

How to Promote Knowledge Sharing in Cross-Functional Npd Teams

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Abstract: This paper investigates the common issues that may arise in cross-functional new product development (NPD) teams from a Knowledge Management perspective. The study has been built around a contextualized trigger, where several factors were preventing a new-born NPD team from performing effectively. The purpose of this paper is to give insights of the main dynamics involved in the knowledge sharing process throughout the application of a systematic problem-solving approach to the case investigated by the authors. Due to the impossibility of building a universal recipe suitable for every team in every situation, this work represents a compromise trying to exemplify how to prioritise interventions in a given context, in order to provide a benchmark for similar circumstances. This paper, using an action research method within a single case context, takes shape around the advises and suggestions made by authors to Electronic Connected Ltd (disguised name), a small-medium enterprise (SME) in a situation of NPD paralysis. In particular, the paper emphasizes the importance of effective leadership and supporting environment in facilitating communication, enhancing cohesiveness, fostering joint commitment and giving direction in order to enable knowledge sharing and to leverage capabilities to conclusively deliver new products.

Keywords: Knowledge Sharing, Cross-Functional, NPD Teams, New Product Development

1. Introduction

Following the advent of the “*knowledge-based economy*” (Drucker, 1969), information sharing and learning have been recognized to have determinant roles in economic performance, as knowledge has become the driver of productivity and economic growth (Foray & Lundvall, 1997). The resource-based view of the firm identifies the achievement of a sustainable competitive advantage depending upon the transferability of a firm’s resources and capabilities (Barney, 1986). With regards to knowledge, the literature recognizes several difficulties of transferring knowledge across the organization, emphasizing its “*stickiness*” due to its natural disinclination to movement (Von Hippel, 1994). The stagnation of knowledge can vary significantly across companies as well as across different portions of a single organization. Scholars focused their attention on the conversion of tacit to explicit knowledge, recognized as the critical mechanism underlying the link between individual and organizational knowledge (Nonaka & Takeuchi, 1995).

From a learning and social point of view, venues of knowledge sharing have been identified in the so-called “*communities of practice*” (Brown & Duguid, 1991; Hildreth, Kimble & Wright, 2000), consisting of: a) the domain, the area of knowledge that brings the community together and shapes its identity; b) the community, the group of people identifying in the domain; and c) the practice, representing the body of knowledge, methods, tools and documents which community members share and develop together (Wenger, 2004). The learning process of the practitioners has been extensively studied by the theory of legitimate peripheral participation (LPP) (Wenger & Lave, 1991), according to which the learning process is an intrinsic part of practice. From a learning perspective, the importance of converting tacit into explicit knowledge reaches its maximum in NPD teams, where performance and outcome are strongly dependent on knowledge sharing and knowledge creation (Madhavan & Grover, 1998; Prieto, Revilla & Rodríguez-Prado, 2009). Following this path, the aim of the paper is to further explore the dynamics of knowledge management in NPD teams, focusing on what are the common obstacles to effective knowledge sharing and throughout which interventions they could be overcome.

The next section, consisting of a review of the extant literature, highlights the key variables underpinning the knowledge sharing process. In the body of the work, the adopted problem-solving approach is accurately discussed in a step-by-step fashion, with the aim to provide the reader with the adequate instruments to replicate the process. The paper ends with a conclusive commentary, limitation of the study and hints for further research.

2. Essentials Of Knowledge Sharing In Npd Teams

Knowledge sharing and knowledge creation find themselves at the core of the entire NPD process, acting as enablers from the early phase of idea generation to the final launch of the product (Madhavan & Grover, 1998). Due to their natural cross-functional composition, NPD teams are most likely to encounter several barriers preventing an effective knowledge sharing, such as divergence in vocabulary, interests, goals and procedures (Eckl, 2012), sometimes further exacerbated by cross-cultural issues. The present section, analysing the extant literature, discusses the key elements, displayed in Figure 1 and from now on referred to as *essentials*, that must be present in a team in order to share knowledge and perform effectively, namely leadership, team building, communication, trust and supportive environment, which in turn comprises culture, time management, proximity, and incentives.

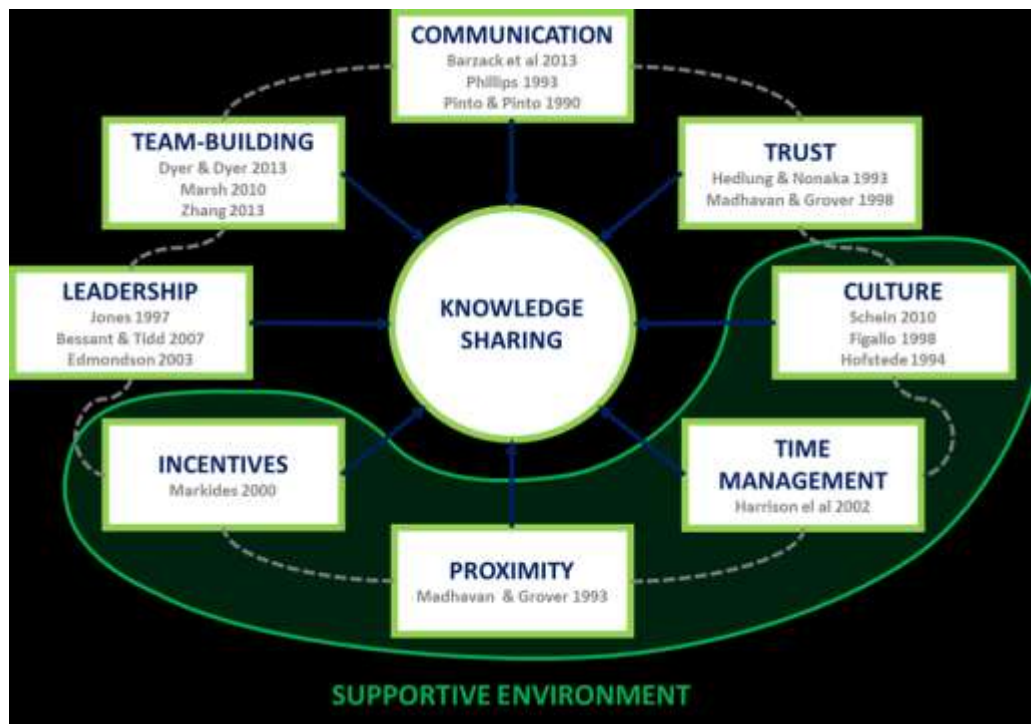


Figure 1: Essentials of Knowledge Sharing.

Team-building: Team building is a vital component of an effective team (Dyer & Dyer, 2013). It is a meta-competency that builds trust and understanding across members and allows the team to constantly evaluate itself and change the way it operates. Team building should not be limited to a single event or activity, but it should be seen as an integral behaviour of a business (Marsh, 2010), an ongoing process that constantly evolves with regards to how teams function by changing team members, skill sets, values, reward systems and available resources. Constant team building helps the team identifying its weaknesses and adapt their strategies in order to keep performing. NPD teams in intricate products, such as electronics, work together in a reciprocal interdependency since different team members need to share information and collaborate to solve problems. Highly interdependent teams often struggle to perform when they are structured as a virtual team and have limited opportunities for constructive face-to-face interactions (Zhang, 2013). In order to develop and improve their performance, teams should be aware of their weaknesses while support and resources to improve them should be given (Pitt, 2010). Successful NPD teams can count on senior management understanding the importance of team building (e.g. when and how to support it) and considering the time and resources needed when designing its structure (Dyer & Dyer, 2013).

Leadership: According to Barczack et al. (2009), the most popular leader in NPD teams is a professional figure whose main job is project management, suggesting that for these more complex projects the majority of firms prefer having them led by a professional. Reinforcing this claim, Jones (1997) concludes that, regardless the functional background the leader may belong, its role will be always to ensure a smooth progression of the project and its constraints adherence, to ensure the availability of necessary resources when required, while also acting as the primary channel of communication between the team, top management and any external

part involved. Especially in new-born teams, leaders are the ones who should create a vision of the group's purpose, giving the direction to team members. One of the most important roles of the leader is "*intellectual stimulation*" (Bessant & Tidd, 2007), ergo the ability to increase the awareness of problems and team's ability to tackle them in innovative manners, influencing the way they frame and reframe knowledge and experience (Edmondson, 2003). These reasons highlight the importance of an effective leadership in non-mature teams, where the project management duties could not be spread across inexperienced members.

Communication: Often in organizations, weak relations between individuals, as well as bureaucracies and over-layered structures (Cushman, 1995) could prevent ideas from being effectively communicated and nurtured (Phillips, 1993; Lovelace, Shapiro & Weingart, 2001). Communication failures tend to be usually explained throughout their symptoms rather than explored beneath the surface level. For this purpose, we identify four main dimensions of communication, namely frequency, clarity, depth, and formality.

Frequency: According to Barczak et al. (2009), communication frequency in a cross-functional team can have a curvilinear relationship to team's performance. This is due to the fact that the more communication frequency increases, the more information could be gathered on another's personality, ability, and intentions, fundamental constituents of the trust-building process (Becerra & Gupta, 2003). When communication frequency is low, the level of trust across members is much more dependent on the individuals' general attitudes towards their colleagues (Phillips, 1993). However, when communication frequency is excessively high, the increased familiarity across members could lead to homogenised perspectives and mitigated creativity, suggesting an inverse u-shaped relationship between team creative performance and intra-team communication frequency (Leenders, Van Engelen & Kratzer, 2003). Frequent interactions between employees generate common understanding and creates useful knowledge that positively affects the development of product innovations (Carrasco-Hernández & Jiménez-Jiménez, 2013).

Clarity: In order to be effective, intra- and inter-team communication must be clear. Team members with different backgrounds tend to use different kinds of language, due to the heterogeneity of technical terms commonly used in each knowledge area. From here the need to establish a common vocabulary, ergo a technical language commonly used by all members when talking to each other (Phillips, 1993), particularly urgent in contexts characterized by the absence of a significant common knowledge base. A great deal of clarity could be achieved through an effective two-way communication: the sole delivery of a clear message does not automatically mean that it would be clearly understood by the receiver.

Depth: While communication frequency influences trust, communication depth depends on trust. In an orthogonal relationship with breadth (i.e. the variety of topics), it measures the significance of the conversation concerning a given topic: the higher the depth of communication, the higher the density of critical information contained in it. According to "*social penetration theory*" (Taylor & Altman, 1987), the willingness to disclose critical information is directly proportional to the perceived trustworthiness of the interlocutor (Abrams et al., 2003). In particular, individuals characterized by diverging interests and objectives tend to retain the information they consider critical for the achievement of their own goals, preventing an effective information sharing.

Formality: Different level of formality are typically associated with different channels and means of communication, although the degree of seriousness of the conversation could vary according to the language and code used. Even though the vast literature fails in identifying a commonly accepted definition, we refer to formality as the extent by which information assume an official connotation flowing through communication channels formally recognized in the organization (e.g. calling a meeting by e-mail rather than face-to-face). Whilst faster informal communication channels emphasize the social component of the conversation, facilitating the familiarization process across members, slower formal ones have much more power in delivering structured information easily traceable throughout hierarchical chains of command. According to the research of Pinto and Pinto (1990), high-cooperative project teams tend to rely more on informal communication channels, such as the use of the telephone and informal discussions, than low-cooperative teams. When managing knowledge sharing in an organisational setting, informal and complementary knowledge processes, often affected significantly by the Human Resource Management (HRM) practices, should be taken into account (Pitt & MacVaugh, 2008).

Even though this is not an exhaustive analysis of communication's dimensions, frequency, clarity, depth, and formality represent key elements that could be leveraged in order to facilitate collaborative communication in a team, as further discussed in the next section of the paper.

Trust: Trust is defined as team members having reciprocal faith in others' intentions and behaviour to work towards team goals rather than towards narrow, individual, or functional goals and agendas (Kreitner & Kinicki, 1992). According to the seminal study of Mayer, Davis, and Schoorman (1995), there are three interrelated conditions that lead to trust: "*ability*", the set of skills and competencies that an individual possess in a specific domain, "*benevolence*", the perceived positive orientation of the trustee towards the trustor, and "*integrity*", the acceptability of the trustee's values by the trustor. Trust is particularly critical in cross-functional and inter-organisational teams, since the non-disclosure of information due to a lack of trust can represent a major obstacle in the processes of knowledge sharing, internalization, and creation (Hedlund & Nonaka, 1993). The positive effect of trust on team performance is extremely evident in literature (cf. Shen & Chen, 2007; Peslak & Stanton, 2007). Madhavan and Grover (1998) argued that trust across team members could be boosted through direct, frequent and informal interactions.

Culture: According to Schein's (2010, p.18) definition, organisational culture is "a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as a correct way to perceive, think and feel in relation to those problems.". Figallo (1998) supports this statement arguing that the feel of being part of a greater social entity drives individuals to participate and actively contribute with content into the community. Referred to as the "software of the mind" (Hofstede, 1994), culture within an organisation is likely to be subtended by organisational sub-cultures (Bessant & Tidd, 2007) originated by the formation of groups made up of individuals with peculiar set of values and behaviours, that may correspond to the so-called communities of practice, each one with a different "way to do things around here" (Deal & Kennedy, 1982). Culture shall be innovation-oriented, embracing a "learning transfer climate" (Bates & Khasawneh, 2005) which should be the main thread uniting sub-cultures. The battle between individualistic and collectivistic culture affects the extent to which knowledge can be shared within and across teams within the organisation (Fei, Chen & Chen, 2009).

Proximity: Edmondson (2003) suggests that by the virtue of working closely, individuals tend to develop shared assumptions and beliefs through a process of "*sensemaking*". Madhavan and Grover (1998) recognised that team members who are able to interact directly will be more effective and efficient at creating new knowledge. Physical proximity can positively contribute to the creation of strong ties between members, which further facilitates the use and creation of knowledge within the team (Krackhardt, 1992), indicating that successful transfer of knowledge requires people talking to each other in each other's presence. In addition, proximity directly influences the frequency of communication, helping to build and maintain the team's social capital embedded in team members' relationships. For example, people working in the same location tend to ask each other rather than searching the information by themselves or using repositories (Bechina and Bommen, 2006). Swan et al. (1999) pointed out that businesses structured around virtual teams lose numerous opportunities for innovation due to the absence of casual knowledge sharing and learning induced by physical proximity.

Incentives: Incentives, either monetary, non-monetary, individual or group incentives, are commonly used in organisations to promote and encourage specific actions and behaviours of individuals in a given period of time. Markides (2000) classified incentives as a fundamental determinant of the organisational environment, together with culture, structure, and people. Since individual rewards tend to create competition across employees, who will likely exhibit unethical behaviour to secure their reward, group incentives could foster collaboration and joint commitment within the team.

Time management: As every scarce and limited resource, time should be correctly and efficiently managed. Time serves as a medium to collaborate with team members to trade specific information (Harrison et al., 2002). Time is the dimension along which repeated interactions help develop social relationships, building trust and reducing the implicit transaction cost of information sharing (Bidault & Fisher, 1994). One of the main issues connected with time is the pressure on team members often exercised by time constraints. The presence of tight time constraints could lead to fewer pieces of information being processed, a greater selectivity in favour of more important information and a general acceleration of the process that could undermine the outcome's quality level (Svenson & Maule, 1993). On the other hand, the absence of time

constraints could cause an excessive relaxation, which may delay the entire process and may also negatively affect the quality of the outcome, consistently with the findings of Shepard and Clifford (2000) which recognises that the introduction of overtime leads to reduced average productivity.

3. The Case

Electronics Connect Ltd (disguised name) is a well-established small-medium manufacturing firm specialized in a range of computer, audio and video accessory products for the European market. The company employs sixty people across five departments, namely Production & Engineering, Quality control, Marketing & Sales, Finance and General Administration. In recent times the company encountered several difficulties in the process of new product development as the company's success was based on a single initial innovation representing its "Genesis product". The firm's top management had to see the decreasing trend in product demand and the consequent shrinkage of market share to realize that innovation was completely absent in Electronics Connect Ltd. In response to that, the board of directors formed an NPD team consisting of five members, one from each department. However, six months after its initiation, the cross-functional group did not show any positive sign of progress: internal arguments and agendas were preventing the team from performing effectively. It is important to highlight that the Board of Directors urgently needed this team to work for the sake of the company's survival and success, which otherwise was going to be out of the market soon. In this difficult situation, Electronic Connected Ltd's top management asked us for suggestions on how to bring the new-born NPD team to performance.

Through an action research methodology, the approach used to advise Electronics Connect Ltd on its problem resolution has been accurately reported in the next section of the paper in the same way it has been applied to the real case, with the aim to provide the reader with the adequate instrument to replicate it in similar situations.

4. Methodology

Because the objective of the paper is to contribute insights on dealing with knowledge sharing-related issues in NPD teams, this study uses an action research method within a single case context (Chicucci, 2013; Van der Hoorn, 2016). This type of interventionist research finds researchers as active actors in the field, wherein they are "seen as a competent and trustworthy member of the world where [they are] doing the fieldwork" (Jönsson & Lukka, 2005, p.5). In this particular case, the action research has been underpinned by active consultant-client like relationship (Flinders, Lynch, & Holden, 2009): the authors researched the field to diagnose the NPD paralysis in order to provide Electronics Connect Ltd with a meaningful plan of intervention. To advise Electronic Connect Ltd on its problem resolution it has been adopted a systematic problem-solving approach, depicted in Figure 2, consisting of five consecutive phases: *explore*, *reframe*, *ideate*, *prototype* and *distill*. (P. Lynch, personal communication, December, 4, 2015).

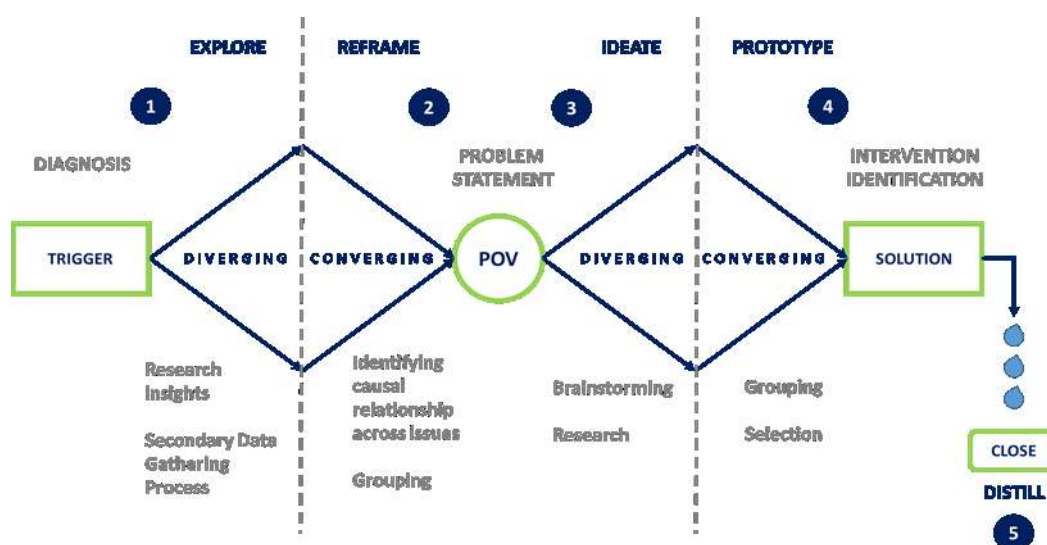


Figure 2: Systematic problem-solving approach (P. Lynch, personal communication, December, 4, 2015).

Explore: The process starts with the trigger diagnosis that endures for the entire explore phase, consisting in exploring the problem (through interviews, documents and direct observation of the NPD process), gathering various insight about the issues emerging from the trigger, diverging as much as possible. One of the key tools used to explore the trigger is represented by the *empathy map*, which is going to be discussed in the next section.

Reframe: After a satisfactory level of research has been achieved, the second phase aims to frame a meaningful and synthetic problem statement (i.e. *point of view* - PoV) in a converging fashion, throughout the interpretation of existing causal relationships across the issues identified in the previous phase in order to identify the problem at its roots.

Ideate: Brainstorming sessions revolve around the clear problem statement, identifying and creating numerous interventions that could theoretically solve the problem. All along the ideate phase, there is a remarkable presence of research and trigger diagnosis under the light of the new-framed PoV.

Prototype: Following the divergence in the previous phase, the process now converges towards the most suitable intervention to solve the PoV, identified through selection, grouping, and fusion of the possible intervention identified in the ideate phase.

Distill: The process ends with the implementation of the solution, after its refinement and clear definition, in order to avoid ambiguous interpretations. In this paper, this phase is represented by the conclusions.

In the next section of the paper, with the aim to trace the path towards the promotion of knowledge sharing in Electronics Connect Ltd NPD team, the reader will be guided in a practical way through the whole process that has been adopted by the authors.

5. Analysis

Explore: The whole process began with a preliminary diagnosis of the trigger, the aim of which was to identify the macro areas in which the research should have been initially directed, namely leadership, trust, communication and time constraints. Each of these areas was extensively researched in order to determine its influence on knowledge sharing in NPD teams. All research findings were contextualized to the team and carefully examined to determine what, and by which extent, was relevant to the trigger, pointing out the directions in which further research was needed.

The trigger was constantly scrutinized at each authors' meeting during this phase of the process, using the research findings to complete the empathy map. This tool, depicted in Figure 3, has been particularly useful in understanding which were the issues and how they were causing "pain" across NPD team members, translating what they were saying and doing in what they were thinking and feeling.

The empathy map used in this paper is an application of the "*symptoms map*" identified by Shankar, Acharia and Baveja in their "*Soft System Methodology*" (2009, p.140), which gathers all the symptoms of the problem in order to help in the understanding situational contexts.

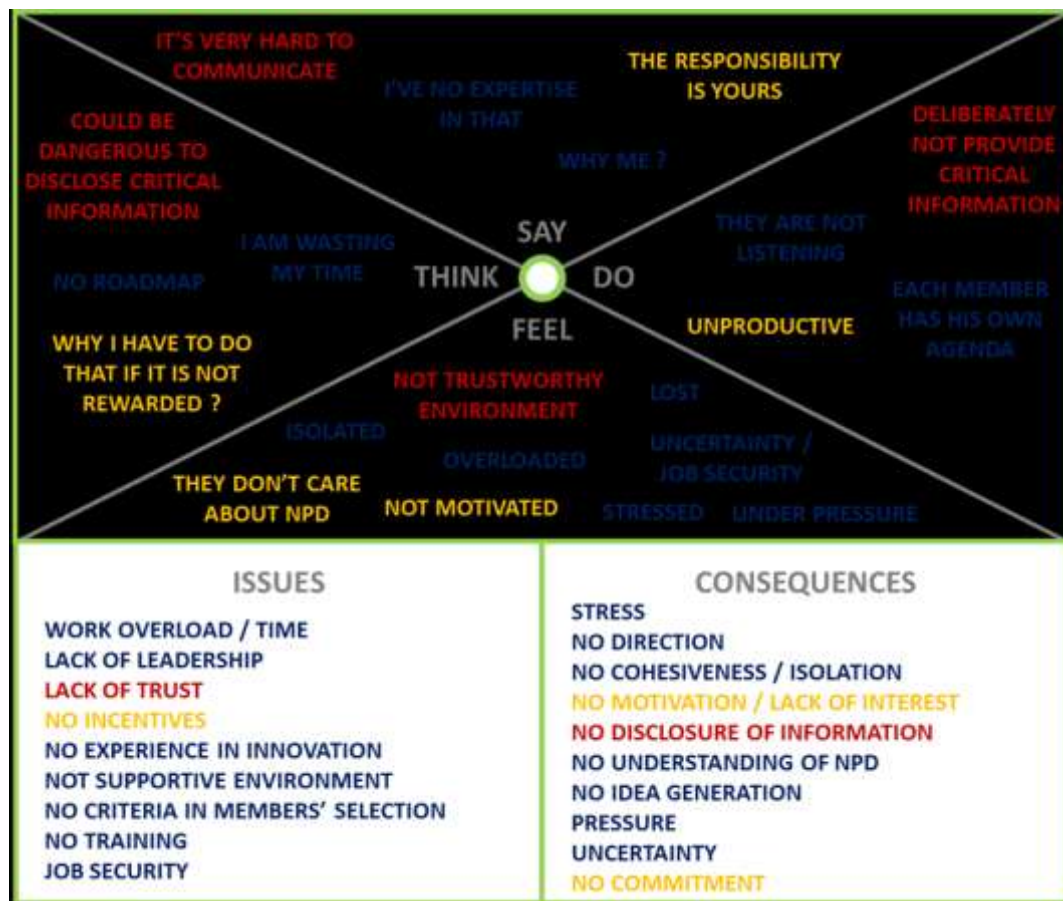


Figure 3: The empathy map

Two reasoning paths, highlighted in red and yellow in Figure 3 are individually explained below in order to put the reader in the condition to appreciate the mechanism underpinning the tool used. In Electronics Connect Ltd, team members were clearly not disclosing critical information (*do*) and they were complaining to directors about the difficulty in communicating with their peers (*say*): these two behaviours were not problems, but rather tangible consequences of their inner thought that the disclosure of such information could have been dangerous (*think*), which, in turn, was the symptomatic manifestation of a deeper problem: the non-trustworthiness of the environment perceived by team members (*feel*). The issue, in this case, was the lack of trust and its consequence was no disclosure of information across members. Following the reasoning path in yellow, two other tangible concerns were the tendency of members to offload their own responsibilities onto the shoulders of their colleagues (“*the responsibility is yours!*” - *say*) and the team unproductivity (*do*): a deeper analysis shed light on these behaviours’ cause, identified in the lack of motivation (*feel*), directly conducive to its triggering element, i.e. absence of incentives (why do I have to do this if I am not rewarded for it? - *think*). In this case, the issue was the absence of incentives and its consequences were no commitment and lack of interest, as displayed in Figure 3.

Once all the most important issues have been identified within the trigger, bearing in mind the interrelations discussed earlier in this paper, each issue was linked to its direct or indirect consequence(s), trying to understand the situation from the NPD team’s perspective.

Reframe: With over ten different issues and consequences emerged in the previous diverging phase, it was needed to downsize the number of issues in a converging fashion by deeply analysing each “*issue*” to eventually identify common traits with the others.

Once an interrelation between two or more issues emerged, the issues involved were grouped together. Subsequently, the list of “*consequences*” has gone through the same process: it resulted in the transition from Table 1 to Table 2.

Table 1: Issues and Consequences from the empathy map.

ISSUES	CONSEQUENCES
WORK OVERLOAD / TIME (3) LACK OF LEADERSHIP (1) LACK OF TRUST (1) NO INCENTIVES (3) NO EXPERIENCE IN INNOVATION (2) NOT SUPPORTIVE ENVIRONMENT (3) (1) NO CRITERIA IN MEMBERS' SELECTION (2) NO TRAINING (2) JOB SECURITY (3)	STRESS (A) NO DIRECTION (B) NO COHESIVENESS / ISOLATION (C) NO MOTIVATION / LACK OF INTEREST (C) NO DISCLOSURE OF INFORMATION (C) NO UNDERSTANDING OF NPD (B) NO IDEA GENERATION (D) PRESSURE (A) UNCERTAINTY (B) NO COMMITMENT (C)

Table 2: Reframed Issues and Consequences.

ISSUES	CONSEQUENCES
TEAM BUILDING / LEADERSHIP (1) SKILL&COMPETENCES/EXPERTISE (2) WORKING ENVIRONMENT (3)	STRESS (A) LACK OF UNDERSTANDING (B) NO COHESIVENESS (C) UNPRODUCTION (D)

This “Reframing” phase translated the list of issues and consequences coming from the empathy map into a specific and meaningful problem statement: it is a process of “focusing” rather than “broadening” the information gathered. During this phase, we developed a deep understanding of the users (team members), with which we were in the position to come up with an actionable **problem statement**, or point of view (PoV).

Table 3: The Problem Statement - Point of View.

USER	NEEDS	BECAUSE
TEAM MEMBERS	SUPPORTIVE ENVIRONMENT EFFECTIVE LEADERSHIP / TEAM-BUILDING TRAINING	IMPROVE IDEA GENERATION ENHANCE COHESIVENESS REDUCE STRESS UNDERSTANDING NPD

This PoV, summarized in Table 3, is a unique vision crafted from the discoveries emerged in the process, a guiding statement that focuses on specific users, their needs, which were uncovered during the explore stage, and the reasons why users have those needs:

“Team members need a supportive environment, effective leadership and training to provide them with effective direction and motivation to share knowledge, to enhance cohesiveness, to understanding and leverage each other’s capabilities to deliver new products”.

Ideate: The second round of divergence began at this point of the process: Brainstorming sessions have been called in order to isolate as many interventions as possible, capable of tackling the problem identified in the PoV. Among all the interventions identified in this step, some of them have been discarded for their inapplicability to the Electronic Connected Ltd context. Then, the remaining Best Possible Interventions (BPIs), have been collected in an exemplary table comprising of Actions, Purpose and Details of each BPI, as displayed in Table 4. The interventions generated were: Team Building, Leadership, Team Restructure, Reward System, NPD Training, Informal Meetings and Information Platform.

Table 4: The Intervention Table.

INTERVENTION TABLE				
INTERVENTION	ACTION	PURPOSE	DETAILS	REFERENCES
TEAM BUILDING	WORKSHOPS (FORMAL / INFORMAL) TEAM ACTIVITIES	HELP UNITE STAFF, DEVELOP RELATIONSHIPS, AND BUILD TRUST	- FORMAL TRAINING/LECTURES - INFORMAL MEETING/GATHERINGS ONCE A MONTH.	- DYER, W. G., & DYER, J. H. (2013). - PHILLIPS, N. (1993) - MARSH, F. K. (2010) - PITT, M. (2010) - ZHANG, L., & ZHANG, X. (2013)
LEADERSHIP	APPOINT AN EXPERIENCED MANAGER TO LEAD THE TEAM (INTERNAL / EXTERNAL)	THE INTRODUCTION OF AN EXPERIENCED MANAGER WOULD BE ABLE TO SUCCESSFULLY IMPLEMENT EACH OF THESE INTERVENTIONS. A MANAGER WOULD ALSO PROVIDE SUPPORT TO THE TEAM AND BE ABLE TO RESOLVE ANY FUTURE BREAKDOWNS IN COMMUNICATION. THE GUIDANCE OF A MANAGER WOULD HELP FOCUS THE TEAM IN THE RIGHT DIRECTION TO COMPLETE THE TASK EFFICIENTLY AND SUCCESSFULLY.	THE PREFERRED OPTION WOULD BE TO APPOINT A MANAGER FROM OUTSIDE THE COMPANY WITH SUCCESSFUL EXPERIENCE IN MANAGING INNOVATION TEAMS. IF THE COMPANY DID NOT HAVE THE NECESSARY RESOURCES TO HIRE ADDITIONAL STAFF FROM OUTSIDE, THE NEXT OPTION WOULD BE TO APPOINT THE MOST SUITABLE PERSON WITHIN THE COMPANY TO MANAGE THE TEAM.	- MCDONOUGH & GRIFFIN, 1997) - EDMONDSON (1999) - LOVELACE, SHAPIRO, & WEINGART, 2001
OPTIMIZE TEAM'S DESIGN AND DEFINE STRUCTURE	APPOINT A FULL-TIME PROJECT MANAGER.	PROVIDE ADEQUATE RESOURCES AND TIME TO ALLOW THE TEAM TO BE SUCCESSFUL. IF THIS TASK IS IMPORTANT FOR THE SURVIVAL OF THE COMPANY THEN THE COMPANY NEED TO TREAT IT WITH THE IMPORTANCE AND PRIORITY IT DESERVES.	- ALLOW A NUMBER OF STAFF TO WORK FULL-TIME ON THIS TASK AND LEAVE THE OTHERS WITH A PART-TIME CONTRIBUTION TO NPD: FULL-TIME STAFF: PRODUCTION & ENGINEERING SALES & MARKETING PROJECT MANAGER. PART-TIME STAFF: FINANCE QUALITY CONTROL GENERAL ADMIN. - ALLOCATE SPACE & TIME WITHIN WORKING HOURS TO NPD TEAM. - INFORMAL MEETINGS EVERY MORNING.	- DEAL AND KENNEDY (1982) - FIGALLO (1998) - HACKMAN J.R. (1990)
REWARD SYSTEM	INTRODUCE INCENTIVES	IT WOULD MAKE THE TEAM FEEL VALUED, THAT THEIR EFFORTS WILL BE REWARDED AND THAT THEY ARE NOT BEING EXPLOITED. AS THE COMPANY IS IN FINANCIAL DIFFICULTIES IT MIGHT NOT BE ABLE TO AFFORD IMMEDIATE FINANCIAL REWARDS SO OFFERING SHARE OPTIONS WOULD GIVE THE TEAM AN EXTRA INCENTIVE TO WORK HARD AND EVENTUALLY REWARD THEIR SUCCESS.	- SHARE OPTIONS UPON SUCCESSFUL COMPLETION OF THE TASK. - GROUP REWARD SYSTEM - MONETARY/NON-MONETARY - HOLIDAYS - TIME OFF IN LIEU - POTENTIAL PROMOTION - VOUCHERS. AVOID (IF POSSIBLE) INDIVIDUAL REWARD SYSTEM AS IT COULD BE COUNTER PRODUCTIVE.	- BAREKET-BOJMEJ, HOCHMAN & ARIELY (2014) - GRANT & SINGH (2011)
NPD TRAINING & LEARNING	BRING IN OUTSIDE KNOWLEDGE TO PROVIDE ADDITIONAL TRAINING	AS THE TEAM HAS NO EXPERIENCE IN INNOVATION ANY ASSISTANCE IN HOW TO ACHIEVE THIS NEW TASK WOULD REPRESENT A HUGE BENEFIT.	- INNOVATION, CREATIVITY, LEADERSHIP, PURPOSE, COMMUNICATION. - TIME MANAGEMENT SESSIONS. - INTERNAL PROJECT MANAGER MUST BE TRAINED ON LEADERSHIP.	- WHEELWRIGHT, S.C. & CLARK, K.B. (1992) - (MOENAERT & CAELDRIES, 1996).
INFORMAL MEETINGS	ORGANISE INFORMAL MEETINGS	IT WOULD HELP DEVELOP THEIR RELATIONSHIP AND BUILD TRUST. THEY WOULD HAVE THE OPPORTUNITY EACH DAY TO DISCUSS THE TASK, COLLABORATE AND THEN HAVE THE FULL DAY TO WORK ON ANY IDENTIFIED AREAS. IT WOULD ALSO BE A FORM OF A REWARD FOR THE TEAM AND HELP THEM FEEL APPRECIATED. TO SHARE INFORMATION, ENHANCE COHESIVENESS.	- SET-UP A BREAKFAST CLUB WHERE THE TEAM COULD MEET EACH MORNING IN A RELAXED ENVIRONMENT. - SOCIAL CLUB. - LUNCH SESSIONS. INCREASE COMFORTABILITY BETWEEN COLLEAGUES.	- MADHAVAN & GROVER (1998) - KRACKHARDT (1992)
COMMUNICATION & INFORMATION PLATFORM	DESIGN A PLATFORM AND PROCEDURES: HOW THE TEAM SHARES INFORMATION AND ENCOURAGES COLLABORATION	THE SIMPLE INTRODUCTION OF A PLATFORM SIMILAR TO GOOGLE DOCS WHERE TEAM MEMBERS CAN SHARE INFORMATION QUICKLY, CHECK WHAT OTHERS MEMBERS ARE WORKING ON AND NOT NEED TO WAIT FOR GROUP MEETINGS TO LEARN OF PROBLEMS OR PROGRESS.	- DEVELOP AN IT INFORMATION INTRANET TO EXCHANGE TASK INFORMATION AND SHARE PROCESS PROGRESS. - ALLOCATE SPACE AND TIME WITHIN WORKING HOURS (20HRS NPD, 19HRS NORMAL WORK) - FIRST 4 HOURS/DAY EACH DAY TO NPD.	- GILSDORF (1998) - HARGIE (2004) - WEAVER, R.G. & FARREL J.D. (1999)

Team building helps unite staff, develop relationships and build trust within the team. Leadership is paramount to implement the above-stated interventions and avoid breakdowns in communication. Team restructuring intends to provide adequate resources and properly organise the NPD work. To ensure team member feel appreciated, a reward system should be utilised to combat low morale and productivity issues.

NPD training will establish a form of guidance and foundation for the inexperienced NPD team. Informal meetings aim to increase overall cohesiveness within the team, providing the opportunities to communicate direct and interactive manner. The information platform, on the other hand, is a virtual forum to dispense information and progress accessible to everyone.

The process of ideation was a viscose system of research. For this reason, it was important to take a second look and re-diagnose the primary trigger: it was essential not to lose sight of the specific context at hand.

Prototype: Once the Best Possible Interventions (BPIs) have been identified, the fourth phase consisted in converging towards the Most Suitable Intervention(s) (MSI) to solve the problem. MSIs are those interventions that among BPIs particularly suit with the given context. It may be the case that one MSI is formed by merging two or more BPIs. The outcome of this phase is represented by the following plan, containing the authors' recommendations for Electronics Connect Ltd:

#1 Place a leader: when introducing for the first time an NPD team in a pure functional organization, care should be taken ensuring unambiguous understanding of the team by team members in particular, and by the whole organisation in general. The NPD process can be seen as a project, which has a start and an end, consisting of consequential phases and being time framed. In order to effectively manage the project, it is necessary to place a leader. Figures 4 and 5 display two alternative options: hire a project manager (PM) and appoint a project manager inside the organisation, respectively.

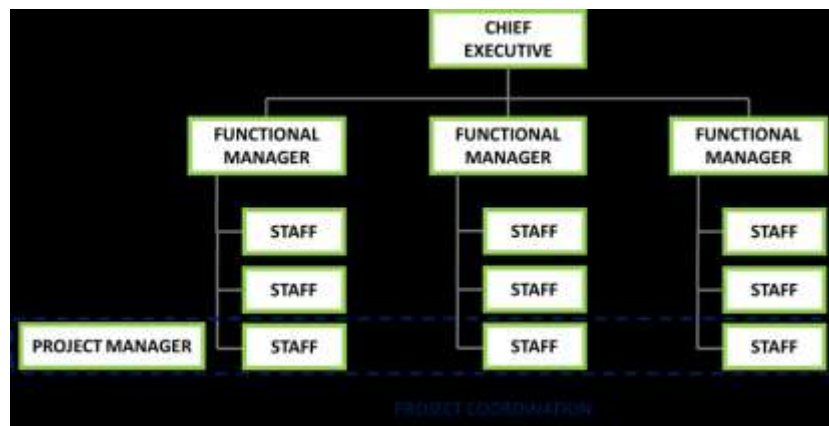


Figure 4: External project manager.

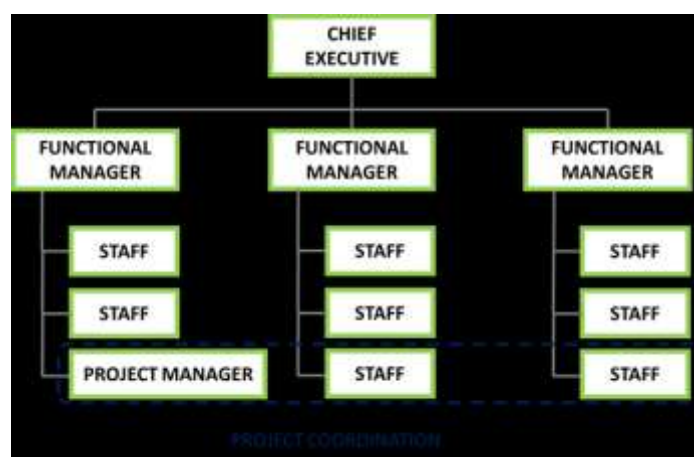


Figure 5: Internal project manager.

Often, hiring a project manager is too costly, not only in monetary terms but also in terms of integration in the organisational environment and business understanding. Assuming a shortage of financial resources, it may be more convenient to identify a leader inside the organisation, most likely inside the new-born team, who possess the desired skills, such as project management and communication facilitation.

The advantage of having principled leadership rather than decentralized one (self-directed teams) consists in the accepted presence of a guide able to unleash the talent of group members and capable of creating the necessary changes to get the job done (Weaver & Farrell, 1999).

A major obstacle inhibiting this intervention could be the non-acceptance of the leader by team members, likely to occur when the leader is not legitimated by his competencies, which, in turn, must be supported by evidence.

#2 Define team's structure: Once a project manager has been appointed (e.g. the engineer) the team needs to be re-built around the leader. This is not about changing team members, it is rather about clearly defining who are the members and the extent to which they are committed to the project. In Electronics Connect Ltd, the creation of the NPD team was sought as nothing but adding further duties and responsibilities to already overloaded employees. In such a small company, where few development projects are being undertaken at one time, the establishment of a full-time project team may not be practicable (Jones, 1997). In this context, an appropriate intervention could consist of having three members, such as Production & Engineering (in this case the appointed PM), Quality control and Marketing & Sales, permanently associated with the project, while the other team members from Finance and General Administration only involved on a part-time basis. The scope of full-time members is to ensure a certain degree of continuity in the project development. Assuming 40 working hours per week, the part-time members could be assigned to the NPD team for 50% of their time. For proximity purposes, the team members should be physically co-located with the project leader in a team-dedicated venue, perhaps close to the Production & Engineering department. An appropriate schedule could consist of four hours every morning from 9.30 to 13.30 Monday to Friday for all members, and four hours every evening from 14.30 to 18.30 solely for full-time members, in order to grant part-time members the time to work in their departments. To accelerate the social process through informal communication, we suggested that every morning team members should meet at 9.10 for 20 minutes breakfast before starting the daily work session. The team should be also equipped with an information sharing platform, where the progress of the project could be stored and easily recalled.

#3 Incentives introduction: Since individual rewards tend to reduce information-sharing and raise suspicions of the peers' intentions (Bessant & Tidd, 2007), it may be appropriate to foster team's joint commitment through the establishment of group rewards. The motivational push exercised by result-related group incentives could definitely help the NPD team in Electronics Connect Ltd. Proper incentives connected with the successful completion of the task could consist of potential promotion and career advancement, share options and career benefits such as training courses and certification awards. An interesting point could be the introduction of thank-you rewards, consisting in positive feedbacks and effort-recognition coming from the top management and from the whole organization.

#4 Training: The introduction of training session aims to fill existing gaps between the ideal skills and competencies required in NPD and the actual ones possessed by the team members. Professional trainers should be called in for training and coaching sessions concerning team-building, leadership, communication, and NPD innovation process, exclusively attended by the NPD team. A corporate day should be called in order to create awareness about the importance of the NPD team success for the purposes of business continuity, creating consensus and supportive behaviours from the whole company and establishing a "*firm-wide creativity ethos*" (Flinders, Lynch & Holden, 2009, p.13). Additional training should be provided to the PM about conflicts management, promotion and maintenance of cooperative communication, delegation and constraint adherence.

6. Conclusion

After an extensive examination of Electronics Connect Ltd's need for a new strong product development team, this study identifies the key areas where the company should intervene to drive the NPD team to perform and let the company regain its market share. This study explored how an SME could manage performance within the complex context revolving around cross-functional NPD throughout the implementation of four practical interventions able to leverage the *essentials* of knowledge sharing in order to catalyse its innovation process. Moreover, it has been clarified that unless groups can develop tools for capturing knowledge and implementing the learning process, knowledge will not be translated into proficiency. The paper recognized the creation of knowledge sharing culture as a fundamental part of a management initiative by having strong

leadership within the organisation at all levels. Only effective team work and communication, which extends across the whole company structure, will generate trust and give NPD team the boost it really needs, which should be accompanied by innovation training to educate staff on how they could help bring Electronics Connect Ltd to the next level. The NPD team, with the appropriate knowledge sharing mindset, the appropriate leadership and the proper environment supporting it, will be able to achieve the objectives of Electronics Connect Ltd. In short, knowledge sharing and learning need to be managed and led by good leadership and teamwork (McKee, 1992).

There are some physiological limitations which set the boundaries of the study. For example, this paper lacks on giving statistical evidence of the successful implementation of interventions, paving the way for further research that could fill this gap. Moreover, future research could focus on the effects exercised by cross-cultural differences within already stormed cross-functional team.

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