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Empirical evidence of factors delivering effective change management in telecom vendor projects

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Abstract: Telecom businesses has been constrained to several changes in the name of technological developments, mergers, acquisitions, political and economic pressures, rapidly increasing customer's demands, or pressure from competitor markets. Therefore, it is important to identify such factors that help in implementing effective change management within such projects. The purpose of this paper is to fulfil the need to identify various factors that contribute towards effective change management in Telecom vendors' projects. Five major success factors, contributing to effective change management in Telecom Industry based on highest citation count, are identified. The sample of 106 Project Managers, Change Managers and Change Agents working across multinational Telecom Vendors was approached for data. The factors under study show positive impact on effective change management while involvement of clients and stakeholders in change process is the most critical factor. Based on results this research provides recommendations to the stakeholders involved in change management process in Telecom based projects to avoid any disruptions or re-work caused due to immediate change requests.

Keywords: Change process, Effective change management, Critical success factors, Telecom vendor projects, Project management

INTRODUCTION

In Telecommunication sector changes mostly occur over launching a new product or service; a merger or acquisition; growth on large scale; productivity; changing market behaviours, enhancing product quality or any decline (Crawford, 2013). Despite the need to incorporate changes throughout Telecom vendor's projects, a lot of managerial failures to manage the change process have been witnessed rapidly over past few years. Most of the project participants do not perceive changes within projects as a healthy move towards project success, therefore strategies like conversing a complete oversight about the purpose and vision of changes needs to be applied. According to CEB Employee Survey (2015), employees in telecommunication organizations are facing 5% more change-oriented stress as compared to an average employee.

There are catastrophic consequences of not managing such changes through effective organizational change management procedures. Munassar, et al., (2013) indicated poor project change management practices as a primary element of failure in Information Technology (IT) projects. A study conducted by Thomas, (2014) also concluded that changes and advancement in technology has a profound influence on Project's performance and patronage of the customer. The projects that undergo changes effectively during its execution sees less post project changes (Andersen et. al., 2011).

Telecom sector in developing countries like Pakistan has grown rapidly during past five to six years. If we look at the changing trends in technology in Pakistan within past few years it is realized that Ministry of Information Technology and Telecommunication, has subsidized fast paced up-gradation of broadband technology such as an upgrade to CDMA/Third generation (3G), WCDMA/Fourth Generation (4G) and Long-Term Evaluation (LTE) technologies. Pakistan Telecommunication Authority (PTA, 2018) has reported a rapid growth of Broadband subscribers in the country reaching approx. 44.6 million by the end of Fiscal year 2016-17 from 2.72 million as calculated at the end of Fiscal year 2012-13. Therefore, a drastic rise in competition and longing for endowment of new technological services has been witnessed in these years in Telecom Sector within the country. It was reported that a total of US\$ 105.7 Million Foreign Direct Investment (Inflow) was made in telecom sector in Pakistan during Fiscal Year 2016-17. According to the statistics provided by Pakistan Telecommunication Authority (PTA, 2018), Telecom sector has generated a revenue of Rs. 467.6 billion during the fiscal year 2016-17. But factors like globalization, technological advancements, seizing market opportunities, reaction to competitors and change in customers' demands have enforced Telecom based companies to undergo various changes. This has resulted in a decline of 54% average revenue per MB usage which has been recorded as decreased from \$0.55 to \$0.20 for fiscal years 2013-14 and 2015-16 respectively. In case of national and international users, average revenue per minute has declined from \$1.68 to \$0.60 from 2011-16. To catch up with global rapid growth of Tech World or changes in technology, Telecom Vendors need to provide real grounds to detect the changes and to bring about new and improved services to their clients to meet their demands.

Due to dynamic environment in Telecom business the project managers and change managers need to realize the importance of factors contributing effective change management that backs up a project's success. This research would help finding various factors that are critical to the success of Telecom Vendor's Projects and also to explore the impact of such factors on effective change management process.

LITERATURE REVIEW

Effective Change Management in Telecommunication Projects

The effective implementation of change management depends on the nature, industry type, complexity, size, and experience level of major stakeholders of a project. Project managers or change managers ensure to minimize the inability of a project to achieve its critical objectives and the risks of change failure (Mou, 2013).

Gilley, and his fellow researchers (2008), believed that effective change management leads to successful implementation of the project, and it should be one of the most focused areas in project management through entire project life cycle. According to Jansson, (2013) effective change management is taken as one of the major elements of a project and can be more complex as compared to the development and implementation phases of the project.

The literature of importance of effective change management is not limited; it is well believed by past researchers that application of an effective change management process is necessary to meet the project objectives. Hornstein, (2015) also approving the argument in his research, described that effective change management is a contributing factor to the successful completion of a project.

Burnes (2005) considered effective change management as a core competence of an organization. It has been reported in study of Balogun and Hailey (2008), effective change management over telecom projects is difficult, the rate of failure of change initiatives is 70%. He noticed that majority on the Telecom projects under study were going through changes in requirements without any process to manage those changes effectively. Due to delays in contract or proposal change finalization, the overall schedule of the project was affected. According to Prosci Report (2016) the probability of achieving objectives increases six times on projects with improved change management process. Thus, it is necessary for change managers and change agents working in Telecom industry to identify the critical success factors that help in implementing changes effectively during projects.

Critical Success Factors

Changes might occur at any point during a project. Having a clear vision of CSFs while managing projects helps the project management team to work together and deal with the changes efficiently. It helps them identify the factors that could affect project management process. Research of Pollack and Algeo (2016) also describes that if CSFs are not addressed properly it would lead to occurrence of risks within that project. They believed that the project sponsors should implement effective change management practices to address these CSFs to avoid occurrence of any unfavourable conditions. Factors like not knowing the reasons behind change, no commitment or support from the leaders or senior management, poor communication, minimal client/ stakeholder's involvement, unclear change objective, no organization culture support, ineffective risk management, improper monitoring and feedback are some of the major factors that are critical to effective change management (Masunda 2015; Dong et al., 2004; Hashim 2013; Hornstein 2015; Thomas, 2014). After detailed literature review the most cited CSFs are discussed further.

Change Objective

Change objectives are tangible project deliverables that a change might bring to a project after its successful implementation (Crawford, 2013). While exploring the past literature we have summarized that it is mandatory to make changes during Telecom based projects due to their complexity. The objectives of change should be well defined while making a project plan to make change integration successful (Todnem, 2005; Munassar et al., 2013). A project Manager should brief his team on internal and external driving factors of change and deliver the perspective on the goals or objectives that would be achieved after change is successfully made (Dong et al., 2004). Masunda (2015) says that due to uncertainty of change objective, it was difficult to manage changes during a project. An insight to citation of change objective in past literature can be seen below in Table 1.

Table 1 Literature Support for Change objective.

Factor	Citation
Change objective	Community of Change Professionals, NSW (2018); Masunda (2015), Munassar et al., (2013), Gilley et al., (2008), Oakland and Tanner (2007), Price and Chahal (2006), Todnem (2005), Dong et al., (2004)

The literature cited above affirms that change objectives are critical to achieve change management milestones over Telecom based projects. Thus, change objective is a CSF to effective change management as per detailed literature review.

Comprehensive Communication

It has been observed that communication has been found to be most dominant factor during process of change management (Price and Chahal, 2006). Prosci Report (2016) explaining best practices in change management indicated open communication as a key success factor. Effective communication management over projects promotes active participation of the team members and aids in increasing their response towards change (Proctor and Doukakis, 2003). It also gives a complete oversight about the purpose and vision of changes, to project participants who are directly being subjected to change. Past research as shown in Table 2 have also emphasized on maintaining comprehensive communications throughout the project which expands our understanding about what role comprehensive communication can play to effectively implement a change, over Telecom projects.

Table 2 Literature Support for Comprehensive Communication in Change Management.

Factor	Citation
Comprehensive communication in change management	Sjögren et. al., (2018), Pollack and Algeo (2016), Prosci Report (2016), Hornstein (2015), Masunda (2015), Patanakul (2014), Thomas (2014), Saruhan (2014), Munassar et al., (2013), Crawford (2013), Hashim (2013), Kotter and Schlesinger (2008), Gilley et al., (2008), Oakland and Tanner (2007), Price and Chahal (2006), Dong et al., (2004), Proctor and Doukakis (2003),

Using comprehensive communication practices such as issue bracketing in strategic meetings, adding strategic vocabularies, and rhetorical or linguistic tactics would help gain organizational attention which helps in effective change management (Saruhan, 2014). Lack of communication during change management process may lead to employee attrition and increase resistance among them towards the change (Masunda 2015; Saruhan, 2014; Kotter and Schilesinger, 2008). Sjögren et. al., (2018) found that less dialogue between project participants or communication barrier was acting as a critical junction in successful delivery of change requests. Therefore, recognizing effectiveness of communication during all new developments or change process is countermeasure for employee's resistance towards the change.

Monitoring and Feedback

Negligence in ensuring proper change monitoring and controlling process during a project result in missing the chances of risk identification at earlier stage (Patanakul, 2014).

As indicated in Assessment Report on change management by Pink SCAN (2012), change related incidents must be tracked down throughout the project. By taking feedback or suggestions from project participants, especially those who would directly get affected by the change would aid in making effective decisions by the management. Two-way communication is a critical success factor (CSF) for smooth and improved change management process (Thomas, 2014). Table 3 shows literature support for Monitoring and Feedback as a CSF to change management.

Table 3 Literature Support for Monitoring and Feedback

Factor	Citation
Monitoring and Feedback	Pollack and Algeo (2016), Thomas (2014), Patanakul (2014), Hashim (2013), Gilley et al., (2008), Price and Chahal (2006), Dong et al., (2004), Kotter (1996)

The research exhibits that feedback from all critical stakeholders should be given equal opportunity to express their idea of change. A two-way communication is a better way to clear the ambiguities of all stakeholders on proposed changes; it helps them ask questions and help change leaders to effectively assess the change process.

Top Management Support

The role of top management during process improvement and change management is seen prominent in past research. Specific to the Telecom based projects Dong et al., (2004) According to change management guidelines by Department of Commerce NSW, (2002) the ultimate success of change management depends on cascading commitment and support from top to bottom of an organization. Mou et al., (2013) assumed that effective change management is defined a top manager's perspective of looking from top to bottom within an organization. Thus, the leadership skills and involvement of top management is of utter importance to effective change management and a change should be implemented from top to lower management (Oakland and Tanner, 2007).

Table 4 Literature Support for Top Management Support.

Factor	Citation
Top management support	Pollack and Algeo (2016), Masunda (2015), Hashim (2013), Munassar et al., (2013), Oakland and Tanner (2007), Price and Chahal (2006), Dong et al., (2004), Kotter (1996)

Previous research (as shown in Table 4) claimed top management's support as a CSF for successful change management in projects.

Clients & Stakeholder Involvement

To approach a successful change within a project the first thing to fix is to involve all key stakeholders in change process and then to communicate the importance of reasons for change implantation so that it is well understood by all the stakeholders (Masunda, 2015). According to Dong et al. (2004) Telecom based projects are complex in nature; it is very difficult to understand the user or system requirements

at the project initiation. Therefore, client or stakeholder involvement and contribution in change management process is essential throughout the project life cycle. Prosci Report (2016) indicated that engaging contemporary roles or various stakeholders through change management process would increase chances of its successful implementation. Detailed literature support for clients and stakeholder involvement is given below in Table 5.

Table 5 Literature Support for Clients & Stakeholder Involvement.

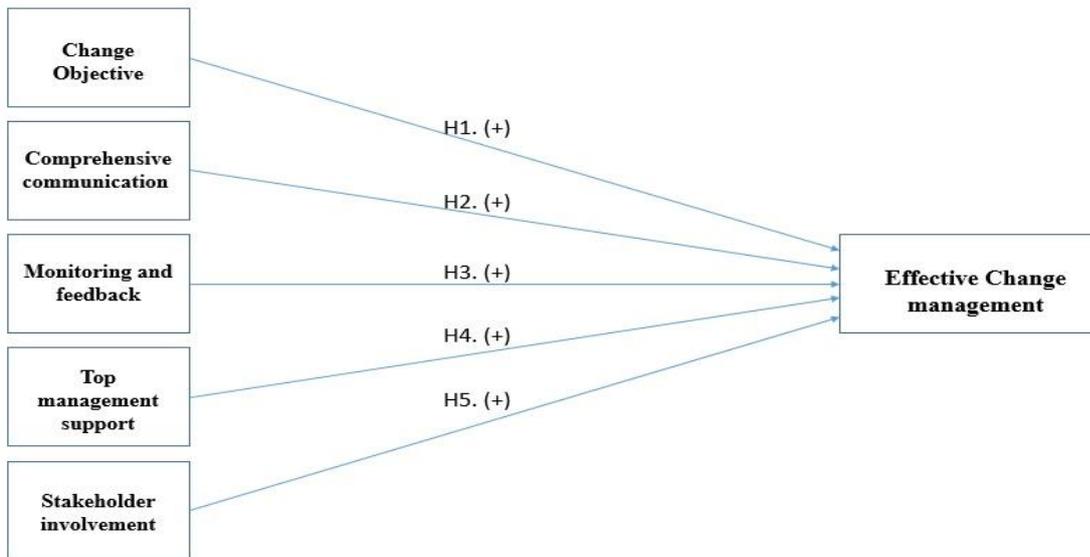
Factor	Citations
Stakeholder/clients Involvement	Community of Change Professionals, NSW (2018), Pollack and Algeo (2016), Hornstein (2015), Masunda (2015), Thomas (2014), Patanakul (2014), Hashim (2013), Gilley et al., (2008), Oakland and Tanner (2007), Price and Chahal (2006), Dong et al., (2004), Freeman and McVea (2001)

The interest of stakeholders should not be overlooked during strategic change management (Freeman and McVea, 2001). Considering past studies, involvement of clients or stakeholders is a CSF to effective change management process.

RESEARCH METHODOLOGY

To find the impact of all five identified CSFs on effective change management, quantitative method of survey was used. Questionnaires were distributed among two hundred respondents. The data was collected from four major Telecom vendors i.e., ZTE, Ericsson, Alcatel-Lucent, and Huawei within the vicinity of Islamabad. These vendors provide IP technologies, Telecom network equipment, fixed mobile/internet broadband, business solutions, IPTV services and IT/Network solution services. The head offices of these telecom vendors were contacted so that the responses from experienced professionals could be obtained. Project managers, change managers, operations managers, change agents and all others who were involved in change management process were taken as respondents of the survey. Questionnaires were designed on 5-point Likert scale. After data collection only 106 responses were used for the data analysis, rest was discarded due to incomplete or missing values. Fig I. shows model adapted for finding the impact of CSFs of change on effective change management. It shows CSFs as independent variables (IV). While effective change management is taken as dependent variable (DV) in this research. H1, H2, H3, H4 and H5 are respective hypothesis indicating influence of each IV on DV as shown in Fig I with arrowheads. These hypotheses were then tested using statistical analysis i.e., Multiple Regression Analysis in SPSS.

Figure I. Model of the study



The proposed hypotheses on the basis on literature review are as follows:

- H1: Change objective positively influences effective change management.
- H2: Comprehensive communication positively influences effective change management.
- H3: Monitoring and feedback positively influences effective change management.
- H4: Top management support positively influences effective change management.
- H5: Clients & Stakeholder involvement positively influences effective change management.

Data Analysis and Results

Data was analysed on statistical software, SPSS. Reliability of the instrument was confirmed by Cronbach's Alpha value which was separately done for each independent variable (IV) and dependant variable (DV). In this research the Cronbach's alpha value was 0.774 which shows that the data is consistent. The Cronbach's Alpha values can be seen in Table 6.

Table 6 Data Reliability Statistics.

Variables	No. of Items	Alpha Reliability Coefficient
Change objective	6	0.731
Comprehensive communication	6	0.729
Monitoring and feed back	6	0.754
Top management support	6	0.784
Stakeholder involvement	3	0.705
Effective change management	7	0.774

Mean and frequencies were calculated for descriptive analysis. To find the impact of all CSFs on DV Pearson's Correlation test was performed. The coefficient of Pearson correlation tells a linear relationship between two independent and dependent variables such as X and Y, respectively. The value of Pearson coefficient should lie in between +1 and -1. The value of coefficient as +1 shows total positive correlation while the value of coefficient as zero shows no correlation among the variables and -1 shows a total negative correlation among the variables under study. Table 7 shows values of Pearson's correlation among CSF and effective change management.

Table 7 Pearson's Correlation Values.

	CO	CC	MF	TPS	SHI	ECM
CO	1					
CC	.378	1				
MF	.347	.582	1			
TPS	.282	.497	.527	1		
SHI	.347	.403	.408	.412	1	
ECM	.503	.629	.646	.577	.673	1

For $r = 0.503$, it is proved that there exists a substantial relationship between change objective and dependent variable. Here, r is the Pearson's Coefficient. $r = 0.673$ shows a consistent relation between clients & stakeholder involvement and effective change management. $r = 0.629$ depicts a consistent relationship among effective communication and dependent variable. $r = 0.646$ is indicating a consistent relationship among monitoring and feedback and DV. The value of $r = 0.577$ shows that the relationship between top management support and effective change management is substantial. For all the variables p remains less than 0.01 which shows that all values of Pearson's Correlation are consistent and within acceptable limits.

For Relative Importance Index (RII) respondents were asked to rank CSFs which are important. They were supposed to rank according to the level of impact of each CSF on effective change management at a scale of 1 to 5. Senior experts were mostly contacted having more experience in related field to maintain the quality of responses. RII calculated using relative weight analysis is given below in Table 8 which shows Management commitment and support as highest ranked CSF in expert's opinion.

Table 8 Relative Importance Index (RII)

S No.	Factor of effective change management	RII	Rank
1	Management commitment and support	0.817	1
2	Continuity	0.809	2
3	Top management support	0.806	3
4	Vision	0.783019	4

5	Comprehensive communication	0.773585	5
6	Planning	0.771698	6
7	Monitoring and feedback	0.771698	6
8	Staff involvement	0.771698	6
9	Change objective	0.769811	7
10	Stakeholder involvement	0.766038	8
11	Effective sponsorship	0.75283	9
12	Providing enhanced understanding	0.75283	9
13	Exceptional Team	0.750943	10
14	Passivity towards obstacles	0.739623	11
15	Organizational Structure	0.735849	12
16	Well defined milestones	0.735849	12
17	Change agents and effective Leadership	0.730189	13
18	Troubleshooting	0.726415	14
19	Resistance to change	0.666038	15
20	Unfreezing the organization	0.60566	16

Multiple Regression analysis was performed to find the impact of multiple independent variables on single dependent variable which is effective change management. It is most common method used for hypothesis testing. In Table 9, $R^2=0.705$ is the coefficient of determination which indicates 70.5% overall impact of all 5 independent variables on dependent variable.

Table 9 R^2 Coefficient Values.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.839 ^a	0.705	0.69	0.343

Table 10 shows beta coefficient values for each variable for Multiple Regression Analysis. As shown in table below, all the values are significant for values ranging less than 0.05. The beta coefficient value i.e., 0.173 of change objective shows that one unit change in this variable would create an impact of 17.3% on dependent variable provided the other variables remains constant. Similarly, beta coefficient for comprehensive communication indicates 20% impact on dependent variable for one unit change providing other variables remain constant.

In the same manner, the beta coefficient values of Monitoring and Feedback, Top Management Support and Client and Stakeholders Involvement as 0.239, 0.149 and 0.374 respectively shows that, one unit change in each of these IVs separately would bring about 23.9%, 14.9% and 37.4% change in DV keeping the others constant for each IV. The Results show Client and Stakeholders Involvement as most important CSF to effective change management. Monitoring and Feedback is ranked second with 23.9% influence on effective change management. With beta value of 0.200, comprehensive communication is third important critical factor for successful integration of changes in Telecom based projects. While change objective ranks fourth CSF in change management with 17.3% influence on effective change management. As compared to other CSFs, Top management support has least impact on effective change management with 14.9% impact on DV.

Table 10 Multiple Regression Analysis.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.153	0.25		0.614	0.541
Change objective	0.148	0.052	0.173	2.842	0.005
Comprehensive communication	0.165	0.059	0.2	2.786	0.006
Monitoring and feedback	0.232	0.07	0.239	3.304	0.001
Top management support	0.126	0.058	0.149	2.187	0.031
Stakeholder involvement	0.334	0.057	0.374	5.893	0

Conclusions are drawn from these results based on which a few recommendations have been made in next section of this paper.

CONCLUSIONS AND RECOMMENDATIONS

Due to the problems faced by Telecom Vendors for implementing the change successfully through the projects, this study intended to address this situation by identifying those change factors which are critical to successful implementation of a change. After detailed literature review and analysing responses from 106 respondents from experienced professionals from Telecom Industry it is concluded that critical success factors should be considered important to control an optimal level of changes occurring over projects, also to avoid any unfavourable consequences or occurrence of certain risks. In this study the intended research objectives have been encountered very well. We have successfully identified the CSFs and found their role in effective change management process in Telecom industry. This study recommends Telecom Industries to focus on five success factors while going through change process.

These CFs were ranked by the respondents to be client and stakeholder's involvement, monitoring and feedback, comprehensive communication, change objective as 1-5 respectively.

The CSF Stakeholder and client involvement is the most critical success factor as per the results of this study. It is therefore important to involve those people who are directly prone to changes or affected by the change in change management process, this would help in reduction of Employee resistance towards change. The findings of Vuorinen and Martinsuo (2018) also supported the fact that project managers are not the only project actors who are active in performing change management and the change management process should also involve other project personnel. The results of our study also emphasize that to involve all the key stakeholders in decision making process and during planning process would help in successful completion of the project. This would also reduce the chances of employee resistance and improve active participation of all stakeholders in change management process. For effective change management over Telecom based projects this research recommends that it is important to:

1. Ensure proper documentation and communication of reason for change to be integrated during a project. All the stakeholders must be made aware of the change and ready to accept and implement the change.
2. Document categorical change management policies: include all required IT resources, well defined risks that are associated to changes, impact of changes on technology and organization and include most important aspects like benefits for employees etc.
3. Circulate this document as a read-only document among all employees for their awareness and understanding.
4. Regular meetings should be held to discuss the risks associated with changes in which presence of those participants must be mandatory who are directly involved in change management process.
5. Approvals should be made based on their opinion and feedback.
6. Minutes of all CCB and CAB meeting should be recorded and circulated among all change participants to make them aware of the change process.

In Telecom sector project managers and change managers are accountable for responding to customers changing requirements while maintaining the smooth delivery of the project. Due to external and internal factors as discussed earlier in first section of this paper, these change requests are spontaneous sometimes and require urgent action by the management. Management must be able to avoid any disruptions or re-work caused due to such immediate change requests in Telecom projects. Our research also helps to understand the fact that change implementation fails due to negligence of Change Advisory or Control Board while assigning roles and responsibilities during change management process. It is therefore important that appropriate roles and responsibilities related to technological and process-based requirements must be documented for involvement of most effective stakeholders in change management process. The findings of a research conducted by Eskerod et. al., (2017) also commends this. They concluded that wrong selection of change agents can jeopardize a project's performance despite having the top management support.

A few recommendations in terms of technical specifications and processes involved on Telecom projects considering CSFs identified in this study are discussed further.

1. It is important to create environment of open communication between upper management and those stakeholders who are involved in change implementation and project deliverables.
2. Information Management systems can be installed to improve communication of information on Telecom based projects. They can be helpful to manage network alterations. They can save all the data on changes while maintaining the old information in the repository.
3. Proper system for monitoring a change should be incorporated and all stakeholders must be informed about change status throughout the change management process till signoff meeting.
4. Post implementations change reviews from upper management should be encouraged.

Continuous monitoring of changes is necessary, project managers must ensure that changes are continuously highlighted, documented, reviewed, and implemented with involvement of upper management.

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