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ScienceDirect

Procedia CIRP 107 (2022) 34–39

www.elsevier.com/locate/procedia

55th CIRP Conference on Manufacturing Systems

Towards a shared vision in innovation projects: Understanding actor involvement as a preventative approach against defensive routines for innovation capability

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Abstract

This paper is based on the understanding that industrial product innovation projects often emphasize speed and economic accounts of the process without sufficiently considering the human mechanisms that drives the innovation process forward.
The human factor is especially important in relation to projects involving change and organizational collaboration, as actors may perceive the collaboration situation differently based on their varying preconditions and worldviews.
Acquiring a shared vision is thus understood to enhance product innovation capability. However, a lack of actor involvement is in this case seen as detrimental to the innovation process, as it may facilitate actors to perform various defensive routines, directing focus away from the innovation and towards what is perceived as meaningful.
The paper presents different defensive routines on behalf of one project case context and highlights the importance of involvement for shaping understanding and shared visions within different innovation value chain phases.

Keywords: Innovation capability; product development; innovation projects; collaboration; defenive routines; involvement; shared vision

1. Introduction

1.1. Involvement in innovation project cooperation

Innovation projects involving change, require involvement and collaboration on behalf of all participants [1].
An absence of involvement may thus result in project failure [2]. Reasons for this may be that as humans act from their own logic and context [3], they may naturally resist change [4].
From an organizational perspective involvement in relation to decisions made is stated to facilitate commitment, acceptance, a sense of community and meaning [5, 6]. In Norway, we have an involvement model emphasizing participation and good working conditions between employees and managers [7] The model focus on human relations and democratic participation of all national and organizational levels (e.g., team autonomy and employee driven innovation) [8, 9, 10]. Traits of the model are power balance, co-determination, decision making influence and involvement, which seek to enhance trust, work satisfaction, fairness, and commitment in the workplace [7]. Facilitating a system for industrial democracy [8]. This is different from other ways of organization (e.g., scientific management) [11] which emphasize competition and economic efficiency. In fact, most literature on product development (e.g., innovation) performance emphasise time (pace) [12] and economic measures [13]. As such, organizational and human mechanisms driving commitment and cooperation within innovation processes are often left out of the equation e.g., [14, 15, 16, 17]. This has also been mentioned in relation to lean manufacturing [18].

10.1016/j.procir.2022.04.006

1.2. Defensive routines and worldviews

Understanding worldviews and thus how employees perceive and make sense of the complexities of our social world matters in relation to organizational communication and cooperation [19, 20, 21]. This is significant for innovation projects because employees may perceive a situation differently according to the meaning and significance (e.g., coherence) [22] it has. Equally important, individual experience and cognition may frame role visions and process adaptiveness (impacting tacit knowledge) [23]. Worldviews are thus understood to link to information asymmetry, seen as detrimental to product development [23]. One reason for this may be employee's complacent behavior from an unawareness of "dangers and trouble" and thus a feeling of contentment and self-satisfaction [24]. This behavior is a type of resistance to change which impact inertial thinking within an organization [25]. Signs of complacency may involve blaming, postponement, playing it safe, internal focus or a laid-back pace [26, 24].

Similarly, employees may develop defensive routines which can further hinder learning in organizations [27]. Defensive routines are "thoughts and actions used to protect individuals, groups, and organizations usual way of dealing with reality" [28]. As such, it contains defensive reasoning and action strategies consequently avoiding embarrassment or threats [29, 30]. Some cues involve inconsistency (mixed messages) [27], silence (fear to speak up), and defensive reasoning approaches (unilateral control) [31]. Defensive routines are linked to a lack of involvement and interest on behalf of e.g., managers in organizations [31]. Hence, defensive behaviors may develop in environments where employees are disconnected from everyday routines [32]. In this way, we view complacency as a type of defensive routine.

1.3. The innovation value chain

In this paper, we aim to look at defensive mechanisms from an innovation value chain perspective. The paper thus contributes with mechanisms subject to complacency and defensive routines found to be important results for employees' perception and sensemaking in different phases of the innovation value chain.

The Innovation Value Chain (IVC) provides a systematic and tailored approach to analyze innovation activities and assess innovation performance [33]. The first ideas of an innovation value chain derive from organizational activities and thus viewing the innovation as a process [34] creating value for customers [35]. However, every organization has unique innovation challenges. Hence, one organizations innovation practice may be detrimental to another organization [33]. As such, there is not one right way to enhance innovation capability. For this reason, we use Hansen and Birkinshaw (2007) framework on the innovation value chain [33]. From Hansen and Birkinshaw's view, the innovation value chain consists of three phases: *idea generation*, *idea conversion*, and *idea diffusion*. Further, these phases involve six connected tasks: *internal, cross-unit* and *external collaboration, idea selection, development*, and *spread* of developed ideas. Hence, any weak links may be detrimental to the innovation efforts. In this regard, the authors presented some key questions to assess the strengths and weaknesses in the value chain process (table 1).

Through a case study, we build on the questions of Hansen and Birkinshaw, highlighting important factors for managers to be aware of when initiating innovation projects. The key factors seek to answer our main case question of how defensive routines impact the different phases of the innovation value chain. As this case involved interorganizational collaboration, we compare our findings with the following phases and chosen key factors (table 1):

Table 1. Innovation value chain phases, with key questions/factors and case findings.

	Idea generation	**Idea conversion**		**Idea diffusion**
	External	Selection	Development	Spread
Key questions [33]	*Do we source enough good ideas from outside the firm?*	*Are we good at screening and funding new ideas?*	*Are we good at turning ideas into viable products, businesses, and best practices?*	*Are we good at diffusing developed ideas across the company?*
Key factors [33]	*"Not invented here syndrome"*- not seeing outside ideas as good as inside ones, resulting in missed opportunities	*Risk averse attitude* in investing in novel ideas	New product development projects *not finishing on time*	*Sharing ideas* (among employees/ external org.)
Main case question	*How may defensive routines impact the different phases of the innovation value chain?*			
Case findings	Difficult to tap into the knowledge and insights of others Hinder collaboration Missed opportunities Hinder creativity and innovation productivity May be difficult to see and consider external ideas as valuable Failing to develop quality links with others	Reluctance in relation to investing in the project (not taking responsibility) Unclarity of project roles and responsibility (waiting on others to take the leap) Lacking a system for managing ideas/tasks may facilitate a halt in innovation execution.		Narrow focus/internal communities Lack of involvement of external partners Harder to reach shared vision/long-term vision

1.4. The energy-transmission tower case

The paper presents one case study emphasizing a technical production system and the generation of new value chains for substitution products. The case highlights important mechanisms for managers to be aware of when initiating innovation projects. The mechanisms are understood to hinder innovation capability and performance (e.g., progress).

The case was an interorganizational energy transmission tower case consisting of a finished research project subject to product innovation (aluminum substitution research project in Norway). Energy transmission towers have received both public and private interest in recent years due to visual appearance, Health, Safety, and the Environment (HSE) in assembly and maintenance, cost and sustainability. The traditional material regime for such towers are steel, concrete and impregnated wood (medium sized grid-net), and more recently Glass Fiber Reinforced Polymer (GFRP) composites and aluminum have been explored as a substitute material due to light-weight properties and potential benefits with regards to transportation, on-site assembly, maintenance and design features. Steel and concrete are materials with well-developed standards and design codes, field-experience, value chains and actors. The last 70 years show examples of aluminum used in such towers, for transmission-lines in both Europe and North America, but no breakthrough for this material substitution is achieved.

This project was somehow unique in the sense of producing prototypes at all levels and dimensions from focused to comprehensive and physical to analytical. The project consortium covered the value chain from aluminum producers, extruders, assembly, surface treatment and end customer, as well as research and development partners. In the idea generation phase, modularity of transmission towers was demonstrated by scaled prototypes made by 3D-printing of simple polymer mock-ups. This was done to demonstrate how towers could be designed in modules to ease assembly and not at least helicopter lifts. Furthermore, 1:1 beam and joint designs were verified by both Finite Element (FE)-simulations and physical tests for tension and compression loads. Spray tests were conducted to check corrosion resistance (pitting corrosion, intergranular corrosion, galvanic corrosion, and crevice corrosion). Moreover, as a final demonstration a full-scale tower was built and physically tested for vibration, fatigue, static loads, and impacts; a comprehensive test to verify FE-models of global and local failure modes, and to check against technical specifications.

The value chain perspective is seen as of particular importance when substituting materials. Established information and product routes, among a multitude of actors, have evolved and improved over time, creating a cost-efficient and smooth flow throughout the value chain. As such, it may be a major barrier for a new, non-standard material, to establish a competitive business plan for breaking those traditional patterns. For this purpose, the case study involved understanding relationships and collaboration among project participants that could impact innovation performance.

2. Method

To understand organizational employees' worldviews to enhance product development as well as innovation capability, the study involves one single instrumental case study and semi-structured interviews [36, 37]. In-depth interviews have facilitated a more detailed account of employees' project experiences. The interview guide facilitated a conversation surrounding the project contexts, network, activities, and relations, seeking to capture important work-related mechanisms. As such, the paper facilitates an interpretivist understanding of employees' project experiences [38] and thus how organizations respond to complexity and change. Hence, the paper contributes to an understanding of preconditions for employees' different worldviews. The findings can be used for larger quantitative investigations.

Interpretive case studies focus on *number of cases, data collection techniques, unit of analysis, role of prior theory and analysis methods* [36]. The interview questions were created to explore and understand employee perspectives and needs within the two projects at a specific point in time (cross-sectional). The interviews were performed with key employees within the project chosen from convenience and relevance to the study. This involved eight participants chosen based on the aim of acquiring in-depth understanding of employees' experiences. The interviews were recorded and transcribed in detail. Moreover, a combination of an inductive and deductive approach was performed [39]. The inductive findings were based on an inductive coding process [40]. Color coding in Word was therefore used for data analysis to facilitate accuracy, structure and confidence in the mechanisms created [41]. Codes were related to mechanisms seen as barriers for innovation progress "what was going on" [42] and how respondents perceived the project situation. An inductive coding process [40] facilitated the development of various categories (e.g., patterns and connections within the data) that resulted in themes and concepts. The themes defensive routines and complacency was thus found as barriers to innovation progress and capability and served as theoretical concepts on behalf of the case.

The next section discusses involvement, defensive routines, and complacency as part of employees' worldviews and presents some important human mechanisms of value to innovation projects.

3. Results and discussion

Defensive routines can derive from uncertainty and future expectations of behavior [43]. Moreover, being unaware of e.g., dangers are linked to contentment, self-satisfaction and internal (narrow) focus [26, 24]. Such complacent attitudes are understood to be detrimental for project cooperation. On behalf of the energy transmission tower case, *role understanding, competence, project intent and risk* were preconditions (e.g., organizational characteristics/contextual factors) found to impact employees' opinions (e.g., worldviews) and facilitated separation within the project community. Collective belief structures were also found among employees that were familiar with each other and shared a common work identity [44].

However, a shared vision may be harder in projects consisting of many different organizations, as tacit knowledge transfer may be more challenging. Reasons for this on behalf of the respondents' answers, could be related to pre-decided project roles and organizational characteristics (preconditions) which facilitated employees to emphasize different things. The consequence was thus complacent behaviors such as internal focus, emphasis on details, narrow/ short term in contrast to long-term project vision, uninterest in engaging with others and emphasis on what was perceived as valuable. Further, the case involved autonomy to perform tasks. As such, some of the companies had postponed [24] project collaboration to the end of the project. Hence, the complacent attitudes within the project together with an unawareness of others´ preconditions had facilitated group separation from internal focus/responsibility for own tasks/role. In this way, a lack of involvement may lead employees to take responsibility in different ways enhancing disconnection within the project. Equally important, emphasizing preferred tasks independently of others, and hence an unawareness and lost understanding of future vision and others´ preconditions, had increased employees´ sense of risk and misunderstandings within the project. One example was the detailed focused behavior of one employee being perceived as competitive and indifferent by another. In this case, being unaware (of others perception of oneself) had impacted meaning creation, dialogue, involvement, commitment, and information sharing negatively on behalf of the project partner.

As the case have shown, a disconnection from the collective mind [45] can be harmful for project communities as it may result in defensive routines and thus different levels of involvement and commitment within a project. As such, employees´ understanding of others may be limited to their own world understanding. Hence, from the case, resistance towards change may develop based on worldview perception and being unmindful of others´ worldviews. Consequently, enhancing employees understanding of worldviews (involving thinking from what is understood and known within the project) is significant for project involvement in innovation projects as it may enhance positive expectations.

Connecting these findings to the innovation value chain and the idea generation phase, defensive routines may make it harder to tap into the knowledge and insights of others, hindering collaboration. Missed opportunities may thus impact creativity and innovation productivity negatively. Moreover, having a narrow focus and being disconnected towards others may make it harder to see and consider external ideas as valuable (e.g., resulting in different levels of "not invented here" attitudes). Thus, failing to develop quality links with external partners.

Further, converting good ideas into products may be difficult as the number and diversity of individuals involved may facilitate a risk averse process [33]. The unclear project vision and sense of risk made some employees more reluctant to invest time and money in the project. Hence, there existed some unclarity in terms of project roles and responsibility within the value chain and thus being a first mover. In this way, not having a system for managing ideas/tasks may bring the innovation execution to a halt as employees might be waiting for others to take the leap.

In relation to idea diffusion and the ability to spread ideas, organizations need to acquire the relevant constituencies and support [33]. Defensive routines were linked to a lack of involvement and disconnection to e.g., everyday routines [31, 32]. Moreover, different levels of autonomy could impact proximity and the sense of connection among project members. Within the project, employees were sharing ideas among each other. However, the degree of involving others may vary as employees might form internal communities (e.g., based on common work identity or collective belief structures) within the project. In addition to tacit knowledge transfer being more difficult in separate project communities, this may make it harder to involve external partners that could invest in the project (help take the innovation to the next level).

"An organization's ability to innovate is only as good as the weakest link in its innovation value chain" [33]. Having highlighted important mechanisms that may enhance defensive routines and complacent behavior in different phases of the innovation value chain may therefore be a valuable contribution to our understanding of involvement and reaching a shared vision in innovation projects. Consequently, the paper shed light on essential factors to be aware of for innovation performance and towards generating new value chains for substitution products.

4. Further research

To be able to generalize the findings, there is a need to examine more project cases. Hence, performing participatory action research would be the next natural step. This will provide better opportunities to explore and acquire an enhanced understanding of organizational characteristics and involvement in the different phases of the innovation value chain. Moreover, the case challenges the involvement model in relation to questions about levels of trust, autonomy, and control in projects. Hence, an enhanced context-based understanding may make it easier to know the right level of involvement as well as the optimal balance of autonomy and control for satisfied employees and efficient innovation collaboration.

5. Conclusion

This paper has highlighted the importance of emphasizing an understanding of employees' worldviews for project involvement by investigating one innovation case subject to material substitution. The case demonstrates context specific mechanisms and their dynamics in relation to defensive routines and complacent behavior in project communities. This behavior may develop as a consequence of being unaware and lacking understanding of others´ preconditions in the project. The findings show the negative impact of this behavior within different phases of the innovation value chain and stresses the importance of shared visions (e.g., a collective mind) and facilitating awareness and understanding of worldviews in innovation projects.

Acknowledgements

The Norwegian Research Council, SFI NORCICS project, (grant number 310105) has provided financial support for this study.

Abbreviations

3D-printing: Three-dimensional printing;
FE-simulations/ FE-models: Finite Element simulations/models;
GFRP: Glass Fiber Reinforced Polymer;
HSE: Health, Safety, and the Environment;
IVC: Innovation Value Chain

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