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A REVIEW OF EMPLOYEE TURNOVER OF TELECOM ENGINEERS DEPLOYED IN THE NETWORK OPERATING CENTRE

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ABSTRACT

This study stems from the need to identify the factors that will enable a telecom service organization to retain its key resources in the National Network Operating Centre (NNOC- Network Function) and thereby ensuring its uninterrupted support to the telecom network operations and maintenance. The objective of this research is to analyze the aspirations of telecom engineers and the cause and effect of attrition in the NNOC and suggesting suitable remedial measures. This primary research, spread over two months, is based on the analysis of data garnered from 100 employees working in the NNOC in a leading pan-India telecom player, using stratified random sampling technique and a non standard structured questionnaire. The hypotheses of this study were validated empirically using One-Sample Kolmogorov Smirnov test. The research findings indicate that attrition in the NNOC can be managed by balancing the needs of the business and career aspirations of engineers.

KEYWORDS

Attrition, Employee Turnover, Job hopping, NNOC.

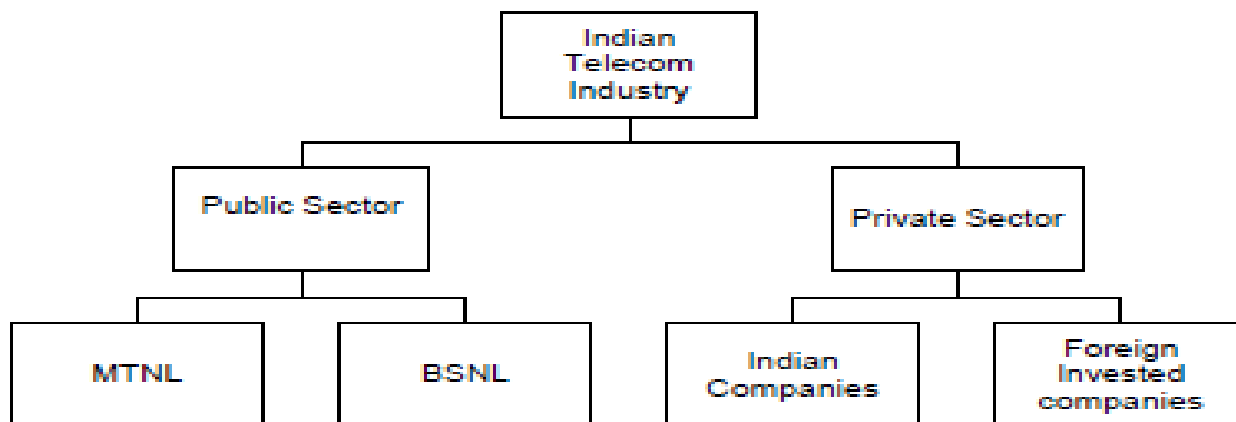
INTRODUCTION OF TELECOM INDUSTRY

The Indian telecom industry has seen tremendous growth in the last 10 years due to the liberal policies of the government and the extensive need for communication. A conducive business environment, favorable demographic outlook and the political stability enjoyed by the country have contributed to the growth of the industry. *The rapid growth of the Indian Telecom Industry has significantly contributed to India's GDP. Retaining the best talent is emerging as a major focal area for organizations while managing a highly skilled workforce. The primary area of concern for this sector is the spiraling attrition rate that is currently hovering around the 25% mark. The Indian Telecommunications network is the third largest in the world and the second largest among the emerging economies of Asia. The telecom sector has been one of the fastest growing sectors in the Indian economy in the past 4 years. This has been witnessed due to strong competition that has brought down tariffs as well as simplification of policy environment that has promoted healthy competition among various players. The growth of the industry prompted the government to allow more players on the field leading to an intense price war in an attempt to garner market share. The total number of mobile subscribers is expected to breach the 800 million mark by the end of the year 2012 accounting for an overall teledensity of around 70%. TRAI Annual Report. (2010-11).* India is fast emerging as the telecom hub of the world in terms of the growing demand, size of demand and FDI inflows. The rapid growth of the Indian Telecom Industry has been contributing to India's GDP. With more and more players entering the industry, retaining the best talent is emerging as a major focal area for organizations in general and HR Managers in particular. Retention of employees remains a significant KRA of all Managers in an organization, owing to talent scarcity (*Indian Telecom Industry, 2011*).

CURRENT STRUCTURE OF THE INDIAN TELECOM INDUSTRY

Currently, both public and private sector players are actively catering to the rapidly growing telecommunication needs in India. Private participation is permitted in all segments, including ILD, DLD, basic cellular, internet, radio paging, et al. The broad structure of the telecom industry (in terms of service providers) is depicted in Figure 1 below (*Preethi Sundaram et al. , 2009*);

FIGURE 1: STRUCTURE OF INDIAN TELECOM INDUSTRY



SEGMENTS IN THE TELECOMMUNICATION INDUSTRY

The telecom services in India can be divided into two broad segments, wire line services and wireless services. The industry classification is as follows:

- Wire line services (Fixed line telephone and Broadband)
- Wireless service: [Mobile Phone - GSM (2G, 3G and 4G) and CDMA (1x and HSD – Wireless Data Cards)]
- Internet services

- Public Mobile Radio Trunked Services (PMRTS)
- Global Mobile Personal Communication by Satellite (GMPCS)
- Very Small Aperture Terminals (VSAT)
- Mobile Value Added Services

MAJOR FUNCTIONS AND DIVISIONS IN THE TELECOM SERVICE ORGANISATION

- Wireless Planning and Engineering
- Wireless and Wire line Projects
- Wire line Planning and Engineering
- Network Operations Centre(NNOC)
- Transport Planning and Engineering
- Network Field Operations and Maintenance
- Data Planning and Engineering
- Network Quality and Performance
- Fixed Access
- International Long Distance and National Long Distance operations
- Installation and Commissioning of Network Infrastructure

STRUCTURE, FUNCTIONS AND CAREER IN THE NETWORK OPERATING CENTRE

The management of the modern day state-of-the-art telecommunication networks mandates a centralized management setup that can monitor, configure and troubleshoot network entities on a 24 *7 basis. The nerve centre of the LEADING TELCO Network is the spectacular 110,000-sq ft national Network Operations Centre (NNOC). The concept of one control centre for an entire network was a unique and pioneering concept in telecom Network Management. The significance of a single NNOC is that all services, including billing, databases and customer relations, can be managed centrally. This approach substantially reduces the cost of network management.

The Pan India network telecom organization is a convergence ready broadband Pan-India network consisting of terrestrial fiber optic links, submarine and satellite links, with a scalable and restorable global Next Generation Network (NGN) footprint supported by the latest standards and technologies. The network functions are supported by an integrated business and operational support (BSS-OSS) systems facilitating the delivery of a complex suite of services with end-to-end connectivity. The technologies deployed include Synchronous Digital Hierarchy (SDH), Dense Wavelength Division Multiplexing (DWDM), Optical Transport Network (OTN), Microwave, VSAT on the transport domain, 2G to 3G, GSM to UMTS, CDMA to HSD in the Wireless domain, Switching to Routing, IP to MPLS, TDM to NGN Soft Switch, Utilities, OSS and many more. The services provided includes POTS, PRI, Leased line, VoIP, HSD, Video Calling, Ethernet Leased Lines, L3-VPN, Mobile TV, Mobile broadband on 3G, etc.

The service assurance and service fulfillment functions for the LEADING TELCO network are carried out from the two world class state-of-the-art 24x7 National Operating Centers (NOC) at Navi Mumbai and Hyderabad. Both Hyderabad and Mumbai NOC also act as back up for each other and support service assurance functions in case of any emergency at either of NOC. With 500 + seats in each shift, NOC is equipped with Network Management Systems (NMS) and Operational Support Systems (OSS) to carry out Fault management, Configuration Management, Accounting, Performance Management and Security Management (FCAPS) on all Network elements in a LEADING TELCO network. The Integrated Network Operations Centre is responsible for the constant monitoring and troubleshooting of network devices, from a multitude of vendors including Ciena, Lucent, Huawei, ZTE, Ericsson, NEC, Ceragon, Siemens, Celtrio, Juniper, CISCO, Alcatel-Lucent, Atrica, UTStar and Telsima, to ensure round the clock management of the LEADING TELCO network. It specializes in technical issues relating to the network and guarantees a fast response time to all critical issues. Sophisticated alarm tools prioritize network related issues to ensure quick repair times. Scheduling of planned intervention and management of planned outages of the system, tending to basic daily network operation, fault handling and responding to customer queries are all tasks carried out by the NNOC teams. The NNOC ensures delivery of quality services to Customers; ensure efficient monitoring of network alarms, fault diagnosis and fault rectification within targeted Mean Time to Repair (MTTR) through a proactive response to the network incidents through Performance Monitoring.

The NNOC consists of the following functional blocks:

- Wireless NOC: Managing network elements serving mobile services
- Wire line NOC: Managing switch, Transport, Data, Wire-line Access, Fiber and Utility Network Elements
- Enterprise NOC: Interfacing, Communicating and Service Assurance of Enterprise Customers
- SOMG: Configuration and Provisioning Services on the Network Elements
- NMG: Manages all the NMS/PMS deployed in the NOC
- Performance Management: Taking care of Network and Services performance statistics, preventive actions as required

NNOC provides a challenging environment that fosters continuous learning, competency building and a progressive career in the telecom industry. A candidate can progress from the network surveillance function, to fault management, TAC (Technical Assistance Center) management and performance management in any of the following domains:

- Transport – Optical and Radio
- Data – Access, RDN (Reliance Data Network), MEN (Metro Ethernet Network)
- Switch and Adjunct
- Access Technologies
- Utilities

The role-career progression would be from an engineer to team lead, shift head, functional lead, technical manager in the domains mentioned above. The NNOC roles require candidates with good communication, inter-personal, analytical skills with sound conceptual knowledge and willingness to learn and adapt to the changing business landscape.

PERCEIVED CHALLENGES IN THE NNOC

- Time sensitivity - The KPI is to deliver quality results on time, hence there is a pressure to deliver always - "fire fighting mode"
- Increasing load - With increase in load observed over service and network layers, engineers get less time for skill set development in parallel domain.
- Shift Operation - Tendency to prefer general shift timing over A, B and C shifts
- Practical Exposure - Compared to planning and deployment, engineers from NNOC have less practical exposure to creation of network/services. Their role is to do assurance of the created infrastructure
- Routine operation- Not much of variety in day to day operations, unlike planning and deployment
- Dependency- On the Field unit is very high to deliver network KPIs, gap becomes evident in critical cases
- Escalation- After office hour escalations by customers / business are high on NNOC engineers
- Skills not matching the roles performed and hence the steep investment in training
- High attrition and consequently low productivity

- Impact on organization's performance - network performance owing to high turnover

The NNOC roles call for strong customer-facing skills, the ability to collect customer requirements and implement short- and long-term technical solutions. The positions required excellent proactive and day-to-day verbal and written communication skills with widely varying audiences. Fault management roles need to be adept in identifying gaps and/or persistent issues, proposing and implementing solutions to fill the gaps or to resolve the issues. Candidates need to possess the ability to thrive in an environment with rapidly shifting focuses and priorities, quickly learn new technologies, commitment to provide run-the-business and Tier 3/4 support for voice and collaboration solutions, and participate in on-call and/or 24x7 availability. They need to develop strong, proven fault and root cause analysis skills working in a global, distributed environment along with the strong vendor management skills.

Some of the key challenges of Engineers deployed in the NNOC are highlighted as under:

- Working in shifts
- Adapting the NNOC environment of fault, surveillance and performance management roles
- Balancing aspiration v/s role expectation
- Job repetitive, monotonous and chasing the field for closure network faults and fault management
- Raising trouble tickets and closure by continuous follow up with field engineers

PERCEIVED JOB OPPORTUNITIES FOR NNOC TELECOM ENGINEERS

With the mushrooming of the number of operators, we have witnessed significant growth in the infrastructure, subscriber base and the revenues over the past 5-8 years. There is a hiring spree, since the organizations had to quickly launch and roll out their services. Widespread job hopping for higher salary, bigger roles etc., was the buzz word until recently. Employee retention has become a very big challenge for the existing operators who have their operations running since 1996 or 2001. This steep growth compelled with the entry of new organizations in this space has created numerous job opportunities and the job hoppers had a free run by maximizing on the upward trends. With the entry of new operators, the existing skill shortage in the labor market resulted in steep increase in salaries to woo new employees or to hold on to existing ones. NNOC engineers are looking at planning, engineering, architecture and quality roles including roles in service assurance and service delivery in the network, in the competition companies to beat the monotony in the job and lack of growth. Alternatively, the telecom engineers are scouting for opportunities in the software organizations or with equipment manufacture or managed service operators in network management roles.

ATTRITION IN THE TELECOM INDUSTRY

The industry has been expanding and jobs mushrooming by the minute and hence it has all boiled down to attracting, managing and retention of talent. There is a scarcity of qualified and trained manpower to meet the growing needs. The Indian economy has been growing at a sturdy pace of 8% annually and has surely placed an enormous strain on the existing talent pool of various job opportunities. Conducive business environment, favorable demographic outlook and the political stability enjoyed by the country have contributed to the growth, resulting in the increase in job options. Shortage of skilled manpower has caused deep concerns in this space and with increasing workforce complexity the challenges have been mounting. The game changer, attrition, in an organization seems to decide outcomes. The changing paradigms, the cost of employee turnover, employee perspectives and new retention methodologies are worth studying for any practicing HR manager. Liberalization, Globalization and Privatization in the telecom space has provided job hoppers with multiple options. With more and more players at the marketplace, the pressure in terms of attracting and retaining the right talent is a challenge. The employment scenario is very promising and is creating employment opportunities and adding more and more people to its workforce. There is a huge demand for trained and qualified engineers and other professionals.

ATTRITION, EMPLOYEE TURNOVER AND JOB HOPPING

EMPLOYEE TURNOVER

Employee Turnover (ET) is defined as the ratio of the number of workers that had to be replaced in a given time period to the average number of workers. Attrition is the reduction in staff and employees in a company through normal means, such as retirement and resignation. Some of the significant aspects of ET are as listed below:

ET can be classified as:

- Voluntary Turnover- which is initiated at the choice of the employee
- Involuntary Turnover- where the employee has no choice in his/her termination (E.g. Long-term sickness, death or employer-initiated termination)

JOB HOPPING

A person changing jobs frequently is termed as a job hopper. Job hopping by employees has existed ever since the inception of the industry. An employee leaving an organization that did not meet his expectations when an alternative position became available in another organization was considered normal (**India Attrition Study, 2008**).

India is a country booming with youngsters who are ambitious, optimistic and hard-working. The country generating a large pool of engineers in electronics, communications and telecom after four years graduate program. Majority of the engineering students are keen to start their career in the industry after their graduation and prefer technology roles in the IT and Telecom sector. Bulk of the roles in the telecom service sector evolves around operations and maintenance or NNOC centric roles. However, close to 30% of the roles are available in the areas of planning, engineering, network architecture, quality and performance improvement. Today's engineering graduates are aspirational and are looking at accelerated growth prospects coupled with competitive compensation and adequate training and skill development. The current trends indicate that engineering students prefer IT roles when compared to Telecom industry operational roles and is a possible factor for high attrition rates in the NNOC and telecom industry. Managing employee turnover has thus become a major challenge for the Telecom industry, especially in India. This has led organizations to focus on methods and techniques to increase employee engagement and reduce attrition. It is now well understood by organizations that employee engagement is the force that drives performance outcomes.

CONSEQUENCES OF JOB HOPPING IN THE NNOC

Drop in productivity, increase in training costs, impact on work culture are a series of aspects associated with job hopping. No doubt job hopping has become the latest trend today, or a shortcut to success. The consequences of frequent job change are many, but the most affected area is loyalty with the organization. The consequences of job hopping by engineers in the NNOC are elaborated as under:

- Huge back log of trouble tickets not being closed impacting network performance
- Transfer of work load to other engineers resulting in long hours of work and burn out
- Delayed closure of network issues impacting network performance
- Inadequate support to the field on operation and maintenance issues
- Further trigger for attrition owing to instability
- Drop in customer satisfaction resulting in drop in revenues

Frequent movement of engineers has an impact on the continuity of business operations, productivity of employees, opportunity, hiring, training and induction costs etc. Whenever engineers in the NNOC leave an organization they carry with them the historical knowledge, functional and cultural knowledge of the organization, which takes a long time to replenish. Employee turnover in the NNOC surely impacts network service delivery. Employee turnover increases the payroll and retention costs and thereby impacting the profitability of organizations. Organization's growth and success would largely depend on stable,

motivated and highly engaged employees. Organizations with controlled attrition and employee turnover rates are normally more successful and consistent than the rest and hence this social phenomenon impacts the long-term interest of the employees, organizations and the society at large.

Higher pay and better employment prospects may be utmost for a person switching companies, but job-hopping can severely hamper career growth as well as wealth creation in long-term. The experts believe that sticking to the same company for more time, rather than aimlessly hopping jobs, can provide better learning and career momentum to young professionals. Job-hopping is taking place in the NNOC function owing to the following reasons some of which have been quoted below:

- Routine and Mundane work responsibilities
- 24/7 Shift working
- Follow up and chasing for closure of trouble tickets
- Rudimentary roles, job content and volume of activity
- Compensation and career prospects
- Job Stress
- Not much learning on the job
- No scope for accelerated growth

COSTS ATTRIBUTED TO ATTRITION IN THE NNOC

Attrition represents significant costs to Network operations and it seems to be one of those areas in which the management can make a difference and one that can be measured in quantifiable, financial terms against targets. Some of the costs attributed are listed below:

- Separation
- Recruitment
- Training
- On-boarding
- Drop in customer experience and revenue owing to stability of operations and maintenance
- Drop in network performance owing to delayed closure of trouble tickets, surveillance and performance management
- Loss of employee productivity
- Other administrative costs

REVIEW OF LITERATURE

The literature review enabled the researcher to study the phenomena of engineer's job hopping in the BPO and IT service help desk operations. These industry roles were some- what similar to the NNOC roles but from a different industry segment all together. There was virtually no research material available on the subject in libraries, digital libraries, books or journals which could have aided the researcher to study the trends with specific reference to the NNOC in the Telecom service industry.

Call centers and outsourcing have become the main components of globalization and is a result of unparalleled scientific and technological development throughout the world. Because of the vast employment opportunities provided by the Call Centers and Business Process Outsourcing (BPO), they are called the sunshine industries. Today India is the hub of BPO because of the availability of cheap and qualified workforce, state of the art technology, booming IT and telecommunication sectors and its unique geographical location. But the alarming rate of employee turnover in the Call Centers and other BPO sectors has become a stumbling block for the growth of this sector. In India, the average attrition rate in the BPO sector is approximately 30-35 percent (**Depak, Ramakrishna and Kripa, 2012**).

The greatest challenge for a Network Operations Center (NOC) is to balance the following three desired outcomes with respect to a communications network: the organization's mission, the support to the individuals, and network security. The fulcrum for this triangular shaped plate is that of a pinhead and these tasks are constantly outweighing each other. This paper is not intended to identify the perfect formula for this balance but only to show some real life concepts and solutions as well as some technical points. To manage all three outcomes requires a fair amount of knowledge, experience, and resiliency on the Network Operations Center Staff. This process involves the proper planning and configuration of resources, to include personnel, training, equipment, end-user awareness, and manageable policies. A working Network Operations Center (NOC) is a high speed, immediately responsive center that must operate in a proactive mode to be able to react to threats against the network at a moment's notice "Reaction" (**Peterson, 2001**).

Call centers are an increasingly important part of today's business world, employing millions of agents across the globe and serving as a primary customer-facing channel for firms in many different industries. Call centers have been a fertile area for operations management researchers in several domains, including forecasting, capacity planning, queuing, and personnel scheduling. In addition, as telecommunications and information technology have advanced over the past several years, the operational challenges faced by call center managers have become more complicated. Issues associated with human resources management, sales, and marketing have also become increasingly relevant to call center operations and associated academic research. This paper provides a survey of the recent literature on call center operations management. Along with traditional research areas, special attention to new management challenges that have been caused by emerging technologies, to behavioral issues associated with both call center agents and customers, and to the interface between call center operations and sales and marketing have been addressed. A handful of broad themes for future investigation are also listed along with several very specific research opportunities (**Zeynep Aksin, November-December 2007**).

The majority of IT organizations are under considerable pressure to evolve to a next generation Network Operations Center (NOC). For example, a survey of 176 IT professionals has uncovered the fact that over a quarter of NOCs do not meet their organization's current needs. In order to fulfill the current and emerging requirements, NOCs are being driven to do a better job of managing application performance, to implement more effective IT processes and to be able to troubleshoot performance problems faster.

While the survey results confirmed the conventional wisdom that a NOC is often stove-piped and reactionary, the results disputed the conventional wisdom that NOC personnel are focused largely on monitoring in general and that they spend the majority of their time on networking in particular. The survey results also showed that while the vast majority of NOCs are undergoing significant change, not all NOCs are starting at the same place in terms of the functionality that they currently provide. To be able to plan for the evolution of their company's NOC in this demanding yet uncertain environment, network professionals need an awareness of what their peers are doing to address the challenges they are facing, as well as an understanding of how well their efforts are succeeding (**Metzler, Dr. Jim, Ashton, Metzler & Associates, 2011**).

A well-organized IT infrastructure support system can help enterprises and service providers improve IT staff productivity and retention while simultaneously increasing uptime and providing a better end-user experience. The use of a tiered support structure containing a 24x7 Network Operations Center (NOC) can help IT Support Managers cost-effectively address their IT support needs by leveraging lower-cost first-level (Tier 1) support (**Rao, 2008**).

The movement and collaboration of information has never before been more important to the success of tactical missions. Advanced mobile and wireless networking technologies have the capability to put critical information at the fingertips of the operator, enabling tactical units to successfully carry out their missions. The increasing use of expeditionary and special operations forces in ad hoc, dynamic, and tactical environments poses a need for an adaptable, flexible, and responsive deployable network operations center (DNOC) to support their efforts. Whether co-located or virtual, the DNOC must support tactical units by supplying them with the right information, at the right time, and in the right format. This platform must also provide a rapid, reliable, and secure communications network so forces can collaborate in a manner which builds quality interaction and trust (**Alex Bordetsky, 2012**).

Network Operations Center (NOC) is one or more locations from which control is exercised over a computer, television broadcast, or telecommunications network. Large organizations may operate more than one NOC, either to manage different networks or to provide geographic redundancy in the event of one site being unavailable or offline.

NOCs are responsible for monitoring the telecommunication network for alarms or certain conditions that may require special attention to avoid impact on the network's performance. For example, in a telecommunications environment, NOCs are responsible for monitoring for power failures, communication line alarms (such as bit errors, framing errors, line coding errors, and circuits down) and other performance issues that may affect the network. NOCs analyse problems, perform troubleshooting, communicate with site technicians and other NOCs, and track problems through resolution. If necessary, NOCs escalate problems to the appropriate personnel. For severe conditions that are impossible to anticipate – such as a power failure or optical fiber cable cut – NOCs have procedures in place to immediately contact technicians to remedy the problem.

NOCs often escalate issues in a hierarchic manner, so if an issue is not resolved in a specific time frame, the next level is informed to speed up problem remediation. Many NOCs have multiple "tiers", which define how experienced/skilled a NOC technician is. A newly-hired NOC technician might be considered a "tier 1", whereas a technician that has been there for several years may be considered a "tier 3" or "tier 4". As such, some problems are escalated within a NOC before a site technician or other network engineer is contacted. Additionally, the NOC staff may perform extra duties; a network with equipment in public areas (such as a mobile network Base Transceiver Station) may be required to have a telephone number attached to the equipment for emergencies; as the NOC may be the only continuously staffed part of the business, these calls will often be answered there (Wikipedia).

RESEARCH METHODOLOGY

This research is a blend of theoretical and empirical work and is descriptive in nature and has been carried out with specific objectives resulting in definite conclusions. The sample was drawn from LEADING TELCO-Network National Operating Centre based out of Navi Mumbai and the disaster recovery operating centre at Hyderabad. The population is approximately 850 permanent employees {excludes associate employees, outsourced, managed services employees, consultants and retainers, trainees (GET's/MT's)} who are currently working in the target organizations. The research was conducted in two phases;

Exploratory phase: Referred various literature on the subject and the exit interview analysis of the employees who have quit the NNOC function over the last 3 years. Validation phase: During the validation phase the questionnaire was administered on the target sample and the research instrument adopted the Likert scale with a few close ended questions.

DATA COLLECTION AND ANALYSIS

A sample of from a universe of permanent employees was the size of the sample for the final research and a stratified sampling method was adopted. The stratified sampling method was followed as it would have more statistical efficiency. The questionnaires were administered personally and involved face to face interviews. The various tests and analysis performed with the raw data using SPSS (Statistical Package for Social Sciences) are as under:

- Cronbach's Alpha reliability tests
- Pearson's Correlation technique
- One-sample Kolmogorov – Smirnov test
- Comprehensive Comparative Analysis of demographic data

Non-Parametric tests have been used to validate the hypotheses. The findings of the research have been presented in the research report after statistical validation. Each query has generated responses leading to employees subscribing to certain views, which has resulted in conclusive empirical evidence in the area of research.

DATA ANALYSIS AND INTERPRETATION

The demographic details of the participants of the survey are depicted below in table 1:

TABLE 1: DEMOGRAPHIC PROFILE OF THE PARTICIPANTS OF THE SURVEY

Experience Band	No of Respondents	Age Band	No of Respondents	Qualification	No of Respondents
Years	Nos.	Years	Nos.	Degree	Nos.
1-2	18	22 – 26	38	Diploma	3
2-6	50	27 – 31	31	B Sc/ B Com	6
6-10	20	32 – 36	18	BE/ BTech	87
> 10	12	> 37	13	Masters	4
Total	100	Total	100	Total	100

TABLE 2: QUESTIONNAIRE RESPONSES – DESCRIPTIVE STATISTICS

	Q1	Q2	Q3	Q4	Q5	Q7	Q8	Q9	Q10	Q11	Q12	Q14	Q15	Q16	Q13 Reverse Coded
N	Valid	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean	2.16	2.04	2.26	2.85	2.26	2.94	2.33	1.93	3.5	3.44	2.78	2.68	2.77	2.42	2.84
Std. Error of Mean	0.1	0.08	0.11	0.11	0.1	0.103	0.1	0.08	0.109	0.116	0.086	0.09	0.09	0.1	0.103
Median	2	2	2	3	2	3	2	2	4	4	3	3	3	2	3
Mode	2	2	2	2	2	2	2	2	4	4	2	3	2	2	2
Std. Deviation	0.95	0.84	1.07	1.095	0.99	1.033	0.99	0.81	1.087	1.157	0.86	0.89	0.93	0.96	1.032
Variance	0.9	0.71	1.14	1.199	0.98	1.067	0.97	0.65	1.182	1.34	0.739	0.79	0.87	0.91	1.065
Skewness	0.97	1.18	0.93	0.445	0.85	0.402	0.97	0.72	-0.34	-0.33	0.346	0.5	0.71	0.55	0.441
Std. Error of Skewness	0.24	0.24	0.24	0.241	0.24	0.241	0.24	0.24	0.241	0.241	0.241	0.24	0.24	0.24	0.241
Kurtosis	1.36	2.31	0.41	-0.71	0.43	-0.55	0.41	0.28	-0.54	-0.81	-0.43	0.43	0.09	0.19	-0.578
Std. Error of Kurtosis	0.48	0.48	0.48	0.478	0.48	0.478	0.48	0.48	0.478	0.478	0.478	0.48	0.48	0.48	0.478
Range	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4
Percentiles	25	2	2	2	2	2	2	1	3	3	2	2	2	2	2
	50	2	2	2	3	2	3	2	4	4	3	3	3	2	3
	75	3	2	3	4	3	4	3	2	4	4	3	3	3	4

DATA INTERPRETATION

The descriptive statistics of the questionnaire responses is presented in the table 2. These include mean, standard deviation, skewness and kurtosis. Skewness is used for distribution analysis and is indicative of a sign of asymmetry and deviation from a normal distribution. Out of the 16 factors 14 indicate positive skewness while the remaining 2 factors are negatively skewed. Kurtosis is an indicator used in distribution analysis as a sign of flattening or "peakedness" of a distribution. Most of the factors have a Kurtosis > 3 which is indicative of a Leptokurtic distribution, sharper than a normal distribution, with values concentrated around the mean and thicker tails. This means high probability for extreme values.

QUESTIONNAIRE RELIABILITY

The cronbach alpha test was performed for testing the reliability of the research instrument. Post the reverse coding of Q13 the test was positive and the reliability was established.

The table 3 & 4 indicates that the reliability of the research instrument can be significantly improved by omitting Question 6 from the analysis. The recomputed reliability coefficient α is presented in the table below:

TABLE 3: CRONBACH ALPHA TEST

Reliability Statistics	
Cronbach's Alpha	N of Items
.726	15

TABLE 4: CROBACH ALPHA TEST AFTER DELETION Q6

Item-Total Statistics				
Question	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1	37.04	41.231	.234	.721
Q2	37.16	39.307	.473	.699
Q3	36.94	37.289	.502	.691
Q4	36.35	37.442	.474	.694
Q5	36.94	39.734	.342	.710
Q7	36.26	40.800	.237	.722
Q8	36.87	37.084	.578	.684
Q9	37.27	43.856	.045	.737
Q10	35.70	41.586	.158	.732
Q11	35.76	40.346	.225	.725
Q12	36.42	43.519	.065	.736
Q14	36.52	40.030	.372	.708
Q15	36.43	40.086	.343	.710
Q16	36.78	38.598	.462	.697
Q13 Reverse Coded	36.36	38.475	.426	.700

QUESTIONNAIRE RELIABILITY - INTERPRETATION

Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. The alpha coefficient for respondent data is 0.726 which indicates a high internal consistency of the scale items (**Cronbach Alpha, 2012**) (Refer Table 5).

TABLE 5: PEARSONS CORRELATION TEST

Questionnaire Data – Co-relational Analysis		Q1	Q2	Q3	Q4	Q5	Q7	Q8	Q9	Q10	Q11	Q12	Q14	Q15	Q16	Q13 Reverse Coded
Q1	Pearson Correlation	1	.283**	.088	.169	-.130	.246	-.014	.002	.049	.091	.204	.049	.145	.303**	.068
	Sig. (2-tailed)		.004	.385	.093	.196	.013	.892	.988	.629	.366	.042	.625	.151	.002	.504
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q2	Pearson Correlation	.283**	1	.472**	.270*	.242*	.096	.252*	-.041	.144	.086	.180	.153	.283**	.356**	.182
	Sig. (2-tailed)	.004		.000	.007	.015	.342	.011	.689	.153	.397	.073	.128	.004	.000	.070
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q3	Pearson Correlation	.088	.472**	1	.456**	.422**	.087	.435**	.010	.000	.029	.063	.259**	.193	.248*	.395**
	Sig. (2-tailed)	.385	.000		.000	.000	.387	.000	.925	1.000	.774	.535	.009	.055	.013	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q4	Pearson Correlation	.169	.270**	.456**	1	.250*	.179	.393**	.057	-.013	.204	.008	-.019	.194	.370**	.399**
	Sig. (2-tailed)	.093	.007	.000		.012	.074	.000	.576	.900	.042	.941	.853	.053	.000	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q5	Pearson Correlation	-.130	.242*	.422**	.250*	1	.075	.356**	.099	-.009	.049	-.063	.314**	.197*	.161	.229*
	Sig. (2-tailed)	.196	.015	.000	.012		.461	.000	.328	.926	.629	.536	.001	.050	.110	.022
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q7	Pearson Correlation	.246*	.096	.087	.179	.075	1	.178	.055	.099	.014	.110	.233*	-.067	.169	.086
	Sig. (2-tailed)	.013	.342	.387	.074	.461		.076	.584	.327	.891	.275	.020	.507	.093	.397
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q8	Pearson Correlation	-.014	.252*	.435**	.393*	.356**	.178	1	.106	.108	.252	-.033	.377**	.282	.366**	.460**
	Sig. (2-tailed)	.892	.011	.000	.000	.000	.076		.296	.283	.011	.747	.000	.004	.000	.000
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q9	Pearson Correlation	.002	-.041	.010	.057	.099	.055	.106	1	.178	-.021	-.066	-.060	.019	-.119	.035
	Sig. (2-tailed)	.988	.689	.925	.576	.328	.584	.296		.076	.838	.514	.554	.854	.240	.730
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q10	Pearson Correlation	.049	.144	.000	-.013	-.009	.099	.108	.178	1	.096	-.032	.073	.245*	.078	.072
	Sig. (2-tailed)	.629	.153	1.000	.900	.926	.327	.283	.076		.340	.749	.468	.014	.442	.476
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q11	Pearson Correlation	.091	.086	.029	.204*	.049	.014	.252*	-.021	.096	1	.037	.139	.095	.215*	.161
	Sig. (2-tailed)	.366	.397	.774	.042	.629	.891	.011	.838	.340		.712	.169	.348	.032	.110
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q12	Pearson Correlation	.204*	.180	.063	.008	-.063	.110	-.033	-.066	-.032	.037	1	-.001	.176	.052	-.177
	Sig. (2-tailed)	.042	.073	.535	.941	.536	.275	.747	.514	.749	.712		.996	.080	.606	.079
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q14	Pearson Correlation	.049	.153	.259**	-.019	.314**	.233*	.377**	-.060	.073	.139	-.001	1	.277*	.256*	.297**
	Sig. (2-tailed)	.625	.128	.009	.853	.001	.020	.000	.554	.468	.169	.996		.005	.010	.003
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q15	Pearson Correlation	.145	.283**	.193	.194	.197*	-.067	.282**	.019	.245*	.095	.176	.277**	1	.087	.098
	Sig. (2-tailed)	.151	.004	.055	.053	.050	.507	.004	.854	.014	.348	.080	.005		.389	.332
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q16	Pearson Correlation	.303**	.356**	.248*	.370**	.161	.169	.366**	-.119	.078	.215	.052	.256*	.087	1	.315**
	Sig. (2-tailed)	.002	.000	.013	.000	.110	.093	.000	.240	.442	.032	.606	.010	.389		.001
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Q13 Reverse Coded	Pearson Correlation	.068	.182	.395**	.399*	.229*	.086	.460**	.035	.072	.161	-.177	.297**	.098	.315**	1
	Sig. (2-tailed)	.504	.070	.000	.000	.022	.397	.000	.730	.476	.110	.079	.003	.332	.001	
	N	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 6 represents the groups formed from the pool of questions for testing the hypothesis.

TABLE 6: DETAILS OF GROUPS

GROUP 1 (Q1, Q2, Q3)		Group 2 (Q4, Q5, Q8)		Group 3 (Q7, Q9, Q10, Q13, Q14, Q15)	
Reliability Statistics		Reliability Statistics		Reliability Statistics	
Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
0.524	3	0.597	3	0.426	6

Questions which could not be grouped are: Q6, Q11, Q12 and Q16

HYPOTHESES

Hypothesis 1: The roles and career options in the NNOC do not excite engineers to pursue their careers in the long term

Hypothesis 2: The NNOC roles do not provide adequate opportunities for skill and knowledge development

Hypothesis3: Engineers prefer planning and engineering roles as against pursuing a career in the NNOC

HYPOTHESES TESTING

TABLE 7: ONE SAMPLE KOLMOGORV SMIRNOV TEST – HYPOTHESIS TESTING

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of HYP1 is normal with mean 6.28 and standard deviation 5.37.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
2	The distribution of HYP2 is normal with mean 7.02 and standard deviation 7.70.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.
3	The distribution of HYP3 is normal with mean 1.10 and standard deviation 0.30.	One-Sample Kolmogorov-Smirnov Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

The table 7 shows that the null hypotheses have been rejected which leads to the following:

MAJOR FINDINGS

- The roles and career options in the NNOC does excite engineers to pursue their careers in the long term and hence the hypothesis is negated.
- The NNOC roles do provide good opportunities for skill and knowledge development and hence the hypothesis is negated
- Engineers prefer planning and engineering roles as against pursuing a career in NNOC and hence this hypothesis is validated

SUPPLEMENTARY FINDINGS

1. There is a positive co-relation between Q2 and Q3(Refer Table 5)

Candidates who were enthusiastic about NNOC roles and responsibilities at the time joining continued to maintain the optimism during their tenure with NNOC. They perceive that their qualifications, skill and career aspirations match with their current roles and responsibilities.

2. There is a positive co-relation between Q3 ,Q4, Q5, Q8 and Q13(Refer Table 5)

Candidates who perceived that their qualifications, skill and career aspirations match with their current roles and responsibilities reported that their training needs were fulfilled and could translate their learning to on-the-job experiences. There is also enough learning opportunities in the current role, scope for growth, career progression and preferred to pursue their career in the NNOC function.

3. There is a positive co-relation between Q4 and Q13(Refer Table 5)

Candidates who perceived that their training needs were identified and served also felt that there was scope for growth and career progression in NNOC.

4. There is a positive co-relation between Q8 and Q13, Q14 and Q15(Refer Table 5)

Candidates who reported that there are enormous learning opportunities in the current job/role also perceived further scope for growth and career progression in NNOC, multiple job opportunities outside NNOC and at the market place.

5. There is a positive co-relation between Q16, Q11 and Q13(Refer Table 5)

Candidates who preferred to pursue a career within the NNOC function perceived further scope for growth and career progression in NNOC, but strongly felt that their remuneration was not on par with their roles and responsibilities.

LIMITATIONS

This study is limited to the permanent employees of the NNOC and does not encompass the other functions of Network or other businesses or divisions in the telecom service organization.

Managed services operator employees, outsourced resources, consultants, trainees [Graduate Engineer Trainees (GET) or Management Trainees (MT)] or retainers have also been excluded from the study.

24x7 operations of the NNOC based in Navi Mumbai were only considered.

NNOC employees are not a full representation of the Network organization and resemble IT- BPO or IT service help desk organization. The lack of published literature on the attrition of NNOC employees or engineers working in similar roles was a challenge. Involuntary turnover or attrition was not considered part of this study or its impact on voluntary turnover. Host of other variables and factors that go into the decision of a job hopper might not have been covered owing to the magnitude of the social phenomenon, which could be part of the effort for future research. This study also does not cover the impact of non-work domain on job hopping.

DIRECTIONS FOR FUTURE RESEARCH

Similar studies could be undertaken for a larger audience i.e., covering the whole of the industry. Since bulk of the responses were gathered from participants of a Leading Telcom organization it would be relevant to cover all the NOC engineers working with other Telcos and managed network service providers for seeking a holistic picture and also for validation of this research findings.

ORGANIZATIONAL DIRECTIONS FOR FOCUSING ON RETENTION OF TELECOM ENGINEERS

At the conceptual level, job hopping of telecom engineers in the NNOC can be thought of a decision process that makes an engineer to voluntarily terminate his present employment in the NNOC with an organization to join another organization to pursue his career ambition. The decision process is conscious and is driven by the causes that reside in his personality and his membership of the present organization and the alternative avenues of employment that are available to him. The decision rests on the balancing act of values that an employee perceives that he stands to derive from the alternate organizational membership. The impetus for employee job hopping emanates from dissatisfaction with current position and eminent promise of a bright future elsewhere. The personality of an individual is a sum of his convictions, values, experience and expectations. It is reflected in the way he views his acts and of those around him in the work place.

Innovation matters for the company and the world hence, it is important to promote innovation and be on the cutting edge of technology. Employees, customers and the organization will benefit from the strengths in leading- edge technology. Therefore it is important to offer engineers friendly work-life policies and support work-life balance and flexible work options, making it easier for engineers to balance their busy work with their personal lives. Telecom engineers must be provided job rotation in the areas of planning, engineering, architecture, quality and performance management periodically in addition to their operation and maintenance roles to keep them motivated to continue working longer and delivering superior performance. Organizations must create a performance-based culture that talented people find very attractive. Believing in empowering employees as partners to success, offering job enrichment and best workplace amenities adds value. Culture can be considered to be among innovations and hence organizations must strive to provide an environment that is stimulating with high levels of motivation, empowerment, and recognition. An organization must provide employees exposure to the latest technologies which offer immense scope for professional development and career growth, across technological and functional areas. Organizations must help employees remain committed by providing learning through a series of job rotation programs and on the job development. Career growth must always be encouraged and

employees must be given opportunities to challenge themselves through on the job learning and cross functional rotations. Organizations must also invest in a comprehensive market survey and data analysis to arrive at a competitive compensation structure. Provide competitive benefits and incentive packages for employees based on superior performance.

CONCLUSION

The data analysis and the tests enabled the researchers to establish that telecom organizations can take the essence of this empirical research work for strengthening their people practices in the NNOC. It is established from the research findings that the telecom engineers prefer NNOC roles and do see opportunity to learn grow in the NNOC environment in a telecom service organization. The real test of the information and knowledge provided through this research endeavor is in its end use for managing job hopping of telecom engineers. While the researcher has spared no efforts in making this study as authentic, elaborate and also relate to the industry – market trends, there could be further scope for extending the boundaries of the research.

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APPENDIX

APPENDIX 1 – QUESTIONNAIRE SURVEY – ROLE OF ENGINEERS IN THE NNOC AND REASONS FOR ATTRITION

Name:	Age and Qualification:
Title :	Function and Role:
Total Experience :	NNOC Experience :

Sr. No.	Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Did you opt for a career in the NNOC while joining RCOM?	0	0	0	0	0
2	Were you excited with the roles and responsibilities offered to you while joining the NNOC function?	0	0	0	0	0
3	Did your qualifications, skill and career aspirations match with the roles and responsibilities offered to you?	0	0	0	0	0
4	Were you provided adequate training and proper induction for performing your role?	0	0	0	0	0
5	Are you applying your previously acquired skills, knowledge and experience in the current role	0	0	0	0	0
6	The current job in the NNOC is monotonous, repetitive and stressful	0	0	0	0	0
7	I like to work in shifts	0	0	0	0	0
8	There are enormous learning opportunities in the current job/role	0	0	0	0	0
9	I prefer Planning, Engineering, Quality and Architecture roles in the Telecom Industry	0	0	0	0	0
10	I prefer field roles in the Network O and M function	0	0	0	0	0
11	I am paid adequately for the current roles and responsibilities	0	0	0	0	0
12	Owing to high attrition in my team I am forced to handle additional work load	0	0	0	0	0
13	There is very little scope for career advancement, growth and progression in the NNOC function	0	0	0	0	0
14	My NNOC experience has provided me multiple alternate job opportunities at the market place	0	0	0	0	0
15	Industry offers multiple opportunities of my choice outside the NNOC function	0	0	0	0	0
16	I would prefer to work and pursue my career in the NNOC function.	0	0	0	0	0

APPENDIX 2

Response	Q1. Did you opt for a career in NNOC while joining RCOM?	Wt average
Strongly Agree	24	24
Agree	46	92
Neutral	24	72
Disagree	2	8
Strongly Disagree	4	20
Total	100	2.16
Response	Q2. Were you excited with the roles and responsibilities offered to you while joining the NNOC function?	
Strongly Agree	23	23
Agree	58	116
Neutral	13	39
Disagree	4	16
Strongly Disagree	2	10
Total	100	2.04
Response	Q3. Did your qualifications, skill and career aspirations match with the roles & responsibilities offered to you?	
Strongly Agree	23	23
Agree	47	94
Neutral	16	48
Disagree	9	36
Strongly Disagree	5	25
Total	100	2.26
Response	Q4. Were you provided adequate training and proper induction for performing your role?	
Strongly Agree	6	6
Agree	41	82
Neutral	24	72
Disagree	20	80
Strongly Disagree	9	45
Total	100	2.85
Response	Q5. Are you applying your previously acquired skills, knowledge and experience in the current role	
Strongly Agree	20	20
Agree	50	100
Neutral	17	51
Disagree	10	40
Strongly Disagree	3	15
Total	100	2.26
Response	Q6. The current job in the NNOC is monotonous, repetitive and stressful	
Strongly Agree	12	12
Agree	33	66
Neutral	36	108
Disagree	17	68
Strongly Disagree	2	10
Total	100	2.64
Response	Q7. I like to work in shifts	
Strongly Agree	4	4
Agree	35	70
Neutral	33	99
Disagree	19	76
Strongly Disagree	9	45
Total	100	2.94
Response	Q8. There are enormous learning opportunities in the current job/role	
Strongly Agree	14	14
Agree	59	118
Neutral	10	30
Disagree	14	56
Strongly Disagree	3	15
Total	100	2.33
Response	Q9. I prefer planning , engineering, quality & architecture roles in the telecom industry	
Strongly Agree	31	31
Agree	50	100
Neutral	14	42
Disagree	5	20
Strongly Disagree	0	0
Total	100	1.93

Response	Q10. I prefer field roles in the Network O&M function	
Strongly Agree	4	4
Agree	14	28
Neutral	30	90
Disagree	32	128
Strongly Disagree	20	100
Total	100	3.5
Response	Q11. I am paid adequately for the current roles and responsibilities	
Strongly Agree	5	5
Agree	19	38
Neutral	23	69
Disagree	33	132
Strongly Disagree	20	100
Total	100	3.44
Response	Q12. Owing to high attrition in my team I am forced to handle additional work load	
Strongly Agree	3	3
Agree	39	78
Neutral	37	111
Disagree	19	76
Strongly Disagree	2	10
Total	100	2.78
Response	Q13. There is very little scope for career advancement, growth & progression in the NNOC function	
Strongly Agree	7	7
Agree	20	40
Neutral	28	84
Disagree	40	160
Strongly Disagree	5	25
Total	100	3.16
Response	Q14. My NNOC experience has provided me multiple alternate job opportunities at the market place	
Strongly Agree	6	6
Agree	38	76
Neutral	42	126
Disagree	10	40
Strongly Disagree	4	20
Total	100	2.68
Response	Q15. Industry offers multiple opportunities of my choice outside the NNOC function	
Strongly Agree	3	3
Agree	42	84
Neutral	36	108
Disagree	13	52
Strongly Disagree	6	30
Total	100	2.77
Response	Q16. I would prefer to work and pursue my career in the NNOC function.	
Strongly Agree	15	15
Agree	43	86
Neutral	30	90
Disagree	9	36
Strongly Disagree	3	15
Total	100	2.42

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