

It's Only Temporary: Time Frame and the Dynamics of Creative Project Teams

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The success of many knowledge-intensive industries depends on creative projects that lie at the heart of their logic of production. The temporality of such projects, however, is an issue that is insufficiently understood. To address this, we study the perceived time frame of teams that work on creative projects and its effects on project dynamics. An experiment with 267 managers assigned to creative project teams with varying time frames demonstrates that, compared to creative project teams with a relatively longer time frame, project teams with a shorter time frame focus more on the immediate present, are less immersed in their task and utilize a more heuristic mode of information processing. Furthermore, we find that time frame moderates the negative effect of team conflict on team cohesion. These results are consistent with our theory that the temporary nature of creative projects shapes different time frames among project participants, and that it is this time frame that is an important predictor of task and team processes.

“Everybody knows it’s temporary. We all know the deadline, and then we shut down everything here. The whole thing is built up to be broken down. [. . .] You become one team, certainly, but through it all, in the back of your mind, you ask: for how long will it stay?” (Project engineer on major medical innovation project, on what characterizes being on a creative project team. Interviewed 4 May 2009)

Introduction

As organizations in more and more industries look for innovative ideas and flexible ways of

production in the wake of rapidly changing market environments, project-based organizing is becoming an increasingly important mode of organization in knowledge-intensive industries (e.g. Bouncken, 2011; Bryde, 2005; Eisenhardt and Tabrizi, 1995; Whittington *et al.*, 1999). Areas such as new product development (Eisenhardt and Tabrizi, 1995), movie production (Jones, 1996), research and development (Katz, 1982) and academic knowledge production (Wuchty, Jones and Uzzi, 2007) all seem to increasingly rely on creative project teams to perform the primary production process. A unique characteristic of these projects is that they involve groups of people who are temporarily grouped together around specific tasks to be solved, after which the team disbands and may or may not collaborate again in different compositions later (Baker and Faulkner, 1991; Sorenson and Waguespack, 2006). This temporary nature, coupled with high volatility in competition, technologies and client needs, creates a

The authors gratefully acknowledge helpful comments by Remus Illies, Candy Jones, Joerg Sydow, Ramon Rico and Petre Curseu. We also thank Sander Smit for his considerable help in collecting data, and TiasNimbas Business School for its continuous support for the project. All remaining errors are our own.

number of temporal challenges for teams and places a premium on understanding the role of time and temporality in creative projects (Mohammed and Nadkarni, 2011). However, while having been recognized as *the* distinguishing characteristic of project-based organization and project management (Bechky, 2006; Grabher, 2002; Janowicz-Panjaitan, Bakker and Kenis, 2009) the temporality of project teams seems to have to date received only scant research attention (Bakker, 2010). Kozlowski and Bell (2003, p. 364) in fact suggested that in teams time remains 'perhaps the most neglected critical issue'. To start to address this gap, the present study focuses on the perceived time frame of creative project teams and its effects on task and team processes.

Our concern with understanding time frame in the context of creative projects is fuelled by the fact that creative projects tend often to be ambiguous and unpredictable, and to require a significant amount of within-project planning and intense social interaction (Barrett and Sexton, 2006). Zika-Viktorsson, Hovmark and Nordqvist (2003) suggested that, as such, creative projects are a good setting to study developing task and team processes. We expect time frame to be an important predictor of such processes and for it to be directly related to the temporary nature of projects.

The quotation at the beginning of this paper, taken from our own previous research on creative projects, illustrates how the temporary nature of projects can create an awareness among project participants that the project they work on is limited in time and scope by a deadline, after which the project is to be disbanded. Consequently, with time frame we refer to creative project teams' anticipation of the termination of their project that is more or less imminent (see Janowicz-Panjaitan, Bakker and Kenis, 2009; Jones and Lichtenstein, 2008). Our running hypothesis is that project teams that expect to keep collaborating for extended periods of time into the future (long time frame) will behave differently from teams for which the time of termination of the project is more imminent and consequently that have a shorter expectation of interaction (short time frame). The underlying theoretical reason for this difference is that because deadlines and the resultant temporariness of projects are the central notions around which project teams are formed, and completion by a scheduled due date is one of the most frequently used measurements of project success,

time frame is likely to be an especially salient element of the project team's shared representation of their work (Nordqvist, Hovmark and Zika-Viktorsson, 2004). This representation is often referred to as a team mental model (TMM), which comprises elements regarding the characteristics and demands of the task, the teamwork and the context. These elements form a mental structure that is shared by the group members and that consequently guides their interactions (Mohammed and Dumville, 2001). Moreover, it is a strong predictor of the way teams organize and perform tasks (e.g. Klimoski and Mohammed, 1994), as TMMs allow team members to coordinate behaviours and anticipate one another's actions especially when time does not permit extensive interaction and strategizing among the project team (Lim and Klein, 2006). Building on TMM theory, our overall expectation is that time frame, as a dimension of the TMM, is likely to be an important antecedent of the way task and team processes take shape in creative projects.

Our main contributions to current discussions in the fields of management and project-based organization are threefold. First, we try to build a richer theoretical notion of the temporary nature of flexible and project-based organization by capitalizing on its subjective implications. This, in our view, constitutes a clear step beyond some of the more conventional notions of time and temporariness in creative projects, which have tended to depict the temporality of projects mostly as projects having a clear beginning and end (see for instance Lewis, 2000; Young, 2007). Second, we aim to decant the initial impact of time frame from the following iterative processes that occur in project teams. Purely ecological research has a good understanding of the outcomes of these processes (mainly at the end of the project), and the majority of research, certainly in project management, has focused on project performance *per se*, rather than the specific temporal mechanisms that may trigger it (cf. Nordqvist, Hovmark and Zika-Viktorsson, 2004). In contrast to previous research, we try to disentangle the primary effects of time frame and the consequences of the unfolding processes of project teams and otherwise possibly confounding variables. Third, our study also aims to make a broader contribution to the literature on time and management. A number of researchers have called for a more prominent place for the role of time in team and management

studies (Amabile *et al.*, 2005; Das, 2006; Orlikowski and Yates, 2002). Building on the insights from the many case studies of creative projects that have recently been documented, our use of an experimental approach to explore our research question offers the possibility to disentangle the impact of time frame in projects. Moreover, experimental control gives the possibility to isolate the temporal dynamic of organizing and to focus specifically on the impact of time frame in the initial stages of collaboration. In our specific context, breaking the overall picture of task and team processes in creative projects into more focused relations we believe can help us to understand important processes that occur in project teams and can set the basis for interventions to improve their functioning.

Theoretical background and hypotheses

In order to explain how time frame is likely to impact task and team processes in creative projects, we enfold theories of TMMs. TMMs can help explain task and team processes by enabling members to formulate accurate team-work and task-work predictions (Daniels, Johnson and de Chernatony, 1994). In essence, TMMs serve as a structure that guides team members' behaviours and ultimately impacts team performance (DeChurch and Mesmer-Magnus, 2010). As mentioned, time frame is likely to be a core element of project teams' mental models, because deadlines and the resultant temporariness of projects are the central notions around which project teams are formed, and on-time task completion is one of the most frequently used measurements of project success (Nordqvist, Hovmark and Zika-Viktorsson, 2004). Being a crucial part of the TMM, we expect that time is likely to be involved in both its domains: the teamwork dimension and the task dimension (Saunders and Ahuja, 2006). Task TMM refers to the common schema team members have regarding their tasks and the potential role that the broader environment and technology may play. In contrast, teamwork TMM represents a shared understanding among team members about how they will interact with one another, their norms and roles. Because time frame in creative projects is likely to be incorporated in the entire TMM, we expect that it impacts both task processes and teamwork processes

(DeChurch and Mesmer-Magnus, 2010; Saunders and Ahuja, 2006). Put somewhat differently, because it is a central element of project teams' shared cognitions, we expect time frame to shape both team and task processes in creative projects.

Therefore, the present study focuses on the impact of time frame on both task-related processes (time orientation, Hypothesis 1; task immersion, Hypothesis 2; and processing of information, hypothesis 3) and team processes (team conflict and cohesion, Hypothesis 4). Figure 1 presents a conceptual model that illustrates the relations we propose and test in this paper.

Time orientation

Time orientation captures the degree to which a team is focused on the present rather than the future (Twenge, Catanese and Baumeister, 2003). Time orientation is different from time frame in the sense that time frame is a component of the TMM, whereas time orientation is a process that develops from it (Twenge, Catanese and Baumeister, 2003).

Previous research has demonstrated that temporary project teams can have a short-term orientation with a focus on immediate deliverables because, as mentioned, completion by a scheduled due date is one of the most frequently used measurements of project success (Nordqvist, Hovmark and Zika-Viktorsson, 2004). A team's time orientation, however, is both subjective and malleable (Ebert and Prelec, 2007), as 'future . . . events have an impact on present behaviour to the extent that they are actually present on the cognitive level of behavioural functioning' (Nuttin, 1985, p. 54). One could argue that members of project teams with a shorter time frame are less likely to focus attention to the future than members of teams with a longer time frame, for instance by worrying about how current behaviour within the team might play out in future discussions. In a project context with a short time frame, there is also little opportunity for the postponement of activities (DeFillippi and Arthur, 1998). This is all likely to draw temporary team members' attention toward the present, and therefore a shorter time frame probably creates a narrowed time perspective among the members. As Miles (1964, pp. 457–458) stated a long time ago with regard to projects with a short time frame: 'the person lives more in the psychological present, coping with

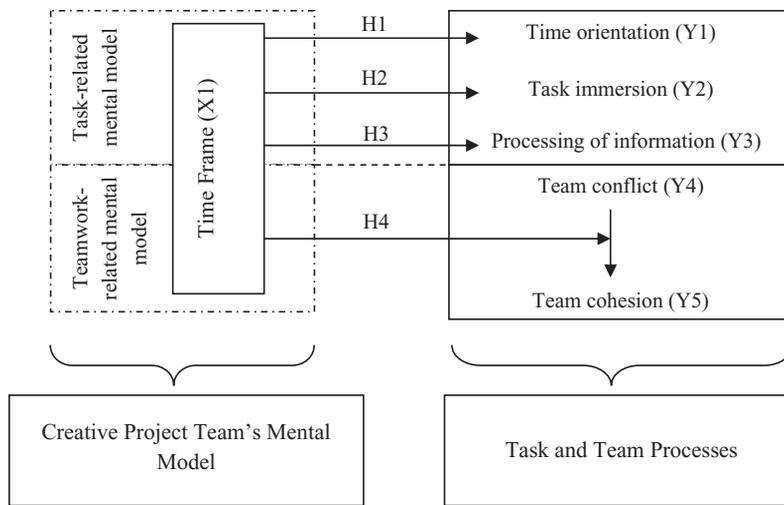


Figure 1. Conceptual model

immediate demands and simultaneously forgetting the past and neglecting plans for the future'. Therefore, we expect that on average members of creative project teams with a shorter time frame are less likely to orient attention on the distant future and more on the present. This leads to the formulation of Hypothesis 1:

H1: A short time frame has a positive effect on present time orientation: all things being equal, creative project teams with a shorter time frame are relatively more likely to focus on the immediate present than creative project teams with a longer time frame.

Task immersion

Task immersion refers to the extent to which teams are absorbed in a task at hand (Mainemelis, 2005). Task immersion increases the likelihood of various dimensions, angles and solutions being explored and appreciated in the context of work (Mainemelis, 2005), and thus is likely to significantly impact the effectiveness of teams.

There seem to be two reasons why creative project teams with a short time frame are more likely to be highly immersed in a task than project teams with a longer time frame. First, as we mentioned, because of the short time frame for working as a team, project teams with a shorter time frame are likely to be primarily focused on elements that relate closely to the accomplishment of an immediate task, rather than the building of relationships or long-term team satisfaction

(Saunders and Ahuja, 2006). This attention focus is likely to deeply immerse temporary teams in the task in order to secure a rapid completion (Saunders and Ahuja, 2006).

Second, because creative project teams with relatively shorter time frames seem to be more likely to be focused on the immediate here and now, such teams are likely to be less distracted by expectations of or thoughts about future events. Immersion requires a period of uninterrupted engrossment in the activity, which is heightened by a strong focus on the immediate present (Mainemelis, 2001). Consider how not worrying about the long-term future of one's project frees up 'brain space' to focus fully on the present activity (Janowicz-Panjaitan, Bakker and Kenis, 2009). As a consequence, Hypothesis 2 predicts a positive effect of short time frame on task immersion.

H2: Short time frame has a positive effect on task immersion: all things being equal, creative project teams with a shorter time frame are relatively more likely to be highly immersed in a task than creative project teams with a longer time frame.

Processing of information

The third task-related process considered here, processing of information, is a crucial project characteristic in the way it relates to the task creative project teams work on. Information, and the way in which teams process it, is a prime driver of attitudes and it has an established relation with

team effectiveness (Griffin *et al.*, 2002). A common distinction in information processing is between heuristic and systematic processing. Systematic processing entails a broader effort to evaluate and understand information, whereas heuristic processing involves the use of simple decision rules to form judgements (Griffin *et al.*, 2002).

One of the basic conditions that prompt heuristic versus systematic processing is time constraint: insufficient time resources lead people to process information in a heuristic rather than systematic manner (Ratneshwar and Chaiken, 1991). This happens because time pressure prevents in-depth cognitive elaboration, increases the filtering and selection of information (to reduce the complexity of the situation to a manageable level) and accelerates processing (hence leading to fewer alternatives considered and a larger probability for mistakes not to be noticed). Therefore, we expect creative project teams with a shorter time frame to be less likely to process and evaluate information very elaborately and instead to be more likely to process information heuristically, compared with creative project teams with a longer time frame. In other words, we suggest that an awareness of a short time-span in project teams may lead to a focus on immediate action and task completion (rather than elaborate task-related processing), which creates a sense of 'haste' that favours a more heuristic type of information processing. Therefore, we expect that:

H3: Short time frame affects processing of information: all things being equal, creative project teams with a shorter time frame are relatively more likely to process information heuristically, whereas creative project teams with a longer time frame are more likely to process information systematically.

Team conflict and cohesion

With regard to team processes, previous research has demonstrated that project teams tend to experience less cooperation between the parties involved (Heide and Miner, 1992), and experience more relational conflict and develop fewer regulatory strategies (Druskat and Kayes, 2000) than ongoing or functional teams. Primarily, team conflict seems to have a different dynamic in temporary project teams as opposed to stable or open-ended teams (Druskat and Kayes, 2000). As team

members know that other parties will not have an opportunity to reciprocate or retaliate later, the shorter perspective of time working together in teams with a short time frame can often give rise to opportunistic behaviour and team conflict (Heide and Miner, 1992). Team conflict can have negative effects on a number of very relevant team-based outcomes, especially team cohesion. Team cohesion is particularly important to project teams, as such teams have to quickly achieve tasks while dealing with the diverse expertise and knowledge bases of their members (Sydow, Lindkvist and DeFillippi, 2004).

The interrelations between conflict and cohesion in teams have been extensively researched in group studies. While some studies have focused on the impact of cohesion on the development of conflict (Ensley, Pearson and Amason, 2002), there is mounting evidence from longitudinal studies that the relationship might be reversed: there seems to be a direct impact of both task and relationship conflict on the development of team cohesion (Tekleab, Quigley and Tesluk, 2009). Moreover, this relation seems to be moderated by strategies to resolve conflict (Tekleab, Quigley and Tesluk, 2009). Other examples of such moderators include the creation of trust (Simons and Peterson, 2000) and the explicit use of conflict management techniques (De Dreu and Van Vianen, 2001). Along the same lines, we suggest in the present study that the relation between conflict and cohesion in creative projects is moderated by time frame.

More specifically, in project teams with a long time frame, conflict is likely to be strongly negatively related to cohesion, because cohesion is a function of affective interpersonal relationships. For teams with a shorter time frame, however, conflict can be less detrimental (Saunders and Ahuja, 2006). Knoll and Jarvenpaa (1998) found that when conflict occurred in extremely short-lived teams, team members tended to ignore it. This seems to indicate that because members do not anticipate working together again in the future, project teams with a relatively shorter time frame are less likely to be concerned about it (Saunders and Ahuja, 2006). This argument does not imply that teams with a relatively shorter time frame experience lower absolute levels of conflict than teams with a longer time frame. However, while such teams are just as likely to experience conflict, it seems to affect cohesion to a lesser

extent, because it is less salient to the team's goal and focus. We therefore expect team conflict to negatively influence team cohesion, but to a lesser extent in teams with a short time frame. Hypothesis 4 follows:

H4: Short time frame moderates the negative effect of project team conflict on project team cohesion: all things being equal, the negative effect of team conflict on cohesion is relatively weaker for creative project teams with a shorter time frame than for teams with a longer time frame.

Methodology

Sample and design

Because the nature of the above set of hypotheses required a research design in which the impact of time frame could be isolated and causally linked to task and team processes, we opted to conduct an experiment to test our hypotheses. This experiment complements the many excellent case studies that have been recently conducted on creative projects (see Bakker (2010) for a review of this literature).

The experimental study was conducted between September 2008 and December 2009. A total of 267 subjects (85 women) participated in the study. Participants' age varied from 23 to 68, with a mean age of 39. These subjects were managers enrolled in executive master programmes of TiasNimbas Business School, where the study was a voluntary part of the introduction to their programme. We opted to undertake the study with experienced managers as a means of increasing the validity of our findings. In an experiment, managers will probably bring with them the routines and tacit assumptions about project teams they have formed and been part of in real life. In this way, these tacit assumptions about project work that an experienced manager has (as opposed to students) are more likely to be present also in the task and team processes that we studied.

The 267 managers were assigned to 89 three-person teams, which were in turn randomly assigned to one of two experimental conditions in which we manipulated the teams' time frame (as explained below). Teams were formed according to two criteria: having similar degrees of variance between all the teams (with respect to age, gender and educational background), and having

equivalent teams (with regard to age, gender and educational background) between the experimental and the control condition. In this way, we ensured equivalence between the two conditions in terms of overall sample distribution as well as within particular teams. Data on age, gender and educational background were obtained with permission from the registrar of the school prior to the study.

Procedure

In the first week of their curriculum, incoming executives enrolled at TiasNimbas Business School executive master programmes were assigned to three-person creative project teams. All teams were instructed that they would work on a creative task, for which they had 45 min and which asked for a written deliverable. Moreover, they were instructed that throughout the one-year programme in which they were enrolled, there would be more of such team assignments. This essentially created the 'space' for their anticipation of continued collaboration.

We manipulated time frame through different instructions regarding the teams' expectations of working together. Specifically, at the start of the 45-min task, half of the teams received the instruction that they would only work together in that particular group composition for that particular task. After completing that task, the instructors would re-shuffle the teams for other group work during the rest of the academic year, and none of the participants would be working together with any of her/his teammates again. These teams' time frame, therefore, consisted of one day, on which the task needed to be completed and after which the team was disbanded. The other half of the teams, in contrast, received the instruction that they would work together in the same team composition for the entire programme. These teams' time frames were therefore manipulated to be one year (i.e. the length of the programme). We assessed the effectiveness of this manipulation with a manipulation check, which consisted of three questions: the length of time their collaboration as a team would last (the actual manipulation check), how long the task would take, and what the main purpose of the task would be (masking questions). Five groups provided an incorrect answer to the manipulation check question and were deleted from further analyses. With the

manipulation check, we in fact tested whether time frame did actually translate into the TMM.

The task on which the teams worked consisted of a fictitious business case in which the project teams were asked to come up with a campaign strategy for Google, a campaign budget and a newspaper-style advertisement, which challenged the group to come up with the most creative proposal. After 45 min of working on the task, the teams were asked to fill out a questionnaire and they were debriefed by the experimenters. In the debriefing, the subjects were informed that the instructions they had received had been false, and they were informed of the study's research objectives.

Measures

Besides time frame, which was experimentally manipulated, our study measured the following variables.

Time orientation. The measure of time orientation included seven items, four of which were adapted from Twenge, Catanese and Baumeister (2003) and three that were adapted from Mainemelis (2005). The scale included items such as 'I thought a lot about what I would do after the task was finished' and 'During the task I could only think about the state of the project at that present moment'. Items were scored in the direction of higher values indicating a more present time orientation. Cronbach's α of the scale was 0.60.

Team conflict. We assessed the level of team conflict with eight items adapted from Jehn (1995); we included items such as 'How often did the people on your team get angry?' and 'How often do the members of your team disagree about how things need to be done?'. Higher scores on this scale corresponded to higher levels of team conflict. The α of the scale was 0.70.

Team cohesion. The measure of team cohesion consisted of four items adapted from Carron, Widmeyer and Brawley (1985), and included items such as 'Members of our group would like to spend more time with one another when the group task is finished' and 'Our group joined together in achieving a high quality final product'. Higher scores on these items indicated higher team cohesion. The α of the resulting scale was 0.69.

Task immersion. Task immersion was measured by a three-item scale adapted from Mainemelis (2005) which consisted of the following items: 'I was intensely concentrated in the activity', 'All my attention was invested in the activity' and 'I was completely absorbed in the activity'. Higher values corresponded to higher levels of task immersion. The resulting scale we found to be internally consistent (Cronbach's $\alpha = 0.67$).

Processing of information. Processing of information was measured by a six-item scale adapted from Griffin *et al.* (2002), which consisted of items such as 'After I encountered the information on the task, I first stopped and thought about it' and 'When I read the information for the task, I focused only on a few key points'. Items were coded such that higher values on this scale corresponded with a heuristic mode of information processing, whereas lower values corresponded with a systematic mode of information processing. The resulting α of the scale was rather low (0.47) and should therefore be regarded with caution. Given extensive tests of this scale, however (see Griffin *et al.*, 2002), we did decide to retain the scale in the analyses.

For all the scales, the individual scores were aggregated to the team level by computing mean team scores.

In order to test the distinctiveness of the concepts measured, we performed a confirmatory factor analysis (CFA). More specifically, we ran separate CFAs for task- and teamwork-related processes. Referring back to the conceptual model presented above, the task processes consist of three variables: time orientation, task immersion and information processing. The team processes consist of two variables: team conflict and team cohesion. We ran CFAs for these task-related and team-related processes and in each case compared two models: a model with the different variables taken separately (two- or three-factor models) and a model with all variables collapsed (a one-factor model). The structural equation modelling analyses reported in Table 1 demonstrate that for the task-related processes the three-factor solution has a significantly better fit than the one-factor model (indicated by a significant value of the $\Delta\chi^2$, higher Akaike information criterion scores and lower fit indices for the one-factor models). Also for the team-related processes the

Table 1. Confirmatory factor analysis

Model		χ^2 (df) p	CMIN/df	NFI	TLI	CFI	RMSEA	AIC	$\Delta\chi^2$ (df)
Task-related processes:	Three-factor	77.58	1.52	0.82	0.88	0.92	0.05	155.58	
Time orientation (Y1)	model	(51) 0.01							
Task immersion (Y2)	One-factor	231.51	4.28	0.48	0.30	0.51	0.12	303.51	153.93
Processing of information (Y3)	model	(54) 0.000							(3)
Teamwork-related processes	Two-factor	135.98	2.56	0.73	0.72	0.81	0.08	209.98	
Team conflict (Y4)	model	(53) 0.000							
Team cohesion (Y5)	One-factor	239.61	4.43	0.53	0.39	0.58	0.13	311.61	103.63
	model	(54) 0.000							(1)

CMIN, minimum discrepancy; NFI, normed fit index; TLI, Tucker Lewis Index; CFI, comparative fit index; RMSEA, root mean squared error of approximation; AIC, Akaike information criterion.

Table 2. Descriptive statistics and pairwise correlations

Variable	Mean	SD	1	2	3	4	5	6
1. Time frame (manipulation)	0.51	0.50						
2. Time orientation	2.40	0.39	0.213					
3. Task immersion	3.60	0.55	-0.222*	-0.030				
4. Processing of information	2.90	0.33	0.182	-0.155	-0.481**			
5. Team conflict	1.67	0.30	-0.138	0.267*	0.052	-0.111		
6. Team cohesion	4.09	0.39	-0.041	-0.005	0.392**	-0.194	-0.318**	

n = 84 teams.

*p < 0.05; **p < 0.01.

Table 3. Summary table of independent samples t-tests of time orientation, task immersion and processing of information

	Temporary/open-ended team	N	Mean	SD	Independent samples t statistic of mean difference
H1: Time orientation	Long time frame	42	2.31	0.41	-1.96*
	Short time frame	42	2.48	0.36	
H2: Task immersion	Long time frame	42	3.72	0.42	2.06*
	Short time frame	42	3.48	0.63	
H3: Processing of information	Long time frame	42	2.84	0.32	-1.68 [†]
	Short time frame	42	2.96	0.33	

[†]p < 0.10; *p < 0.05.

two-factor solution has a significantly better fit than the one-factor model. These results indicate that the variables that make up the task processes and the team processes can be treated as distinct concepts with distinct measures.¹

Results

Table 2 reports the pooled descriptive statistics and correlations for the variables under study. Tables 3 and 4 report the specific tests for the hypotheses.

¹Full output, inclusive of individual item factor loadings, is available from the authors.

Hypothesis 1 stated that creative project teams with a relatively shorter time frame would be relatively more likely to focus on the present than those with a longer time frame. Our findings support this hypothesis: creative project teams with a shorter time frame and those with a longer time frame differ significantly with respect to time orientation (p < 0.05): teams with a shorter time frame had a statistically significant higher orientation toward the present (see Table 3).

The formulation of Hypothesis 2 indicated our expectation that, on average, creative project teams with a relatively shorter time frame would have a higher level of task immersion than those with a longer time frame. Contrary to this

Table 4. Ordinary least squares regression model of team cohesion (Hypothesis 4)

Model/step	Team cohesion	
	1	2
1. Time frame (short/long)	-0.08	-1.28*
Team conflict	-0.33**	-0.51**
2. Time frame × Team conflict		1.20*
F change	4.93**	4.25*
R ²	0.11	0.15
AdjR ²	0.08	0.12

* $p < 0.05$; ** $p < 0.01$.

prediction, we found that creative project teams with a longer time frame were significantly more immersed in the task compared with those with a shorter time frame ($p < 0.05$; see Table 3).

Hypothesis 3 stated that creative project teams with a shorter time frame would be more likely to process task information relatively more heuristically compared with creative project teams with a longer time frame that would process information more systematically. Our results were in the expected direction, albeit only marginally significantly (see Table 3). Teams with a shorter time frame demonstrated an accentuated preference for heuristic processing, whereas teams with a longer time frame processed information rather systematically ($p < 0.10$).

Hypothesis 4 stated that a shorter time frame for working together as a team would moderate the negative effect of team conflict on team cohesion. In order to test this hypothesis, a regression analysis was conducted with cohesion as the dependent variable. As Table 4 shows, both the time frame manipulation (long versus short time frame) and team conflict had a negative and significant main effect on team cohesion ($p < 0.05$ and $p < 0.01$ respectively), as did the interaction between them ($p < 0.05$). Hypothesis 4 hence received empirical support (see Fig. 2): a shorter time frame moderates the negative effect of team conflict on cohesion in such a way that it is weaker for creative project teams with a shorter time frame than for those with a longer time frame. We discuss the implications of these findings next.

Discussion

The quotation with which we started this paper, expressed by an engineer whom we interviewed on

a previous research project on creative projects, vividly captures our research interest in the temporary nature of project-based organization. A project-based mode of organization has begun to pervade many industries in the economy, from traditional project-based industries such as film making (Sorenson and Waguespack, 2006), theatre (Goodman and Goodman, 1976) and construction (Gann and Salter, 2000), to industries such as software development, advertising, biotechnology, consulting, emergency response, fashion, television and complex products and systems (Grabher, 2004; Meyerson, Weick and Kramer, 1996; Sydow, Lindkvist and DeFillippi, 2004). Project-based industries tend to be structured around projects that temporarily group together participants in time-bound constellations. It seems apparent from anecdotal evidence and case study research that this temporary nature ‘does something’ to creative project teams, but its exact workings have remained unclear. This, in our view, makes this experimental study of the impact of time frame in creative project teams of theoretical and practical importance to our understanding of project-based organization.

We started from the assumption that time is not just an objective dimension, but that it is one of the core elements represented in a project team’s mental model (TMM). Our manipulation check indeed confirmed that the time frame instruction was immediately adopted in the team’s representation of the context and condition of the task. From this, our findings indicate that in comparison to creative projects with a relatively longer time frame, creative project teams with a shorter time frame have a time orientation that is more focused toward the present (Hypothesis 1), are immersed less in the task at hand (Hypothesis 2) and employ a more heuristic mode of information processing (Hypothesis 3). Furthermore, time frame was confirmed to moderate the negative effect of team conflict on cohesion (Hypothesis 4). These findings hold a number of important implications for theory and practice.

Role of time in creative projects and temporary organizations

In line with recent research on the temporary nature of project teams or ‘temporary organizations’ that has criticized oversimplified assumptions of temporariness as merely indicating

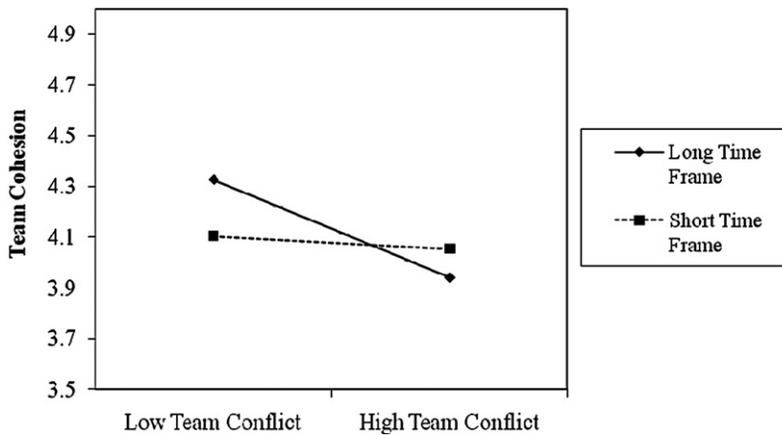


Figure 2. The moderating effect of a short time frame on the relation between team conflict and team cohesion (Hypothesis 4)

duration (Bechky, 2006; Grabher, 2002; Schwab and Miner, 2008), we attempted to develop a broader view of the temporality of flexible and project-based organization that includes the anticipated time frame it shapes among the members of project teams and its effects on project dynamics. This richer temporal view seems especially relevant in the current organizational landscape that revolves around speed, adaptability, change and dynamism, concepts that all hinge on notions of time and temporality (Schreyogg and Sydow, 2010).

Overall, our findings indicate a general pattern which suggests that the representation of time frame in the TMM of creative project teams is an important antecedent of task and team processes like task immersion and the processing of information. There is an interesting analogy here with the broader literature on time and management, which has suggested that time and temporality have both an objective and a subjective capacity (see, for instance, Ancona *et al.*, 2001; Orlikowski and Yates, 2002). The objective capacity (also referred to as ‘natural’, ‘even’, ‘chronological’ or ‘clock’ time) is characterized by the assumption that time is independent from mankind and relates to ‘Newtonian assumptions of time as abstract, absolute, unitary, invariant, linear, mechanical, and quantitative’ (Orlikowski and Yates, 2002, p. 685). The subjective capacity of time reflects the experience of time by individuals and groups (Ancona *et al.*, 2001), and the way they represent it in their mental models. Along the same lines, our study suggests that beyond ‘objective’ notions of duration between start and end date, the temporary nature of

creative projects shapes a subjective representation of the *ex ante* defined, and therefore explicitly anticipated, limited period of interaction between project participants (what we referred to as time frame reflected within the TMM), and that this time frame in turn influences task and team processes. An interesting subject for future research would be to study whether such different time frames, through the task and team processes that were the subject of this paper, also translate into performance differences between creative projects with varying time frames.

Project-based learning

An intriguing finding of our study concerns our test of Hypothesis 1: creative project teams with a shorter time frame are more likely to focus on the immediate present. We believe that this finding holds important implications for the rapidly growing literature on project-based learning (e.g. Cacciatori, 2008; Prencipe and Tell, 2001).

Recent case study based research in the domain of project-based learning and knowledge transfer has frequently observed that although creative projects are tasked with having to come up with new ideas (Grabher, 2004; Ivory *et al.*, 2007; Scarborough *et al.*, 2004) and creativity is a crucial performance indicator (Amabile *et al.*, 2005; Kurtzberg, 2005), these projects frequently experience particular difficulty to sediment this knowledge and lessons learned for permanent use when the project is over. Oftentimes, projects disband and people move on to working on different projects before lessons learned are adequately

captured (Grabher, 2004). As such, project managers are often faced with having to keep ‘re-inventing the wheel’ over subsequent projects (Cacciatori, 2008). On the organizational level, project-based organizations often struggle to develop routines and integrate distributed knowledge, which therefore impedes learning (Newell, Tansley and Huang, 2004). Why learning from projects is so hard has so far not been explained from a team cognition perspective.

We believe that our experimentally developed finding that creative project teams with relatively short time frames have a time orientation that is focused more on the present can offer a theoretical micro-foundation that might help to explain why knowledge developed in projects is often not maintained. Forced by the demand for speed and flexibility, many real-life projects have relatively short life-cycles and time frames (Bakker *et al.*, 2011). Based on our findings, such a short time frame makes it plausible that many creative project teams focus more on immediate present-day problems and concerns rather than on how potential solutions or lessons learned might be preserved for future use. This might partly explain the difficulty that many projects experience in transferring lessons learned to subsequent projects. A theoretical implication is that organizational learning from projects might therefore very well be traced back to team cognition, which would signal a shift in attention from higher levels of analysis to the level of the core team (see Grabher, 2004; Prencipe and Tell, 2001).

Project focus: process versus task completion

One area in which our findings, at least at first, seemed to deviate from expectations concerned task immersion. Specifically, a puzzling finding of the present study is that creative project teams with a relatively shorter time frame have a significantly lower level of task immersion than open-ended teams, contrary to what we expected (cf. Hypothesis 2). This calls for interpretation.

One possible explanation may lie in the focus of the project. Our general expectation was that creative projects with a relatively shorter time frame would be more likely to invest relatively more attention to the task at hand. Our findings suggest that this statement should be refined. An alternative proposition would be that creative project teams with relatively short time frames are more

likely to focus on task completion, rather than the process that leads to it. Lundin and Söderholm (1995) argued that if there is one common denominator in projects and project management it is that there is an imperative and immediate need for action induced by a short time of interaction between individuals. Project teams with short time frames immediately jumping into action would limit their ability to elaborately and systematically focus on the process by which the task is most efficiently executed. Rather, the focus is on getting the work done. In other words, when the focus of the project is disentangled between process and completion, one might conjecture that project teams with a shorter time frame are more likely to be engaged with task completion than the planning or execution of the task itself (i.e. process).

An intuitively similar implication may also be drawn from the confirmation of Hypothesis 4: the cohesion of creative project teams with a relatively shorter time frame is affected to a lesser extent by conflict than the cohesion of project teams with a longer time frame. This seems to indicate that shorter time frames elevate the importance of completion over process, both in terms of team consequences of the TMM (as indicated by conflict and cohesion, Hypothesis 4) and in terms of task consequences of the TMM. With regard to the latter, this revised perspective nicely aligns the findings with regard to task immersion (Hypothesis 2) with those on information processing (Hypothesis 3). As our findings demonstrated, the focus on task completion in creative projects with a short time frame seems to involve a shallower, heuristic mode of information processing. The focus on task process that goes with creative project teams with a relatively longer time frame involves a deeper, systematic investment in the processing of task-relevant information. In the effort to understand the functioning of creative projects, future research on creative projects would do well to make the distinction between task and team process and task completion, and more extensively study its implications.

Managerial implications

The management and leadership of projects is a crucial factor in project success (Rickards and Moger, 2000; Shenhar, 2004). It also provides distinct challenges, however, because of the temporal constraints that are placed on the project leader

and her/his relation to project workers, who are typically all constantly moving from project to project (Thoms and Kerwin, 2004). While temporal attributes and leadership styles often remain in the background, this research calls attention to the saliency of time to project leadership. Ancona *et al.* (2001), in fact, first coined the term ‘temporal leadership’ to refer to ‘the degree to which team leaders schedule deadlines, synchronize team member behaviors, and allocate temporal resources’ (Mohammed and Nadkarni, 2011, pp. 489–490). Borrowing from Ancona *et al.* (2001) and Mohammed and Nadkarni (2011), we would be tempted to refer in this case to ‘project temporal leadership’.

We discussed at length the time orientation of our self-managed project teams, finding that the time orientation of project teams with a short time frame is more focused toward the present, while the time orientation of project teams with a longer time frame is more focused toward the future. Work by Thoms and Kerwin (2004) and Thoms and Pinto (1999) interestingly noted that such differences have important implications for project leadership. Project leaders with a present time orientation tend to excel in scheduling effectively and dealing with complex, parallel tasks (Thoms and Pinto, 1999). Project leaders with a future orientation excel at establishing a project vision and making contingency plans for potential future setbacks (Thoms and Pinto, 1999). Our results give some indication for which types of project teams each of the temporal leadership styles might be most effective. While the homophily principle tells us that managers tend to like to choose to hire, develop and mentor people who are like them, ‘effective leaders specifically choose to work with people who are different’ (Thoms and Kerwin, 2004, pp. 1027–1028). It might very well be, then, that a future oriented project leader can best be matched to project teams with a short time frame (and resulting present time orientation) in order to complement their temporal skills, and a project leader with a present time orientation can best be selected to lead project teams with a longer time frame (and resulting future time orientation). As such, we believe our work highlights the need for time to play a key role in project leadership, and the importance of time-based individual differences in team and leader selection.

One additional specific area where this can be applied is the area of project-based learning. We

mentioned how the present time orientation of creative projects with a short time frame can impede learning. If the goal of a creative project is to successfully transfer knowledge and preserve it after the project completes, project workers should be explicitly asked to focus on and think about the future use of their developed ideas or products, in order to prevent them from being overly concerned with just the present. This would be most naturally done by a future oriented project leader. This strategy might improve the success rate of well-known (but in practice often neglected) knowledge retention mechanisms such as evaluations, databases and other memory objects (Cacciatori, 2008).

Limitations

This study has a number of limitations. First, we should grant that with the benefits of experimental testing of causal mechanisms the experimental method applied in our study comes with downsides as well. For one, we acknowledge that the creative project teams in our experimental setting are ‘extremely temporary’: their duration is very short, probably shorter than the more congenial project team setting. Our results should be understood and interpreted in this light.

Moreover, the creative projects that we studied were (deliberately) deprived of a shared history (by having managers participate in the experiment on the first day of their curriculum). In our experiment, the main goal was to study and test the causal effect of time frame, in which group history should be controlled for. In reality, however, we know that project-based industries have a tendency for repeated collaboration (Bakker *et al.*, 2011; Bechky, 2006), in which relational and structural embeddedness are important factors. As a consequence, in many creative projects, a history of prior interaction between project participants is likely to play an important role in coordination and functioning, by way of role, reputation or macroculture (Bechky, 2006; Jones and Lichtenstein, 2008). Future research would do well by further dissecting the broader nexus between temporariness and social structure, which lies at the very core of the issues dealt with in this paper.

Finally, we should acknowledge that the measures in our study are sub-optimal and should be corroborated in future research on larger samples and real-life settings. As such, we believe our study

answers some questions, but opens the door to many others. One important issue concerns the question of social structure that was mentioned above. Another is the missing link to project performance, which was beyond the scope of the present study. That being said, we do believe there is room for an experimental approach in the methodological toolkit of studies of project-based organization. We could see an emphasis on quantifying and testing causal effects and team processes in a project setting as complementary to, rather than opposing, the more common case based approaches.

Conclusion

The temporary nature of creative projects, despite being so typical and important to project-based organization, has received relatively little attention thus far. In the present paper, we attempted to open the black box surrounding the time and temporality of creative projects by going beyond 'objective' notions of project duration to the more 'subjective' time frame it shapes among project participants. Our empirical study of 84 creative projects teams demonstrated that time frame is a strong predictor of important task and team processes: time orientation, task immersion, information processing and cohesion. Moreover, as we discussed in the preceding section, these findings have important theoretical implications for our understanding of the temporary nature of creative projects, the important process of project-based learning, and project focus, as well as managerial implications. In one sentence, the central message of the present paper holds that, in the words of the project engineer from which we started this paper, it is 'for how long will it stay' that is a crucial, yet understudied, issue that impinges on the functioning of creative projects. We look forward to future work which will build on our work toward a more full-fledged understanding of creative projects and their temporalities.

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