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How unplanned changes emerge while implementing a Project Management Information System (PMIS) in a complex multi project R&D environment.

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Abstract

While implementing our Project Management Information Systems (PMIS) I experienced that despite an approved implementation plan small local interactions can create huge unplanned changes. In my role as an implementing consultant I am part of the politics, loyalty, anxiety, power and conflict that influence the implementation process. In order to get better understanding of what happens and how this influences the implementation and my personal role, I used a reflective narrative approach as research as a practice (auto-ethnographic). After the reflection I studied beside literature from the dominant discourse also an alternative view called the complex responsive processes view of relating. The main conclusion is that the complex responsive processes view gives extra insight in what is actually happening. It helped me to invalidate my assumptions about implementation. In that respect both views are complementary and deserve further research.

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1. Keywords: multi project management; implementation; change; power; complexity; responsive.

1. Introduction

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During the implementation of a Project Management Information System (PMIS) in a complex multi project R&D environment, we experienced that small un-planned events happened with great effect, predefined success criteria changed, agreements were not met, resistance was difficult to address and success was only internal accepted. In the current competitive market, the importance of product development is growing and growing. In the daily struggle to improve the output of the R&D environment a responsible R&D manager asked our company to develop a multi project management approach and implement it. In a multi project environment according to Engwald & Jerbrant (2003) the complexity of resource allocation is the main challenge. Zika-Vitorsson et al. (2006) investigated the risk of project overload and its devastating effects. The investigated R&D department is a typical multi project environment where the same people work simultaneously in several projects (Engwald & Jerbrant (2003).

Because the experience during implementation of the PMIS had influenced my role as consultant I choose to use a reflective narrative approach where I described what happened during my working experience as a reflective practitioner (Brinkmann 2012). Taken my daily experience seriously. Thus this research is done from a perspective 'from within' (Shotton 2005, 2006). I'm not an outside observer but being part of the process. The auto ethnographic methodology is very suitable in researching a personal experience, an epiphany in my live (Denzin, 2013). For Ellis and Bochner (2000), the purpose of auto ethnography is to "come to understand yourself in deeper ways and with understanding yourself comes understanding others" (p.738).

This paper is structured as follows. The first step is the narrative, which describes the personal experience of the author during the implementation of the PMIS (paragraph 2). Secondly he will use personal reflection on what he experienced during the process and what he thought (paragraph 3). In parallel literature on implementing (project) management information systems is examined (paragraph 4). Caniels and Bakens (2012), Yaghootkar and Gil (2012) make clear that high quality information is needed for making PMIS implementation successful. Another important theme in the literature is the acceptance of Management Information Systems. Legrisa et al., (2003) investigated the suggested technology acceptance model (TAM) from Davis (1989). Wagle (1998). And Fui-Hoon Nah et al. (2001) studied the success factors for implementing management information system. Where as Lapointe and Rivard's (2005) researched a process model of resistances during implementation, which Selander & Henfridsson (2011) enlarged with cynicism.

Looking for better understanding, we came across an alternative perspective, the complex responsive processes approach (Stacey, Griffin and Shaw. 2000; Stacey, 2011). Stacey (2011) points that local interactions, which can give rise to the global patterns that create the organization (paragraph 5). Complex responsive processes theory focuses on human behaviour and interaction, meaning that the only agents in a process are people and they are not thought of as constituting a system (Groot 2009 referring to Stacey 2011).

In paragraph 6 the narrative continues to show totally unexpected changes that happened very fast. In the end follows the conclusion that the concept of complex responsive processes is complementary to the dominant literature in understanding what is happening during the implementation of PMIS. Further research is recommended.

Using the method of reflective narrative approach is the main reason that sometimes the word I and me is used very often.

2. The implementation of PMIS in the R&D department.

A few years ago Ted invited me to talk about project management. Ted is an R&D Manager in a company where I was already consultant for many years. His department developed around 20 new products every year. Since a few months Ted took over the whole department and he was facing an environment where a lot of projects were

running with long lead times to deliver, bad due date performance and dissatisfied customers (colleagues from the Marketing and Sales department). Ted asked me to help him to improve the due date performance, which he considered his main problem. My consulting company was at that time developing a new approach on multi project management. In a multi project environment employees are working simultaneously in several projects. Engwall & Jerbrant (2003) describe the allocation of resources to project tasks as the prime challenge of multi-project management. According to Zika-Vitorsson et al. (2006) a multi project setting constitutes a dynamic and challenging work environment at the same time as it has some interesting built-in problems due to the complexity. Zika-Vitorsson et al. (2006) investigated what causes project overload and the effect of it on employees. These causes were: lack of opportunities for recuperation, inadequate routines, scarce time resources, and a large number of simultaneous projects. Further, the study indicated that there are associations between high level of project overload and high levels of psychological stress reactions, decreased competence development, and deviations from time schedules (Zika-Vitorsson et al. (2006 p 385)).

In our view the main problem in a multi project environment is the lack of dedicated teams on one project. The employees are scattered over the projects and demanded sometimes simultaneously on different projects at the same time. Although the projects are not related to each other, the simultaneous demand on employees interconnects these projects, creating interdependencies, which adds to the experienced complexity.

Together with Ted and his two team-leaders Walter and Chris my colleagues and I developed a strategy to improve the speed and output of their R&D department. The end result was a plan to implement our approach called 'FLOW MPM (PMIS)', which supported the new designed routines and procedures. The planned outcome, based on many earlier experiences, was an increase in due date performance and an increase of around 30% new products per year. We trained all engineers of the department. Walter & Chris were responsible for the implementation of their own designed strategy. All projects were implemented in the system. The system provided the engineers and management the following information: task priorities, resource allocation, work load and project progress. Everybody was up and running.

After half a year Ted told me that he was not satisfied with the performance. Although the implementation was done according to plan, Ted did not notice any performance improvement. I was surprised. According to my colleagues everything was up and running and the implementation was successfully finished. Although I was not involved in this implementation directly, I decided to help Ted and his colleagues, Pro Deo. I needed a successful implementation because Ted was the first customer of our new PMIS-product.

After talking with Walter, Chris and some engineers I found out that although they claimed to use the task priorities, in fact they didn't. I just asked the following question: "How are you proceeding on your top priority task"? If they hesitated I asked: "On which task are you working right now"? I found out that a lot of engineers were not working on project tasks but on other unplanned issues. Secondly, if they were working on a project task, quite often it was not the top priority one. There were a lot of arguments why they did not work on the top one. Given my perspective, they were non-valid arguments but I did not react at this moment.

I consulted my colleague Rick who was responsible for the implementation. I told him: "Rick, are you aware that the engineers quite often do not work on their top priority task"? Rick's response: "I told them that they have to obey their priority list otherwise they will not improve. It's up to them to listen to me or not". I was flabbergasted. How could Rick leave it up to this: "If they don't listen, it's up to them". I invited Rick to help this customer to improve for free. He refused. For him the PMIS was successfully implemented, all engineers were trained and knew what to do.

I was not satisfied at all. And decided to have a meeting with Ted, Walter and Chris to talk about further steps. I told them I discovered that the majority of the engineers are not working on their top priority task. Walter and Chris claimed that most people did but that sometimes there are valid reasons to do it differently. I suggested doing another workshop with all engineers. We developed, to support the workshop, an educational simulation tool as a serious game. This tool / game lets people experience the cause and effect relations in a multi project environment where engineers have to be shared. With this tool I'm able to let the attendees experience the resource allocation problem in their environment. The results of the game are widely spread. With the same situations some attendees

finish all simulated projects in 13,2 days and some around 20 days. The median after 500 games I facilitated is 17,4 days. These results make attendees aware that resource allocation in a multi project environment is complicated.

After all attendees agreed on the problem that resource allocation of engineers is complicated we developed step by step the direction of a solution. During this phase I invited the attendees to develop their own solution. In some cases the attendees came up with a solution that is similar to our already developed solution. At the end of this phase the group is able to use the simulation tool to check the differences in results between the solutions they want to use and the solution I provide. The differences in results are convincing enough for the attendees to get agreement on the direction of the solution. They experience the importance of the effects that task priorities, project- and resource overload, progress on projects has on the output and speed of projects. At the end of the workshop everybody agreed to stick to the priorities and that the management would balance the workload with their capacity.

After the workshop Ted, Walter and Chris found out that the workload in some of the resource groups was twice too high. Ted had to convince his 'customers' (Marketing & Sales) that the workload was too much. Together with Marketing & Sales he agreed to freeze 50% of the projects. Now the workload was balanced with the assumed capacity. Within a few weeks we found out that the output was much lower than what the individual engineers expected. After reflection with the engineers it was clear that the level of disturbance was very high. The engineers spent a lot of time on unplanned work. All kind of requests from colleagues form out / inside the department was picked up immediately and the project tasks they were working on delayed. Both Walter and Chris knew about the unplanned work. It was more or less the way of working from the past few years. Ted, Walter and Chris decided to focus on planned projects. Unplanned work was second priority.

Within a few weeks the results were surprising. Walter's team improved unexpectedly with a high level. Speed and output went up considerably. The group of Chris did not show any change in performance at all. After reflecting on the results with Ted, Walter and Chris, they all claimed to use the priority list and focus on the projects. Then Chris said something surprising: "The algorithm in the PMIS that is calculating the priority and workload is not correct and because of that the performance of my team is influenced negatively". This remark pushed me in the defense and made me nervous. Ted and Walter were just looking at me how I would respond. They said nothing. How to deal with this? Chris kept on pointing into my direction. I could not understand the difference between the two teams. I was convinced that it was not the algorithm. A few weeks later the performance of Walter's team kept on improving fast and of Chris's was even deteriorating. Many discussions followed. No breakthrough. Chris kept on blaming the algorithm.

Walter and I were smokers at that time. Ted and Chris always joined us outside during a smoke break. Suddenly Chris said: "I find it difficult to say NO to any request that is coming from my colleagues. I think we all are a team and have to act accordingly. That's why I feel obliged to respond to requests". Walter responded: "And by that you are hanging your neck into the rope. You are crazy". Within seconds the conversation changed from our software tool to the culture in the company. I was relieved, because now I knew that Chris was blaming our algorithm as an excuse to his real problem. "I just can't say NO".

One week later Ted called me that he found out that the engineers of Chris's team had the same behavior. Ted acted immediately and sent Chris and all team members to a course time management and personal effectiveness. Secondly, Ted first filtered all requests from the company. The amount of unplanned work dropped down dramatically. A few weeks later the performance of Chris's team, was also improved at a high level. In that year the department increased the development of new products from 20 till around 40 a year and the lead-time dropped dramatically.

3. Reflection

Through discussion with engineers I experienced that engineers are proud on what they are doing and achieving. A request from a colleague is perceived as a compliment. This colleague asks you for help because he thinks that you are the best one suited for his problem and/or that you are the one that is willing to help him. In this circumstance it is almost impossible not to respond. I can relate to this kind of behavior. I act the same. The negative effect is the delay on the tasks you are working on and the multi tasking effect that causes inefficiency. In engineering environments the lead-engineers are probably the ones that are asked for help most frequently. Considering that the lead-engineers are already involved in a lot of projects because of their knowledge and experience, the negative effect is creating or sustaining a bottleneck which delays the majority of the projects. Introducing a PMIS in this environment brings in an approach where less freedom exists compared to the past. Engineers are framed into a new way of working where the focus lies on priorities coming from a system and output is measured.

Secondly, I felt quite uncomfortable that Chris blamed that the algorithm was wrong. I experienced it as him blaming me, not the algorithm. At that moment I was pushed in the defense without having arguments to defend myself. It was like being pushed in the corner. It made me insecure. I felt that my role as consultant was in jeopardy. I considered myself as a consultant to be an expert in a certain field. Because Chris blamed me, he did not accept me as an expert anymore, which influenced my identity. Because Ted and Walter did not react at all, I felt excluded. I had a similar experience at another client where the load graphs on engineers showed an overload (200%). At the moment the manager was confronted with these graphs, he also responded that the algorithm is wrong. After this second experience I'm convinced that something else is going on. In case of Chris it afterwards was obvious that he wanted to change the subject of not improving. In case of the manager of the other company, he did not like the result of the graphs because the management who releases too many projects at the same time mostly causes overload. Because of my experience with Chris, I organized a meeting with that manager with just the two of us. In a few minutes he told me that his response was more or less based on an impulsive reaction because he was shocked by the load graphs. Elaborating on that, he realized that he was not able to deliver his projects on time and that he had to inform his clients about this.

Third, although people say that they work according to procedure or agreements, you can't be sure. In case of Chris and his team they claimed that they worked according to the priorities. But actually they didn't. They even worked quite often on non-planned work. Years ago I acted the same way like my colleague Rick: "I told them that they have to obey their priority list otherwise they will not improve. It's up to them to listen to me or not". Currently I'm reflecting on my role as consultant. Based on personal experience I realize that change is not going according to plan. Small things can influence the change and the outcome looks unpredictable (in paragraph 6 you will notice this also when I continue my narrative at the same client).

4. Overview of 'PMIS' implementation literature

In order to understand what happened in my experience described in the narrative and reflection, we first researched literature on the subject of implementing PMIS. But there is not much literature about implementing PMIS. First we start with an overview about literature, which researched the quality of PMIS. Secondly we use literature from implementing ERP (also a Management Information System (MIS)) such as SAP, Oracle or Microsoft Dynamics. We think this is comparable with implementing PMIS. At last we finish with a literature study on resistance that is emerging while implementing new information systems in organizations.

Caniëls and Bakens (2012) found in their research that multi project environments generate specific challenges that find their origin in increased complexity. The availability of high quality PMIS information will lead to high quality decision-making (Caniëls and Bakens (2012)). Yaghootkar and Gil (2012) showed that although the PMIS is in practice, the negative relation between top management's pressure on teams to complete a project on time versus the effects on the other running projects shows more multi tasking and decreases of productivity. Raymond and Bergeron (2008) focused on PMIS quality; PMIS information quality; PMIS use; impact on the project manager self; that contribute to the impact of a PMIS on project success. They concluded that the PMIS itself has no direct influence on project success; it is only through higher-quality information, extensive use of the system

and individual impact on the project manager that the system has an effect on project success. All three studies point out that the success of implementing a PMIS is very much depending on the quality of information the project manager and the team gets.

Another important theme in the literature is the acceptance of Management Information Systems. Legrisa et al., (2003) investigated the suggested technology acceptance model (TAM) from Davis (1989) In this research the mediating role of perceived ease of use and perceived usefulness is examined in their relation between systems characteristics (external variables) and the probability of system use (an indicator of system success). Legrisa et al., (2003) found an important limitation of TAM because it considers Information Systems to be an independent issue in organizational dynamics. Research in the broader field of innovation and change management suggests that technological implementation is related to organizational dynamics, which on their turn will have a strong impact on the outcomes (Legrisa et al. 2003), which we fully agree.

There is quite a lot of literature about the success factors that influence a successful implementation of a MIS. According to Wagle (1998) for successful implementation three basic requirements should be met: a clear business objective; comprehension of the nature of changes and understanding of the project risk. Strong leadership and constant watch to budget are two other requirements as stressed by Wagle (1998). And Fui-Hoon Nah et al. (2001) did a extensive literature study about the critical factors of ERP implementation success: ERP teamwork and composition; top management support; business plan and vision; effective communication; project management; project champion; appropriate business and legacy systems; change management program and culture; business process reengineering; software development and testing; monitoring and evaluation of performance, Fui-Hoon Nah et al. (2001).

We also briefly researched the theme resistance because it is a subject in the narrative and reflection. In the work of Lapointe and Rivard's (2005) process model of resistance to MIS systems they claim that resistance behavior like: apathy; passive resistance; active resistance and aggressive resistance is an effect of perceived threats. These perceived threats are coming from the initial conditions of employees before implementation of the MIS system and the objects of resistance like: system itself; system significance and system advocates, Lapointe and Rivard's (2005). Selander & Henfridsson (2011) added user cynicism to the process model of resistance from the work of Lapointe and Rivard's (2005) process model of resistance. Selander & Henfridsson (2011) see user cynicism as cognitively distanced resistance that manifests as a perception of seeing through the espoused goals of the implementers.

After reflecting on the literature study to what happened in the narrative we conclude that during the implementation we were aware of the important issues in PMIS and also about the critical success factors for implementing the PMIS. At least to our opinion we took care of these themes. This literature study themes does not help us to understand what happened in the narrative.

The literature study about resistance helps us further to understand what happened. First of all the passive resistance of Chris in claiming that he worked according to the agreement he made together with Ted and Walter, but actually did not. And secondly the resistance of cynicism while blaming me that our algorithm was wrong. But this literature about resistance still does not help us to understand why Chris and his team changed after he briefly mentioned about the problems he had to say NO to request from colleagues. In the next paragraph we will continue researching on what happened in the narrative from another perspective; the complex responsive processes of relating.

5. Looking to the situation from a perspective of complex responsive processes of relating.

When I reflect on what has happened, I realize that the way I implement software like FLOW MPM is based on assumptions about rational or formative causality. In rational causality, knowledge, competence and technology are all thought to develop as a result of rational choices made by inventors, scientists, investors or leaders. In other words, it is assumed that individuals choose, manipulate and control the technological development (Stacey et al., 2000). In addition to this rational causality, however, also a formative causality is implied. Resources, knowledge and technology are all thought of as designed systems, and this means that they must unfold the design already

enfolded in them by their designers, like an acorn is always developing into an oak. We do not exactly know how it will be shaped, but it will definitely be an oak. In other words, the cause of technological development is the formative process of the operation of the system (Johannessen & Stacey, 2005). We as developers design the system and force people to work accordingly to achieve the predicted results over time. But as my narratives show the results are not predictable at all. The systemic approach, which is based on rational or formative causality, is not what I experience in my work with clients.

Looking for better understanding, I came across an alternative perspective, the complex responsive processes approach (Stacey, Griffin and Shaw, 2000; Groot 2009; Stacey, 2011). Johannessen & Stacey (2005) explore technology as a social object drawing on the work of Mead (1925). According to Mead (1925), metaphysical social objects are historically evolving tendencies to act in similar ways in similar situations by members of groups of people living or working in a common environment. Mead (1934) explains how mind, self and society all emerge in conversations of gestures between human bodies. Elias (1939) emphasizes human interdependence and shows in some detail how the self-organizing patterns of human society emerge in this interdependence. He argues that all human relating is power relating because in their relating people, at the same time, enable and constrain each other.

If we look at the behavior of Chris and his team members, responding immediately to unplanned requests from colleagues could be considered a social object. This social object blocked the success of the implementation. And although Chris was part of the development team that created the new PMIS, he and his team did not change their behavior.

Elias (1939) describes the concept of power relation. Power is not in the hands of one person as a kind of possession, but described as an intrinsic characteristic of any relation; where a balance of power arises in the interaction process. When I reflect on what happened to me at the moment that Chris blamed me that the algorithm was wrong, the power relation between me and Chris, Ted and Walter changed. I was not able to defend myself. So according to Elias (1939) the power configuration changed. My role as consultant was under pressure triggering within me all sorts of emotions. But, when Chris later said that he had problems to say NO, the power relations changed again. According to Shaw (2002, p.73) these power figurations occur spontaneously and unpredictably and can shift over time as a result of the dynamics going on in the interaction. This is happening quite often in my life. It also influences my role as consultant. I now understand that power is not based on my experience or expertise but is emerging in the relation based on the interaction between others and me. I also am aware that this power figuration can change very fast because something totally unexpected is happening like the blaming on our algorithm by Chris.

The perspective of complex responsive processes, in which ‘transformative causalities’ are assumed, offers a different explanation for what is happening at the organizations of ‘my’ clients when we implement a new approach of technical systems and software. Johannessen & Stacey (2005) claim that a transformative perspective on causality, with its implication of fundamental unpredictability, leads to a substantial shift in thinking about organizations. ‘In a world where patterns are emerging unpredictably, it becomes highly problematic to think of technology development as simply human choice or design. Instead, one thinks of technology and knowledge as being perpetually created in the power relating and communicative interaction between people in the living present.’ (Johannessen & Stacey 2005, p 153).

In the complex responsive process perspective, change processes at an R&D department during and after implementing a new project management approach and tool, are primarily occurring in local interactions where patterns can emerge as social objects. The outcomes of these local interactions are unpredictable. If I look at the work of Elias and Mead, and see how Johannessen & Stacey (2005) and Groot (2007; 2009) use this in explaining the essence of a complex responsive processes approach, I now realize that my work is dominated by transformative causality. In the next chapter another example of transformative causality is bringing a totally unexpected turn in my narrative.

6. Another breakthrough emerged through local interaction with a final un-expected ending.

During one of my visits to Ted and his team leaders we always reflect on what happened and try to find further improvement. Ted told me that Marketing and Sales still complained about the long lead times. They insisted on shorter Time to Market. During a discussion I said: “Ted, a few years ago you considered due date performance as your main objective. Now Marketing and Sales is asking for more speed. What will happen if you don’t focus on due date performance anymore but totally focus on speed and output”? Ted responded: “Are you crazy? Due date performance is holy in this company, and you are telling us to ignore it”. I explained to Ted and his team leaders that focus on Due Date performance in a multi project environment can have a negative effect on two sides. First of all, engineers will feel a need to put more hours (safety) in their task estimation to be able to deal with unexpected delays. But this safety will always be consumed. Secondly, focus on due date performance will increase the multi tasking behavior, which is considered as inefficient, according to Goldratt (1997). Because this was almost an intellectual challenge, Ted and his team leaders agreed to give it a try. They tried to reduce the safety in estimations and also did not focus on due date performance anymore. The main focus was on speed and output. The results were immense. Within a few months the output of new products doubled again and the lead-time reduced from the original 12 to 18 months in the past to 3 to 4 months. But nobody dared to estimate a due date. The focus now was on speed and output. The due date was more like a nice to have date. If one of the projects had some delay, nobody got nervous and nobody interfered.

The R&D department was very satisfied about their achievement. Ted and I expected that Marketing and Sales also would be pleased. But no! It happened that 50% of the new products could not be sold. There was no market. This was surprising because the R&D department only develops what Marketing & Sales want to have. And then again, something totally unexpected happened. A new Operations Manager came in and his main focus yet again was on due date performance. He insisted on 95% due date performance. Maybe you can imagine what happened. Everybody began to protect his uncertainty by increasing his estimations. Within a few months the lead-time went up again and output decreased. Groot (2009 p. 266) states about this paradox that increasing the pressure by managers will reduce the outcome. Coming from the production world into the R&D department the Operations Manager introduced a lot of KPI’s and considered them as targets. This all created a big turmoil. At the end Ted with 6 colleagues were fired and the rest of the engineers were directly connected to one Marketing or Sales person. The R&D department does not exist anymore. Walter and Chris still work for this company.

7. Conclusion

The experience described in the first narrative showed a process that developed in another direction separate from the planning we had made. Although the team-leaders were main designers of the new approach, the change did not happen in the beginning. It turned out that one of the team-leaders was claiming that he and his group members were working according to the new routines and procedures, yet it turned out that they didn’t change at all. Homan (2007) describes this difference between what people formally say and informally do as the difference between on-stage and off-stage behavior. Scott (1990) explained it as the difference between ‘public discourse’ and ‘hidden transcripts’. Only by coincidence during a smoke-break we found out what really was going on. These local interactions ended up in a new change / pattern as from the moment the team-leader did overcome his anxiety to ‘not’ help his colleagues when wanted. In the last part of the narrative again the local interactions between manager, team-leaders and consultant created a new pattern through thinking out of the box and ignore the original performance indicator of due date performance. This shows that manager and / or consultant can influence the patterns of behavior. But we must be aware that the outcome is still unpredictable. This is shown in the last unexpected focus of the new Operations Manager on due date performance that ended in a dramatic change and the ending of a ‘successful’ department. At least according to the staff of R&D.

Although literature about implementing PMIS, its critical success factors and resistance to new information systems helped us a lot during the implementation, it did not answer all question from the narrative and reflection on it. The view of complex responsive processes of relation helped me to understand better what happened. We would like to recommend based on this experience further research in the complementary knowledge of the

dominant discourse about implementing software with the complex responsive process approach. It can help us to better understand what is happening in reality.

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