

Evaluating the role of collaboration in NPD team climate for innovation.

The whole is other than the sum of the parts – Kurt Koffka

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Abstract

Today's world and its globalized business environment focus heavily on designing effective team climate based on innovation and collaboration to protect their corporate interests as well as market share. The referred corporate requirement is discussed and analyzed in the current study by attempting to evaluate the effectiveness of new product development team climate based on team collaboration to strengthen innovation process on the basis of a newly established research tool and a newly validated extended theoretical framework. The survey is conducted on 30 team member's representing new product development (NPD) operations at three selected work locations (i.e., Finland, Norway and the UK) of a European multinational company. The results of the study reflected the desire to establish strong team climate potential supported through team collaboration to support innovation at the studied work locations.

However, the weak areas in operations management were identified as the real time team cooperation, effective communication process and timely completion of work targets, limitation in the capacity of data collection and record keeping. All the above referred areas are critically significant in building effective NPD team's innovative capabilities to strengthen healthy NPD team climate supported through collaboration and innovation.

Keywords

New product development team climate, market positioning, collaboration, innovation.

1. Introduction

For long collaboration might be as old as humanity itself and its gaining more and more significance in the modern corporate world. One of the most common reason for corporate collaboration is streamlining business risk and costs. Collaboration is essential to the individual worker as well as the work team and the overall company's growth. In truth, collaboration is extremely important element in business. So much so, considering corporate collaboration like teamwork, the companies often end up building great team, but might not always achieve great outcome. The innovation management is connected to the generalized view of today's corporate world which connects the corporate idea that no single company, particularly with reference to the technological advancements can do everything on its own anymore in the globalized environment. Building effective teams include challenges like corporate trust development, effective communication, global outreach, ethical limitations, ability to convey social presence, lack of information-rich nonverbal cues etc. (Kirkman et al., 2002). In-depth empirical studies conducted during approximately three decades on analyzing corporate success factors have focused on the area of innovation and collaboration to support new product development processes (Cooper's and Kleinschmidt, 1995; Heskett, 2001; Sparke, 1983; Jevnaker, 1998; Leenders et al., 2007; Murray and O'Driscoll, 1996; Kazmi, Naaranoja, 2015). Referred studies have focused either on the internal organizational elements that hold influence on NPD activity to gain competitive edge through reaching the market needs early through innovation and team collaboration (Kazmi, Naarananoja, 2014).

The focus of the current study is to unearth the potential of organizational culture that promotes ethical standards and guarantees conducive team climate supported through team collaboration to support innovation. Such organizational potential will further ensure effective team climate to ensure corporate success and profitability. Hence, the current paper starts with the introduction of the referred concepts i.e., team climate with the special focus on team collaboration to support innovation. In the initial section of the paper, the author will briefly cover the literature review of the main subject areas i.e., New product development team climate, collaboration etc. Later, the paper will throw light on selected research methodology. The study will be concluded with an in-depth analysis and discussion on the study results.

2. Literature Review

2.1 NPD team climate and team collaboration

According to Cooper and Kleinschmidt (1995), while taking into consideration the concept of entrepreneurial or NPD team climate, the following aspects must be considered:

- Opportunity for employees to spend part of their work time in developing their personal ideas,
- Company's support for the official projects, even if those projects were terminated by the management,
- Venture capital, structures to assist the realization of creative ideas.

Cooper's and Kleinschmidt (1995) recommended a holistic view, in connection with the requirements for success of NPD activity, covering the organizational perspective, as follows:

- Strong and responsible project leader. This factor is considered on the basis of numerous studies. The emphasized logic is that the project leader must offer enough authority to manage individuals representing various areas of strengths. In addition the leaders must ensure high level of commitment towards the NPD project by motivating their teams.
- Cross functional NPD teams. This factor was introduced by Brockhoff (1994) as an efficient instrument to overcome organizational interfaces. Moreover, cross functional teams encourage inter-functional communication and cooperation to promote success (Balbontin et al. 1999; Maidique, and Zirger, 1984; Yap, and Souder, 1994).
- Dedicated NPD team for a project. Numerous studies have confirmed that the autonomy of NPD team ensures positive impact on the success of the project (Gerwin, Moffat, 1997; Thamhain, 1990).
- Commitment of NPD team for NPD project. The commitment of the project leader and his or her team may have significant influence on the success of NPD project (Balachandra, 1984; Thanain, 1990).
- Effective communication between the NPD team members during the process of NPD. This can be achieved by sharing information among the NPD teams and organizers in project meetings (Balachandra et al. 1996; Ebadi, Utterback, 1984; Rothwell et al. 1974; Souder, Chakrabarti, 1987; Thamain, 1990)

The 'product champion' structures are identified as success factor for new product development. The 'product champion' principle implies that a dedicated team, with its members showing extensive personal commitment to the NPD project (Song and Parry, 1997). Occasionally, in order to overcome some internal obstacles, that are blocking new product development processes, associating the champion's team with the help of powerful 'promoter' is necessary (Fang, and Ou, 2007). The promoter belongs to the senior management layer and can effortlessly guarantee necessary resources for project development.

2.2 Organizational collaboration and networking

The theory of critical mass in social networks defines the mechanism that how density of social connections in a group improves its prospects for collective action (Marwell, Oliver and Pahl, 1988; Kazmi; Kinnunen, 2012; Kazmi, 2012). However, it is believed that culture can severely restrict any corporate strategy selected to begin with, due to the myopia of shared beliefs among decision makers regarding the organization's goals, competencies, and environment (Casey and Goldman, 2010; Lorsch, 1985).

Teece, (1986) proposes that the phenomenon of organizational cooperation refers to collaborative research and development activities, joint ventures and strategic alliances, and is highly relevant to organizations that are seeking new ideas relating to their corporate operations for their extension beyond the localized market. The reason why organizations indulge in networking and research cooperation is that they require information in the areas of complementary assets, specialized equipment and know-how, which they lack or consider insufficient. According to Brush and Chaganti (1996), organizations which specialize in technical operations are more likely to have a focused and planned strategy of cooperation. A substantial number of empirical studies provide evidence, confirming that customer orientation is significantly related to firm performance (Kirca, Jayachandran, and Bearden, 2005). From the firm's perspective, customer orientation is achieved if the voice of the customer is systematically integrated into various stages of the NPD process (Bowen, Siehl, and Schneider, 1989).

2.3 Organizational market positioning

Empirical studies for approximately three decades have focused on analyzing success factors (Cooper's and Kleinschmidt, 1995; Heskett, 2001; Sparke, 1983; Jevnaker, 1998; Leenders et al., 2007; Murray and O'Driscoll, 1996) of new product development. These studies have focused either on the internal organizational elements or the factors that influence NPD activity to gain competitive edge through reaching the market needs early. These parameters are actually the ones that can be influenced instantly with the support of the company's management. NPD success variables are classified according to the NPD process; organization, culture, role and commitment of the senior management and the overall corporate strategy. Angle (1989) proposes that the new idea generation process is grounded in the organization's creativity in addition to its ability to anticipate opportunities for innovation.

Cooper's and Kleinschmidt's (1995) work has identified positive influence on the overall NPD process due to effective linkage between two aspects, namely the use of market information along with NPD process, at the company level and the proficiency of activities linked to each and every phase of the overall NPD process (Kazmi, Takala, Naaranoja, 2014 ; Kazmi, S. A., Naarananoja, M., & Kytola, J. 2015a; Kazmi, S. A., Naarananoja, M., & Kytola, J. 2015b; Kazmi, Takala, Naaranoja, 2015). This includes effective product idea generation, product development, test marketing and market introduction. The significance of the initial aspect is further supported through numerous studies that highlight the significance of critical commercial evaluation of the NPD projects. Initial in-depth market assessments, covering the technical aspects are decisive in NPD project. Taking into consideration the recommendations of Cooper and Kleinschmidt (1995), following four aspects are suggested for an effective NPD process:

- Explicit definition of the product concept and target market before product development,
- Conducting extensive investigation on the technical and market-oriented feasibility and commercial evaluation.
- Conduct research on the targeted market and the competition in order to align the NPD process along with the market demands.
- Designing an effective NPD process.

Involving the customers, assessing and utilizing their feedback within NPD activities are of paramount significance. The early stages of new product development, additionally termed as fuzzy front end (FFE) (Koen et al., 2002; Smith and Reinertsen, 1991; Kazmi, Takala, 2011; Kazmi, Takala, 2012; Kazmi, Naaranoja, Takala, 2013; Kazmi, Naaranoja, 2013; Kazmi, 2016).), involve planning and evaluation activities that determine the 'go' or 'no-go' decision to either abandon or to accept the product idea to formally proceed to the product development process. The notion of democratizing product innovation by empowering customers to take a greater role in corporate NPD (Von Hippel, 2005) has gained attention over the years. Such NPD approach has encouraged numerous companies globally (e.g. Adidas, BMW, Ducati, Procter and Gamble, 3M) to involve their customers and other stake holders to incorporate their customers' innovative new product ideas into NPD processes more actively, more directly, and more systematically (Fuchs, Martin, 2010; Pitt et al., 1996 Kazmi, Naarananoja, 2014; Kazmi, Naaranoja, 2015a; Kazmi, Naaranoja, 2015b; Kazmi, Naaranoja, 2015c). However, this is recommended not only in the earlier phases when the new product process needs to be aligned with the market needs but during the prototyping and market introduction phases as well. Furthermore, the final authority and control is required to be strictly centralized, since the company that designs and develops the products reserves the ultimate rights to decide whether to produce or otherwise (Fuchs, Martin, 2010; Pitt et al., 1996).

2.3 Research questions

What are the general challenges affecting team collaboration to the target organization while designing supportive NPD team climate related processes for innovation?

3. Methodology

3.1. Sample and Data Collection

The aim of this study is to take into account three specialized groups, having 10 professionals each, representing new product development related work operations and roles) from three globally separate locations of a single European multinational company; Finland, the UK and Norway on the basis of their professional expertise and operational relevance. A specialized feature of the selected work locations is that each one of the unit is engaged in different types of product manufacturing i.e., Finland – Power engines, The United Kingdom – Green energy solutions, Norway- Marine products and service solutions. The selected quantitative approach is the survey methodology which is performed through an email based questionnaire having 50 fixed ended items. Evaluation of the subject company's new product development culture is carried out by combining quantitative and qualitative research methodologies. The qualitative approach, on the other hand, is involved with putting together an organizational case study through in person and email based interview questionnaire. Finally the feedback obtained from those 30 respondents were analyzed by employing statistical analyses.

3.2 Construction of survey tool

The concept of new product development (NPD) team climate (Sun, Xu, Shang, 2012) refers to an organization's capacity to offer supportive practices to its work teams, involved in new product development operations. The selected indicator seeks feedback to reveal organizational practices in relation to new product development idea generation team potential through team collaboration. In total, ten questions items were designed/ modified by following new product development (NPD) team climate related characteristic introduced by Professors Sun, Xu, Shang (2012) in their research inventory. Table 1 below shows the details.

Table 1. Survey instrumentation on NPD team climate

<i>Questions 25 to 34</i>	<i>Indicator</i>
Q25: Team members display agreement with the team's objectives	NPD team climate- Collaboration
Q26: Team members feel understood and accepted	NPD team climate- Collaboration
Q27: Team members keep each other informed	NPD team- Collaborative communication
Q28: Team is capable of making real attempts to share information	NPD team- Collaborative communication
Q29: Team is strong in searching for new ways of looking at product development problems	NPD team- Idea generation through team collaboration
Q30: Team is cooperative in developing and applying new ideas in collaboration with key individuals from other departments	NPD team – Idea generation through team collaboration
Q31: We, as a work team, are capable of cooperating with other work groups	NPD team collaboration
Q32: In our organization, work performance is considered as an overall and combined phenomenon.	NPD team collaboration
Q33: We, as a work team are able to complete work targets on time.	NPD team Responsiveness for collaboration
Q34: The team's ability is considered "quick" while responding to problems.	NPD team Responsiveness for collaboration

The table 1, above, displays the question items 25 to 34 of the study tool. Such items are linked to the study construct, NPD team climate and based on the selected study variables namely, collaboration, collaborative communication, idea generation through team collaboration, responsiveness for collaboration.

3.2.1 Reliability check for NPD team climate based on collaboration to support organizational innovation

In the case of the NPD team climate construct, Cronbach Alpha was calculated as 0.81 representing `good` internal item consistency to anticipate (Cronbach , 1951) the overall construct reliability. The estimated alpha values detailed below present the internal consistency for each item:

Table 2. Reliability check of selected research question items linked to the construct; NPD team climate based on collaboration

Cronbach Alpha and related Statistics for construct items- NPD team climate				
Items	Cronbach Alpha	Std. Alpha	G6(smc)	Average R
If All items deleted	0.81	0.8083	0.8546	0.2966
Q25 excluded	0.8012	0.8049	0.8296	0.3143
Q26 excluded	0.7919	0.7928	0.8338	0.2983
Q27 excluded	0.7779	0.7788	0.8082	0.2812
Q28 excluded	0.7957	0.8022	0.8401	0.3107
Q29 excluded	0.7862	0.7903	0.8385	0.2952
Q30 excluded	0.774	0.7787	0.8309	0.2811
Q31 excluded	0.7888	0.792	0.8349	0.2972
Q32 excluded	0.7826	0.7877	0.8337	0.2919
Q33 excluded	0.7953	0.7978	0.833	0.3048
Q34 excluded	0.7809	0.787	0.8328	0.2911

The table 2 confirms that all the construct items are reliable and acceptable due to having their `Alpha` values over 0.8, therefore, all the construct items must be retained.

3.3 Results and analysis

To respond to research question of the study on the basis of quantitative data analysis, the author refers to the combined study results for the referred constructs displayed in **table 3**. The items in the categories of `new product team climate linked to the concept of team collaboration in Table 3 below presents the question statements receiving predominantly neutral or clear disagreement.

Table 3 Combined results for NPD team climate linked to collaboration for organizational innovation

Item No.	Variables	Count	Average	Median	Unique	Std. deviation	Confidence Interval at 95%	Highlighted Response trend
25	Team members display agreement with the team's objective.	30	3.8	4	4	0.48	3.77 – 4.03	Agreed with 76.6%
26	Team members feel understood and accepted.	30	3.9	4	4	0.54	3.71 – 4.09	Agreed with 80%
27	Team members keep each other informed.	30	3.7	4	4	0.74	3.44 – 3.69	Agreed with 66.6%
28	Team is capable of making real attempts to share	30	3.7	4	4	0.59	3.49 – 3.91	Agreed with

	information.							70%.
29	Team is strong in searching for new ways of looking at product development problems.	30	3.8	4	4	0.66	3.56 – 4.04	Agreed with 73.4%
30	Team is cooperative in developing NPD ideas with members from other departments, if required.	30	3.46	4	4	0.81	3.17 – 3.75	Agreed with 53%.
31	We, as a work team, are capable of cooperation with other work groups.	30	4.06	4	4	0.82	3.77 - 4.35	Agreed with 83%
32	In our organization, work performance is considered as a combined phenomenon.	30	3.63	4	4	0.61	3.41 – 3.85	Agreed with 63.3%
33	We, as a work team, are able to complete work targets on time.	30	3.5	4	4	0.93	3.17 – 3.83	Agreed with 53%
34	The team's ability is considered to be quick to respond to problems.	30	3.73	4	4	0.82	3.44 - 4.02	Agreed with 70%

A total of 30 responses, contributed toward evaluating the quality of the current practices and clues for filling the gaps. The response mean average for all the ten items representing the construct variable ranged from 3.46 to 4.06, which indicates agreement with the posed evaluation queries. On the basis of the survey recipient's feedback, the NPD - team climate category reached beyond the 'agreed' opinion level between 4 and 5, on a scale of 1 to 5. In all the ten items (i.e, from items 25 to 34) reliability exceeds the satisfactory level of agreement. For comparative analysis, the eight items in this category were divided into four groups. An item orientation scores representation follows;



Fig 1. Graphic representation of results – NPD Team Climate – study variable collaboration.
Questions No. 25-26

Item 25: Team members display agreement with the team's objective (construct's variable – Collaboration)

The number of respondents who agreed or strongly agreed with the item are 23 (76.6%) in total. The respondents having a neutral opinion are 7 (23.3 %) out of the 30 respondents in this category. No respondent disagreed with the item. The comparative analysis revealed that the population segment reflecting neutral responses (23%) belong to Norway (13%) mainly, while Finland (10%) scored moderately. The neutral responses came from the team members belonging to the product and sales (10%), project management (3%) and general management (10%) related work roles.

Item 26: Team members feel understood and accepted (construct's variable – Collaboration)

The number of respondents who agreed or strongly agreed with the item are 24 (80%) in total. The respondents having a neutral opinion are 6 (20 %) out of the 30 respondents in this category. No respondent disagreed with the item. The comparative analysis revealed that the population segment reflecting neutral responses (20%) belong to Norway (13%) mainly, while the UK (7%) had a moderate score. The neutral responses came from the team members belonging to the product and sales (3%), project management (7%), design (3%) and general management (7%) related work roles.

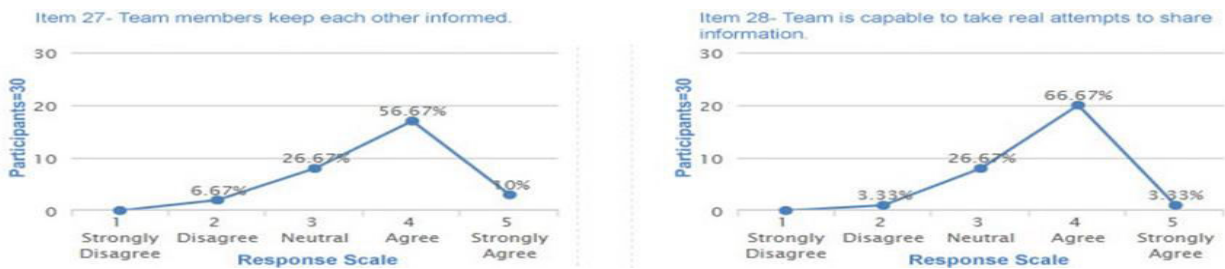


Fig 2. Graphic representation of results – NPD Team Climate – study variable Collaborative communication. Questions No. 27-28

Item 27: Team members keep each other informed. (Construct's variable – Collaborative communication)

The number of respondents who agreed or strongly agreed with the item are 20 (66.6%) in total. The respondents having a neutral opinion are 8 (26.6 %) out of the 30 respondents in this category. The respondents who disagreed with the item are 2 (6.6%). The comparative analysis revealed that the population segment showed disagreement belonged to Norway (3.33%) and the UK (3.33%) moderately. These negative responses came from the team members belonging to the product and sales (3.33%), project management (3.33%) related work roles.

Communication

Item 28: Team is capable to make real attempts to share information. (Construct's variable – Collaborative communication)

The number of respondents who agreed or strongly agreed with the item are 21 (70%) in total. The respondents having a neutral opinion are 8 (26.6 %) out of the 30 respondents in this category. Only 1 (3%) respondent disagreed with the item. The comparative analysis revealed that the population segment showing disagreement belongs to the UK (3%). This negative response came from the team member belonging to the project management (3%) related work role.

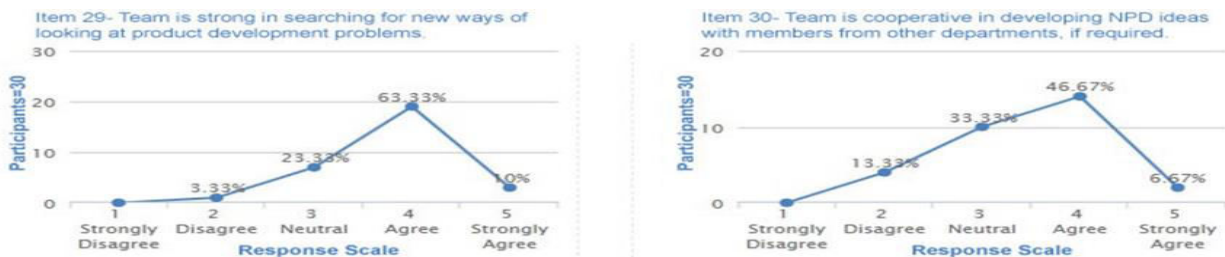


Fig 3. Graphic representation of results – NPD Team Climate – study variable Idea generation through team collaboration. Questions No. 29-30

Item 29: Team is strong in searching for new ways of looking at product development problems. (Construct's variable – Idea generation through team collaboration)

The number of respondents who agreed or strongly agreed with the item are 22 (73.4%) in total. The respondents having a neutral opinion are 7 (23.3 %) out of the 30 respondents in this category. Only 1 (3.33%) respondent disagreed with the item. The comparative analysis revealed that the population segment showing disagreement (3.33%) belonged to Norway (3.33%) moderately. This negative response came from the team member belonging to the product and sales (3.33%) related work role.

Item 30: Team is cooperative in developing NPD ideas with members from other departments, if required. (Construct's variable – Idea generation through team collaboration)

The number of respondents who agreed or strongly agreed with the item are 16 (53%) in total. The respondents having a neutral opinion are 10 (33.3 %) out of the 30 respondents in this category. Only 4 (13%) respondents showed disagreement with the item. The comparative analysis revealed that the population segment showing disagreement (13%) belongs mainly to the UK (10%), with moderate disagreement from Norway (3%). The negative responses came from the team members belonging to the project management (3%), design (3%), and general management (3%) and technical engineering (3%) related work roles.

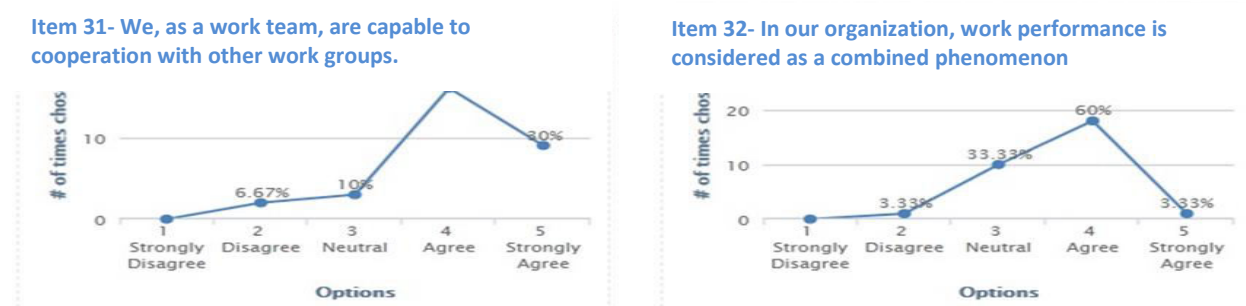


Fig 4. Graphic representation of results – NPD Team Climate – study variable, Collaboration.
Questions No. 31-32

Item 31: We, as a work team, are capable of cooperation with other work groups. (Construct's variable – Collaboration)

The number of respondents who agreed or strongly agreed with the item are 25 (83%) in total. The respondents having a neutral opinion are 3 (10%) out of the 30 respondents in this category. The respondents who have disagreed with the item are 2 (7%). The comparative analysis revealed that the population segment showing disagreement (7%) belongs to Norway (3%) and the UK (3%). These negative responses came from team members belonging to the technical engineering (3%), product and sales (3%) related work roles.

Item 32: In our organization, work performance is considered as a combined phenomenon. (Construct's variable – Collaboration)

The number of respondents agreed or strongly agreed with the item are 19 (63.3%) in total. The respondents having a neutral opinion are 10 (33.3 %) out of the 30 respondents in this category. The respondents who have disagreed with the item are 1 (3.3%).

The comparative analysis revealed that the population segment showing disagreement belongs to the UK (3.3%) moderately. This negative response came from the team member belonging to the project management (3.3%) related work role.

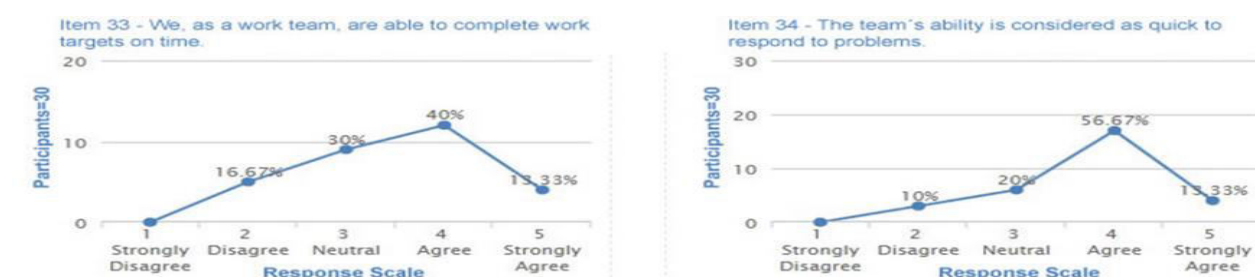


Fig 5. Graphic representation of results – NPD Team Climate – study variable, Responsiveness for collaboration
Questions No. 33-34

Item 33: We, as a work team, are able to complete work targets on time. (Construct's variable – Responsiveness for collaboration)

The number of respondents who agreed or strongly agreed with the item are 16 (53.3%) in total. The respondents having a neutral opinion are 9 (30 %) out of the 30 respondents in this category. The respondents who disagreed with the item are 5 (16.6%). The comparative analysis revealed that the population showing disagreement (16.6%) belongs to the UK (6.66%) and Finland (6.66%) mainly while Norway (3.33%) moderately. These negative responses came from team members belonging to project management (10%) and design (6.6%) related work roles.

Item 34: The team's ability is considered to be quick to respond to problems. (Construct's variable – Responsiveness for collaboration)

The number of respondents who agreed or strongly agreed with the item are 21 (70%) in total. The respondents having a neutral opinion are 6 (20 %) out of the 30 respondents in this category. The respondents who disagreed with the item are 3 (10%). The comparative analysis revealed that the population segment showing disagreement (10%) belongs to the UK (7%) and Finland (3%). The negative responses came from team members belonging to the general management (7%) and technical engineering (3%) related work roles.

4. Conclusion

This survey based study offers a case study based research tool to interpret and evaluate the effects of NPD team climate on team collaboration while supporting organizational innovation process for timely market positioning. The statistical results of question items 25, 26, 27 and 28 linked to the conceptual agreement for team collaboration focused on operational management related variables i.e., ***Team members display agreement with team's objective, Team members feel understood and accepted, Team members keep each other informed and Team is capable of making real attempts to share information*** reflected 76%, 80%, 66% and 73% agreement respectively. The rationale behind the above trend is the logic that corporate collaboration is essential for corporate success. For this purpose, such NPD team climate is considered healthy that promotes team's ownership (ref. question item 26), effective communicational flow (ref. question item 27) and strong communicational networking among teams (ref. question item 28). The study results reflected slight weakness in the area of effective communicational flow. The results of question items 29, 30, 31 and 32 linked to the items; ***Team is strong in searching for new ways of looking at product development problem, Team is cooperative in developing NPD ideas with members from other departments, if required. We, as a work team, are capable of cooperation with other work groups and In our organization, work performance is considered as a combined phenomenon*** reflected 73%, 53%, 83% and 53% agreement respectively. The trend of responses, in case of question items 27, 28, 30, 31 and 32, reveals the logic that the global, fast-moving, service-driven world we are living in is bringing collaboration to the front and therefore promoting the concept of thinner hierarchies. This further calls for the need to build innovative organizational teams that are large and extended, sometimes virtual, diverse and constituted on highly qualified professionals to support challenging NPD projects. Finally, the results of question items 33 and 34 linked to the items; ***We, as a work team, are able to complete work targets on time and The team's ability is considered to be quick to respond to problems*** reflected 53% and 70% agreement respectively. The response trend however, reflected obvious contradiction in terms of the percentages of the set of similar questions item numbers 33 and 34. This response trend confirms the natural corporate drawback linked to the phenomena explaining the fact that the qualities required for organizational success are more or less the same factors that challenge corporate success. In addition to above, the implementation of the newly devised specialized survey tool and proposed theoretical framework revealed weakness in the areas, mainly, real time team cooperation (ref. question items 27, 30, 32 and 33) effective communication process (ref. question items 27, 30 and 32) and timely completion of work targets (ref. question item 33), limitation in the capacity of data collection and record keeping (ref. question items 27 and 30). All the above referred areas are critically significant in building effective NPD team's innovative capabilities to strengthen healthy NPD team climate supported through collaboration and innovation.

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