

Managing Innovative Virtual Project Teams in an Innovative Way: Developing and Sustaining Strategic Momentum

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Abstract Virtual teams become very popular in many organisations. They can establish the collaboration of experts all over the world, and meanwhile reduce the travelling costs and time. On the other hand it is much more difficult to manage a virtual team, due to the geographical distance between the management and the team members. This paper presents strategic momentum, defined as the ‘perseverance of virtual team strategy’, an innovative way of managing the virtual team so that the original objectives of the virtual team are achieved. The emergence and sustenance of the strategic momentum is dependent on three determinants: empowerment, team task insight, and collective commitment. These three determinants can be emerged and sustained by context factors and management interventions. The concept of strategic momentum is more deepened and illustrated by qualitative research conducted on five case studies, each consisting of an innovative virtual project team.

Key words virtual project teams, strategic momentum, innovative management

1 Introduction

Virtual teams - which can be defined as teams, consisting of goal oriented collaborations characterised by geographical dispersion of the members, who rely only on a limited extend to face-to-face communication - are becoming more popular. There are a lot of specific benefits in using virtual teams. We can mention a few, without being exhaustive. In the first place, when team members work mostly from their own home (teleworking), using virtual teams can cut office-space costs (Cascio and Shurggailo, 2003). In the second place it can cut time and travel costs (Cascio and Shurggailo, 2003). In the third place the team can get access to and therefore consist of experts, distributed all over the world (Konradt and Hertel, 2002). And in the fourth place the potential to produce high-quality, innovative solutions at lower costs by using virtual teams offers organisations a competitive advantage (Cohen and Gibson, 2003).

The research presented in this paper is inspired by a field problem concerning virtual project teams. Van Aken (2007) defines a field problem as ‘a problem regarding the realization of a “better” reality’. So, what is the field problem concerning virtual project teams? Konradt and Hertel (2002, p. 9) say that there is scepticism among middle- and linemanagement concerning virtual cooperation, because ‘they complain about the absence of instruments for leading and steering of the ‘invisible employees’’. A survey concerning problems of managers and employees after implementation of teleworking made clear that 53% of the managers had difficulties with leadership (Konradt and Hertel, 2002, p. 28). Although this survey was about managing *teleworkers*, we suppose that for ‘managing teleworkers’ one can also read ‘managing (a) virtual team (members)’, because in both cases we can talk about ‘invisible employees’. This difficulty to manage a virtual team can have a negative influence on the effectivity of the virtual team. Virtual teams are especially difficult to manage when interferences occur. In virtual teams, interferences of all kinds can occur. For example:

- when a team member can not do his task due to illness.
- a team leader who has to be replaced.
- a team member who has to be replaced.
- when an organisation goes bankrupt (in case of a multi-organisational virtual team).
- a part of the team is developing a tool that does not fit with the project description.

These interferences can frustrate the continuity of a project, which is under construction of a virtual team, and therefore its effectivity. In the most negative case these interferences can lead to a cancelling of the virtual team, before the project has ended successfully. This problem is probably higher for a virtual team than for a collocated team, due to a lack of face-to-face interactions between virtual team members and the team manager or as stated before, due to the ‘invisible employees’. Therefore, the field problem in this paper is *how can a virtual team become less vulnerable, due to a lack of face-to-face*

interactions between virtual team members and the team manager.

This problem was also (and already!) acknowledged by Kerr and Jermier (1978) in their 'substitutes for leadership' theory. In this theory, they make a distinction between 'neutralizers' and 'substitutes' for leadership. They defined leadership neutralizers as moderator variables which '...paralyze, destroy, or counteract the effectiveness of something else. In the context of leadership this term may be applied to the characteristics, which make it effectively, impossible for relationships and/or task-oriented leadership to make a difference. Unlike substitutes, neutralizers do not replace the leader's behavior and, as a result, may be said to produce an 'influence vacuum' (Podsakoff et al, 1993). According to us, a neutralizer makes leadership in part or totally ineffective. An important neutralizer Kerr and Jermier distinguish is that the influence of the leader is neutralised when located apart from his/her subordinates (with only limited communication possible), producing an 'influence vacuum' (Podsakoff et al, 1993).

Kerr and Jermier ((1978) defined leadership substitutes as 'a person or thing acting or used in place of another. In context, this term may be used to describe characteristics which render relationship and/or task-oriented leadership not only impossible but also *unnecessary*'. According to us, a leadership substitute replaces in part or totally the function of leadership.

A possible solution for this field problem is the emergence and sustenance of a (new) substitute for leadership in a virtual team: strategic momentum. Van Aken and Opdenakker (2006) developed the theory of 'the strategic momentum', whereas with strategic momentum in general is meant '*perseverance of goal-oriented behaviour*'. Applied to virtual teams the strategic momentum can help to decrease or even solve the field problem by increasing the effectivity of the virtual project team. Emerging and sustaining strategic momentum in a virtual team, as a substitute for leadership, can help to decrease management activities, and also decrease the vulnerability for interferences. But the 'Achilles heel' of the 'substitute for leadership' model is, although it sounds quite logically, that it has not been sufficiently confirmed by research yet. The sparse significant results (Podsakoff et al, 1993) indicate that from research it has become clear that substitutes have a *cumulating* effect on leadership behavior. So the effect of leadership behavior is *increased* by the substitutes. Therefore, we see strategic momentum as a *complement* for management (especially leadership), and not as a substitute.

The first aim of this paper is to present a causal model for emerging and sustaining strategic momentum. The second aim is to gain more insight into the emergence and sustenance of strategic momentum in virtual (project) teams. Therefore we conducted five case studies – four ex-post and one longitudinal - between October 2005 and Mai 2008, by which more insight is gained into the emergence and sustenance of strategic momentum in virtual (project) teams. We also learned more about the characteristics of the strategic momentum. In the end we will give some conclusions.

2 Strategic Momentum

2.1 Theory on Strategic Momentum

Momentum is a concept borrowed from physics. In formula: the momentum of a moving body equals mass times velocity ($p=m*v$). Momentum in physics is a *vector*, which means that it has a certain magnitude (mass times velocity), as well as a certain direction (the direction of the velocity).

The article by Miller and Friesen (1980) 'Momentum and Revolution in Organisational Adaptation' is the first publication in the academic management literature that discusses the concept of momentum. They do not give a formal definition of the concept, but use it in its colloquial meaning of driving force. More specifically, they discuss the momentum of change in organisational characteristics as a kind of spontaneous persistence: 'any emerging organisational tendency, whatever its direction, will tend to have momentum associated with it' (Miller and Friesen, 1980, p592). Miller and Friesen present a great amount of literature on resistance to change and adaptation and the elements causing this resistance, like enduring myths and ideologies, the primacy of heuristics, which were successful in the past, vested interests of political coalitions, reluctance to admit failure.

In a later article they apply their idea of momentum to product innovation: you have 'entrepreneurial firms' with a consistent drive, or a 'momentum' in the direction of innovation, and you have 'conservative firms' lacking that drive, that momentum (Miller and Friesen, 1982).

Kelly and Amburgey (1991) are interested in both organisational inertia and in momentum of change. Unlike Miller and Friesen (1980), they do not discuss the momentum of change in organisational characteristics, but the momentum of change in organisational actions.

A somewhat more specific interpretation of the concept is given by Amburgey and Miner (1992).

They discuss the concept *strategic momentum* and define it as “the tendency to maintain or expand the emphasis and direction of prior strategic actions in current strategic behaviour”. So, in this article they discuss momentum as perseverance in the present strategic actions of a company. The concept of momentum is also used in Gersick (1994). She uses the concept in the framework of the punctuated equilibrium model: organisations have long periods of converging growth, during which a certain momentum in present actions is sustained or even increased, alternated with periods of upheaval/revolution, during which momentum disappears or is destroyed, after which a new period of gaining and sustaining momentum begins.

Jansen (2004) more or less combines the approach of momentum as persistence in present actions with momentum as persistence in change of actions. She discusses two types of momentum: ‘stasis-based momentum, describing the energy associated with persisting or extending the current trajectory, and change-based momentum, describing the energy associated with pursuing a new trajectory’ (Jansen, 2004, p. 277).

The interpretation of momentum by Dutton and Duncan (1987) also refers to the content of action. Their contribution is especially interesting because they are interested in the creation of momentum. Their starting point is a strategic issue and they discuss how ‘strategic issue diagnosis’, a combination of an assessment of the urgency of the issue and an assessment of the feasibility to do something about it, creates ‘momentum for change’. For them ‘momentum for change refers to the level of effort and commitment that top-level decision-makers are willing to devote to action to resolve the issue’ (Dutton and Duncan, 1987, p. 286).

2.2 Strategic Momentum in Virtual Teams

As we have seen above, there is a diversity of interpretations of the concept of momentum in the academic management literature. There are various interpretations of the concept, including the impetus of changing organisational characteristics and the one behind perseverance in (strategic) actions. However, it is important to be careful with the use of analogies and metaphors (Gavetti, Levinthal and Rivkin, 2005). Therefore, we propose to aim at a convergence in interpretations of the concept momentum by staying close to its definition as used in physics.

In this paper the term *strategic momentum* is used concerning virtual teams. The behaviour in a virtual team consists of actions that are aimed at pursuing certain outcomes. This behaviour can also be seen as a strategy. A strategy of a virtual team is ‘a certain course of action, undertaken by a virtual team, using certain resources, in order to realise certain outcomes’. Therefore, in this paper the definition of a *strategic momentum in virtual teams* is ‘*the perseverance of virtual team strategy*’.

Strategic momentum in virtual teams can emerge and sustain through three factors, or independent variables. In the first place team task insight, as an element of the technology (T) domain of Tichy (1983). With team task insight is meant the degree to which virtual team members felt they acquired new insights regarding the objectives and tasks of their virtual team. In the second place empowerment, as an element of Tichy’s political (P) domain. With empowerment is meant the degree to which tasks, responsibilities, and capabilities are delegated from the management to the virtual team. And in the third place collective commitment, as an element of Tichy’s cultural (C) domain. With collective commitment is meant the degree in which team members feel determined to translate the insights into formal action. Thus leading to three initial propositions:

Initial proposition 1. *Strategic momentum can emerge and be sustained through team task insight*¹.

Initial proposition 2. *Strategic momentum can emerge and be sustained through collective commitment.*

Initial proposition 3. *Strategic momentum can emerge and be sustained through empowerment.*

When *strategic momentum* has been created, the team members have learned a great deal about the tasks and objectives at stake and feel empowered and committed to translate these insights into actions whenever the time is right for doing so. This will lead to achieving the project goals. So, the fourth initial proposition concerning *strategic momentum* is:

Initial proposition 4. *Strategic momentum has a positive influence on the realisation of project goals*

Some relativising remarks are made here concerning the *strategic momentum*. There is also another side of the medal concerning the *strategic momentum*. It is difficult to change momentum, i.e. to change the direction of the momentum when for example the original project goals of the team are changed by

¹ Part of team task insight is transactive memory, or ‘the shared division of cognitive labor with respect to the encoding, storage, retrieval, and communication of information from different knowledge domains, which often develops in close relationships’

the management. Then one can argue that a more negative definition of strategic momentum is 'stubborn pursuing of virtual team strategy'. By 'perseverance of virtual team strategy', the project is difficult manoeuvrable. So, the initial proposition 4 will only be true when the original project goals do not change during the whole course of the project.

An important addition is that there is always the possibility to replace the project goals by the management during the project. Therefore they need to use 'force', i.e. management interventions. This does not have to mean that the strategic momentum changes in intensity, but it will certainly change in direction.

Also 'perseverance of virtual team strategy' does not mean that pursuing the project goals is a rigid business in the process between project start and project end itself. There is enough tolerance interval for creativity and improvisation, as it helps to push the team further in accomplishing the (original) project goals.

Therefore, we presume that the emergence and sustenance of strategic momentum depends not only indirectly on the context factors, but also on management interventions (i.e. leadership behavior). Thus, not only context factors are adopted in the causal model (figure 1), but also management interventions.

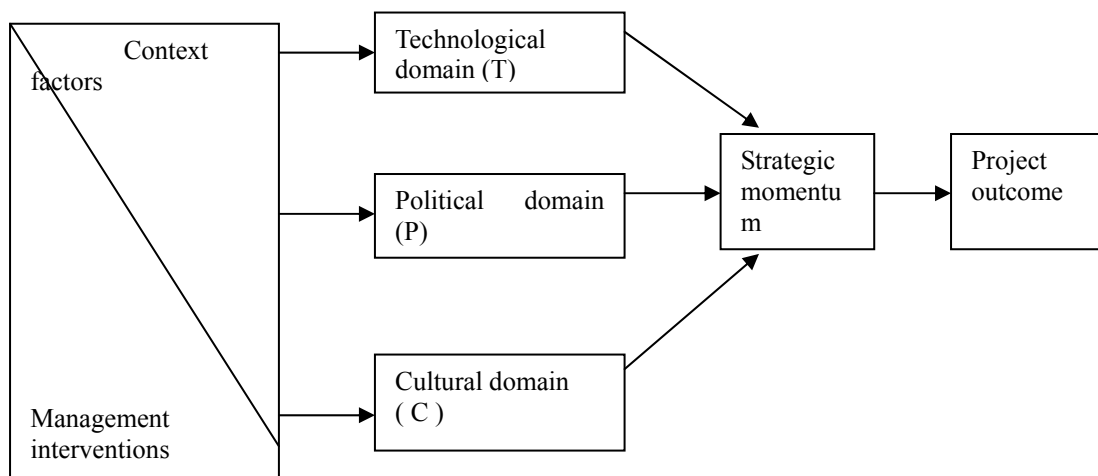


Figure 1 The Causal model of Strategic Momentum

2.3 Measuring Strategic Momentum

A way to measure strategic momentum in a virtual team is to link it with the resources, deployed by the organisation(s) to realise the strategic objectives. When the people, allocated to realise the objectives of a certain venture, are working according to plan (or according to expectations if there is no formal plan), using the agreed amount of resources in the agreed direction, we may say that the strategic momentum is equal to these resources. In formula $SM=R$.

However, in reality this is often not the case and actual strategic momentum may be described by $SM= \alpha * \beta * R$, with α and β as dimensionless correction factors. The first one reflects the possibly less or more deployment of resources for the venture in question, because middle managers withdraw some resources from it, for instance to address an urgent issue elsewhere, or because more resources are allocated to the venture (withdrawn from other tasks), for instance because the objectives prove to be more difficult to realize than foreseen. This correction factor is non-negative and can, as discussed, be both greater and smaller than 1. The correction factor α may also reflect the productivity of the resources in question, larger or smaller than planned.

The second correction factor reflects the degree in which one operates in the right direction. This one is equal to $\cos \gamma$, with γ the angle between the actual and the desired direction of working, the angle between the vectors a and b in figure 2. With γ between 0 and 180 degree, β lies between +1 and -1. Negative values for momentum mean that one is actually working against agreed objectives. These two correction factors are related with the two factors determining the vector strategic momentum, i.e. respectively its size and direction.

It can be somewhat cumbersome to get a specific measurement of the strategic momentum of a virtual team in absolute terms. In actual practice one may, therefore, prefer to talk about normalized

strategic momentum SM_n : $SM_n = SM_{actual} / SM_{planned}$. In this case one may ask: are we all working with the expected effort in the agreed direction, in which case $SM_n = 1$. If not, SM_n is smaller or larger than 1. When for example SM_n is much more larger than 1, when we deal with the extraordinary drive of a highly motivated team in a winning mood, this extraordinary drive is described by Csikszentmihalyi as the phenomenon of “flow” and thus of strong momentum. Csikszentmihalyi (1990, p. 65) describes an example of flow in a team: ‘*Surgeons say that during a difficult operation they have the sensation that the entire operating team is a single organism, moved by the same purpose; they describe it as a “ballet” in which the individual is subordinated to the group performance, and all involved share in a feeling of harmony and power*’. Flow in teams is also demonstrated by Bakker et al (2006, p. 482) ‘*Those who worked in highly engaged teams reported higher levels of vigor, dedication, and absorption that were independent of the work conditions*’.

We do not suggest that you always have to measure strategic momentum in quantitative terms or always have to use the formulas, given above. We give these formulas primarily to illustrate the concrete power of the concept and the idea of the impact on strategic momentum of deploying more or less resources than agreed (the α) or of deploying them not (fully) in the direction of the agreed objectives (the β).

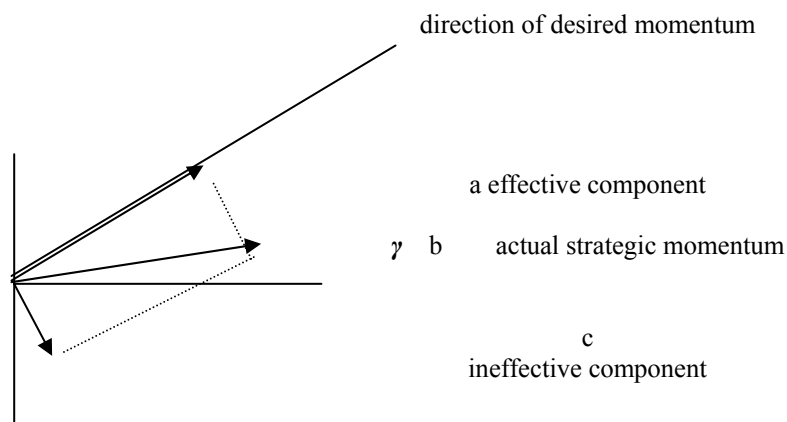


Figure 2 Strategic momentum as a vector

To get more insight in the causal model, i.e. the emergence and sustenance of strategic momentum in innovative virtual project teams, and learn more about the characteristics of the strategic momentum, we discuss five case studies with real life virtual project teams in the next sections.

3 Methodology and Data

3.1 Methodology

In this qualitative study, we have chosen for cases to study, because:

- We want to have a closer look into ‘the black box’.
- Case studies are particularly effective when a large amount of variables that cannot be manipulated have to be dealt with, and when little information about a number of these variables is available (Rasters, 2004, p. 32).

We do not use the word ‘multiple case-study’, but serial single case study, because with Dul and Hak (2008, p. 45) we agree that the term multiple case-study must be more nuanced. Dul and Hak (2008, p. 45) distinguish as follows:

- A comparative study is a study in which (a) a small number of cases in their real life context are selected and (b) scores obtained from these cases are analysed in a qualitative manner.
- A parallel single case study is case study research with a replication strategy in which a number of single cases are selected at the same time and the same proposition is tested in each of them without taking into account the outcome of any of the separate tests.
- A serial single case study is case study research with a replication strategy in which each test takes into account the outcome of previous tests (Dul and Hak, 2008, p. 45).

We have conducted a serial single case study because we first conducted three case studies. Beforehand, we formulated context factors and management interventions on the basis of an explorative

study (conducted in 2004) and literature study (conducted in 2004 and 2005). These context factors and management interventions were also used to develop an a priori codebook which was used during the analysing process. This is also recommended by Miles and Huberman (1994, p. 58) when they state that 'one method of creating codes - the one we prefer - is that of creating a provisional 'start list' of codes prior to fieldwork'.

The outcome of the three mentioned case studies, concerning (new) context factors and management interventions, formed the input for the next series of case studies. In the end, the outcome of the next two case studies formed the input for re-analysing the first three case studies. In this way, '(...) the theory is better grounded, more accurate, and more generalizable (all else being equal) (...)' (Eisenhardt & Graebner, 2007).

3.2 Respondents

For this study, we interviewed a total of fifteen members of five innovative virtual project teams between October 2005 and Mai 2008. Four cases were ex post studies of virtual project teams and one case a longitudinal study of a virtual project team (see Table 1). The innovative virtual project teams consisted of partners from different organisations. The innovative virtual project teams were all started to establish high-tech innovation, f.e. the Dewey team defined an infrastructure for modelling all phases in a life cycle of new production facilities, whereas the Goa project developed a system that supported assembly process improvement. All virtual project teams ended their project successfully. Two innovative virtual project teams consisted only of Dutch partners. The other three innovative virtual project teams were funded by the EU and consisted of several European partners. In one of these projects, the Print project, also a partner from Israel participated.

3.3 Procedure data capture

We interviewed three or four members of each team (except the Jiaozuo case) in-depth, using a semi-structured interview method, which gave us the freedom to keep on asking when new questions occurred. It met the requirement of triangulation, also because beside interviewing three or four members we analysed project documentation. For this study, it was important to uncover variances of strategic momentum in time. Therefore we looked after disturbances of the equilibrium in each case study. These disturbances were made manifest by using the 'critical incident technique' of Flanagan (1954). So, we explicitly asked '*Can You give examples of things that went less good in this team?*'. During critical incidents it can become manifest if momentum exists.

Topics for discussion were project design, project start, project process and project adjourning.

We used four interview techniques to collect the data, i.e. face-to-face interviews (which lasted for about one hour), telephone interviews (which lasted for about one hour), MSN interviews (which lasted for one and a half-hour), and e-mail interviews (spread over several days) (see Opdenakker, 2006).

Table 1 Time Interval of Data Capture and Techniques Used for Data Capture in the Five Cases

Name project	Time interval data capture	Ex post or longitudinal research	Amount of interviewed	FTF interview	Telephone interview	MSN messenger interview	E-mail interview
Dewey	November 2005 till February 2006	Ex post	Four members	3	--	1 (together with e-mail interview)	1 (together with MSN messenger interview)
Goa	October 2005 till December 2005	Ex post	Three members	3	--	--	--
Print	October 2005 till December 2005	Ex post	Three members	1	1	1	--
Jiaozuo	December 2005 till April 2006	Ex post	Two members	2	--	--	--
Groningen	February 2006 till March 2006	Longitudinal	Three members	3	--	--	--
Groningen	March 2007 till April 2007	Longitudinal	Three members	3	--	--	--
Groningen	Mai 2008	Longitudinal	One member	1	--	--	--

The members were invited for the interview by telephone or by e-mail. Confirmation of the appointment for the interview followed by e-mail, and some information concerning the aim of the interview was sent to the informant. We also asked the first respondent of a case for additional information (f.e. documents) concerning the project, and names and addresses from other members of the project.

The face-to-face and telephone interviews were tape recorded with the permission of the respondents beforehand. Within three days after the interview, the tapes were transcribed. MSN messenger and e-mail interviews have the advantage that the whole text is available immediately after the interview.

3.3 Procedure data analyses

The analysis phase is an iterative process. The factors and interventions of the codebook (or template) were taken as items on which the cases could be compared. Then the critical incidents of the cases were compared, to look at differences and similarities, and to find new context factors and management interventions. These new factors and interventions were inserted into the template. With the adapted template, the cases were analysed all over again, till the template was saturated (i.e. no further codes can be added to the template). For analysing the interviews by coding, a software program for qualitative research, ATLAS Ti, was used.

After analysing the different cases with the help of the coding template, a case history was written, as a within-case analysis. The within-case analysis were sent to the informants to get feedback (member-check). After the within-case analyses a cross-case analyses was conducted.

4 Results

On the basis of the cross-case analyses, we gained insights into the process of the emergence and sustenance of the strategic momentum in a virtual team, and about the characteristics of the strategic momentum. Especially in the context factors and management interventions of the causal model, presented in figure 1. The relationships between context factors and management interventions which have direct (variable 2) or indirect (variable 1) influence on the emergence and/or sustenance of team task insight, empowerment and collective commitment, as the moderating variables, are presented in abstract as in figure 3.

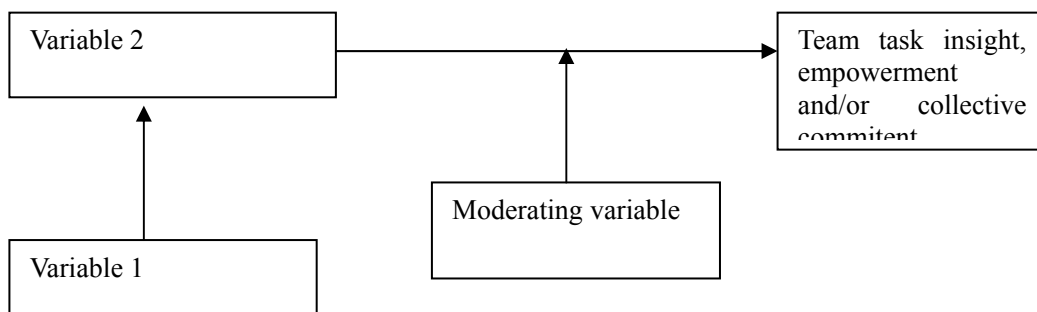


Figure 3 Relationship between (Moderating) Variables and Team Task Insight, Empowerment and/or Collective Commitment

Team task insight

Concerning team task insight, there are several context factors and management interventions which have directly (variable 2) or indirectly (variable 1) influence on its emergence and sustenance. There are also two moderating variables (see Table 2).

Table 2 Context factors and management interventions having directly or indirectly influence on team task insight (F: context factor; I: management intervention)

Variable 1	Variable 2	Moderating variable
Participative decision making	Making and sharing project description (I)	Communication media (ftf-kick off meeting)
	Participative decision making (I)	Communication media (ftf-kick off meeting; ftf meeting)
(Difference) national cultural background (F)	Technical knowledge sharing (I)	Communication media
	Ftf (kick-off)-meetings (I)	
	Open feedback (I)	
Training	(different) Professional background (F)	
	(difference) national cultural background (F)	
	Partner selection (I)	
	Facilitative management style (I)	

At a (semi) kick-off meeting, by bringing the project description under the attention of the team members, team task insight is developed. On the other hand, at a (semi) kick-off meeting, when the project description is vague, and not enough is done, f.e. participative decision making concerning the content at the kick-off meeting, team task insight will be small. Participative decision making during the kick-off meeting has a positive influence on team task insight.

Technical knowledge sharing can sustain or increase team task insight. A mediating factor is communication medium. (*Technical knowledge sharing via*) Different media types can have a different influence on team task insight. Ftf-meetings have in most projects the greatest (positive) influence on team task insight, followed by a shared repository in one project. Next comes e-mail and teleconference. Less influence has a teleconference, e-mail, Netmeeting and MSN messenger. So, one can argue that the influence of team task insight from e-mail and teleconference are quite the same.

Using a shared repository can have a positive impact on technical knowledge sharing and team task insight, because a team member can always consult this backup tool.

A smaller team task insight was probably the result of not enough communication (and therefore technical knowledge sharing and technical adjustment) in the Groningen project.

When video- and telephoneconferences are not managed well, it will lead to communication disturbances, having a negative effect on team task insight.

Ftf-meetings are necessary, because otherwise there would be more divergence in the project (and by not focussing on the main goal: small momentum, i.e. a less effective component of the momentum; see figure 2). Ftf-meetings can even lead to a greater strategic momentum, as one informant said '*the drive for the process, the will to come to results and also understanding what the other wants to do, is only possible with ftf meetings*'. So, ftf-meetings have a positive impact on (team task insight and the direction of) the momentum. When there are too less ftf-meetings in the beginning of the project, collective commitment and team task insight will not develop properly, which can have a negative influence on the magnitude and direction of the strategic momentum.

Participative decision making mostly has a positive influence on team task insight. Participative decision making does not have a positive influence on team task insight, when the project plan itself (the outcome of the participative decision making!!!) is vague. Directive decision making (in this case not concerning the project description) can have a *positive* influence on team task insight, because knots can be cut. Directive decision making, with the project description as an outcome, has a negative influence on team task insight.

Concerning the management style: when the management style is facilitative, this will have a positive influence on team task insight.

When partners are already acquainted to each other (partner selection), it can also lead to lesser communication disturbances, because they 'speak the same language', thus having a positive influence on team task insight.

Open feedback can increase team task insight.

When the project description is updated at the start of the project, as an outcome of discussion in which all partners participate, team task insight, *probably empowerment* and collective commitment will

increase. Having a positive influence, and probably a change in direction, on the strategic momentum.

The project proposal (or description) has a positive influence on team task insight.

A difference in professional background can lead to a greater team task insight. But a difference in professional background can also be negative, leading to a smaller team task insight. To decrease the negative effects of the professional background, especially on team task insight, training can be effective. A difference in professional background can even be neutral.

A difference in national culture background can lead to a greater team task insight, when differences in national culture lead to new ideas and when partners from North and South Europe are part of the innovative virtual project team. It can lead to a smaller team task insight, when national culture is more reserved and when differences in national culture lead to communication disturbances.

Empowerment

Concerning empowerment, there are several context factors and management interventions which have directly (variable 2) influence on its emergence and sustenance. There are also two moderating variables (see Table 3).

Table 3 Context factors and management interventions having directly or indirectly influence on empowerment (F: context factor; I: management intervention)

Variable 2	Moderating variable
Participative decision making (I)	Communication media (ftf-(kick off) meeting)
(difference) National cultural background (F)	
Various modes of task reallocation (I)	
Facilitative management style (I)	Trust

Participative decision making during the kick-off meeting has a positive influence on empowerment. A directive (dictating) way of decision making can probably have a negative influence on empowerment.

Task reallocation probably leads to greater empowerment for the 'receiving' organisation, in terms of responsibilities. It leads also to less empowerment for the 'giving' organisation.

When the project description is updated at the start of the project, as an outcome of discussion in which all partners participate, team task insight, *probably empowerment* and collective commitment will increase. Having a positive influence, and probably a change in direction, on the strategic momentum.

Differences in national cultural background will lead to less empowerment, when national culture lead to greater power distance, f.e. in France, and people are not empowered to take decisions on their own and when national culture lead to greater power distance between younger and older people.

When a manager uses a facilitative style of management, and the more the manager trusts the team members, the greater the empowerment.

Collective commitment

Concerning collective commitment, there are several context factors and management interventions which have directly (variable 2) or indirectly (variable 1) influence on its emergence and sustenance. There are also two moderating variables (see Table 4).

Table 4 Context factors and management interventions having directly or indirectly influence on collective commitment (F: context factor; I: management intervention)

Variable 1	Variable 2	Moderating variable
	Participative decision making (I)	Communication media (ftf-kick off meeting)
Participative decision making (I)	Making and sharing project description (I)	
Partner selection (I)	Team cohesion (F)	Communication media (ftf-meeting)
	Communication media (f.e. ftf-(kick off) meetings)	
	Facilitative management style (I)	
	(different) Professional background (F)	
	(difference) National cultural background (F)	
Partner selection (I)	Trust (F)	
	Various modes of task reallocation (F)	
	Open feedback (I)	

When there are too few meetings in the beginning of the project, collective commitment and team task insight will not develop properly. Ftf-meetings can sustain collective commitment in an artificial way, by organising 'social' events, and in a natural way, because people can talk with each other ftf.

Ftf-meetings (special meetings of one week each) have a positive influence on team cohesion, and in its turn the team cohesion has a positive influence on collective commitment. Ftf-meetings can even lead to a greater strategic momentum, as one informant said 'the drive for the process, the will to come to results and also understanding what the other wants to do, is only possible with ftf meetings'. So, ftf meetings can have a positive influence on team task insight and collective commitment.

Participative decision making during the kick-off meeting has a positive influence on collective commitment. At a (semi) kick-off meeting, collective commitment can develop in an artificial way, by organising 'social' events, and in a natural way, because people can talk with each other ftf.

The project proposal, as the outcome of participative decision making, probably had a positive influence on the collective commitment. In the Dewey project, participative decision making did not have a positive influence on collective commitment. A possible reason is 'because the aims were vague and (*therefore*) the partners wanted to invest less in this project'.

On the other hand, directive decision making (in this case not concerning the project description) can probably have a negative influence on collective commitment. Directive decision making, with the project description as an outcome, has a negative influence on the development of collective commitment.

Concerning communication media as a moderating factor: when video- and telephoneconferences are not managed well, it will lead to communication disturbances, having a negative effect on the collective commitment.

When the management style is facilitative, this will lead to a greater collective commitment. The project leader can try to increase the collective commitment by sending information concerning the project to the team members, and by involving team members at ftf project meetings, which he organised twice a year at one project. On the other hand, when the management style is more directive, this will lead to lesser collective commitment.

Open feedback can increase collective commitment

Team cohesion is greater:

- when people work together more often
- more focused on the objectives of the virtual team than on the objectives of the own organisation
- when people know that they have to work together for a long time

Concerning partner selection, when partners are already acquainted to each other, for example because they know each other from a previous project, this can lead to trust between these partners. When new partners are acquainted beforehand to one or more partners in the existing consortium, this also can lead to trust. When partners are not acquainted beforehand to one or more partners in the existing consortium, trust is not taken for granted. Trust, in its turn, can have a positive influence on the collective commitment.

When the project description is updated at the start of the project, as an outcome of discussion in which all partners participate, team task insight, *probably empowerment* and collective commitment will increase. Having a positive influence, and probably a change in direction, on the strategic momentum.

A difference in professional background can be negative, leading to a smaller collective commitment.

Momentum effects

In all cases we could identify momentum effects. A momentum effect is a consequence of a momentum. Or, because momentum effects exist, one can say that there is momentum. For example, there were several momentum effects in the Lisbon project. These momentum effects are as follows:

- Most of the team members were very autonomous. They did a lot of things without asking for permission, and a lot of results were presented. They also organised workshops themselves, without noticing beforehand the project leader.

- The commitment from team members from some partners was very small, and there was an exchange of team members, whom had no team task insight. The cause of this problem was that the partners were less committed to the project, and team members also participated in other projects inside

the partners. As a result, the partners' momentum was small. In this case team members from other partners intervened by trying to integrate the newcomers in the project.

- At the end of the project, a new project was defined, in which most of the project partners were involved from the Lisbon project.

- One partner has developed a very good relation with some of the other partners. In a professional context. And this collaboration was implemented in common collaborative actions, in common research projects on open level.

Characteristics of the strategic momentum

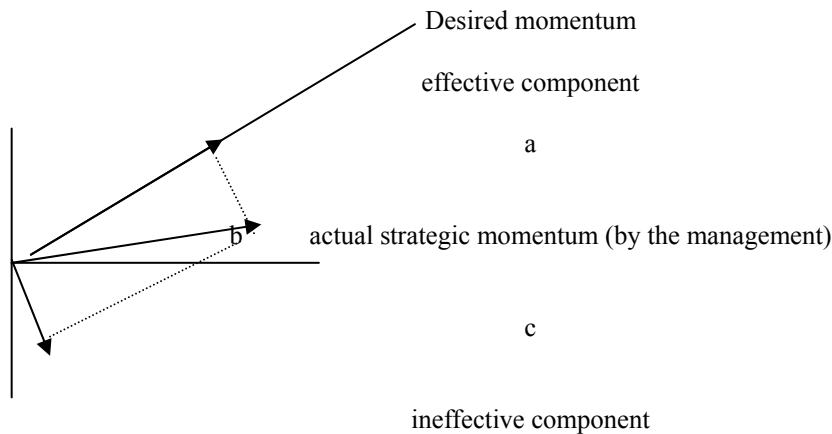
We also got more insight into the characteristics of the strategic momentum, which are as follows:

- The strategic momentum can emerge in a *natural way*, but can also *develop spontaneous*, as a result of management interventions (f.e. social activities during the FtF kick off meeting).

- The strategic momentum is *not equally distributed* over the participants in an innovative virtual project team. Some organisations or team members can have a great strategic momentum, while others have a small one.

- Important *indicators* for a great strategic momentum are 'enthusiasm' and 'hard working' (employees spending more working time in the project than is agreed).

- In the course of one project (Dewey) it became clear that the eventual aim deviated from the original aim determined in the project proposal. A 'reorganisation' took place, which caused a new strategic momentum, but with another direction, since the project became a success, but the original objective was not reached.



- a. effective component (desired strategic momentum)
- b. actual strategic momentum (by the management)
- c. ineffective component

The collective commitment and empowerment have influence on the *magnitude* of strategic momentum, i.e. the amount of resources actually used. The team task insight has influence on the *direction* of strategic momentum, i.e. if the effective component is small (small team task insight) or great (great team task insight).

5 Conclusions

Beside presenting the causal model of the strategic momentum in this article (figure 1), we have also seen some characteristics of strategic momentum. Another aim of this paper is to gain insights into the emergence and sustenance of the strategic momentum. Of course, a strategic momentum can emerge and sustain in a natural way, f.e. when dealing with a 'Tiger team'. In a lot of other cases, strategic momentum will not or not enough emerge and sustain in a natural way. Then it is necessary for the team manager, to look after the factors and interventions that can have a positive influence on this emergence and sustenance. Concerning team task insight, only the factor 'difference in national cultural background' can lead to more team task insight. On the other hand, this factor can also lead to communication disturbances, decreasing the team task insight. A difference in professional background can also lead to a decrease of team task insight. Therefore, it is recommended to train team members

beforehand.

The interventions that have a positive influence on team task insight, and therefore on the strategic momentum, are participative decision making, making and sharing the project description (by participative decision making), technical knowledge sharing, ftf-(kick-off)meetings, open feedback, partner selection, training and a facilitative management style. Also, efficient use of communication media is necessary (moderating variable). When these factors and interventions are used in a proper way, team task insight will increase, the β will increase and strategic momentum will develop and sustain into the right direction.

Concerning empowerment, differences in national cultural background, when dealing with members from a country where the power distance is great, can lead to less empowerment.

The interventions that have a positive influence on empowerment, and therefore on the strategic momentum, are participative decision making (with efficient use of communication media (moderating variable)), various modes of task reallocation (although it will decrease the empowerment of the 'giving' organisation), and a facilitative management style. But this last intervention depends on the amount of trust the manager has in his employees (moderating variable). When these factors and interventions are used in a proper way, empowerment will increase, the α will increase into the direction of 1 and strategic momentum will develop and sustain, deploying at least all resources.

Concerning collective commitment, differences in national cultural background can lead to less collective commitment. A difference in professional background can also lead to less collective commitment. Team cohesion in its turn can lead to a greater collective commitment. Trust can also have a positive influence on the collective commitment.

The interventions that have a positive influence on collective commitment, and therefore on the strategic momentum, are participative decision making, making and sharing the project description (by participative decision making), partner selection (indirectly), communication media (f.e. ftf-(kick off) meetings), open feedback and a facilitative management style. Also, efficient use of communication media as a moderating variable is necessary. When these factors and interventions are used in a proper way, collective commitment will increase, the α will increase into the direction of 1 and strategic momentum will develop and sustain, deploying at least all resources.

Future research could look at the emergence and sustenance of strategic momentum in virtual project teams consisting of members from one organisation. It would even be interesting to conduct research concerning the emergence and sustenance of strategic momentum in collocated teams.

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