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Pockets of Creativity in Business Processes

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Abstract:

Creative processes, for instance, the development of visual effects or computer games, increasingly become part of the agenda of information systems researchers and practitioners. Such processes get their managerial challenges from the fact that they comprise both well-structured, transactional parts and creative parts. The latter can often not be precisely specified in terms of control flow, required resources, and outcome. The processes' high uncertainty sets boundaries for the application of traditional business process management concepts, such as process automation, process modeling, process performance measurement, and risk management. Organizations must thus exercise caution when it comes to managing creative processes and supporting these with information technology. This, in turn, requires a profound understanding of the concept of creativity in business processes. In response to this, the present article introduces a framework for conceptualizing creativity within business processes. The conceptual framework describes three types of uncertainty and constraints as well as the interrelationships among these. The study is grounded in the findings from three case studies that were conducted in the film and visual effects industry. Moreover, we provide initial evidence for the framework's validity beyond this narrow focus. The framework is intended to serve as a sensitizing device that can guide further information systems research on creativity-related phenomena.

Keywords: creativity, business process, process automation, process modeling, process performance measurement, risk management

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I. INTRODUCTION

Creative people and their practices play a prominent role in business processes. Creativity is commonly associated with the generation of products, services, processes, or ideas that are both novel and purposeful [Amabile, 1988; Woodman et al., 1993]. Creative processes, for instance, the development of computer games, visual effects, and marketing campaigns, increasingly become part of the agenda of managers [Hall and Johnson, 2009]. Similarly, Information Systems (IS)-related domains, such as software development [Ocker et al., 1998; Schenk et al., 1998], knowledge management [Lee and Choi, 2003; Datta, 2007], and the design of IT tools like decision support systems [Weber, 1986; Elam and Mead, 1990] or group support systems [Garfield et al., 2001; Hender et al., 2002] are largely dependent on creativity. While in recent years organizations have sought to improve the efficiency of predominantly transactional processes through approaches such as process reengineering [Hammer and Champy, 1993; Kettinger et al., 1997], process modeling [John et al., 2006; Rosemann and van der Aalst, 2007], and process automation [Amit and Akhil, 2002; van der Aalst and ter Hofstede, 2005], it has also become noticeable that many processes are not amenable to such efforts [Davenport, 2005; Harmon, 2007; Hall and Johnson, 2009]. Extending the scope of a company's traditional business process management (BPM) activities to creative processes would come along with the danger of straight-jacketing a key source of competitive advantage. Handling creativity in business processes as black boxes, however, would exclude this source from managerial leverage and IT support.

The present study contributes to the above discussion by examining creativity in business processes. The findings are grounded in empirical evidence that we derived from three case studies from film and visual effects (VFX) production. The article contributes to the IS body of knowledge by developing a conceptual framework that defines creativity within the context of business processes. The framework provides IS researchers with a sensitizing device that is meant to initiate and guide further studies [Klein and Myers, 1999] and assists practitioners in better managing business processes when creativity is involved. Based on our findings, we pinpoint potential directions of BPM research on process automation, process modeling, process performance measurement, and risk management in order to appropriately address the role of creativity in business processes. This is important because creativity is a vital element to the business model of many organizations, yet one that remains to be fully understood.

We proceed as follows. We first present the study's background by discussing related work from the BPM literature. We then provide an overview of the research method applied. Subsequently, we develop and discuss a framework for creativity in business processes and then examine its applicability for conceptualizing creativity based on two example processes. Since one of the examples comes from the healthcare sector, it can be regarded as initial evidence for the framework's validity beyond the narrow focus of the film and VFX industry where creativity more naturally applies. This is followed by a detailed assessment of our study's implications for IS research. The article concludes with a discussion of contributions and limitations.

II. RESEARCH BACKGROUND

BPM has emerged as a key area of IS research [Brancheau et al., 1996; Sidorova et al., 2008] that is characterized by high relevance to practitioners. It has evolved as a discipline that treats organizational processes as an important, but underutilized, asset in the challenge of enhancing organizational efficiency [Davenport, 1993; Hammer and Champy, 1993]. A business process represents a series of tasks or activities that need to be carried out in order to collectively realize an organizational objective or policy goal, and a set of conditions that determines the order of the tasks [van der Aalst and van Hee, 2002]. Many studies have shown that principles associated with BPM (e.g., process modeling, automation, performance measurement, or risk management) enable organizations to enhance organizational performance and sustain competitive advantage [Davenport, 1993; Hung, 2006].

It has been asserted that the outcomes of these different streams of BPM research have to be tailored to the type of process under analysis [Leymann and Roller, 2000]. A popular differentiation of processes is to classify them based on their business value (high/low) and their repetition (high/low) [Leymann and Roller, 2000]. Production workflows (e.g., claims handling) describe the class of high value processes that are executed in high frequency. These processes are highly transactional. Administrative processes (e.g., travel expense handling) are of high repetition and low business value. While production and administrative processes are, due to their transactional nature, receptive to the benefits of mainstream BPM solutions, collaborative processes (high value, low repetition) and ad hoc processes (low value, low repetition) require rather human-centric approaches that also consider the lack of stability in the design of these processes [Leymann and Roller, 2000; Harmon, 2007]. Examples for such

collaborative processes include the processes of collaborative research and software development. Typical examples for ad-hoc processes include correspondence management and run time exception handling.

Over recent years, research on BPM has shifted the focus from the optimization of highly structured, transactional production and administrative processes toward supporting human-centric or knowledge work processes [Eppler et al., 1999; Davenport, 2005; Harmon, 2007]. The focus on process standardization and automation is gradually substituted by the appreciation of human needs, as these have emerged as the key lever of value generation in knowledge work processes [Eppler et al., 1999]. BPM research is thus confronted with a new level of complexity and variability that arises from the complex problem solving mechanisms applied by knowledge workers and experts [Harmon, 2007].

These challenges become even more paramount when processes involve creativity—just think of the development of creative products, for instance, computer games, visual effects, or marketing campaigns. This is because creativity demands high levels of flexibility, autonomy, and personal judgment as well as low levels of structure [Hall and Johnson, 2009], which runs counterintuitive to most of the typical BPM paradigms, such as automation or standardization. Hall and Johnson [2009], therefore, claim that some processes need to be treated like arts rather than science, as they largely resist definition and standardization. Davenport [2005] asserts that work which primarily takes place in people's heads, and is conducted in an iterative and collaborative way, is hardly amenable to structure. Consequently, existing and widely used BPM concepts such as Six Sigma [Pande and Holpp, 2002] or Lean Management [Harmon, 2007] that have a strong focus on highly predictable and repeatable processes may be a danger to the management of rather creative processes, which require a set of different, more flexible, management approaches [Davenport, 2005; Amabile and Khaire, 2008].

Though processes that rely on creativity differ from classical transactional processes, there is evidence to suggest that they are still amenable to, and may benefit from, the central ideas of classical process management. Streamlining recurring and uncreative processes frees up an organization to focus on the creative parts [Adler et al., 1996]. An organization has to provide the space to generate plenty of creative ideas; at the same time, it has to guarantee the required structure that is needed to capitalize on them [Brown and Duguid, 2000]. Processes from both spheres have to be managed in an integrated manner in order for a company to succeed in a highly competitive environment [Maletz and Nohria, 2001].

Notwithstanding the awareness that processes involving creativity may benefit from BPM, the majority of literature in the field of creativity research does not choose the business process as the level of analysis. This area of research typically does not provide analytical means to capture the interplay between creative tasks and the business process they are part of. Though the literature refers to the "creative process" [Satzinger et al., 1999; Russ, 2000; Edmonds and Candy, 2002; Kristensson and Norlander, 2003], the focus is on single, often isolated creative tasks [Kahl et al., 2009] and how these are solved by individuals [Massetti, 1996; Mace and Ward, 2002] and groups [Nunamaker Jr. et al., 1987; Couger et al., 1993]. This perspective shields creativity from its corporative setting. Hall and Johnson [2009], for example, argue for a strict separation between scientific and artistic processes. They insist on dividing a process as soon as it contains both artistic and scientific elements and managing both parts separately. Such a procedure caters to a fragmented silo-perspective in an organization and is contrary to the idea of process thinking [Harmon, 2009]. However, those studies that analyze the impact of creativity on the corporate sphere [e.g., Bonner et al., 2002, Cooper, 2000, and Eckert and Stacey, 1998] also fall short in providing a satisfactory process conceptualization of creativity. These studies treat creativity as a monolithic black box rather than providing a detailed account of the different facets of this concept and their impact on the embedding business processes.

The aim of this article is to fill the sketched research gap. It delivers a conceptualization of creativity *within* business processes based on empirical research. It is expected that core IS topics such as those discussed above can benefit from this conceptualization and that the framework will sensitize fellow researchers in their efforts of investigating creativity-related topics.

III. RESEARCH METHOD

Research Design

The goal of this research is to generate a conceptual framework of creativity in business processes. We advance an inductive design based on empirical data as we argue that relatively little is known about how organizations effectively deal with the phenomenon of creativity at the level of business processes. In order to do so, we decided to collect qualitative data from three case studies with organizations from film and VFX production. An attempt was then made to study the phenomenon of creativity in business processes in a real-life context [Eisenhardt, 1989]. This research, therefore, is interpretive in nature; that is, the underlying assumption is that any access to reality is a social construction [Walsham, 1995; Klein and Myers, 1999]. It further follows an inductive design; that is, its primary

purpose is on generating theoretical knowledge rather than testing existent theories. The data was analyzed using a grounded theory approach that particularly draws from the work of Strauss and Corbin [1998].

Site Selection

The three case organizations that focus on post-production and VFX production were selected based on their involvement with creativity within their organizational processes. Thus, organizations, in which the subject of interest was transparently observable were selected [Eisenhardt, 1989; Pettigrew, 1990]. Both post-production and VFX production are part of the broader domain of film production, which can be broken down into the stages of development, pre-production, production, and post-production [Clevé, 2006]. Post-production comprises all tasks between production and final delivery [Clark and Sphor, 1998]. VFX production processes usually start parallel to the actual production phase and are carried out until the product is finally delivered. However, VFX production is often seen to be part of post production [Wales, 2005]. Table 1 provides an overview of the case organizations that were involved in the present study.

Table 1: Case Study Organizations

Organization	Approx. number of employees	Main areas of business
Organization A	40	Teaching
Organization B	120	VFX production
Organization C	150	Post production, VFX production, TV commercials

Organization A

Organization A is a leading teaching body in the field of film, radio, and television production in Australia. It was chosen for a case study because it was expected that respondents could provide access to a broad range of processes in the film industry. While the main service of this organization is teaching, the organization also conducts actual film projects. Teaching professionals that were interviewed have practical experiences in film production. For example, respondents work as producers on independent film projects. At the time of the interviews, Organization A had approximately forty employees.

Organization B

Organization B is a VFX house. VFX are computer-generated artifacts that are combined with conventional film material within television commercials (TVC), feature films, and other screen products [Kerlow, 2004]. At the time of the study, the organization had around 100 employees. Clients of Organization B include major Hollywood film studios, international producers, directors, and VFX supervisors. The core process of Organization B is the production pipeline. The main purpose of this process is the generation of computer-generated characters, character animation, and realistic simulations. The production pipeline comprises of complex sets of interrelated processes, which are characterized by high levels of creativity that result from the complexity of the generated products.

Organization C

Organization C focuses on post-production; that is, the stage of film production in which footage and audio are joined to a “flowing coherent piece” [Kellison, 2006, p. 143]. Besides classical post-production, Organization C also works in the areas of animation films and VFX production but has a broader scope than Organization B. Organization C offers VFX production for TVC, feature film, and television, different post-production services such as sound design and the design of menus, as well as distribution of various types of digital media. Organization C thus employs a great variety of processes that rely on creativity. At the time of the interviews, Organization C had approximately 150 employees.

Data Sources

Data collection took place over a period of approximately two years between 2006 and 2008. Including the preliminary stage of the study, the process involved well above thirty respondents (for a more detailed description of interviewees also compare Table 2 and Table 3). Multiple data collection techniques (semi-structured interviews, process modeling, document analysis) were used, an approach which is referred to as triangulation across methods and that is thought to support researchers in achieving a strong substantiation of concepts [Eisenhardt, 1989].

Data collection commenced with a series of preliminary interviews and meetings with fifteen experts, including both senior managers and artists from the case organizations. These first encounters with respondents were structured as open discussions and helped to further the understanding of the research problem and gain an initial understanding of processes that rely on creativity. Themes that were discussed include the general nature of processes in the case organizations as well as challenges associated with their management.

Subsequently, a total of thirteen respondents that were expected to have profound knowledge of the processes under investigation were involved in semi-structured, topical, in-depth interviews [Rubin and Rubin, 1995]. Both process managers and various stakeholders who work within the processes were included in the study. The average interview length was about an hour, and each interview was fully recorded and transcribed. The interview design was based on a set of preplanned questions to cover the subject area. The interview questions were always adjusted to the specifics of the situation at hand [Strauss and Corbin, 1998]. For example, a VFX supervisor from Organization B was specifically asked about VFX processes rather than creative processes in general. Follow-up questions and probes were used in order to gain a deeper understanding of concepts. Probes "request the interviewee to elaborate on what they have just said or to explain it further" [Rubin and Rubin, 1995, p. 139]. An illustrative set of interview questions that guided an interview with a VFX supervisor form Organization B can be found in the Appendix. Table 2 provides an overview of those respondents who participated in semi-structured interviews. The table also shows that two additional interviewees were included in the study; that is, the interviewees did not belong to any of the case organizations, but were also expected to provide insights into the phenomenon being studied. These two interviews focused on the role of IT in business processes that are characterized by creativity.

Table 2: Interviewees Involved in Semi-Structured Interviews

Organization	Interviewees
Organization A	Manager with finance background, producer, head of post-production department, production executive, sound designer
Organization B	Chief executive officer, VFX supervisor (2)
Organization C	General manager, creative director, design coordinator
Additional cases	Production manager of a leading European TV production company, IT professional from the media industry

In addition to semi-structured in-depth interviews, we used process modeling techniques in order to gain an in-depth, structured, and shared understanding of processes in the case organizations. Process modeling is typically used in order to deconstruct organizational complexity in order to increase process awareness and knowledge about business processes [Recker et al., 2009]. Generally, it distinguishes between informal methods used by business managers and formal methods used to specify software systems [Abeysinghe and Phalp, 1997]. For the purpose of our study, we used a management-oriented language, namely the event-driven process chain (EPC), one of the most popular modeling grammars [Davies et al., 2006]. A total of fifteen respondents were involved in process modeling (compare Table 3). Out of these fifteen respondents, four were also involved in the semi-structured interviews (marked with an asterisk in Table 3). The interviewees that were involved in process modeling held either management roles (e.g., VFX supervisor) or worked as some kind of artist (e.g., VFX artist).

Table 3: Interviewees Involved in Process Modeling

Organization	Interviewees
Organization A	Manager with finance background*, producer*, editor
Organization B	Chief executive officer*, VFX supervisor*, VFX artist (expert in rotoscoping), VFX artist (expert in 2D animation), VFX artist (expert in texturing)
Organization C	Project manager for interactive media, VFX artist, head of technical engineering, facility manager, technical directors (2)

* Respondents who were also involved in semi-structured interviews

Finally, secondary data in the form of process documentation, *PowerPoint* presentations, and press releases were collected. For example, in addition to the process models that were generated within process modeling, all three organizations provided some sort of process documentation (e.g., descriptions of standard operating procedures); however, no formal process modeling grammars were used. This documentation in particular contributed to the understanding of the nature of the processes being studied. Studying existing documentation thus helped the researchers understand both the domain and the industry's language, which facilitated the dialogue with the respondents.

Data Analysis

Data was analyzed using the grounded theory method as proposed by Strauss and Corbin [1998]. Grounded theory attempts to explore for and develop theoretical knowledge about the features of a phenomenon of interest, while it simultaneously grounds the account in empirical observations [Martin and Turner, 1986; Strauss and Corbin, 1998]. In the case of the present study, grounded theory data analysis was applied in order to derive a conceptual

framework of creativity in business processes. The framework may be regarded as analytic and descriptive theory [Gregor, 2006].

The process of theory-building following grounded theory is highly iterative, and theory and data are constantly compared [Strauss and Corbin, 1998]. This process can be referred to as *comparative analysis*. The second main principle underlying grounded theory is that of *theoretical sampling* as a process of "data collection for generating theory whereby the analyst jointly collects, codes, and analyzes his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges" [Glaser and Strauss, 1967, p. 45]. In order to analyze data, three types of coding as proposed by Strauss and Corbin [1998] were used: open coding, axial coding, and selective coding.

Open coding aims at identifying concepts. Open codes are early concepts that result from the stage of open coding. These open codes are then further integrated in order to form the concepts that find their way into the final model. Axial coding then helps to identify relationships among these concepts and selective coding aims at integrating the concepts into a coherent scheme. Because the study was part of a larger research project, the data generated were examined and coded by focusing on issues related to the nature of creative sections within business processes (compare Orlikowski [1993] for a similar approach). Consequently, the process of theoretical sampling played an important role. After it had become noticeable that processes that involve creativity are characterized by varying levels of structure, this impacted further data collection. Moreover, the researchers revisited the already collected data in order to learn about how those parts that are creative can be further conceptualized. This process enabled the researchers to further investigate those sections within business processes that are particularly characterized by creativity. Data collection and analysis were thus driven by the emergent theory. The process of constant comparative analysis stopped when enough concepts and relationships were identified that were deemed relevant in order to conceptualize creativity in business processes and further data analysis did not provide further insights [Glaser and Strauss, 1967]. This stage yields the interchangeability of indicators [Holton, 2007] and has also been referred to as theoretical saturation [Glaser, 1978].

In order to foster validity and reliability of the data analysis, including the process of theoretical sampling, two analysts were involved in the coding process. One analyst conducted the entire coding phase while the second coded selected data (one interview from each organization) independently. The latter then served as a basis to discuss the plausibility of codes and to reach inter-analyst agreement. All disagreements could be solved in an open discussion and finally both analysts fully agreed on the codes. This process of inter-subjective coding allows a strong substantiation of emerging concepts [Glaser and Strauss, 1967; Orlikowski, 1993]. Moreover, the resultant model was compared to the raw data, a process that Strauss and Corbin [1998] refer to as high-level comparative analysis.

IV. FINDINGS

The framework developed in this study is primarily descriptive and analytical [Gregor, 2006]. That is, the relationships are mainly associative, rather than explicitly causal. However, explanatory elements are also present. We present our findings in two steps. First, we discuss the general nature of business processes that involve creativity by focusing on their property of *varying levels of structure.* We conceptualize these processes as *creativity-intensive processes.* We then proceed to the discussion of the central concept of the present study, namely that of *pockets of creativity.* Pockets of creativity conceptualize those sections within creativity-intensive processes that are particularly characterized by the involvement of creativity. For each concept we provide detailed descriptions of how it was developed from the data; that is, for each concept open codes as well as actual data are shown.

Varying Levels of Structure in Creativity-intensive Processes

We found that the processes in the case organizations usually are not simply either creative or noncreative, but often combine creative as well as noncreative parts. The following statement that was made by a producer from Organization A exemplifies this:

> *With TV and film you break it down into chains of events that are then divided into sort of creative and noncreative tasks.*

This also became apparent during process modeling, where some parts of the processes could be modeled and described easily. Others turned out to be more complex, hard to predict, and characterized by the creativity of the involved people. While, at the highest level, a process may be framed as creative (as it generates products that are both novel and purposeful), it can often be further broken down into more detailed sub-processes. These processes may be either creative or well-structured and easy to predict. Figure 1 illustrates this dichotomous interplay by using an example from VFX production. Exemplary pockets of creativity are modeling, 3D animation, and what is called

the *base mesh.* All these sub-processes are characterized by the novelty and purposefulness of the products they generate. The pockets of creativity are illustrated by means of an iterative cycle which is intended to highlight that these sub-processes do not follow a predetermined structure and logic, but are rather characterized by their involvement of individual opinions, judgment, divergence, and their iterative nature.

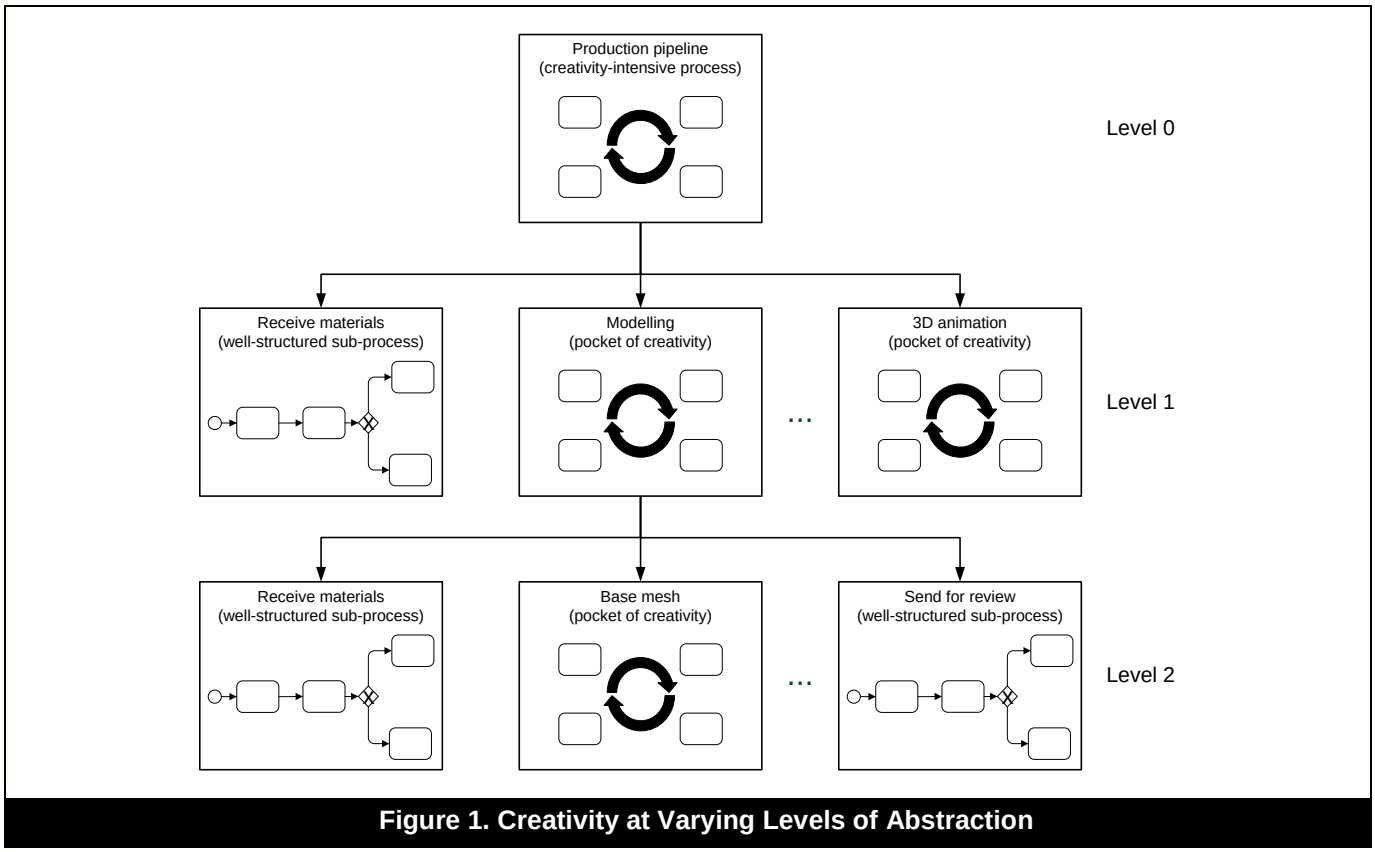


Figure 1. Creativity at Varying Levels of Abstraction

Based on these findings, we suggest the notion of the creativity-intensive process as opposed to the creative process per se. A creativity-intensive process can be conceptualized by the property *varying levels of structure*. Open codes from the stage of open coding that led to the formation of this property include *creative tasks, technical tasks, granularity, inherent process steps, sub-processes, recurrent elements,* and *patterns.*

In the following, we explain the main characteristics of those parts of a creativity-intensive process that involve creativity by introducing a set of interrelated concepts and explaining of how they were derived from the data. As will be seen, the emergent concepts were grouped into types of *uncertainty* and *constraints.*

Pockets of Creativity

Uncertainty in pockets of creativity

Our data suggests that creative sections within business processes are characterized by three different types of uncertainty. First, it became apparent that the outcome of a pocket of creativity is not entirely known in advance. Yet, often it is not the case that nothing is known about the creative product. Just think about a particular animation sequence for a film or a VFX. A producer who needs that sequence to complete a film will certainly know the technical format and also its intended length (not necessarily precisely though). However, some aspects remain unknown until the process is carried out. Particularly creative aspects of the output (e.g., what characters occur in a particular sequence or what the characters look like) are not known in advance. This property of a sub-process is epitomized by the concept of *product uncertainty* of pockets of creativity. The following comment was made by the chief executive officer (CEO) of Organization B:

> *And I think … one of the features of it being a creative process is that … there's no objective way of defining the outcome; as it is with the … aesthetics. After you got it, you can cast some judgment over whether or not it is appropriate, but you can't sit down before you start and define the outcome in a sort of objective, measurable way.*

Second, not only is the process outcome not predetermined, but also the actual process leading to this outcome. As opposed to well-structured sub-processes such as receiving materials (compare Figure 1), pockets of creativity are not entirely predictable. For example, when producing a particular VFX for a feature film, the organization does not know the iterations that are necessary for different process steps (e.g., creating the skeleton, creating the surface, lighting). Also, required process steps may not even be known beforehand, as the product and its properties are further developed throughout the process. This became particularly apparent through process modeling where we often hit the limits of the used modeling approach, as the respondents kept coming up with exceptions and alternatives that would have led to over-engineered, non-readable process models. This property of a pocket of creativity is epitomized by the concept of *process uncertainty*. The following comment made by a creative director from Organization C exemplifies this:

> *So I am trying to get to an end-point, but how I get there is undetermined, and exactly whether I meet that target or come up with something better or different is still undetermined.*

Third, as required process steps and iterations are not entirely predictable, so are resources such as required people, technical equipment, time, and budget. For example, within VFX production processes, while the process is conducted, it may become necessary to involve further people with particular skill sets or to extend computing power if a novel animation proves to be particular complex. Also, very often it is hard to predict how much time a creative process will take. This facet of a creative sub-process manifests in the concept of resource uncertainty. A VFX supervisor from Organization B provided evidence for this concept with the following comment:

> *In the planning and resourcing stage …, we are always taking a good guess on how things should be done, and by the end of the project you can see how close or how far away you are from the mark, so there's always a degree of adaptation that you go through.*

Table 4 provides an overview of the concepts discussed above along with open codes that led to the formation of the according concept. Evidence for these concepts was found in data from multiple respondents from all three case studies.

Table 4: Types of Uncertainty in Pockets of Creativity

Concept	Description	Open Codes
Product uncertainty	Certain characteristics of a creative product are not known in advance. Uncertainty with regard to outcome depends on various factors such as the level of requirements specifications, and can be ranked on a dimensional range from low to high.	Bringing something individual to it, changing mind, conflict potential, differing interpretations, disagreement, individual opinion, judgment, making creative judgments, no objective way in defining the outcome, open end, openness, trying different things, variance in outcome
Process uncertainty	The process structure (required process steps, number of iterations, control flow) of creativity-intensive processes is often not known in advance. This is mainly due to different perceptions of the involved creative individuals and evolving product characteristics. Uncertainty with regard to process structure varies on a dimensional range from low to high.	Adaptation, being open to embrace, doing things differently, flexibility, fluidity of process, giving someone a run, going broad, individuality, jumping a process step, latitude, low predictability, not controlling anything, not having a pre-structured guide, openness, organic processes, process choices, process realignment, tackling new work, thinking laterally, variance in process, varying numbers of iterations, working dynamically
Resource uncertainty	Required resources in creativity-intensive processes are often not fully known in advance or vary during execution. As different operational procedures and different creative actors require different supplies, resource requirements remain uncertain until a creative product is finished. Uncertainty with regard to required resources varies on a dimensional range from low to high.	Flexibility of resource use, sink of resources

Constraints in pockets of creativity

In the above discussion one important issue has already become noticeable: It is not the case that nothing is known about the product, the process, and the required resources. Even though there is a certain degree of

unpredictability, pockets of creativity underlie certain constraints. This becomes obvious in the following comment that was made by the CEO of Organization B:

> *Creativity is all about what's the best thing that I can do within the constraints.*

The study identifies three types of constraints. First, a creative product has to meet certain requirements (this is reinforced by the awareness that creative products are always purposeful). The following statement that was made by a respondent from Organization C exemplifies this:

> *I have to try and understand what the customer wants and sometimes it becomes less creative if I have a very, very clear brief. They may want to have a specific sort of dog on a specific street and then I have to give them that.*

Second, the process structure is restricted by dependencies between different process fragments (such as mandatory process steps and sequence dependencies). Process modeling contributed to the formation of this concept, as it became obvious that even within creativity-intensive processes there are mandatory process steps and temporal dependencies between specific process fragments. A good example for such mandatory process steps is quality assurance that turned out to be an imperative step following some critical tasks within a creative process. Evidence for mandatory quality assurance was also found in the interview data. A respondent from Organization B describes this process as follows:

> *We tend to have a process where, once it's been approved, it's gone to the client, the client is happy with it, we finish the shot, before the shot actually goes out the door, someone senior goes through it and just makes sure that all the basic standards are right.*

Third, acting creatively is restricted by both the required resources and the availability of resources (such as human resources, time, budget, and equipment). Process modeling contributed to this understanding as it became apparent that certain creative tasks, such as modeling in VFX production, require certain resources. Consequently, the availability of these resources becomes a constraint to the underlying process. Evidence for resource constraints was also found in the interview data. Time and budget were repeatedly mentioned as the most important resources in creative processes. Other resources include technical equipment, as the following statement that was made by a respondent from Organization B exemplifies:

> *There are going to be technical resources that are required depending on the problem, and they become more and more important the better you understand what the issue is.*

Thus, constraints describe the boundaries in which creative work happens. These boundaries are set by what is required (e.g., what a client expects a product to be or do) and what is available (e.g., what resources). These two are two sides of the same coin that constitute the constraints under which the creative process is conducted. We thus use the notion of constraints in order to conceptualize *what is known* about a creative process.

In summary, the study suggests three types of constraints that describe what is known about a pocket of creativity in advance: *product constraints*, *process constraints*, and *resource constraints*. When the process is carried out, it must adhere to these constraints. Evidence for the three types of constraints was found in data from multiple respondents from all three case studies. Table 5 provides an overview along with open codes that led to the formation of the according concept.

Integrated framework of pockets of creativity

Figure 2 provides a model that is proposed as an initial formulation of the key concepts that are required to conceptualize creativity in business processes and their relationships. The model is the result of the stages of axial and selective coding. Axial coding was the stage where relationships among concepts were identified, while in selective coding the concepts were integrated into a coherent framework [Strauss and Corbin, 1998]. No claim is made that the concepts and relationships presented here are exhaustive. The model in Figure 2 exhibits those relationships that emerged as being salient from the data. It is suggested that pockets of creativity are characterized by the three interrelated concepts of product uncertainty, process uncertainty, and resource uncertainty. These concepts are, in turn, impacted by three interrelated types of constraints, namely product constraints, process constraints, and resource constraints. As indicated, the relationships are mainly associative, rather than explicitly causal [Gregor, 2006]. Evidence for all suggested relationships was found in data from multiple respondents from all three case studies.

Table 5: Types of Constraints in Pockets of Creativity		
Concept	**Description**	**Open Codes**
Product constraints	Product constraints limit the degree of uncertainty in the outcome of a pocket of creativity. They are important for review cycles involved in a process and for process sections succeeding a pocket of creativity. Explicating characteristics of a product known in advance enables to secure required product characteristics and define how the process can continue after a particular creative task.	Appropriateness of product, basic qualitative requirements, client feedback, compliance issues, decided by someone else, doing what has already been thought up, getting to an end-point, having a good understanding of what you are doing, level of detail of requirements specifications, limiting creativity, low latitude, requirements specifications, specificity, story requirements, storyboard, what is known
Process constraints	Process constraints describe how much of the process can or has to be pre-determined. They may impose mandatory process steps and temporal dependencies between specific process fragments. For instance, review steps may be enforced for every major refinement of a creative product.	Acting in a narrow band, boundaries, common process parts, constant reviews, crucial tasks, disciplined process, doing something mechanical, drawing upon related information, inherent process steps, logistics, making sure you stay on the same path, mandatory process steps, mastering technical skills, operating, pre-planned processes, process alignment, process blueprints, replicating, target number of iterations, technicalities, too difficult to do
Resource constraints	Resource constraints describe both resources that are compulsory to carry out a pocket of creativity (i.e., requirements) and resource restrictions under which the creative product has to be developed. Time and budget are common resource restrictions whereas specific technical assets or skill-sets of creative individuals exemplify mandatory resource requirements.	Budget, good use of resources, hardware constraints, human resources, logistics, open end, providing deadlines, required implicit knowledge, resource allocation, software constraints, tacit knowledge, technical resources, time

In the following, we first consider the relationships among product, process, and resource uncertainty, before discussing product, process, and resource constraints.

In our case study, we found that, typically, uncertainty with regard to the outcome is the raison d'être for uncertainty with regard to process and resources (relationships 1 and 2). As the characteristics of a creative product are vague, so is the knowledge about the required resources and procedures. The following statement made by a respondent from Organization C exemplifies this:

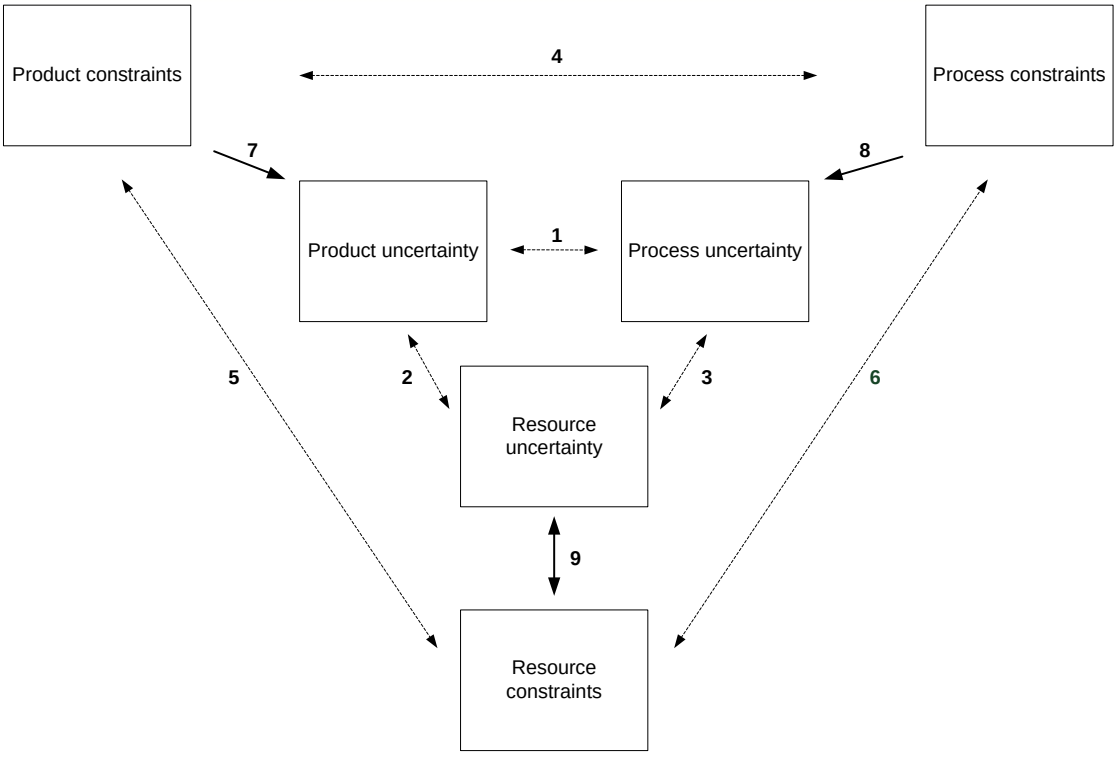
> *For example, with film work, they [the designers] will read a script and they'll be told we need a title sequence for this script: "Go away, read the script, and see what you come up with." And you'll notice that the designers always see things completely differently from each other. Even if somebody's initial ideas are similar, the way that they actually physically design it and put it together is always very different. So that's very much a creative thing where they have free reign.*

It became further noticeable that the relationship between product uncertainty and process uncertainty (relationship 1) can be seen as associative and mutual, rather than unidirectional. In particular, the data suggests that uncertainty with regard to process also impacts on uncertainty with regard to the outcome. The following statement was made by a producer from Organization A:

> *If it's something like offline editing, you want the editor to think independently and creatively about problem solving. You don't just want them sit there at the desk and put the pieces together and do it technically.*

Generally speaking, if there is room for divergence and a greater flexibility in process, this may contribute to uncertainty with regard to outcome.

Similarly, the relationship between product uncertainty and resource uncertainty (relationship 2) is to be seen as associative and mutual, rather than unidirectional. For example, due to an ill-defined problem situation, it may not be known what resources may be used in order to solve the problem. As a consequence, it may be chosen



Legend for arrows
1, 2, 3: Mutual relationships between three types of uncertainties
4, 5, 6: Mutual relationships between three types of constraints
7, 8: Impact of constraints on uncertainties
9: Mutual impact of resource uncertainty and resource constraints

Figure 2. Framework for Pockets of Creativity in Business Processes

among a variety of different resources (within the resource constraints), each of which may have a different impact on the outcome, thus influencing uncertainty with outcome. Due to the fluid deployment of teams and resources in creative processes it may, for example, not be known who carries out what task, which, in turn, will impact on the creative product. A respondent from Organization C described the process of making a skeleton for a character in VFX production as follows:

> *Some people would just get a skeleton and the library and modify, other people would make a fantastic skeleton that does all sorts of amazing things, and that's creative and that's not ... so the same task in two different people's hands is different.*

We further found a mutual relationship between process uncertainty and resource uncertainty (relationship 3). If the process is not known in advance, it is not known what will be required in the end. Similarly, if there is uncertainty with regard to the resources that will be available, as it is often the case in creative processes, this may also impact on the process options. The following quote from Organization A with regard to the impact of the individual on the creative process exemplifies this:

> *I suppose something, a task that requires an individual's opinion or input, is what is different each and every time. It's not simply a chain of events of doing a process from A, B, C.*

In summary, the uncertainty regarding outcome, process, and required resources are closely interrelated. One dimension of uncertainty can impact on another (thus, relationships are mutual, which is expressed by an bipolar arrow in each case). We note that there was clear evidence that much of the uncertainty with regard to process or resources is to be attributed to product uncertainty. As organizations are regularly confronted with the challenge of generating novel products, they have to constantly adapt their processes and reallocate resources.
Similarly, the underlying constraints (illustrated by the outer three concepts in Figure 2) are also intimately connected. Organizations must find a balance between product constraints, resource constraints, and process constraints. Together, these constraints set the boundaries in which creativity happens. Fulfilling certain product constraints will often require specific resources and process steps and, thus, impact on the corresponding

constraints (relationships 4 and 5). The following comment made by a visual effects supervisor from Organization B exemplifies how the requirements of the creative product (i.e., product constraints) impact on the process:

> *Basically, what we have to do to serve the customer is rearrange how we are working internally.*

The following statement that was made by a sound designer from Organization A provides a good example of where resource constraints were adjusted based on product constraints:

> *Based on what I knew about that, I pushed really, really hard from early stages … that a substantial amount of money was put toward getting the right location crew and the right equipment to do what was needed to be done creatively.*

At the same time, resource constraints impact on product and process constraints (relationships 5 und 6). For example, a responded from Organization A told us about an occasion in the process of making a feature film, where a scene was originally planned with six wind machines (technical resources) in order to create a dust storm. The following happened:

> *When they got closer to shooting the scene, they had run out of money. … [Therefore,] they couldn't have six wind machines. They could have one. But there was no way around it, and they all put their heads together and decided how they could do this with one wind machine. Ah, why don't we shoot inside, and actually pad around to the dust storm through the windows, and hear the cows mooing and outside there was all these guys with the dust machine running around the building making sure there was a dust storm outside every window.*

In this statement it not only becomes apparent that resource constraints impact on product and process constraints. It also shows that pockets of creativity must be seen in the wider context of the process they are part of. In this case, for example, there were other pockets of creativity that, due to resource uncertainty, consumed more money than expected. This, in turn, resulted in stricter constraints for the pocket of creativity described above.

The study also suggests that there are relationships between the different constraints and the three types of uncertainty of pockets of creativity. As has been become apparent above, product constraints, by limiting the uncertainty associated with a creative task, also limit the creative potential of a task as there is less room for divergence and exploration (relationship 7). Moreover, resource constraints limit the uncertainty with regard to resource consumption (relationship 9) and process constraints limit process uncertainty (relationship 8). Thus, constraints on the one hand and uncertainty on the other hand side turn out to be two sides of the same coin.

While the study suggests that there is a clear tendency of product constraints to limit creativity, it also becomes apparent that resource constraints do not limit creativity per se. It was repeatedly mentioned that under time pressure (which is a resource constraint), for example, people may come with particularly creative ideas. A design coordinator from Organization C said:

> *I mean it's good to have that latitude, but often they come up with some very creative solutions because they are under pressure.*

As the example with the wind machine also shows, constraints with regard to other resources may force people to come up with particularly creative solutions.

While the study shows that rather strict constraints with regard to product and process limit the corresponding uncertainties (relationships 7 and 8), the relationship between resource uncertainty and constraints (relationship 9) deserves further attention. In fact, there was evidence that this relationship is rather mutual. The following quote from Organization B exemplifies this:

> *In some sequences you just want to get it done, and there really isn't a lot of liberty for too much creative interpretation, and, yeah, you just want to be able to focus on those other areas that you know are going to be a lot more complex, where there will be a lot of creative decisions that have to be made. So in those areas you do want to make sure that you have ample time, ample people.*

In this example, a creative director is pointing out that high levels of resource uncertainty may require the organization to make sure that resource constraints are set in a way that ensures that all potential requirements are met as there is an explicit danger that the task may not be completed if there will be lack of resources.

Summarizing, when everything is known about a product and process, everything is predetermined by constraints. Once a product is not completely specified in advance, however, its completion will require the creative input of an individual or a group of individuals. The outcome is not predetermined any longer. The above framework thus accounts for a variety of situations, ranging from detailed specification to complete uncertainty (and creativity).

V. TWO CASES OF CREATIVITY-INTENSIVE PROCESSES

In this section, we demonstrate how the conceptual framework introduced above can be applied in order to conceptualize creativity. We present two cases of creativity-intensive processes. The first example originates from the domain of TV show production; that is, an area that is quite similar to the substantive area the conceptual framework was developed from. In order to do a first step toward the evaluation of the framework's applicability beyond primarily creative domains, we then provide a second example originating from the healthcare sector.

Process A: Development of a TV Show Concept

Our first example process comes from the domain of TV show production where the initial concept development phase, in particular, is characterized by the involvement of creativity. The development of a TV show starts with a creative idea that has to be fleshed out to an in-depth show concept for a single TV show or series of TV shows. Among others, it catalogs a meticulous timetable, a detailed description of visual artifacts that constitute a show's look and feel, and a comprehensive set of rules if, for example, the concept is about a game show.

The evolution of a creative idea to a comprehensive concept involves both creative and noncreative sub-processes. One example for the latter type is the archiving of a show-concept. If a concept does not fit the current demand of a television station, the production company has to file the related artifacts in order to be able to revert to them in the future. This involves subsuming a concept's key aspects and categorizing the developed documents for future retrieval. The development of an initial pitch is an example for a creative sub-process, that is, a pocket of creativity. A pitch constitutes a very brief and catchy subsumption that sketches out a show's main idea. It is about defining the characteristic that makes a concept stand out from the shows that have been there before (product uncertainty) and thus requires a high level of creative freedom. The time required for developing a successful pitch (resource uncertainty) and the steps and iterations necessary for rounding off its edges (process uncertainty) vary to a large extend. Some pitches are born out of the blue and are thus already done before anybody explicitly puts someone in charge of developing a pitch. Sometimes developing a catchy concept idea is a toilsome and lengthy endeavor.

However, a pitch always has to adhere to specific constraints, as every show concept has to be purposeful; that is, it has to meet the requirements set out by a client television station or the demand anticipated by a production company. For instance, the type of a show (quiz, game, comedy), its target audience, and its host may be defined in advance (product constraints). Moreover, if a television station explicitly entrusts a production company with the development of a show concept, the overall budget is usually set from the very beginning and thus also restraints the sub-process of pitch development (resource constraint). In this case, a representative of a station often has to acknowledge directive aspects of a show concept, such as the initial pitch, before it becomes further refined (process constraint).

Thus, the creativity-intensive process of developing a TV show concept is a continuous interplay of generating and assessing novel ideas under consideration of given business imperatives. Table 6 gives an overview of the characteristics of the pocket of creativity of developing an initial concept pitch.

Process B: Central Administrative and Medical Admission

Our second example case stems from the healthcare sector. This case focuses on the processes from an interdisciplinary central admission center of a hospital. The admission center provides a single point of contact for all patients, irrespective of their individual professional requirements. The central admission process comprises of both the rather structured sub-process of administrative admission and the fairly variable sub-process of medical admission, making it an apparently good case for the application of the concept of pockets of creativity.

The creativity within the medical admission process can be primarily explained with process uncertainty. Although the product—the patient—is different each and every time and "its" final condition may not be precisely predicted (product uncertainty), the overall goal is always the same: the patient's cure (product constraints). This is different for the process flow of a medical admission. Even though there exists a multitude of procedural guidance and restrictions and, therefore, a rather general consensus among physicians about the appropriateness of treatments for certain diseases or symptoms (process constraints), the individual composition and sequence of therapies can vary extensively from case to case (process uncertainty). Often, physicians have to (creatively) react to the particular situation of the individual case instead of acting in accordance to precisely defined procedural specifications. A

Table 6: Exemplary Properties for the Pocket of Creativity Concept Pitch Development	
Constraints/Uncertainty	**Example Case**
Product constraints/ uncertainty	Usually, several product constraints are given in advance. A television station may define the general type of a show (quiz, game, comedy) and both the chosen time slot and a station's general profile confine the target audience. Predefining the host of a show may also restrict the creative freedom of a concept pitch. Moreover, the selection of countries that a show is going to be broadcasted in has an impact on the final product, as local conventions and legal restrictions have to be considered. However, the pitch still has to be novel in order to stand out from prior shows and also must intrigue a television station.
Process constraints/ uncertainty	If a project is critical for a television station due to a large budget or its strategic role, a representative of the television station often becomes a loose part of the development team so as to ensure that the development process is heading in the right direction. The representative has to acknowledge every directive aspect of the show concept. However, the exact choreography of people involved in the pitch development evolves in the course of the process and thus is not known in advance.
Resource constraints/ uncertainty	Typical resource constraints for a TV show set by a television station are the time given for concept development and the budget provided for producing the entire show. A station normally already knows when a show is going to be broadcasted and, accordingly, when the concept and its pitch have to be finished in order to facilitate a timely production of the show. Similarly, the overall budget for a show and its development phase is fixed beforehand. However, the actual sources of inspiration for a concept pitch are not known in advance.

patient's condition may change during treatment; in particular, when she arrives in critical condition. Moreover, often there is incomplete information about a patient's condition and history of medical treatment. In these situations physicians typically choose the least risky treatment for a patient instead of the most effective one. Moreover, decision-making is based on human experience and assessment. In a central admission center experts from different disciplines with different perceptions of an optimal treatment have to cooperate.

In addition to obliging sequences of medical treatments, procedural regulations such as clinical pathways also define medical resources that are deemed appropriate to cure a specific disease. Moreover, the available resources for a specific therapy are also dependent on billing procedures that differ in accordance to the type of disease, a patient's health insurance, and the billing history of the present accounting period (resource constraints). However, the on-time availability of medical instruments and the unpredictability of a patient's constitution may force a physician to improvise beyond the borders of official regulations (resource uncertainty). Table 7 provides an overview of product, process, and resource constraints and uncertainties that apply for the pocket of creativity of medical admission.

Table 7: Exemplary Properties for the Pocket of Creativity Medical Admission	
Constraints/Uncertainty	**Example Case**
Product constraints/ uncertainty	The overall goal of medical treatment is a patient's cure. However, a patient's final condition highly differs in dependence on the individual case including aspects like the patient's general sanitary condition and medical history.
Process constraints/ uncertainty	In the healthcare sector plenty of procedural guidance and restrictions are provided by regulations like clinical pathways. These define sets of mandatory and optional treatments for specific symptoms and diseases and partly define sequential dependencies for particular therapies. However, due to the human factor that resides in both the patient and the team of responsible physicians, medical admission highly depends on the (creative) reaction to ever changing situational conditions.
Resource constraints/ uncertainty	Medical procedural regulations constrain the set of applicable equipment for individual diseases. These options are further restrained by the general existence of—often very expensive—medical instruments such as a CT scanner within a medical facility. Moreover, billing procedures have to be taken into account to assess a treatments economical feasibility. Resource uncertainty may originate from both the product and a process's context. Allergies of a patient, for example, may prohibit specific treatments and medications. Moreover, medical equipment may not be available due to a tight occupation schedule.

VI. IMPLICATIONS

By focusing on the role that creativity has in business processes, the framework presented in this article provides new avenues for research on business processes and related areas. It becomes apparent that creativity, due to its divergent nature, requires a discussion beyond aspects of human centricity, knowledge-intensity, variability, or flexibility. The notion of the creativity-intensive process as well as the central concept of pockets of creativity may thus guide future studies. One way to interpret the framework presented in this article is to see it as a sensitizing device [Klein and Myers, 1999]. The framework can, for example, contribute a new perspective on ERP implementation failures. Does the existence of creativity in business processes provide new explanations for the defeat of large scale IS support? Likewise, how does the notion of creativity-intensive processes and pockets of creativity change our understanding of product development? We also advocate research on the framework's refinement. We thus propose to further examine organizations that employ creativity-intensive processes in order to proceed to a more general framework that comprises of formal concepts and is applicable beyond the substantive area that was studied [Urquhart et al., 2009]. Examples include software development [Bose, 2008; Harris et al., 2009] or research and development in other fields such as engineering. We further suggest researchers to extend the examination to those industries that do not primarily rely on, but also benefit from, creativity. It is our belief that a broad variety of organizations employ processes that can be described as creativity-intensive. Our second example case, stemming from the healthcare sector, may be seen as a first indication of this belief.

Our framework can inform different fields of IS research in domains that are characterized by the existence of creativity-intensive processes. The field of process automation, for example, is expected to benefit from the findings of this study. Recent years have seen a number of studies on IT-mediated variability within business processes [Reichert et al., 2009]. While research on process automation especially focuses on control of coordination, there is also a strong research stream that aims to nurture operational flexibility [Lu et al., 2009]. Concepts such as workflow evolution [Hsu and Kleissner, 1996; Casati et al., 2000], exception handling [Casati et al., 2000; Müller et al., 2004], pockets of flexibility [Sadiq et al., 2005], ad-hoc workflow [Narendra, 2004; Dustdar et al., 2005], or case handling [van der Aalst and Berens, 2001; van der Aalst et al., 2005] introduce mechanisms to cater for different degrees of uncertainty within IT-mediated business processes. However, in pockets of creativity we are confronted with a level of uncertainty that exceeds the capabilities of these approaches. Here uncertainty transcends the understanding of a possible exception as a "deviation from an 'ideal'" [Klein and Dellarocas, 2000, p. 400] and also the notion of last-minute lashing of control flow structures [Sadiq et al., 2005; Weber et al., 2008]. When creativity is involved, uncertainty is not a necessary evil, but it is explicitly required and compelled by creative individuals. In this context, IT must not be applied for taming uncertainty—rather, it has to respect it. When a team of artists designs a visual effect for a movie scene, for example, a workflow management system must not impose a specific choreography on this process. The way a visual effect evolves is different each and every time. Sometimes it is a laborious procedure of many iterations and starting from scratch over and over again. Sometimes, however, an intuitive insight may quickly lead up to the final solution. Consequently, IT may just support this process by offering functionalities in a pull fashion that creative people can make use of if it fits the momentum of the creative process. Moreover, IT may operate on the outset of a pocket of creativity or push through existing process constraints. For example, an IT system can remind the creative team of a deadline for a first version of the visual effect to be delivered to the client. Thus, it is hoped that our approach will inform both the development of new and the adaptation of existing approaches toward process automation. The notion of pockets of creativity and varying levels of structure in creativity-intensive processes can help us distinguish process sections that are amenable to process automation and sections that are not.

The proposed framework can also guide the development of new process modeling techniques. While existing modeling techniques proved to be well-suited for structured processes and sub-processes [Rosemann and van der Aalst, 2007], the involvement of creativity inhibits the specification of a process by means of rigid control-flow structures. This aspect particularly became apparent during the modeling exercises in the course of data collection. For process sections that involve creativity the respondents kept coming up with exceptions and alternative process structures that led to non-readable process models. Thus, our framework helps to pinpoint aspects of a process that go beyond the mere specification of control-flow structures. It is thus hoped to inform the design of new modeling techniques capable of picturing the sphere of creativity-intensive processes.

Another field of research that we expect to benefit from our findings is the field of process performance measurement. Similar to the necessity of handling creative and structured sub-process differently when it comes to process modeling or process automation, the measurement of performance also requires this separation. Pockets of creativity have to be particularly assessed regarding creative performance. Here measures such as originality and novelty [Dean et al., 2006] are of relevance while structured sub-processes have to be judged regarding conventional performance ratios that primarily relate to efficiency.

The study suggests that constraints and uncertainty in pockets of creativity are intimately connected. Generally, exhaustive constraints are associated with low levels of uncertainty, while loose constraints are associated with high levels of uncertainty. Hence, pockets of creativity can also be associated with particularly high levels of risk. The identification of pockets of creativity can assist organizations in implementing appropriate mechanisms for risk management. Similar to the area of process automation, managerial intervention in creativity-intensive processes must not aim at blindly reducing uncertainty, since it is a vital facet of creativity. Rather, risk management has to implement mechanisms to mitigate potential unwanted consequences. Knowing that certain characteristics of a creative product are not known in advance, for example, can require planning for subsequent review cycles in order to make sure that a product actually meets a client's expectations. Due to the pivotal role of the human factor in creative work, pockets of creativity exhibit risks that are new to highly structured, transactional processes. For instance, a lack of motivation or creative thinking-skills of the people who are in charge of a creative task may have disastrous consequences for the quality of a creative product. These risks have to be mitigated by strategies such as the allowance of an appropriate level of creative freedom and the thoughtful composition of project teams.

In summary, the proposed framework is aimed to stimulate further research that addresses the role of creativity in business processes. It is our belief that, inter alia, research on process automation, process modeling, process performance measurement, and risk management will benefit from this study's findings. We further hope that, from a practical perspective, sensitizing to the existence of pockets of creativity will enable to enhance overall process efficiency. Corporate performance can profit from optimizing and automating the well-structured, noncreative tasks while not straight-jacketing the creative parts and, in consequence, compromising creativity. This article is thus a call for researchers and practitioners to exercising caution when creativity is involved in business processes.

VII. CONCLUSION

This article introduced a framework that conceptualizes creativity in business processes and is grounded in an empirical study on organizational creative processes. It is argued that this framework can act as a sensitizing device and guide further research. It may also provide a basis for further theory development. The study suggests that creativity-intensive processes comprise of both well-structured, noncreative parts and highly creative parts, what we call pockets of creativity. By identifying three types of constraints and three types of uncertainty as well as their interrelationships, we have made a first step towards describing these pockets of creativity.

The present study's contribution to the IS body of knowledge is in line with a current development in IS research. "The IS discipline became less technology focused and more business-process-focused over time" [Sidorova et al., 2008, p. 476]. In consequence, BPM-related research themes such as business process reengineering, supply chain management, enterprise resource planning systems, and risk management have been identified as core subjects of the IS discipline [Sidorova et al., 2008]. While in the present study the IT artifact is treated as being absent [Orlikowski and Lacono, 2001]—like in almost every second article published in our top tier journals [Nevo et al., 2009]—we contribute to the "stable core of IS research at the boundary of IT and organizations" [Sidorova et al., 2008, p. 477]. We indicate how different fields of IS research may evolve into the appreciation of creativity-intensive processes. This also affects the design of different types of IT artifacts such as workflow management systems, ERP systems, process modeling suites, process performance monitors, and tools for risk assessment.

This study has some limitations. Due to the interpretive nature of this research, it cannot be claimed that the phenomenon of creativity in business processes has been conceptualized exhaustively. Potentially relevant concepts and relationships may not have been accounted for. It has to be further acknowledged that other researchers may interpret codes differently. Given the interpretive nature of this research, however, the main concern lies in the question of whether the codes are plausible [Urquhart, 2001]. Moreover, the development of the proposed framework is based on empirical studies with only three organizations from one particular industry. However, in order to show its applicability, the framework has been applied to two additional example cases of creativity-intensive processes. This is to be seen as a first step toward evaluation.

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APPENDIX

This appendix provides an overview of main questions and follow-up questions that guided a semi-structured interview with a creative supervisor from Organization B. It must be noted that the interview also covered other topics as it was part of a larger study. Here, we only list those questions that are deemed relevant for the development of the conceptual framework presented in this study.

Main Questions and Follow-Up Questions for a Semi-Structured Interview
What is your professional background?
What roles have you performed on projects?
What type of work have you carried out?
Who have you mainly worked with?
Have you been responsible for or have you managed any processes as a supervisor?
Can you tell us about creative tasks or processes you have worked on?
What do you think makes a process or a task creative?
What do you think are the main differences between an individual creative process (such as drawing a painting) and organizational creative processes (such as making a film)?
What are typical stages of visual effects production processes?
What do you think is needed in order to successfully carry out visual effects production processes?
What resources are needed?
What are the most important resources?
What is the role of information technology in visual effects production processes?
How do you internally manage the visual effects production process?
What are the main factors that drive resource allocation?
Who allocates resources?
What is the role of IT in resource allocation?
What problems may occur because of a lack of resources?
What are the greatest risks related to resource allocation?
How do time and budget impact on creativity?
Are there situations when creativity needs to be restricted?
What type of problems may occur because of certain constraints/restrictions? What are these restrictions?
What do you think are the greatest risks to creativity?

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