Competency Level of Manpower and Its Impact on the Success of a Wire Line Telecom Project, Indian Scenario

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Abstract

Telecommunication Industry in India is growing fast. The performance Indicators released by (TRAI, Nov 2009), are encouraging. In India currently there are 525.65 million telephone subscribers. The teledensity recorded ending oct 2009 was 44.87.Out of 525.65 million subscribers 488.40 million subscribers have subscribed wireless services and 37.25 million wire line services. The subscriber base for wireline is on decresing trend. The Study was conducted for wireline segment.In the study it was found out that due to various issues related to Quality, Deliverables, Time and cost over runs; there is a decreasing trend in the subscriber base. It was also found out that Competence Level of manpower has great Impact on the success of a wireline telecommunication Project. Since Telecommunication Service providers outsource network construction, Service delivery, service assurance to vendors, success mostly depends upon the competence level of the manpower working for that project. The mathematical model suggests that Skill sets of the manpower have the maximum impact on the Project deliverables, Time over runs and cost over runs. Another mathematical model suggests that for Quality, it is not only skill sets or attitude but Knowledge also has the maximum impact. Correlation analysis between Competence level of manpower and Project success has come to be 0.23 which is positive but its degree of association is very weak. It may be concluded that in addition to manpower competency other resources like Machines, Materials and Money play important role in the success story of a wire line telecommunication Project. Training and development programs for vendor manpower should be top priority for the vendors as well as the the Telecommunication service provider.

1. Introduction

Competent manpower plays a vital role in the success of a telecom project. Among the resources required for a wire line telecommunication project namely time, machines, material, manpower and money (TM4); manpower is of greatest importance because it integrates the project areas and implements the project processes (Raina, 2007).

Competence is a standardized requirement for an individual to properly perform a specific job. It encompasses a combination of knowledge, skills and behavior utilised to improve performance. More generally, competence is the state or quality of being adequately or well qualified, having the ability to perform a specific role. For instance, management competency includes the traits of systems thinking and emotional intelligence, and skills in influence and negotiation. A person possesses a competence as long as the skills, abilities, and knowledge that constitute competence are a part of him and enable the person to perform effective action within a certain workplace environment. Therefore, one might not lose knowledge, a skill, or ability, but still lose a competence if what is needed to do a job well changes.

Since other resources like time, material, machines and money are being managed by manpower therefore any problem related

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with the project like time over runs, cost over runs, quality deviations and deviations in the project deliverables arise due to incompetent manpower. If there are time over runs, it may be due to poor scheduling of the project or non availability of other resources on time. When ever there are time over runs in a project; there are always cost over runs. The budgets will cross the limits and project may become a sick unit before launching. Again quality deviations will make project non acceptable to the client and the more resources we pump in improving the quality, the more cost over runs will be there. The ultimate goal of a telecom project is deliverables, if the deliverables are not in tune with the original plan, the project ceases to be a project because it deviated from the original plan. In all these cases in one way or the other manpower is responsible to manage the resources. That competent manpower should possesss necessary skills, knowledge and attitude to minimise time over runs, minimise cost over runs, have minimum quality deviations acceptable to the client and make project deliverables fully delivered, (Chandra, 2008)

Competency analysis is necessary to identify the knowledge, skills and process abilities required to perform the organisation's business activities so that they may be developed and used as a basis for workforce practices.

Literature Review

In studying the competency area, one is immediately struck by the lack of uniform definitions, very fine lines of distinction in terms such as competence. Merriam Webster defines that competency and competence are synonymous as are competences and competencies then common parlance can't be far behind. Boyatzis (1982) defines competency as that body of knowledge which results in effective and/or competency-based human resource management on the other hand takes the broad term of competencies that make up an individual's overall competence and matches them with required which competencies are available to an organization can help, inform and direct HRM culture."

Zemke (1982) interviewed several experts in the field to determine "precisely what makes a competency" and found that competency, competencies, competency models, and competency-based training are all humpty-dumpy words meaning only what the definer wants them to mean. The problem comes not from malice, stupidity or marketing avarice, but instead from some basic procedural and philosophical differences among those racing to define the concept and to set the model for the way the rest of us will use competencies."

"The American Compensation Associations define competencies as "individual performance behaviors that are observable, measurable and critical to successful individual or corporate performance".

Hence, the term competency has been defined in the literature from several different points of view. It was originally used in the field of education to describe trainee teacher behaviors (Bowden and masters, 1993). It became widely known in the management field through the work of, Boyatzis (1982) however, the term competency was not "owned" by any particular group. In fact a variety of stakeholders were involved in using the term, each with their own agendas (Burgoyne, 1993).

The occupational competence movement was initiated by, (McClelland in the 1960s), with a view to moving away from traditional attempts to describe competence in terms of knowledge, skills and attitudes and to focus instead on the specific self-image, values, traits, and motive dispositions (i.e. relatively enduring characteristics of people) that are found to consistently distinguish outstanding from typical performance in a given job or role. It should be noted that different competencies predict outstanding performance in different roles, and that there is a limited number of competencies that predict outstanding performance in any given job or role. Thus, a trait that is a 'competence' for one job might not predict outstanding performance in a different role. (McClelland) argued that these competencies could neither be identified nor assessed using traditional procedures.

Hence competency can be defined as combination of several entities; motives, traits, self-concepts, attitudes or values, skills and abilities; all of which can differentiate superior performers from average performers. Since competencies take a composite view of an employee's ability to perform, they go beyond mere job knowledge.

Oxford Advanced Learners Dictionary (2008) defines "competence" as 'being competent' and having the 'necessary knowledge, ability, skill and authority'. Competence in normal parlance is thus synonymous with ability, skill, fitness, aptitude, proficiency, know how, experience and expertise. Competence is a range of knowledge, skill, ability, dexterities and attitudes that are evident in a person's actions. In business context, the definition that addresses the importance of the problem proposed to be studied is "a specific, identifiable, definable and measurable knowledge, skill, and/or deployment related characteristic (eg, attitude, behavior, physical ability) which a human resource may possess and which are necessary for ,or material to, the performance of an activity within a specific business context". Therefore competence is the underlying characteristics that can be shown to be the base of outstanding performance on the job. Competence, in technical terms, should therefore be taken to standard for the knowledge, skill and ability to complete a specific task, to undertake particular activity and / or perform certain functions and duties that pertain to a given job (Subramanian, 2008).

Competency focuses on what is required of an employee in the workplace rather than on the learning process. It embodies the ability to transfer and apply skills and knowledge to new situations and environments. ''competencies'', aim at linking the human resource systems of an organization to its purpose. The competency focus gives insights into the process of aligning the human resources of an organization with the vision and mission of the same. It tries to chart out the differences between the core competencies of an organization and the individual competencies of an employee. This may seem to be a trivial issue, but for many it is very difficult to recognize this difference (Shermon, 2004).

The delivery of products and services takes place through human resources, working for the company. Competencies, that is, knowledge, skills and abilities of human resources need to be

adapted and, or adjusted to the emerging changes (Subramanian, 2008).

Competence is the combination of knowledge, skills, attitude and personality of an individual as applied to a role or job in the context of the present and future environment that accounts for sustained success within the framework of organizational values (Sharma, 2002).

This is a competency era. It is beyond doubt that it is beneficial and cost effective, to have competent people to occupy higher-level positions. Competency refers to the intellectual, managerial, social and emotional competency. Many organizations in India and abroad are channeling their efforts to mapping competencies and implementing assessment and development centers (Shermon, 2004).

In this way competency of human resource is necessary for the success of a project. By the Success of a project we mean having negligible time over runs and ultimately no cost over runs. Project success is correlated with thorough analysis of the need for project deliverables. When a project results in deliverables that are designed to meet a thoroughly documented need, then there is a greater likelihood of project success. Most people have an intuitive appreciation for what success is, but defining it and measuring it is a bit tougher.

But how should we define it? As per the literature of the 1960s and 1970s project success was usually limited to meeting cost, schedule, and objectives - was the project finished within budget, on time, and according to the specifications? Later both quality and stakeholder satisfaction were often called out separately rather than being subsumed within scope.

The common theme in all cases was that project success was defined in ways that could be measured the day the project was finished. But what about the Sydney Opera House? It cost sixteen times as much to build and took four times as long to complete as the original estimates. A project management disaster produced an enduring and inspiring civic symbol, was this project really a failure?

Dimensions of Project Success

In the same way that quality requires both conformance to the specifications and fitness for use, project success requires a combination of product success and project management success:

- Was the product (service, result, or outcome) of the project a success?
- Was the project well managed?

Simple yes-or-no answers will not suffice. We should not be asking, "was your project a success?" We should be asking, "How successful was your project?" different stakeholders will use different measures. The health and safety officer wants no injuries. The manufacturing manager wants a product that is easy to build. The ISO 9000 compliance team cries "success" if the documentation is complete. The VP marketing will be delighted if you get to market before your competition. For a telecom project manager the success means that

1. That the project is completed on time and there are no time over runs.
2. The Project is completed within the allocated budgets and there are no cost over runs.
3. That the project is full filling quality standards and there are no deviations in the initial plan.
4. The project is adhering to environmental laws and other industrial laws as prescribed by the government.
5. The project deliverables are in tune with the original plan.
6. The client has taken over the project hapilly.
7. The stake holders have been paid their bills and dues like sub vendors and sub contractors.
8. Telecom subscriber is happily using services and there is no violation of SLA.

Why Telecommunication?

Telecommunication has revolutionized the communication arena world over. It has connected people across globe. People don't feel isolated from their close ones due to availability of telecommunication services. Telecommunication has boosted economy of many nations and opened huge job markets globally.

In India currently there are 525.65 million telephone subscribers. The teledensity recorded ending oct 2009 was 44.87.Out of 525.65 million subscribers 488.40 million subscribers have subscribed wireless services and 37.25 million wire line services. The major telecom players operational in India are BSNL, MTNL, Bharti, Reliance, HFCL, Idea, Tata Indicom, Vodafone, Aircel, MTS, Sistema, and Loop,(TRAI NOV 2009)

The study was conducted for a wire line LCO project at Ludhiana. In the study manpower of both telecommunication service provider and its vendor were studied. The TSP "Telecommunication service provider'' constructed hundreds of kilometers of fiber optic cable network. The roll out was launched in 30 major cities in India including Ludhiana. TSP engaged LCO "Local cable operators" for the E2E "end to end "services which included construction of copper and fiber optic cable networks, commissioning of the networks and delivery of voice, data and video. Vendor LCO was entrusted with the network and last mile assurance part also.

Objectives of the study

1. To measure competency level among the employees and to measure project success in a selected project.
2. To analyze the impact of competency level on the success of the selected project.
3. To suggest some measures to improve the success level of the project

Scope of the study

Though there are various components of competency like traits, ability, behavior, skills, knowledge, capability, fitness, aptitude, proficiency, know-how experience and behavior etc. our Study will consider only three components of the competency which are listed as folows: i) Skills, ii)Knowledge and iii)Behaviour (attitude component of behavior will be studied in the project)

Skills

Skill is the ability that has been acquired by training. It is ability to produce solutions in some problem domain. Skill is the ability, usually learned and acquired through training, to perform actions, which achieve a desired outcome.

In context to telecom project, the skill of a splicing technician who splices two delicate fibers can be judged by the amount of loss occurring at that splice. Hence competence of a splicing technician is measured in the amount of loss at each splice. For example the admissible loss per splice is .02db per splice, if the losses are within the permissible limits, we can say that the splicing technician is a competent man and has acquired proper skills for splicing.

Similarly, while constructing a telecom network special skills are required to roll the drum and pull the cables, if it is not done with skill, the fiber may get damaged and later on may affect the service delivery such as voice, data and video. Hence OFC (fiber optic cable pulling) manpower must have requisite skills to roll the drum on stand and then pull the cable over poles and fix up grip helicals. Proper skills are required to clamp the OFC on wall-to-wall network. There are around 9 ways with which we can construct building-to-building network in those areas where pole scope cannot be ascertained.

Last mile technicians need to have proper skills to punch the CDPs (customer distribution point), holding punching tools and punching the pairs is a skill which is acquired through training and experience. Fixing of EDPs is again a skill which a technician needs to have.

We may say that skills are special traits acquired by a person through training, knowledge and practical experience. The practical experience is hands on that machine, equipment etc. Skills are defined as the proficiencies needed to perform a task (Muchinsky, 2001).According to (Mckenna, 2006), skills are manifest when a person operates a machine, solves a difficult problem, and relates effectively in an interpersonal way to people, and these skills are nurtured over time.

Skills are required to mount poles. When a pit is dug, skill to hold Bokki and then dug the pit is very important considering the quality part of the project. The skill of the person who is digging the pit is ascertained by the finishing and dimensions of the pit. The mason should have special skills to put PCC (Plain cement concrete) and cement the hollow pit around the Pole. Making of muff around the pole requires skill. The slant and the angle which the muff makes with the NGL (natural ground level). During the erection of the pole, it should not tilt. The skill of the manpower can be identified by the height of the hole across the pole, which is exactly at 5 feet from the bottom. Actually, the pole must be put at a depth of 5 feet from NGL. A bed of 300 mm is made first at the bottom of the pit and then pole is mounted on that. The height of pole from bed to NGL must be 1200mm.

Once the poles are mounted and OFC (optic fiber cable) is unloaded with requisite skills, and then starts the process of laying out OFC either aerially or from building to building. Cable pulling technicians should have proper skills to pull OFC (optic fiber cable) over the poles. These are pulled through a helical, which is attached to OFC at the Pole spot. Proper skills are required to clamp the poles so that OFC passes over the pole with out abrasions. Any damage to OFC during the pulling; causes damage to the Fiber tubes, once these fibers are damaged, they may show losses once the services are started. In case there are losses in the fiber then in that case, the need will arise to completely replace the OFC and the span may be 1-2 kms. The replacement will cause time overruns and cost over runs for the entire project.

Skills are also required to install EDPs (electronic data processors) and then branch splice them. While installing EDPs four holes need to be done on the wall with the help of a drilling machine. Technician must possess skills to hold drilling machine properly and then drill a hole on the wall. Fastening of the EDPs on the wall require proper skills also.

Requisite Skills department wise

Technical skills are the knowledge and proficiencies required in the accomplishment of engineering, scientific or any specific task. These are operational capabilities necessary to perform certain job specifications. Word processing is a very widely used technical skill in many organizations, (www.allbusiness.com)

Technical

- Pole mounting, Pit digging, PCC placement and measurement of the dimensions.
- Aerial copper layout from pole to pole or from building to building
- Installation of CDPs ,IDF and IMDF
- Installation of DLC
- Krone punching
- Earthing
- To handle tools like punching tool, drilling machine
- Testing of the network
- To lay out OFC(optic fiber cables)
- Install EDPs
- Splicing
- OTDR testing
- Network integration
- Commissioning of the networks

Managerial Skills

- Handle permission issues at the site
- Manage technical teams and assign duties to them
- Communicate the daily out put to the vertical ups.
- Maintain quality at the sites

Knowledge

Knowledge is the awareness and understanding of facts, truths or information gained in the form of experience or learning (a post priori), or through introspection (a priori). Knowledge is an appreciation of the possession of interconnected details, which, in isolation, are of lesser value. Epistemology, from the Greek words episteme (knowledge) and logos (word/speech) is the branch of philosophy that deals with the nature, origin and scope of knowledge. Knowledge examples are like to arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, and reproduce state. Knowledges are specific types of information people need in order to perform a job. Some knowledge are required of workers before they can be hired to

perform a job, while other knowledge may be acquired on the job, (Muchinsky, 2001).

Knowledge is organized or contextualized information which can be used to produce new meanings and generate new data. or what the person know. is the act or condition of knowing something with a familiarity gained through experience or association. It means "to perceive directly", "to have direct cognition", to "apprehend intellectually", "to acquire facts". (Standards that ask the learner to recognize and recall facts and specifics).What is known by perceptual experience and reasoning. For example, 111.12 is data; "Your bank balance has jumped 50% to Rs. 2 crore" is information; "Nobody owes me that much money" is knowledge; and "I'd better talk to the bank before I spend it because of what has happened to other people" is wisdom. Knowledge refers to evidence of having absorbed and understood items of information needed to perform adequately in the job. It can be obtained from formal education and training as well as from on the job experience, (McKenna, 2006).

According to free on-line dictionary of computing explicit knowledge is formal and codified, eg, documents, databases, knowledge bases. Knowledge refers to acquired information necessary to do the job (eg, principles of fiber optics). Skills refer to acquired measurable behaviors (eg, autoclave operation). Abilities refer to natural talents or acquired dexterity (eg, capacity to lift 200 pounds).Understanding gained by actual experience is the result of learning. Knowledge is the internalization of information, data, and experience. Tacit knowledge is the personal knowledge resident within the mind, behavior and perceptions of individual members of the organization. Explicit knowledge is the formal, recorded, or systematic knowledge in the form of scientific formulae, procedures, rules, organizational archives, principles, etc., and can easily be accessed, transmitted, or stored in computer files or hard copy. The facts or principles relating to a particular subject or subject area. Information (organized facts in a specific context) plus judgment. Concept-driven conversation, such as "how things work" discussions and explanation of language.

In context to telecom project we may define knowledge as an understanding that optic fiber cables are used in telecom networks and through telecom networks voice, data and video is served to the end telecom consumer. A technician may have knowledge of splicing and fiber pulling but he may not have sufficient skills to perform the Job of splicing and fiber pulling. Thus having knowledge of some activity doest mean that the person may have requisite skills for the same activity. The manpower that works on the sites must possess knowledge about the networks. The summary of the knowledge which a technician must possess is mentioned as follows.

Regarding knowledge part; which personnel is required to have to execute the telecom project successfully can be described in the following line. The OFC aerial cabling option shall be used predominantly for interconnecting all buildings within the ring of a BAN. Since the interconnection will entail crossing of cables between two or more poles, two or more buildings or combination thereof in the air, it will have to be done with utmost care without compromising on human safety during and after installation. The installation work should be done in the manner and method, which will not cause inconvenience to general public or cause traffic disturbances for a long time.

Attitude

Attitude is a hypothetical construct that represents an individual's like or dislike for an item. Attitudes are positive, negative or neutral views of an "attitude object": i.e. a person, behaviour or event. People can also be "ambivalent" towards a target, meaning that they simultaneously possess a positive and a negative bias towards the attitude in question.

Attitudes come from judgments. Attitudes develop on the ABC model (affect, behavioral change and cognition). The affective response is a physiological response that expresses an individual's preference for an entity. The behavioral intention is a verbal indication of the intention of an individual. The cognitive response is a cognitive evaluation of the entity to form an attitude. Most attitudes in individuals are a result of observational learning from their environment. The link between attitude and behavior exists but depends on human behavior, some of which is irrational. For example, a person who is in favor of blood transfusion may not donate blood. This makes sense if the person does not like the sight of blood, which explains this irrationality.

According to (McKenna, 2006), attitude refers to the emotional or affective feelings and perspectives held by a person. An attitude may affect whether or not a skill is exercised in the manner prescribed. For example a driver is capable of driving a car on the motorway-which is a skill and is aware of the fact that the speed limit is 70mph, but travels at 100 mph on the stretches of the motorway because he or she seems to harbor unsafe attitudes.

To accomplish Job FEOs must possess correct attitude whether they are in the field or in the office. To achieve organizational effectiveness and organizational goals proper attitude is required from every one in the organizations to handle inter office interactions or communication with the customers. A total value of (10) has been assigned to Attitude factor of the competence.

Similarly for other profiles, the scale has been fixed to judge the competence of the employee. The above competence scale has been selected considering ideal conditions and the values demonstrate the standard of competence. An employee who possesses complete skills, knowledge and attitude about the job can be assigned 30 Points.

On the basis of the questionnaire and appraisal reports, actual competence level of the employees was arrived. Vertical heads of each department assessed the filled questionnaire and on the basis of the replies, they assigned marks / points out of (10) to each component of the competence. Annual appraisal points of the targeted employees were also considered for the assessment of their actual competence.

Methodology of the study

The study was conducted at DHS Pvt. Ltd a vendor company of Reliance communications Ltd. Reliance communications Ltd "RCL" is a Telecommunication service provider in India and is providing telecommunication services through wireless and

wire-line mode. In 2006 Reliance came out with a unique LCO-BA (local cable operator), BA (Business associate) business model. RCL short listed 30 cities in India and identified 30 Business associates from cable TV industry. The reasons for selecting cable –TV operators were many like: i) Knowledge and Skills to roll out copper or fiber Networks, ii) Knowledge of routes, iii) Access to the end Subscriber, iv) Local Support for seeking permissions, v) Round the clock Service assurance, vi) Collection of payments on time, and vii) Network assurance.

In Punjab RCL appointed two major cable operators DHS Pvt Ltd for Ludhiana and one at Chandigarh. DHS Pvt Ltd was Joint venture partner of SITI cable a major MSO (Multi service operator). DHS had a sound knowledge of co-axial copper NW lay outs and had already laid out around 75 Kilometers of the cable network in Ludhiana city of Punjab state. DHS was providing cable TV service to around 1.5 Lakh subscribers through LCO. It had 130 LCO in place. Reliance selected DHS as Business associate for Ludhiana city. The BA business model was as under: i) Identification and selection of LCO, ii) Procurement of Free material from Reliance, iii) Survey and route walks and permissions, iv) Construction of telecommunication networks as per designs, v) Commissioning and integration of networks, vi) Testing of networks, vii) Installation of DLC / EDP, viii) Splicing and OTDR testing, ix) Delivery of voice and data, x) Network assurance, and xi) Last mile assurance.

DHS recruited manpower and started operations. The manpower recruitment was done as per the HR policies of Reliance communications. The manpower was recruited for following main departments; i) Construction of Networks (separate teams for Fiber and copper), ii) Device installation Teams, iii) Service delivery teams, iv) Network service assurance teams, v) Last mile service assurance teams, vi) Splicing and OTDR testing teams, vi) Logistics and materials, and vii) Accounts and billing.

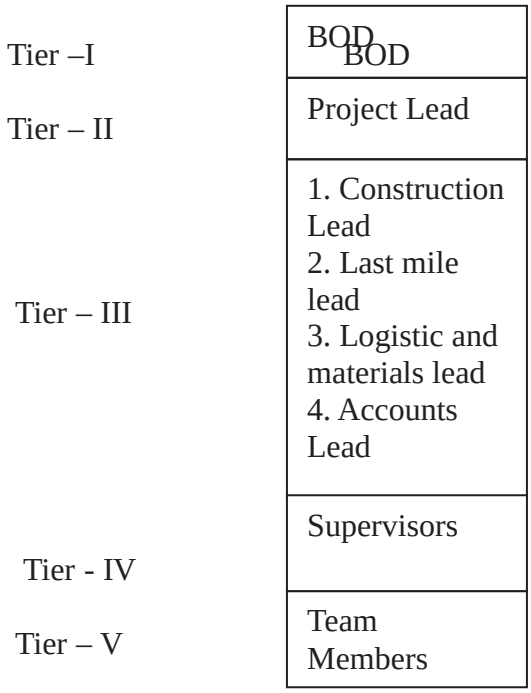

Figure 1: The Company structure

Team based concept was adopted in order to minimize complexities in the organization structure. DHS laid out around 199 kms of fiber optic cable networks and around 85 kms of copper network in one and a half years of operations and delivered more than 10,000 voice and data connections during that period. It was instrumental in making the MEN network roll out a reality in Punjab. On the basis of Ludhiana success, DHS was engaged as end to end service provider for North Delhi also. The company rolled out fiber optic cable networks, copper network, and installed EDPS and DLCs in north Delhi also. The company did delivery of Voice and data through EDP, DLC and WIMAX.

A self-designed non-disguised questionnaire was prepared which comprised of competence related questions and each employee among the sample was asked to fill it up. The questionnaire was regularly filled up on monthly basis. The secondary data collected from the company records, Vertical ups of the employees were asked to provide grades to the employees under survey. On one hand competence was analyzed and on other hand project success was analyzed. Competence components included in the study are: i) Knowledge, ii) Skills and iii) Attitude while the project success components are: i) Deliverables, ii) Time over runs and iii) Quality.

A sample of 54 employees was taken for the study purposes. The data in the first; second, third column shows the actual points obtained by the employee from the primary and secondary sources. Column 5th, 6th, 7th and 8th show the points received by each employee vis-à-vis their level of contribution towards project deliverables, time over runs, cost over runs and quality of the project. The scales are mentioned for the reference purposes.

For all employees working in DHS, a standard value of (10) was assigned to the components of the competence. For example a value of (10) was attached to skill that means that the highest standard of competence is (10) in terms of skill.(1) will demonstrate the level of poor skills and (10) the level of highest skills.

Similarly a value of (1) will demonstrate the level of least knowledge and (10) the level of highest knowledge related to that Job. Value (1) demonstrates the level of poor attitude and (10) the degree of highest attitude. A value of 30 demonstrates standard competence level of an employee. Standard competence to accomplish a particular Job = 30 (Sum of the values of 10 points assigned to skill, knowledge and attitude).

To accomplish Job FEOs must possess correct attitude whether they are in the field or in the office. To achieve organizational effectiveness and organizational goals proper attitude is required from every one in the organizations to handle inter office interactions or communication with the customers. A total value of (10) has been assigned to Attitude factor of the competence.

Similarly for other profiles, the scale has been fixed to judge the competence of the employee. The above competence scale has been selected considering ideal conditions and the values demonstrate the standard of competence. An employee who possesses complete skills, knowledge and attitude about the job can be assigned 30 Points.

On the basis of the questionnaire and appraisal reports, actual competence level of the employees was arrived. Vertical heads of each department assessed the filled questionnaire and on the basis of the replies, they assigned marks / points out of (10) to each component of the competence. Annual appraisal points of the targeted employees were also considered for the assessment of their actual competence.

Criteria for calculating project success

Following areas of the project were taken to assess the Project success: i) Project deliverables, ii) Time Over runs, iii) Cost over runs, and iv) Quality.

i) Project deliverables

Standard project deliverables are uninterrupted delivery of voice, data and video. Incase of the losses the voice; data and video won't be effectively delivered to the end telecom customer. There will be humming and link loss while connecting the Internet. The streaming video will also waver in case of the losses at various cable Joints. Under ideal conditions a value of (10) was assigned to the project deliverables.

Standard Scale

1_____3_____5_____6_____10

Failure level of deliverables Success level of deliverables

ii) Time over runs

Standard value of the time over runs has been kept as (10).

Standard Scale of Time Over runs

1_____3_____5_____6_____10

Highest level of time over runs least level of time overruns

The actual values of the project overruns have been calculated with the help of time scheduling chart i.e. CPM (Critical Path Method). The critical activity in case of MEN networks is splicing and due to delay in the splicing, the project gets delayed.

iii) Cost Over runs

The standard value of the cost has been kept as (10). The actual values were calculated bases on the out put of the employee, for that purpose earned value Analysis has been taken into the consideration.

Standard scale for cost over runs

1_____3_____5_____6_____10

More cost over runs less cost overruns

iv) Quality

The standard scale for the quality chosen is shown as under. The deviation in the quality has been measured with the help of standard deviation analysis.

Standard scale for quality

1_____3_____5_____6_____10

More quality deviation less quality deviation

Statistical tools for analysis

The study analyzes impact of manpower competence on project success. The study has modeled four multiple regression equations. First statistical model is impact of skills, knowledge and attitude on project deliverable. Second statistical model is impact of skill, knowledge and attitude on the time over runs. Third statistical model is impact of skill, knowledge and attitude on the cost over runs. Fourth and the last model is impact of skill, knowledge and attitude on the quality of the project. Actually, the study investigates the impact of manpower competence components (i.e. skills, knowledge and attitude) on the components of project success (i.e. deliverables, time over runs, cost over runs, and quality).

Analysis and Discussion

The study analyses and discusses the impact of manpower competences on components of the project success. In the course of analysis and discussion the investigation achieves its objectives. In total the study has three objectives: i) to measure competency level among the employees and the project success in a selected Project, ii) to analyze the Impact of competency level on the success of the selected Project, and iii) to suggest some measures to improve the success level of the project.

Objective I: to measure the competency level among the employees and project success in a selected project.

The results of employee's competency in annexure –I reveal that out of sample of 54 employees, skill sets, knowledge and attitude scored 5.5, 5.3, and 4.6 respectively. This implies that employees have an average required skill sets and knowledge to accomplish a project. However, employees have poor attitude to accomplish the project.

Moreover, the skewness of the employee's competency is negative for skills and the knowledge. Negative skewness implies a left–skewed distribution (Aczel and Sounderpandian, 2006).The inference we can draw from these results is the fact that the project recruited employees with proper skills and Knowledge. The skewness of the attitude is positive, according to Aczel and Sounderpandian, positive skewness implies right skewed distribution. The study infers that Attitude of employees is poor and moving from 10 to 0 on the attitude scale.

The results on Kurtosis are very interesting. All independent variables (i.e. Skills, Knowledge and Attitude) have negative number. A negative kurtosis implies a flatter distribution than the normal distribution and it is called platykurtic. The flatter Kurtosis infers that the project did not employ star performers.

The results of Project success (annexure – II) reveal that the mean value of deliverables time over runs, cost over runs and quality is 5.24, 5.5, 5.25 and 4.38 respectively. This implies that due to an average competence level of the manpower working on the project, the project deliverables and quality are also average. The average competence of the manpower gave rise to time over runs and ultimately the cost over runs.

The kurtosis is positive for deliverables, time over runs and quality and kurtosis for cost over runs is negative. Moreover, the

skewness of the project deliverables is negative. Negative skewness implies a left–skewed distribution (Aczel and Sounderpandian, 2006). The skewness of the time over runs, cost over runs and quality is positive; according to Aczel and Sounderpandian 2006), positive skewness implies right skewed distribution. The study infers that the time over runs, cost over runs is moving towards high end and there are more quality deviations also.

Objective II: To analyze impact of Skills, Knowledge and Attitude on the project deliverables

Null Hypothesis- All the three independent variables Skill, Knowledge and Attitude have equal impact on Project Deliverables.

Alternate Hypothesis – Either Skill or Knowledge or Attitude is important for Project deliverables.

Mathematical Model

Y (deliverables) = $\alpha 0 + \alpha 1$ (skill) $+\alpha 2$ (Knowledge) + $\alpha 3$ (Attitude) + θ

$\check{y}$ = 4.8391+0.2025skills-0.1726knowledge+0.0466Attitude
't' (9.444) (1.725) (-1.4665) (.50499)

The null hypothesis is rejected and alternate is accepted .we can say that Skill sets of the manpower are important for Project Deliverables refer to annexure – III.

Objective III: To analyze impact of Skills, Knowledge and Attitude on the time over runs of the Project

Null Hypothesis- All the three independent variables skill, knowledge and attitude have equal impact on Time over runs.

Alternate Hypothesis – Either skill or knowledge or attitude is important for project success.
Mathematical Model

Y (Time over runs) = $\alpha 0 + \alpha 1$ (skill) $+\alpha 2$(Knowledge)+ $\alpha 3$ (Attitude) + θ

Y (Estimated) = 4.34 + 0.22 skills - 0.03282 knowledge + 0.014909 attitude

't' (7.421) (1.70) (-0.243) (0.1411)

we accept the alternate hypothesis and reject the null and conclude again that skill sets of the manpower working on a telecommunication wire line project have the most impact on the time over runs ie the time over runs are dependent primarily on the skill sets of the manpower working on that project. Refer to annexure - IV

Objective IV: To analyze impact of skills, knowledge and attitude on the Cost over runs of the project

Null Hypothesis - All the three independent variables skill, knowledge and attitude have equal impact on the cost over runs of the wire line project.

Alternate Hypothesis – Either skill or knowledge or attitude has impact on cost overruns or two of the competencies have impact on the cost over runs of the project, refer annexure-V

Mathematical Model

Y (cost over runs) = $\alpha 0 + \alpha 1$(skill)$+\alpha 2$(knowledge)+ $\alpha 3$ (attitude) + θ

Y (Estimated) = 5.1488 + 0.07115 skills – 0.1021 knowledge + 0.05799 attitude

't' (6.5986) (0.3979) (-0.5694) (0.412347)

We accept the alternate Hypothesis and reject the null and conclude again that Skill sets of the manpower working on a telecommunication wire line project have the most impact on the cost over runs ie the cost over runs are dependent primarily on the Skill sets of the manpower working on that project. In comparison more than knowledge attitude plays the second role in keeping the cost over runs low.

Objective –V: To analyze impact of skills, knowledge and attitude on the quality of the project

Null Hypothesis- All the three independent variables skill, knowledge and attitude have equal impact on the quality of the wire line telecommunication project. quality is dependent on the skills, knowledge and attitude of the manpower.

Alternate Hypothesis – Either skill or knowledge or attitude are important for the quality of the project or two of the competencies have impact on the quality of the project.

Mathematical Model

Y (Quality) = $\alpha 0 + \alpha 1$ (skill) $+\alpha 2$ (knowledge) + $\alpha 3$ (attitude) + θ

Y (estimated) = 3.6455 + 0.050736 skills + 0.040 knowledge + 0.17503 attitude

t (4.45) (0.27051) (.0213186) (1.18649)

We accept the alternate hypothesis and reject the null and conclude that for quality component of the project success it is not only skill sets of the manpower but also knowledge which plays important role in the success of a wire line telecommunication Project, refer annexure - VI

Objective –VI: To suggest some measures to improve the success level of the project

As observed in the regression analysis and descriptive statistical results, we may suggest that due to poor skill sets and knowledge of the manpower working on wire line telecommunication project, the project ran beyond schedule. The time over run was calculated to be approximately 188 days, which resulted into cost over runs also. The client did not take over the project due to various quality related issues.

The suggestions are for Reliance communications that it must select vendors with great care and through some qualifying criteria. Training and development programs of the employees should be made mandatory and trainings must be imparted by Reliance to its vendors.

Conclusions of the study

Wire line telecommunication projects are very sensitive. Services like voice and data is delivered to the end user through copper or fiber networks by various telecommunication service providers. The telecommunication networks are either under ground or aerial. The aerial networks are rolled out on poles or building to building. It was found that for a wire line telecommunication project skill sets play vital role in project deliverables, in keeping time and cost over runs under control. Research revealed that for quality, it is not only the skill sets or attitude which is important but the Knowledge also which plays important role in project quality.

The analysis showed that correlation between manpower competence and project success is very low ie 0.23. Though there is a positive correlation between the two yet its intensity is very low. It may be concluded that if the competence of the manpower increases the project success will also increase but the degree of association is not high. There are other factors responsible for the success of the project like machines, material, money and time.

Abbreviations of Technical Terminology

TRAI	Telecom regulatory authority of India
Teledensity	Telephones per 100 people
LCO	Local cable TV operator
TSP	Telecommunication service provider
E2E	End to End
PCC	Plain cement concrete
NGL	Natural ground level
OFC	Optic fiber cable
Kms	Kilometers
EDP	Electronic data processors
DLC	Digital Loop carrier
CDP	Central distribution frame
IDF	Intermediate distribution frame
IMDF	Intermediate Directory Frame
BAN	Building access node
Mph	miles per hour
CAPEX	Capital expenditure
FEO	Field Engineer
Teledensity	Telephones per 100 people
SLA	Service level agreement

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ANNEXURES

Annexure –I (Descriptive Analysis results of Skills, Knowledge and attitude)

Skills		*Knowledge*		*Attitude*	
Mean	5.5	Mean	5.37037	Mean	4.61111
Standard Error	0.244792	Standard Error	0.24271	Standard Error	0.19856
Median	6	Median	6	Median	4.5
Mode	6	Mode	7	Mode	4
Standard Deviation	1.7988466	Standard Deviation	1.78353	Standard Deviation	1.45909
Sample Variance	3.2358491	Sample Variance	3.18099	Sample Variance	2.12893
Kurtosis	-1.259704	Kurtosis	-0.7614	Kurtosis	-0.3317
Skewness	-0.070689	Skewness	-0.2351	Skewness	0.26376
Range	6	Range	7	Range	6
Minimum	2	Minimum	2	Minimum	2
Maximum	8	Maximum	9	Maximum	8
Sum	297	Sum	290	Sum	249
Count	54	Count	54	Count	54
Confidence Level (95.0%)	0.4909904	Confidence Level (95.0%)	0.48681	Confidence Level (95.0%)	0.39825

Annexure-II (Descriptive analysis results of Deliverables, Time over runs, cost over runs and quality.)

Deliverables		*Time over runs*		*cost over runs*		*quality*	
Mean	5.24074	Mean	5.5	Mean	5.2593	Mean	4.38889
Standard Error	0.1266	Standard Error	0.149	Standard Error	0.1873	Standard Error	0.19856
Median	5	Median	5.5	Median	5	Median	4
Mode	5	Mode	6	Mode	4	Mode	4
Standard Deviation	0.93031	Standard Deviation	1.0946	Standard Deviation	1.3761	Standard Deviation	1.45909
Sample Variance	0.86548	Sample Variance	1.1981	Sample Variance	1.8938	Sample Variance	2.12893
Kurtosis	0.19746	Kurtosis	-0.2281	Kurtosis	-1.151	Kurtosis	0.51367
Skewness	-0.0701	Skewness	0.1345	Skewness	0.0526	Skewness	0.94733
Range	4	Range	5	Range	5	Range	6
Minimum	3	Minimum	3	Minimum	3	Minimum	2
Maximum	7	Maximum	8	Maximum	8	Maximum	8
Sum	283	Sum	297	Sum	284	Sum	237
Count	54	Count	54	Count	54	Count	54
Confidence Level (95.0%)	0.25393	Confidence Level (95.0%)	0.2988	Confidence Level (95.0%)	0.3756	Confidence Level (95.0%)	0.39825

Annexure – III (Impact of Skills, Knowledge and attitude on Project deliverables)

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.257019907				
R Square	0.066059232				
Adjusted R Square	0.010022786				
Standard Error	0.925637174				
Observations	54				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	3.030161461	1.01005	1.1789	0.3272
Residual	50	42.84020891	0.8568		
Total	53	45.87037037			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	4.839147718	0.512116602	9.44931	1E-12	3.8105
Skills	0.202482655	0.117358932	1.72533	0.0906	-0.0332
Knowledge	-0.17258011	0.117674991	-1.4666	0.1488	-0.4089
Attitude	0.046573922	0.092307491	0.50455	0.6161	-0.1388

Annexure – IV (Impact of Skills, Knowledge and attitude on time over runs)

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.342097				
R Square	0.11703				
Adjusted R Square	0.064052				
Standard Error	1.058948				
Observations	54				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	7.431423	2.477141	2.20902773	0.098568911
Residual	50	56.06858	1.121372		
Total	53	63.5			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	4.348204	0.585872	7.421763	1.3159E-09	3.171445032
Skills	0.22896	0.134261	1.705336	0.09433803	-0.040711216
Knowledge	-0.03282	0.134623	-0.24376	0.80841326	-0.30321344
Attitude	0.014909	0.105602	0.141182	0.88829332	-0.197198273

Annexure – V (Impact of Skills, Knowledge and attitude on cost over runs)

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.09554926				
R Square	0.009129661				
Adjusted R Square	-0.050322559				
Standard Error	1.410347637				
Observations	54				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0.916347466	0.30544916	0.153563	0.926915
Residual	50	99.4540229	1.98908046		
Total	53	100.3703704			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	5.148821022	0.780286769	6.59862659	2.55E-08	3.581568
Skills	0.071158397	0.178814007	0.39794644	0.692364	-0.288
Knowledge	-0.102106747	0.179295571	-0.5694884	0.571575	-0.46223
Attitude	0.057994288	0.140644363	0.41234704	0.681848	-0.2245

Annexure – VI (Impact of Skills, Knowledge and attitude on quality)

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.173997089				
R Square	0.030274987				
Adjusted R Square	-0.027908514				
Standard Error	1.479305956				
Observations	54				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	3.416028	1.138675905	0.520336	0.670244
Residual	50	109.4173	2.188346112		
Total	53	112.8333			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*
Intercept	3.645538093	0.818439	4.454260035	4.74E-05	2.001655
Skills	-0.050736968	0.187557	-0.270514872	0.787878	-0.42746
Knowledge	0.040092179	0.188062	0.213185796	0.832049	-0.33764
Attitude	0.175032493	0.147521	1.186491185	0.241036	-0.12127