (Somers, T.M. & Nelson, K. (2001); Umble *et al.* (2003); Barba-Sánchez *et al.* (2007) and Laukkanen *et al.* (2007)). User training has taken place at Z only to very limited extend, training the GenDir in his function as Sales Representative of Z in the use of the system's quoting functionality and training the AdminDir in her function as head of Procurement in the use of the system's Requirement for Purchase Orders-functionality. By the end of September, according to tags in the files, training files in Spanish were created to complement the existing, built-in training of the ERP in English language. Given the workload and the temporarily shutdown of the ERP by the software developer due to missing down payments from Z the future users never actually trained on the system. The lacking training might also be a reason for the lackluster buy-

in of staff observed by the AdminDir in her earlier-cited quote of staff being suspicious towards the benefits brought by the ERP.

Paper & Chang (2005) augment the concept of communication, considering open feedback channels as a KSF of BPR efforts. Drawing from observations of the researcher in his function as InternDa Z disposes of open feedback channels. In particular, the example of InternDa suggesting – as an intern to the GenDir - to change the entire organizational structure to allow for more timely delivery and the enactment of change-efforts from mid-January on (cf. Appendix F) can be seen as a strong indicator of open feedback channels.

An adequate compensation and reward system that encourages information sharing is deemed necessary for successful BPR adoption by Paper & Chang (2005). As lot of the changes planned, such as the effective adoption of the ERP or an efficient deployment of Microsoft Project has not yet been effectuated, Z's reward system still reflects more traditional approaches than information sharing encouragement.

How the staff's fear of change is accounted for by management is considered a KSF of BPR (Paper & Chang, 2005). The ProjMng states, referring to the ERP's perception by staff as a tool of control and whether this perception can be overcome:

> *"I think yes, yes it can be overcome by communicating it [referring to the beneficial character of ERP, the author]"*

Adding to this, he furthermore perceives the staff as being

> *"in a kind of comfort zone, and they [the staff, the author] don't want to see themselves obliged to do certain things [such as reporting actual labor hours, the author] and leave the comfort zone."*

and presents as a solution to the problem

> *"For the comfort issues, I think they are negotiable, meaning they will ask for something in exchange and accepting the greater control."*

Drawing on this, the researcher suggests that Z is dealing in a rather pro-active way with the fears raised by the organizational change. The notion 'rather pro-active' as opposed to 'proactive'

implies that, due to fact that no other member of the top management mentioned such thoughts, it is not totally assured that Z will take the posture proposed by the ProjMng.

The IT believes of an organization, meaning the creativity allowed for and encouraged by the deployed system is important to deployments success, suggest Paper & Chang (2005). The systems currently to be deployed at Z are rather rigid systems that require a rather strict adherence, hence the notion that the systems deployed formalize the production planning process, requiring said adherence. As Paper & Chang (2005) do not indicate whether creativity, i.e. flexibility of the system is generally preferable to structure the author does not rate the formal structure of the systems deployed by Z.

External pressure to adopt a new IT is identified as a KSF of IT adoption by Caldeira & Ward (2002). In the case of Z external pressure embodied by the customer's role is generally recognized:

> *"[…] the clients definitely pushed for change […] they wanted that we showed them in SCHEDULE how we were about to produce their stuff"* (AdminDir),
>
> *"Indirectly the customers pushed us towards doing things better, e.g. by requiring the use of [a software to display technical drawings from different sources; the author] or SCHEDULE."* (ProjMng) and
>
> *"Certainly there were customers who told us to improve our planning process as we began to run late in delivering […] [however] they didn't indicate or even pressure towards the adoption of a certain system or software."* (GenDir).

The statements indicate that external pressure existed, while it did not go so far as to 'strongly suggest' a particular software, undermining Z's integrity.

Finally, the time of adoption is deemed crucial for success of IT deployments (Caldeira & Ward, 2002). Seconding the notion and indicating that Z probably could have done better in selecting a data, the AdminDir states:

> *"When everyone is doing the urgent and not the important ("cuando se hace el urgente y no el importante") it is difficult to find time for such a big implementation [referring to ERP and SCHEDUL implementation and adoption efforts, the author]".*

To conclude the KSFs given in the case of Z and those that were only partially met as well as those that were not met at all, it is convenient to summarize the findings in a table. As for drivers and stoppers, to exemplify that the KSFs of PF identified seem to appear rather on a continuous than on a 'digital' scale, the items are grouped with respect to their 'degree of existence', as either "given / met", "partially given / met" or "not given / met"

Table 6. *KSFs for PF at company Z*

KSFs given / met	**KSFs partially given / met**	**KSFs not given / met**
Commitment of top management.	Business requirements aptly defined and system acquired matched to needs (only partially met b/c system in English and not on project basis).	Univocal strategic objectives and goals established.
Company characteristics taken into account for system selection.	Organizational change management apt to deal with system deployment (only partially met b/c no clear process for organizational change).	Comprehensive vision why and how deployed systems supports goals and objectives established.
System architecture adapted to company needs.		Performance measures established and tracked.
Project champion on executive level.		Highly skilled implementation team.
Steering committee w/ "superuser".		Communication of objectives, goals and progress.
Accuracy of data input into the system.		Reward system to favor information exchange.
Open feedback channels.		Implementation data aptly selected.
External pressure to effectuate change.		

With the drives, obstacles and KSFs as they were given during Z's process improvement efforts described, it becomes evident that the current categorizations, while without a doubt contributing to conceptual understanding, posses limited practical relevance in terms of facilitating the assessment of a company's readiness for formalizing deployments. The following section, 5.2 Synthesis, proposes a new categorization of the identified factors that overcome the drawback of the current groupings.

5.4 Synthesis

Pulling together the open threats of this paper, the drivers, obstacles and KSFs of PF identified in literature and the extent of their presence in the case of Z's improvement efforts, this section proposes a new categorization that not only allows to describe the circumstances of successful PF but that rather allows to assess whether or not it is recommendable to a SME to formalize a certain process.

Particularly the match between the case study and the KSFs identified in literature shows that a company can feature various success factors and still success of implementation or even adoption is all but guaranteed. The interviews conducted, however showed, that the factors of success mentioned in the literature do have their relevance. To improve existing knowledge on when a SME should formalize its processes, the results suggest that a different categorization is on order; a categorization that groups the existing factors according to their impact on the formalization-ability of a given process and the capabilities of formalizing of a given SME. The factors in such an arrangement obtain the characteristics of criteria that allow assessing the features of the process and company under scrutiny. Such a classification of a process or a company, in turn allow the practioner to take concrete measures to reach a position identified as desirable. In other words, once the company or the process is classified with respect to their formalization capabilities or formalization-ability respectively, the manager can estimate the efforts required to formalize a process, given that he / she deems a formalized process desirable.

Subsequently the factors favoring or inhibiting PF in SMEs identified in literature are grouped along the two proposed dimensions. Were possible the wording used in literature was maintained, were necessary it was adapted to account for the continuous character of the item. For improved readability a tabular layout is chosen. The factors are not ranked. The term procedure is used as opposed to process.

Factors affecting the Formalizability of a Process
Ease of use of the formalized process.
Availability of external expertise on the particular process.
Match / compatibility between formalized process and business needs.
Resource requirements of formalizing the procedure (incl. tec, HR, finance).
Measurability of process' performance.
Process impact on organizational structure.
Amount of required training on the formalized process.
Learning curve imposed by formalized process.
Possibility to train users on the formalized process.

Factors affecting the Capability of Formalization of the SME
Availability of external expertise on the particular formalization effort.
Capability to develop performance measures.
Availability of training resources (e.g. time of users, money for training).
Availability of training capacities (e.g. trainer).
Availability of resources for formalization (e.g. time, internal experts).
Expectations of users towards formalization's outcomes.
Expectations of top management towards formalization's outcomes.
Organizational attitudes towards communication (includes hierarchy).
Organizational attitudes towards cooperation (includes hierarchy).
Structure of compensation & rewards system (which behavior is favored?).

The two identified categories, Factors that affect the Formalizability of a Process and Factors that affect the Capability of Formalization of the SME can now be grouped on a two-dimensional scale, thus allowing conceptualizing them better (cf. Fig 7).

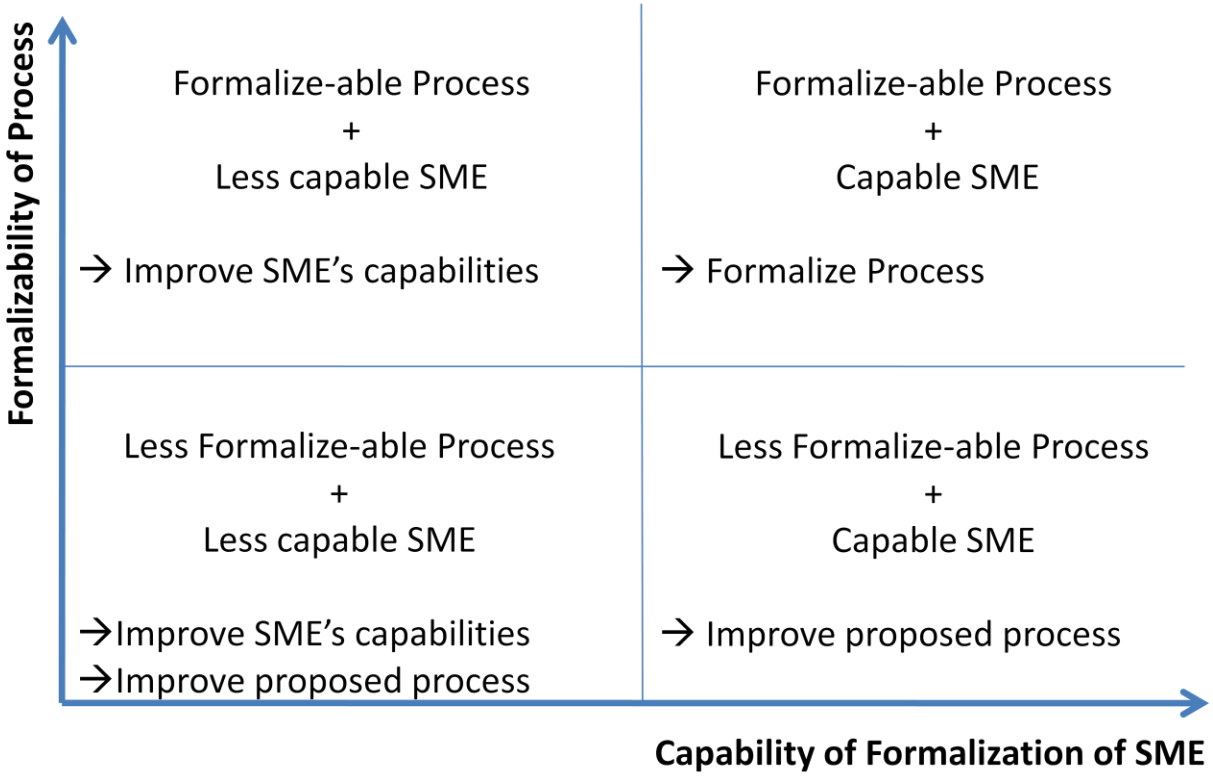

Figure 7. Process Formalization in SMEs – Conceptual Model

With the Conceptual Model of Process Formalization in SMEs (cf. Fig 7), the research question, when should a SME formalize its processes can be answered taking into account the process' as well as the organization's characteristics. Depending on the quadrant a SME pictures itself and the process in question, concrete measures can be derived, such as improving the SME's formalizing capabilities and / or the process' formalizability.

It has to be re-iterated and stated in the most un-mistakable way, that the formalizability of a process is not necessarily an adequate criterion for judging whether a process is suitable or not. Process formalization and its implications have always to clearly support the business goals of an organization in order to be contemplated in first place.