

EMPIRICAL STUDY OF MODERATING INFLUENCE OF REMOTE FACILITATION BETWEEN DESIGN THINKING AND WORKPLACE INNOVATION IN IT INDUSTRY

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Abstract

In this Pandemic struck world, Agility and Speed of Innovation is considered as critical factors in Workplace innovation. The Underlying factors that enable this, needs detailed investigation. This study aims to develop the understanding about the remote facilitation, design thinking and workplace innovation as the current ways of working in organizations are undergoing a tremendous change and it is important to understand forces that drives workplace innovation in the current Context.

Empirical study has been Performed with around 150 Employees pertaining Information Technology Companies. A questionnaire was designed to get their perceptions about what is practiced in their companies and SPSS tool has been used for statistical analysis looking at the nature and distribution of the data. 147 respondents have provided their feedback out of which 142 were found be suitable for Analysis

Descriptive studies on various variables like gender, experience level and hierarchies in the organizations were used. reliability and validity test using Cronbach alpha, correlation studies were performed on the questionnaire to check the consistency and validity. multivariate studies, chi square test, standardized z scores and regression test that done between remote facilitation design thinking and workplace innovation. results clearly establishes that there is a positive relationship that exists between remote facilitation vs workplace innovation, remote facilitation vs design thinking& design thinking vs workplace innovation. Moderation effects off remote facilitation over the relationship between design thinking and workplace innovation was clearly established

Keywords: *Workplace Innovation, Facilitation, Remote Work, Hybrid Work, innovation performance, Innovation Labs, Work Environment, Culture, Employee Engagement, Information technology*

INTRODUCTION

Organizations focus on Innovation as Strategic differentiator to cope up with the Competitive forces in the Market. Design thinking is considered as an important method or process to make

innovation faster. One of the critical success factors while implementing design thinking is the competence of the facilitator and environment which is provided for the Team members to bring out their best in solving the complex Problems.

Also, pandemic has clearly demonstrated that crisis can act as a change agent in driving workplace innovation. Many news ways of working have emerged which has brought lot of challenges in the way Design thinking is implemented in the organization

Team Members working at many places are called by many terms (Charalampous et al., 2019; Vartiainen & Hyrkkänen, 2010) however our study focuses only on remote facilitation aspects while conducting design thinking to enable workplace innovation. The necessary facilitation conditions that enable as well as impact the workplace innovation aspects of the organization Triandis' model (Triandis 1980), establishes the underlying association between human conduct and facilitating conditions. While Human conduct can have various aspects like personal motives, right set of conditions while performing the work also plays a major impact on the behavior of the team members (Tamjidyamcholo et al. 2014) Studies establishes underlying connections between Conditions used for facilitation and how knowledge sharing patterns if the employee improved putting critical thoughts on security aspects of sharing the information while working in virtual mode. Also, Jeon, Kim, and Koh (2011b) studies also clearly establish that there is a positive influence of facilitating conditions over information sharing patterns of the team members

This study is about how remote Facilitation of design thinking happens across multifaceted teams, what kind of impact and challenges are present when we do remote facilitation and how ultimately this impacts the Workplace innovation in the organization. While Many studies have been done about remote work, Facilitation, Knowledge Management, Design thinking, Community of Practice, work engagements etc. Studies Pertaining to remote facilitation conditions and its impact on Workplace innovation is scarce. Understanding the various aspects involved in remote facilitation is an important attribute in building resilient ways of working for the future and to enable companies with sustainable pace for innovation

Literature review

Workplace innovation (Oeij et al. 2012) aims to bring radical shift in the innovation Performance of the companies by also focusing and spending efforts in work life balance as well as employee wellbeing. The challenge in that is creating necessary infrastructure, work environment and support because every human is unique, and it needs lot of deep thinking to create facilitating conditions that enables all the team members to engage actively and contribute

(Oeij et al. 2012) also argues about different ways of working and facilitation strategies like health insurance, spending on employee capabilities etc. Stoffers et al. 2014 (p. 11) talks about the importance of deploying employee's competencies to see significant impact on workplace innovation. He also lists out that necessary conditions and new ways of collaborations that would lead to breakthrough workplace innovations. Volberda and Van den Bosch (2005) very deeply looks at structure of workplace and categorizes them into Dynamic, flexible and Smart working which when works in synchronizations improves workplace innovation. while all these holds good during normal Situations, during pandemic how remote facilitation conditions impact workplace innovation is of interest

H1: Remote Facilitation impacts Workplace innovation

(Meinel and Thienen, 2016) studies talks about the competence of the facilitators in handling interdisciplinary teams and using various methods at different stages of design thinking via user Empathy, Problem reframing, ideate, prototyping and User Testing. Also Leading Design thinking process needs high level of expertise and necessary conditions in terms of prework, workshop and post works need to be laid to see signification outputs related to workplace innovation

(Schallmo and Lang, 2020) also stressed the importance of Facilitation Facilitators need to balance both participants as wells on the Design thinking process simultaneously. critical success factor for design thinking workshop to product meaningful results related to innovation lies in the way facilitation is performed during the workshop.

While working in remote, the planning aspects like digital tools, activities for engagements and flow of the workshop itself puts significant load on the facilitation's aspects

(Johansson-Sköldberg et al., 2013) lists many attributes like user empathy, team motivation, and work flexibility as a necessary condition to enable team working, collaboration, brainstorming & Idea generation etc. Facilitators who spend lot of time in preparing the necessary instructions to be provided during the workshop receive the best ideas and insights which makes them a great facilitator

Currently lot of remote tools and tool assistant like Conversational Agent are tried to see how it can support remote design thinking session by providing instructions however not enough studies are available to get insights into remote facilitation of design thinking. With the current challenge of companies adopting hybrid working & New ways of working, it becomes a critical factor to study its role in design thinking

With this understanding

H2: Remote Facilitation has a positive Influence on Design Thinking

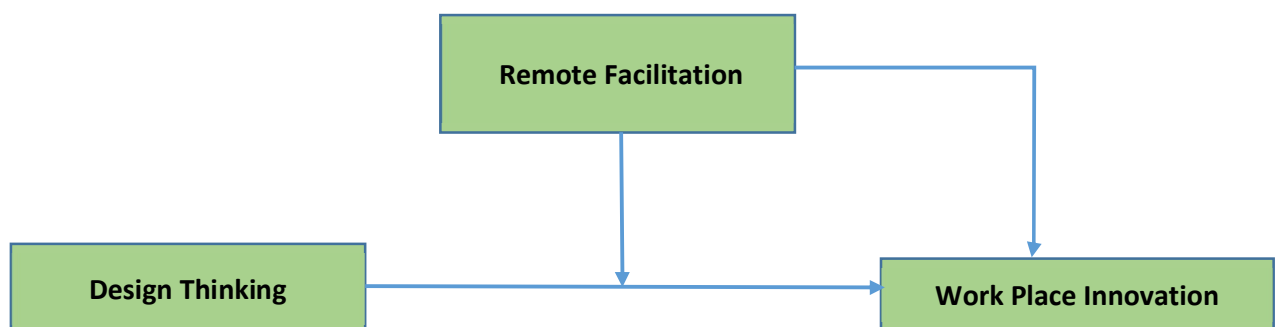
H3: Design Thinking has a Positive Influence on Workplace innovation

H4: Remote facilitation has a moderating Influence between Design Thinking and Workplace Innovation

Conceptual Model

Relationship Between Knowledge Design Thinking & Work Place Innovation and Moderating effect of Remote Facilitation

(Author Model)



Remote facilitation

Remote Facilitation in our context is all about aligning the team and providing the support/direction to take them through various design thinking phases to solve the innovation challenge. This variable is measured using 8 indicators. Utrecht Work engagement scale (UWES) has been taken as reference and applied to this context. Some of the measurements like "During remote sessions, Facilitators were very resilient mentally, despite the challenges" have been used in the Survey to get perceptions from the participants how they feel about this in their company

Workplace Innovation

EUWIN defines workplace innovation as a Transdisciplinary process of innovation pushing the organization in empowering, learning and provide sustainable workplace practices. Workplace innovation scale used by AJ Murray and Durai (2003) has been used in the Survey. Indicators like "We work in teams to solve complex problems" has been applied to get participants perspective

Design Thinking

Design Thinking is a systematic, human centered, creative problem-solving process widely used for Workplace innovations. (Johansson-Sköldberg et al., 2013) Design Thinking is applied with Many stakeholders from various disciplines like business, product management, end user community etc. to look at problems from various perspective and find potential solution options. A Design thinking validated scale (C Doshi et.al 2018) has been used for measuring Design thinking Process. Measurement scale like "I am comfortable to see problems from the user's point of view" has been used in the survey to get insights from the participants

Research Method:

The Study is focused on a population comprising of Junior, Middle and senior levels people in Various business domains in IT Companies at Bangalore. Around 150 Employees has been identified using random sampling technique is being used and questionnaire was used to collect their opinion. The Questionnaire has been framed with a 5 Point Likert scale and has been subjected to reliability and validity tests.

Research Objectives

To investigate whether Remote Facilitation affects Design Thinking & Workplace innovation in IT Industry

To investigate whether Design Thinking effectiveness impacts Workplace innovation in IT Industry

To identify whether Remote facilitation moderates the relationship between Design Thinking and Workplace Innovation

Research Hypothesis

H1: Remote Facilitation has a Positive Influence on Workplace Innovation

H2: Remote Facilitation has a positive Influence on Design Thinking

H3: Design Thinking has a Positive Influence on Workplace innovation

H4: Remote facilitation has a moderating Influence between Design Thinking and Workplace Innovation

Data analysis

The survey was targeted on IT companies in Bangalore belonging to different business domains this could range from banking, telecom, energy, automotive, health care involving R&D, Consulting infrastructure management & Managed Services

The below table provides a picture about gender participation in the survey. around 73% of male participants and 27% off female participants were involved in sharing their perceptions related to remote facilitation design thinking and workplace innovation in the context of their organization

On further analysis, categorization of participants in terms of hierarchy in the company was studied and it was found to round 36% of participants came from senior level, 45% participants were from middle level management and 18% where from junior level involved in completing this survey

Looking at from the lens of experience it was found around 70% participants came with 10 to 20 years of experience in answering the survey while 14% participants were having more than 20 years. 12% participants had and experience of five to 10 years and only 3% of participants where belonging to less than five years' experience. This clearly shows that around 85% of participants we're having experiences more than 10 years which is very important for our survey in terms of getting their perspectives on workplace innovation design thinking and remote facilitation

Reliability Test

The questioner had 8 measurement indicators for remote facilitation, 10 indicators for design thinking and 8 indicators for workplace innovation. Likert scale five point has been used for evaluation. To measure the consistency of the items internal to the survey Cronbach alpha is calculated. In our survey we have a mix of junior middle level and senior level participants sharing their opinions. in this context testing the internal consistency off the items becomes important. SPSS has been used to load the data through an input excel file and reliability test has been performed to get the below results.

SPS test showed a Cronbach alpha of .9 Which is much higher than the threshold value of 0.7. Julie pelant in her book discuss is about Cronbach alpha and the number of items used for the survey. she did mention that if the number of items is less than 10 in a scale then it's difficult to get a Cronbach alpha greater than 0.7 and in such cases even Cronbach alpha of 0.5 should be good enough to check the consistency

Reliability Statistics

Cronbach's Alpha	N of Items
.965	26

the below table indicates the correlation of each item against the combined values of other items in the survey the last column talks about Cronbach alpha value if certain items are deleted. in this case since the crown back value is much greater than 0.7, there is no need to Cronbach alpha

Item-Total Statistics

Items	Cronbach's Alpha
During Covid times, Remote or Virtual Facilitators was very helpful(RF1)	0.966
My company has necessary Remote engagement tools (Webex,Zoom)(RF2)	0.966
During remote sessions, Facilitators engaged me to feel full of energy (RF3)	0.965
During remote sessions, Facilitators were very resilient mentally(RF4)	0.964
Facilitators during remote sessions made sessions Meaningful(RF5)	0.964
Remote Facilitators had enough workaround mechanism to handle any glitches(RF6)	0.963
I felt fully immersed in the activities/session by the remote Facilitators(RF7)	0.963
Remote Facilitators organized so well that I was thinking about new ideas about the problems(RF8)	0.963
I feel comfortable with what is unknown.(DT1)	0.962
I enjoy the fact that a solution can result from unexpected directions.(DT2)	0.966
I actively involve users in diverse phases of the design process(DT3)	0.963
I am comfortable to see problems from the users point of view(DT4)	0.963
I think it is important to reframe the initial problem in order to achieve a good result (DT5)	0.963
I think I can use my creativity to efficiently solve even complicated problems(DT6)	0.963
I am sure I can deal with problems requiring creativity(DT7)	0.963
I believe in my abilities to creatively solve a problem(DT8)	0.963
I continually try new things(DT9)	0.964
I recognize the importance of failing in order to learn(DT10)	0.965
Our workplace has a vision that is made very clear to the employees(WP1)	0.964
Innovation in my workplace is linked to its business goals.(WP2)	0.964
In our workplace performance measurement is related to one's initiative to solve problems.(WP3)	0.964
I am always given opportunities to try new ideas and approaches to problems.(WP4)	0.964
I express myself frankly in staff meetings.(WP5)	0.964
I make time to pursue my own ideas or projects(WP6)	0.964

We work in teams to solve complex problems(WP7)	0.964
In my company people feel a strong sense of membership and support.(WP8)	0.964

Validity-the validity of the questioner items are checked using correlation table in SPSS. it was found the Spearman correlation value for all the items where much above 0.254 and and they are statistically significant. Having the reliability and validity confirmed for the questionnaire, Regression Models were used to understand the relation between the variables.

Hypothesis 1: Remote facilitation (RF) has a positive influence on workplace innovation (WP)

The table below indicates R square value of 0.91 which explains that 91% of influence remote facilitation has over workplace innovation. Also, P value less than .05 indicates that the relationship between remote facilitation and workplace innovation is statistically significant

SPSS-Model Summary

Remote Facilitation Impacts &Work Place Innovation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.957 ^a	.916	.916	.161015

a. Predictors: (Constant), RF

ANOVA-Remote Facilitation Impacts &Work Place Innovation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.667	1	39.667	1530.000	.000 ^b
	Residual	3.630	140	.026		
	Total	43.296	141			

a. Dependent Variable: WP

b. Predictors: (Constant), RF

Regression Coefficients of Remote Facilitation &Workplace innovation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.961	.086		11.137	.000
	RF	.820	.021	.957	39.115	.000

a. Dependent Variable: WP

H2: Remote Facilitation (RF) has a positive Influence on Design Thinking (DT)

SPSS Table below indicates R square value of 0.72 which indicates Remote facilitation causes 72% of change in Design Thinking. Also, P value less than .05 indicates that the relationship between remote facilitation and Design Thinking is statistically significant

Model Summary- Remote Facilitation Impacts & Design Thinking

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.848 ^a	.720	.718		.3879

a. Predictors: (Constant), RF

ANOVA - Remote Facilitation Impacts & Design Thinking

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.139	1	54.139	359.887	.000 ^b
	Residual	21.061	140	.150		
	Total	75.199	141			

a. Dependent Variable: DT

b. Predictors: (Constant), RF

Regression Coefficients of Remote Facilitation & Design Thinking

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.321	.208		1.546	.124
	RF	.958	.051	.848	18.971	.000

a. Dependent Variable: DT

H3: Design Thinking has a Positive Influence on Workplace innovation

SPSS Table below indicates R square value of 0.73 which indicates Design Thinking influences 73% of change in workplace Innovation. Also, P value less than .05 indicates that the relationship between Design Thinking and Workplace Innovation is statistically significant

Model Summary

Design Thinking Impacts & Workplace Innovation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.856 ^a	.733	.731	.287145

a. Predictors: (Constant), DT

ANOVA- Design Thinking Impacts & Workplace Innovation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.753	1	31.753	385.108	.000 ^b
	Residual	11.543	140	.082		
	Total	43.296	141			

a. Dependent Variable: WP

b. Predictors: (Constant), DT

Regression Coefficients of Design Thinking & Workplace innovation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.556	.142		10.978	.000
	DT	.650	.033	.856	19.624	.000

a. Dependent Variable: workplace innovation

H4: Remote facilitation has a moderating Influence between Design Thinking and Workplace Innovation

To find whether remote facilitation has a moderating influence, few steps need to be put forth before developing the regression model.

Firstly, since two independent variables that involved, Chi square test has been performed to see if there is statistically significant relationship between remote facilitation and design thinking. test results show a P (0.000) which indicates that there is a significant relationship.

Secondly to find the moderation effect, and interaction variable (INT2) which is a product of Z standardized score off remote facilitation and design thinking was computed in SPSS.

Thirdly regression model was developed along with variation inflation factor to check the multicollinearity effects as chi square test proves that there is a significant relationship (Hayes (2013),

SPSS Model Summary- Remote Facilitation. Design Thinking Impacts & Work Place Innovation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.964 ^a	.929	.928	.149137

a. Predictors: (Constant), INT2, Zscore: design thinking, Zscore: remote facilitation

ANOVA- Remote Facilitation, Design Thinking Impacts & Work Place Innovation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	40.227	3	13.409	602.874	.000 ^b
	Residual	3.069	138	.022		
	Total	43.296	141			

a. Dependent Variable: WP

b. Predictors: (Constant), INT2, Zscore: design thinking, Zscore: remote facilitation

Regression Coefficients of Remote Facilitation ,Design Thinking & Workplace innovation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	4.244	.020		214.361	.000		
	Zscore: RF	.487	.025	.878	19.188	.000	.245	4.076
	Zscore: DT	.104	.024	.187	4.280	.000	.269	3.711
	INT2	.062	.018	.112	3.404	.001	.477	2.098

a. Dependent Variable: workplace innovation

The below table shows our square value of point 0.929 indicating a good correlation between independent variables (remote facilitation, design thinking) and dependent variable (workplace innovation). ANOVA results indicate clearly that there is a relationship is significant. Also, the coefficient table below clearly establishes that while there is a relationship between remote facilitation and design thinking the VIF factor is less than 10 indicating that it is acceptable.

With this it's clearly established that remote facilitation has a strong influence over the association between design thinking and workplace innovation

Hypothesis	Results
H1: Remote Facilitation has a Positive Influence on Workplace Innovation	Accepted
H2: Remote Facilitation has a positive Influence on Design Thinking	Accepted
H3: Design Thinking has a Positive Influence on Workplace innovation	Accepted
H4: Remote facilitation has a moderating Influence between Design Thinking and Workplace Innovation	Accepted

Conclusion:

Remote facilitation is a valuable method used for design thinking to collaborate across distributed teams, collect ideas, gain insights and solve complex problems resulting in workplace innovation. While this study focused on facilitator attributes and work environment aspects, more study is needed in looking at planning aspects off remote facilitation as that puts load on the effort involved for the pre work as well as post work during remote Facilitation. This study clearly establishes the moderating effects of remote facilitation which becomes and important factor to be considered as part of knowledge management& process management for innovation. Efforts in terms of identifying best practices, sharing the learnings during remote design thinking, identifying the right working conditions and cultural aspects while working across the globe during remote sessions can help organizations to speed up innovation process. With hybrid ways of working picking up, Teams need to unlearn traditional habits dependent on faceto face interactions and develop a sense of collaboration through virtual community of practice. Study also has few limitations starting with the data collection using surveys having common method variance. while reliability and validity tests very carefully performed it is suggested for upcoming studies to have different sources of data. Secondly the study is focused more on IT industry however the same can be applied across other industries to gain in depth perspectives. Thirdly Future studies can focus on the aspect of sustainability of these practices from both Cultural and everchanging business context of the organization

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