INNOVATION RESILIENCE IN TEAM WORK: ANTECEDENTS AND RESULTS FROM A STUDY OF INNOVATION TEAMS IN THE NETHERLANDS

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Abstract

Organising in a mindful way is key to helping innovation teams become more resilient and thereby increase the chances of innovation success. Organising as such, called mindful infrastructure, implies creating the right conditions for teams to excel. To this end, four elements are crucial. When teams are 1) feeling psychologically safe, 2) experience a learning environment, 3) have a say in decision-making, and 4) see that leadership creates synergy, the foundation is laid for resilient team behaviour. In turn, this team innovation resilience behaviour enables teams to successfully deal with critical incidents, which, otherwise, could lead to innovation failure. Resilient innovation teams are extremely alert to small things that can become big problems, hate to jump to conclusions, link management goals with operational practice, value expertise stronger than rank, and can radically change course if required. This helps them keep their innovation projects on track and thus improve the chances of innovation success. This study first transfers insights of crisis and safety management to that of innovation management; second, it has sought to investigate the scientific underpinnings of mindful infrastructure and team innovation resilience behaviour. Third, it provides practical guidelines for building a Resilient Innovation Team.

1   INTRODUCTION

Innovation as a team process is the human effort in teams to develop, support and implement the renewal and improvement of a product, a service or a process (Oeij, 2017). An important question is why projects and innovations often fail. Failure rates of innovation projects are high. Castellion and Markham (2013) report a failure rate of 40% of product innovations. The problem statement of this study is that the substantial failure rates of projects and innovations is a big expense for both companies and society.

Shenhar and Dvir (2007) argue that most people believe projects fail due to poor planning, a lack of communication, or inadequate re-sources, but the evidence suggests that failure is often found even in well-managed projects run by experienced managers and supported by highly regarded organisations. Projects are strongly affected by well-known 'hard' factors, but also by less known 'soft' factors. Being able to adjust a project requires a shift of attention from only the 'hard factors' to including the 'soft factors'. Hard factors, such as the project management's iron triangle - the triple constraint of the criteria to complete the project on time, within budget and within performance goals or requirements - remain important, but soft factors, such as behaviour, leadership, skills, communication, and organisational culture, should not be ignored. The complexity of projects, where the small details of projects are inherently unpredictable, which can have serious consequences, is more often caused by people, than by a product or process (Azim, Gale, Lawlor-Wright, Kirkham, et al., 2010). Team behaviour and the environment of teams therefore contain crucial

leverage factors for both failure and success.

The research objective is to find out how project teams can improve their innovation processes. As the focus is on team behaviour in this study, the research asks how team members deal with the fact that innovation projects might be complex, and that risk-averse behaviour may be involved in the failure of innovation projects. The innovation process in a project might be negatively affected by complex experiences that could trigger defensive behaviours (Cicmil & Marshal, 2005). As a consequence, team members become risk-averse, make defensive responses (Argyris, 1990), and the innovation project might be threatened. Our purpose is to investigate the conditions under which such innovation teams can perform better.

For this purpose the study used insights from the crisis management and safety literature of High Reliability Organisations (Tolk, Cantu & Beruvides, 2015). These organisations proved able to perform without major accidents while working under high pressure. What characterises these organisations is that they have developed a high level of awareness of possible mistakes, and the ability to deal with mistakes in the event that they might occur, which they call 'collective mindfulness'. On the basis of this awareness their teams are able to function very effectively; they excel in anticipating and preventing risky situations that might escalate, and if such risky situations emerge nonetheless, those teams are able to contain the risks, get back on track, and keep the system functioning and performing under pressure. High Reliability Organisations (HROs) have developed organisational environments that encourage trust, and openness, and extremely high motivation and psychological effort to eradicate mistakes and the possible causes of mistakes. HROs invest heavily in organisational learning, and in combining rules and procedures with modes of high adaptivity, and being able to manage the unexpected (Weick & Sutcliffe, 2007). Two concepts are derived and modified from the crisis management and safety literature which we call 'mindful infrastructure' and 'innovation resilience behaviour'. Mindful infrastructure involves the organisational facilitation of effective team work; innovation resilience behaviour is the team behaviour itself, which is built on five principles that ensure it is effective (Oeij, 2017).

The line of reasoning in the study is, that by applying the principles of HROs, it is expected that teams can successfully deal with critical incidents during their innovation projects. Critical incidents (Flanagan, 1954) are situations or events that threaten the successful process of an innovation project. The ability of the teams applying the HRO-principles means that they can solve critical incidents and even prevent them from occurring, or from escalating once they emerge (Alliger, Cerasoli, Tannen¬baum & Vessey, 2015). Such team behaviour can only be expected if teams are embedded in a team environment that enables this kind of behaviour when performing in complex projects (Vidal & Marle, 2008). Such project teams, for instance, must ensure that they are creative, and at the same time cost-effective. In such seemingly incompatible instances it might be tempting to achieve only the goals for which the team is held accountable, and that are tangible. Being cost-effective is perhaps more tangible and accountable, and psychologically less effort (Kahneman, 2011) than being creative, but is to the detriment of the innovation goals of a project. Serving ambiguous goals is difficult and conducive to defensive risk avoidance (Argyris, 1990), which is to be avoided in innovation teams. This study therefore explores the aspects of a team environment that enable what we call 'innovation resilience behaviour'. The term we use for this kind of organisational facilitation is 'mindful infrastructure'. We assume that what HRO-teams can do, could also be beneficial for non-HROs, in order to reduce the failure rate of projects and innovations in project teams. The main question of the study is: How do project teams deal with critical incidents during their innovation projects?

2   THE RESEARCH FRAMEWORK AND RESEULTS

2.1   Theoretical Framework

The study (Oeij, 2017) is rooted in the author's fascination about why so many innovations seem to fail. The researcher's curiosity was driven by initial questions such as: do innovation projects fail because such projects are complex (Geraldi, Maylor & Williams, 2011; Vidal & Marle, 2008)? Do they fail because people in teams become defensive when there is tension, uncertainty and fear (Cicmil & Marshal, 2005)? Somewhere, outside the world of innovation management, there are teams -HRO-teams- that hardly ever fail. These are teams working in high-risk situations, namely teams in nuclear plants, on aircraft-carriers, in operating rooms, and in fire-brigades. Why do such teams hardly ever fail (Cantu et al., 2015; Hollnagel, 2006; Righi, Saurin & Wachs, 2015; Weick & Sutcliffe, 2007)? Moreover, can innovation teams learn from HRO-teams? What basically characterises HRO-teams is summarised in Figure 1: they are embedded in an organisational context that nourishes trust, learning, commitment and supportive leadership: a mindful infrastructure. Due to that

context, a certain kind of team behaviour is enabled that minimises making mistakes and gets a team back on track should a mistake or accident occur (Oeij, 2017). That type of team behaviour is based on five HRO-principles (Weick & Sutcliffe, 2007; Weick, Sutcliffe & Obstfeld, 1999), namely: 1. Be very alert to things that go wrong or indicate negative consequences; 2. Do not accept simple answers but try to validate the facts; 3. Rule out doubt by unambiguously connecting the broad organisational goal and the team work; 4. Anticipate possible and unexpected failure and ensure resilient responses; 5. Rank expertise higher than hierarchy. We mapped this team behaviour to innovation teams and called it innovation resilience behaviour.

Fig. 1: Mindful infrastructure as enabler of innovation resilience behaviour

HRO-teams are able to minimise accidents and contain their escalation should they nonetheless occur: they have excellent team results. However, team results of innovation teams are different, namely achieving progress and positive results instead of failure of innovations. Therefore, the research is directed at the applicability of HRO-principles in the context of innovation.

To answer the central question how project teams deal with critical incidents during their innovation projects, and what characteristics such teams have, for example whether they are teams embedded in a mindful infrastructure, this study looked into the presence of team psychological safety (Edmondson, 1999; 2012), team learning behaviour (Edmondson, 1999; 2012), team voice (LePine & Van Dyne, 2001) and complexity leadership (Lawrence, Lenk & Quinn, 2009). These are the research variables of the above mentioned trust, learning, commitment and supportive leadership. To investigate if teams subsequently perform innovation resilience behaviour (Team IRB), this study assesses the presence of the five HRO-principles that were modified by team behaviour in innovation teams (Fig. 2).
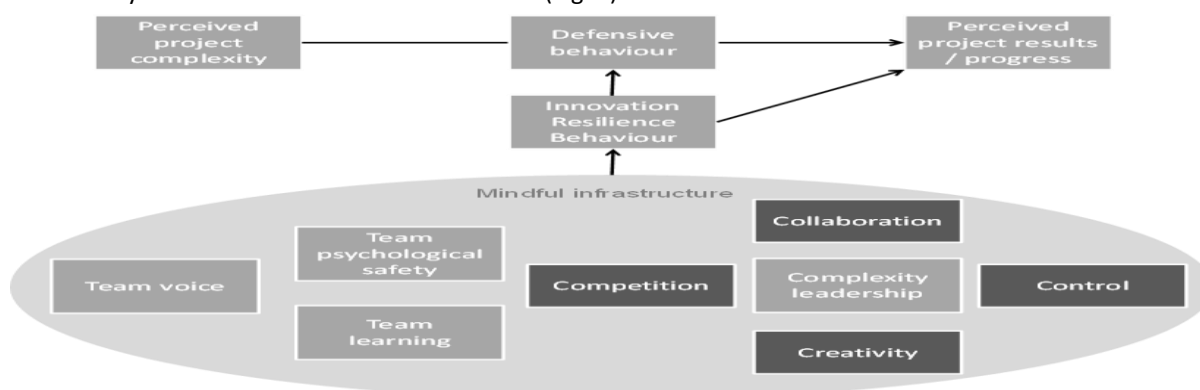

Fig. 2: The theoretical framework of the research.

This study assumes that complexity of projects and defensive behaviour of team members could affect the innovation project in a negative way. A possible cause for defensiveness is project complexity (Cicmil & Marshall, 2005), which refers to unpredictable and unexpected situations that emerge from the interaction of many factors in innovation projects. Talking about complexity (Vidal & Marle, 2008), one can, for example, think about intricate technological and intellectual demands related to the innovation goal, differing interests of stakeholders of the innovation, external influences due to decisions about strategy and finance, priorities taken by others outside the team, and team conflict. If project complexity induces defensive behaviour, then perhaps the presence of mindful infrastructure and IRB could keep the team and the project on track, in order to still achieve a desired outcome (the perceived project results or progress). IRB can also directly lead to good project outcomes (Fig. 2). The main question is divided into seven research questions: 1] What is mindful infrastructure and what is Team IRB? What is their relationship?; 2] Does IRB affect perceived project results and perceived project progress?; 3] Do teams have different configurations of mindful infrastructure?; 4] Is IRB associated with defensive behaviours?; 5] How do project leaders manage innovation projects?; 6] How do teams respond to critical incidents during innovation projects?; 7] What can innovation management teams learn from HRO teams?

2.2   Methodology

The research took place among eleven Netherlands-based organisations, some of them are multi-nationals. These organisations are selected from the manufacturing sector, services and education; some are profit organisations, others are non-profit organisations. In these eleven organisations, eighteen teams and their innovation projects are studied as cases studies, and additionally team members working in similar projects in those companies participated in a survey (309 respondents). A pilot study preceding the main study was executed in a Dutch research and technology organisation.

A case study approach was chosen as the main approach to gather information. In each case we held face-to-face and group interviews with team leaders, team members and the project manager. We approached these teams, their managers, and an additional sample of colleagues in their organisation, performing the same kind of project-based innovation projects, with a questionnaire to gather data suitable for statistics. Finally a team was observed during a team meeting. To analyse the data we used quantitative 'correlational' techniques (e.g. multiple regression analyses), quantitative 'configurational' techniques (qualitative comparative analysis), and qualitative techniques (discourse analysis, content analysis). To interpret the results we used deductive reasoning (e.g. the use of the HRO-literature in crisis management and safety in the domain of innovation management) and inductive reasoning (e.g. in making sense of defensive behaviours and reflective leadership we used the theories of organisational defence mechanisms, reflective practitioner model and organisational learning model). This study combines the positivist approach of hypothesis testing using quantitative data with the interpretivist approach of theory building (and hypothesis-generation) from cases with qualitative data (Oeij, 2017: 21-22).

2.3   Results of the study

The total investigation consists of six studies. Study 1 is a pilot study of a single case, namely an innovation programme in a research and technology organisation (Oeij, Dhondt, Gaspersz & De Vroome, 2016). Based on this study, the framework model above was developed. The study combines survey data, in-depth face-to-face interviews, and the observation of a project team, and concludes that there are positive associations between team mindfulness, team psychological safety, and team learning behaviour. To the degree that more team mindfulness, team psychological safety, and team learning behaviour are present, there are better project results, in terms of more team innovativeness, and team external and team internal effectiveness. A relation with the type of project (innovation project or regular, non-innovative project) and project complexity was not found.

Study 2 (Oeij, van Vuuren, Dhondt & Gaspersz, 2016) explores the main relations of the model (Fig. 2) based on survey data from innovation teams from eleven companies where project teams are working on innovations (study 2 addresses questions 1 and 2). The elements of mindful infrastructure - team psychological safety, team learning behaviour, team voice and the leadership style control – were associated with Team IRB. Similar to study 1, this study found that perceived project complexity did not influence Team IRB. Further, mindful infrastructure was positively associated with project outcomes (perceived project success and perceived project progress), but this relation was significantly stronger when Team IRB was present at the same time. Team IRB mediated the relationship between mindful infrastructure and project outcomes.

Study 3 investigates patterns of mindful infrastructure (Oeij, Dhondt & Gaspersz, 2016), that is, the presence in teams of combinations of (seven) variables of mindful infrastructure (Fig. 2), so-called 'configurations' (this study addressed question 3). Based on 18 cases of innovation projects of just as many teams, there were eight different combinations of mindful infrastructure variables discovered that have a similar result, as it happens to be that each of those patterns was related to the presence of Team IRB in these teams. This implies that teams can have a different design of mindful infrastructure to achieve Team IRB. However, the eight patterns found suggest that those combinations have a better chance to enable Team IRB than other combinations. With a certain probability it is concluded one should realise that seven variables can lead to 128 possible configurations, thus 120 configurations are not 'true'.

Study 4 investigates defensiveness in teams (and addressed question 4) (Oeij, Dhondt, Gaspersz & Van Vuuren, 2016). Indications were found that teams that were less capable of Team IRB were more inclined to show defensive behaviour, which means these teams were more conducive to try to be in control, to prevent losing control and to avoid feelings of embarrassment. It seems that teams less capable of Team IRB were more risk-

avoiding. The study seems to point out that teams capable of Team IRB have more project success. The research also led to the development of an instrument to measure certain defensive behaviours when analysing conversations.

Study 5 researches how project leaders manage their innovation projects (research question 5) (Oeij, Gaspersz, Van Vuuren & Dhondt, 2017). Some project leaders implicitly applied a rigorous research methodology when they have to deal with critical incidents. They followed specific steps: recognise the problem, investigate the problem, develop alternative solutions, test their validity, try out and experiment solutions, select and apply one solution, and evaluate the completed process. Surprisingly these project leaders applied the model of the 'reflective practitioner' developed by Schön (1983, 1987), who contended that experienced professionals use that model tacitly, without being aware of it. Theorising on what we observed, in a subsequent conceptual step, we linked the reflective practitioner model to the control cycle that is part of the organisational learning model (Argyris & Schön, 1996), which integrates single, double and triple loop learning. By making the combined model explicit, assistance was provided for developing ways to train project leaders in becoming more rigorous and resilient whilst learning in leading their innovation projects, and thus reducing the chance of project failure.

Study 6 (Oeij, Dhondt, Gaspersz & Van Vuuren, accepted 2017) explored how teams deal with critical incidents during innovation projects (research question 6). Focusing on the twelve out of eighteen teams that were capable of performing Team IRB, the main finding was that these twelve teams were better at managing and mending critical incidents than in minimising critical incidents. One can say that, unlike HRO teams, who excel in preventing incidents from escalating, the innovation teams capable of Team IRB were more responsive than pro-active, except for those teams embedded in an R&D environment. In these R&D-embedded teams specific project management tools were present, which might explain a more pro-active position and attention toward risk management.

The answer to the question of what innovation management teams can learn from HRO teams (question 7) is found in the HROs' emphasis on the psychology of mindful acting and the organisational discipline to systematically embed organisational routines such as dedicated briefings and debriefings. HROs excel in creating space for learning and speaking up, and to meticulously improve the work process wherever possible, and in so doing test and redesign their routines; their routines never stay the same for long, as they continuously evolve. Paradoxically, HROs are capable of balancing between required rule-based routines and the emerging need to adapt those routines. HROs inform innovation management with its attention toward the psychology of avoiding mistakes and putting effort in unnatural human behaviour. The psychological concepts of reliability and mindfulness, underlying the five HRO-principles, explain the motivation to continuously be aware of unforeseen situations, and ensure continuous learning from events that each time unfold in slightly different ways (Weick & Sutcliffe, 2007). Applying these insights can support the signalling of weak signals of failure by innovation team members and suppress defensive, risk-avoiding behaviour, and therefore ultimately enhance the chance of innovation success.

3 CONCLUSIONS AND RECOMMENDATIONS

The main conclusion of the study is that, indeed, mindful infrastructure and Team IRB are concepts that can be applied to innovation management and project teams working on innovation. Innovation teams that do apply these insights seem to be less defensive and report positive project outcomes more often. While this insight is instructive to innovation management as a field, the findings also add to the knowledge of safety and crisis management, in the sense that mindful infrastructure consists of the elements of team psychological safety, team learning behaviour, team voice and complexity leadership. These are the antecedents for the HRO-principles already applied (Sutcliffe, Vogus & Dane, 2016).

In terms of recommendations to develop 'The Resilient Innovation Team' the research suggests that mindful infrastructures, that support openness and trust, enable teams to perform Team IRB and be less defensive, are all helpful in making complex issues and uncertainties discussable. Instead of becoming risk-averse such teams are solving the project's risks and critical incidents with openness and effectiveness. Some project leaders deploy a research-driven perspective to solve critical incidents with the kind of transparency and validation of solutions that helps to overcome defensive routines in highly resilient ways. Some project teams, notably those embedded in R&D organisations, are better at preventing and minimising critical incidents than other teams. HRO-teams are still even better at minimising incidents and accidents, which means that for innovation teams much is to be won in this regard. The Resilient Innovation Team is able to proactively handle

unexpected, sometimes critical, events to continue pursuing its (project, innovation or team) goal without significant disruption. Practical guidelines and a tool (Oeij, 2017; Oeij, forthcoming 2017) are provided to develop both mindful infrastructure and Team IRB, and to combat defensive behaviour.

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