

2018年度

デミング賞
受賞報告講演要旨

Indus Towers Limited

Chapter 1: Outline of the Organization

1.1 Indian Mobile Telecom

In the Indian Mobile Telecom Industry, the voice market witnessed massive growth during 2006-2012. It went from a subscriber base of 98 million in 2006 to 261 million in 2008 (166% increase vs '06) and to 904 million in 2012 (512% increase vs '06). To grab market share, telecom companies needed ways to *enhance network footprint, reduce time to market, reduce debt and drive efficiencies.*

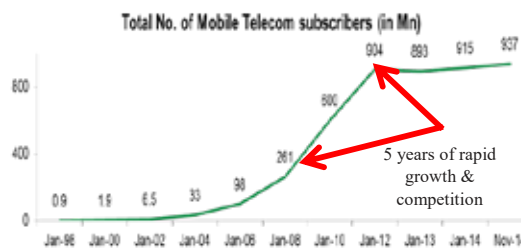


Fig 1.1: Growth of Indian Mobile Telecom Industry

1.2 Indus Towers Limited

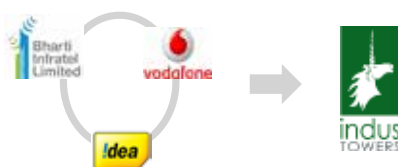


Fig 1.2: Formation of Indus Towers Limited

To achieve the above-mentioned objectives, Indus was formed as an independently managed company, offering passive telecom infrastructure to all telecom operators. Incorporated in November 2007, Indus was promoted under a joint venture between entities of Bharti Group including Bharti Infratel Limited, Vodafone India and Aditya Birla Telecom in a shareholding pattern of 42%, 42% and 16% respectively.

1.3. Business and Operating Model

Indus Towers was incorporated with an objective to provide shared passive telecom infrastructure to telecom operators on a non-discriminatory basis. Passive telecom infrastructure includes a physical tower structure (for mounting customers' antennae), a shelter with controlled environment to house customers' supporting equipment and stable, uninterrupted power supply.

Our operating model is to lease space from the owner of the property for a monthly rent. Indus then installs passive infrastructure equipment at this property. The passive infrastructure equipment is maintained through outsourced service providers to enable 100% uptime of active equipment through passive infrastructure.

Indus operates on an outsourced model wherein deployment of new sites, infrastructure upgrade on sites and the maintenance of these sites is done by the employees of our outsourced partners. We work in close collaboration with numerous Build services partners and maintenance partners, while our employees supervise and govern their operations.

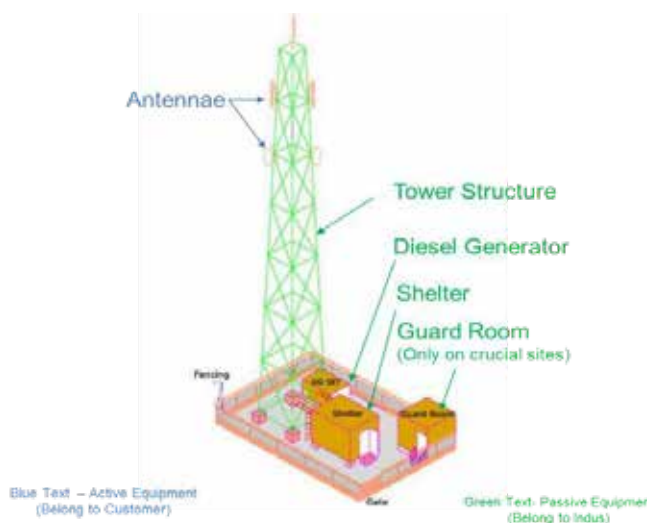


Fig 1.3: Depiction of Tower

Customer Value chain – From Receipt of **Service Request (SR)** from Customer to **Delivery of Site to Customer (RFAI – Ready for Active Installation from Indus Towers)**



Fig 1.4 – Customer Value Chain

1.4 Products and Services

Customers’ expectations from Indus include space to host their equipment, uninterrupted electrical power to activate their components and maintain uptime, and height to host the antennae. Our products provide Tower height, space on the ground and power for this equipment. These products are: Ground Based Towers, Roof Top Poles and Roof Top Towers. These constitute more than 90% of Indus’ portfolio.

With the increase in data consumption, there is a pressing need for socially acceptable and aesthetic solutions as well as a lower footprint in dense urban areas. Indus has launched several new products catering to these requirements. Ground Based Monopoles and Micro sites are new products that offer lower footprint on the ground. They are quicker to deploy and have been fueling the demand in High Density Cities, in recent times. The company is also deploying camouflage towers in areas where there is a requirement from landlords like Municipal Corporations for aesthetically pleasing solutions and where EMF radiation issues are raised by the community.



Fig 1.5: Types of Indus Products

1.5 Our Scale – Geographical Presence

India has been divided geographically by the telecom regulators into 22 telecom circles. Indus has operations in 15 of these telecom circles. The company does not operate in the remaining 7 circles because of a shareholder agreement giving rights to Bharti Infratel to operate in those 7 circles. With a portfolio of 123,191 towers, Indus is the largest telecom tower company in India, along with 2,96,631 active tenancies on its towers.

All data as of Dec 31, 2017



Fig 1.6: Indus Geographical

1.6 Indus’ Customers

Indus started by servicing 3 Joint Venture customers in 2008 and expanded to 18 customers by 2011. In 2012, Supreme Court cancelled 122 telecom licenses, which led to an Industry consolidation leading to 12 players. In recent times, the entry of Reliance Jio has led the industry into another wave of consolidation with effectively 6 players in the market with Vodafone and Idea announcing their Merger which is now in final stage of regulatory approvals.



Indus has consistently maintained high customer satisfaction ratings with 90% of the Respondents in our Customer Organizations considering us as the Best in the Industry (Customer Satisfaction Survey 2016-17). Indus’ Customer Satisfaction Index has grown from 53 in 2011 to 92 in 2017.

Chapter 2: Business Goals and Strategy

2.1 Background:

After formation of Indus and in the growing up years 2008-2010, the organization faced the following challenges:

- Need for Better Uptime of Sites
- Rapid growth expectations
- Energy cost management
- Lack of ‘One Organizational Culture’ to support Customer expectations

In order to have the entire organization aligned and focused we set out to define our Vision, Values and common goals or BHAGs.

2.2 Vision, Values and BHAGs – Part 1 (FY 2012-16)

Our Vision statement “We transform lives by enabling communication” defines the purpose of our existence and what we want to achieve as an organization. Our ExCITE values: Excellence, Customer, Integrity, Teamwork and Environment guide our ways of working and behaviors expected out of our people.

Large scale interactions covering all our employees, followed by a leadership conclave for converging on BHAGs and targets was convened resulting in 7 BHAGs.

These were around becoming *Best in class Uptime, High growth in EBIDTA, Targeted growth in ROCE, Zero fatalities, Most Energy efficient company, a Preferred place to work by employees and Redefining how tower companies do business.*

2.3 BHAGs – Part 2 (FY 2017-21)

With the BHAGs-1 period ending on 31st March 2016, it was time to set up the next set of BHAGs for the organization to focus on. Hence, HR department was assigned this task of planning and executing the co-creation of these BHAGs from 2016-17 to 2021-22. This process started in Jan 2016 and ended in Apr 2016 and was titled as the BHAG 2021 project. Indus Towers partnered with an external consultant to facilitate the process of **co-creating** these BHAGs. Indus involved its **2400+ employees** in co-creating strategic and emotionally compelling.

The Framework:

Discovery process: This process included one on one interviews with Senior leaders (Management Committee members) and Focus group discussions with representative groups at all Circle locations.



Fig 2.1: BHAGs 2 development process

Design thinking workshop and Think Tank Team: Another team called ‘Think Tank’ was formed which comprised of leaders with strong conceptual skills drawn from different functions and circles. *Outcome:* This team came up with an alternate set of BHAGs through the following process:

Leadership workshop: A 2-day leadership workshop was facilitated by the consultants with the Senior leaders of the company, Circle CEOs and the Think Tank team. *Outcome:* Initial set of BHAGs and action plan for engaging with the rest of the organization.

Inclusion through LSIPs (Large Scale Interactive Programs): More than 2400 employees across levels and circles were covered through 14 workshops. *Outcomes of these workshops were* understanding people’s perception on the strengths and extent to which values are lived in the organization, Top ideas from each location on how to take the organization’s vision to the next level and Top voted themes from each location for BHAGs 2021

Confluence Workshop:

The confluence workshop was organized to bring all the inputs from the steps together to create and finalize an organization-wide plan to deploy new set of BHAGs. The key outcomes of the confluence workshop were top voted themes of BHAGs 2021

Governance Structure: Steering Committee to review progress and take decisions and 2 Teams (Design and Logistics) formed to conceptualize and execute the entire exercise.

Project Flow:

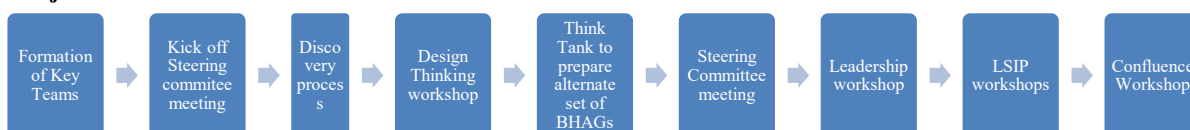


FIG2.2: PROCESS TO DEFINE BHAGS

Top BHAGs 2021 Themes, specific BHAGs, Targets and Strategy to achieve these BHAGs:

Post submission of these outcomes from the consultants, a Confluence workshop was conducted to decide on the Themes, BHAGs and the targets. Following is the outcome:

#	Theme	BHAG
1	Customer	Customer Centric Indus
2	Business Growth (Excellence)	<ul style="list-style-type: none"> • Revenue Growth • EBIDTA from New Streams
3	Environment, Innovation & Customer	Diesel Free Indus with renewable generation focus
4	Employees (Teamwork, Integrity)	Indus as a Great Workplace
5	Excellence	Indus system for Business Excellence
6	Safety	Zero-Zero-Zero

Chapter 3: TQM Promotion

3.1 Overview

In 2010 (almost two years after company's inception) core values of the company were articulated as ExCITE (Excellence, Customer, Integrity, Teamwork and Environment). To drive the value of 'Excellence' better and institutionalize the TQM principles a dedicated 'Process Excellence' function was formed. Terms 'TQM' and 'Process Excellence' are used synonymously. Process Excellence has got a team of 13 full time members. The team is also supported by TQM facilitators (34). These are Circle/Corporate Functions team members who support TQM promotion in their respective Circles/Corporate Functions in addition to their core roles and responsibilities.

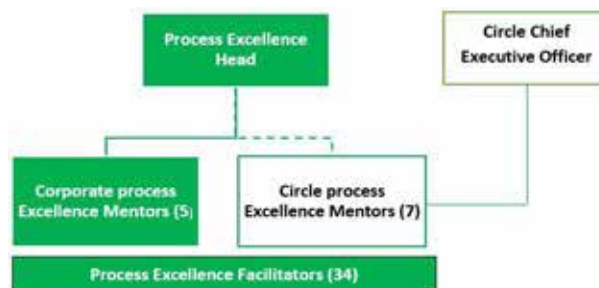


Fig-3.1 Organization structure of TQM promotion office

3.2 Need for TQM

Given the size and scale of operations at Indus it's important to have an umbrella under which the business can be run in a structured and effective manner. In addition to 2486 On-roll and 1479 Contractual employees, there is also a team of over 8100 technicians supporting our sites to carry out maintenance activities. There is also a large Partner base that supports in our day to day operations and needs to be managed effectively. Since all sites are not electrified in India, keeping sites up 24X7 is a huge ask with support of alternate equipment's like DG and Site on Battery. All the above coupled with the diverse geographical spread and expectations of being able to deliver since day one, made way for a strong case for Indus to adopt TQM. Below are the key challenges Indus was facing at the start of TQM Journey.

Features	BHAG, AOP, Policy Deployment, SR-CP	Process standardization RWM, DWM	Effective IT enablement	Total employee participation, group wada	Analytics and problem Solving, PDCA Rotation
Business Dynamics- Rapid Technology changes	○	△	●	○	●
B to B service industry	---	○	●	---	△
Geographically wide coverage, Corporate and Circle structure	●	●	△	●	○
Aspirational BHAGs	●	○	○	●	●
Effective Utilization of business partners	○	○	○	---	●
Diverse Asset base	△	●	●	△	●

● Strong Positive ○ Positive △ Weak Positive

Fig-3.2 Business Delivery at Indus Towers leveraging TQM

Internal Challenges	External Situation
<ul style="list-style-type: none"> • Non-uniform work culture across circles as Indus was born out of integration of three organizations • Non-uniform focus on Quality (High Growth phase) • Lack of Processes standardization • Communication gaps between Circles and Corporate office • Inconsistent outcomes on key customer requirements- Variation in Uptime, throughput (SR to RFAI), cost (Tower) across circles • Poor site hygiene • Non-standard Product Development 	<ul style="list-style-type: none"> • Rapid changes in telecom technologies • Non-availability of new products to cater increase in tenancy • Customer demanding reduction in energy cost at each site

3.3 TQM Journey

Year	Initial Phase FY 2011-13	Development Phase FY 2014-16	Consolidation Phase FY 2017-19
Objective	1. Creating a culture of continuous improvement 2. Availability of standardized processes to all employees 3. Horizontal deployment of Best Practices among Circles	4. Availability of all processes to employees in a standardized manner 5. Improve TQM participation in Field & Function staff 6. Extend Cross functional management to product development 7. Enhance Process knowledge	8. Build culture of data-based decision making 9. Establish Policy Management 10. Digitization of TQM promotion activities
Strategy	1a. Creation of TQM Promotion office 1b. Training of all employees, Launch of Newsletter, PE Blitz and Recognition Program to create awareness 1c. Creation of PE scorecard to gauge effectiveness 1d. Creation of Continuous Improvement framework - launch of GB, YB Program, PE Steering Committee formation 2. Documentation of key Processes 3. Launch of Replication Program	4a. Complete Mapping of Process Universe 4b. Creation of Online Process Repository 5a. Launch of QCC & RWM program 5b. Launch of TQM Facilitator Program 6. Comprehensive NPD process enhancement with CFT 7. Started Indus Process Certification Program (IPCP)	8a. Drive Usage of statistical tools 8b. Standardized CI Project Templates 8c. Added analytics as a part of FY-19 PE Scorecard (Owned by all functions) 9. Design and implement Indus Policy Deployment framework 10a. QCC - Online QCC project Module 10b. RWM – Auto Report Generation
Effects	1. 14-member PE Org created, PE Score at 87% (target 60%), 91% and 95% in FY11,12&13 against 90%, Value Impacted INR(Mn)- 350 2. No of Processes created – 29 3. 749 best practices replicated	4. No of online Processes available up from 29 to 88 5. QCC completed –1206, RWM Pilot in two Clusters 6. Development of 19 energy saving products leading to 25% reduction in energy cost. Next gen and i-Trans tower development (deployed at 4856 sites) 7. 92% of employees process certified	8. 986 Continuous Improvement projects closed 9. Policy Deployment completed across all layers of Organization 10. 2452 QCC projects closed through online portal, 100% FSE's receiving automated performance report through system
Problems carried	1. Entire Process Universe not covered in process creation exercise 2. Lack of standardization in Process availability 3. Lack of process compliance on ground despite Process Compliance Index self-certification index showing consistently high scores	1. Quality of Analytics in several improvement projects lacking depth 2. Manual interventions in PE programs	

3.4 TQM Deployment Framework

TQM framework at Indus is designed in lines with our Values and Culture and has undergone changes over years, current framework is mentioned in fig 3.4. TQM framework comprise of

- 1) Policy Deployment and RWM are done on an annual basis covering all levels of the organization and cross functional management for implementing best practices across circles.
- 2) Total Employee Involvement (TEI) takes care of employee involvement in TQM journey through trainings, Ideation and Recognition.
- 3) Continuous Improvement culture to solve business problems across all levels through QCC, YB and GB.
- 4) New Product development & Quality assurance to meet customer satisfaction.

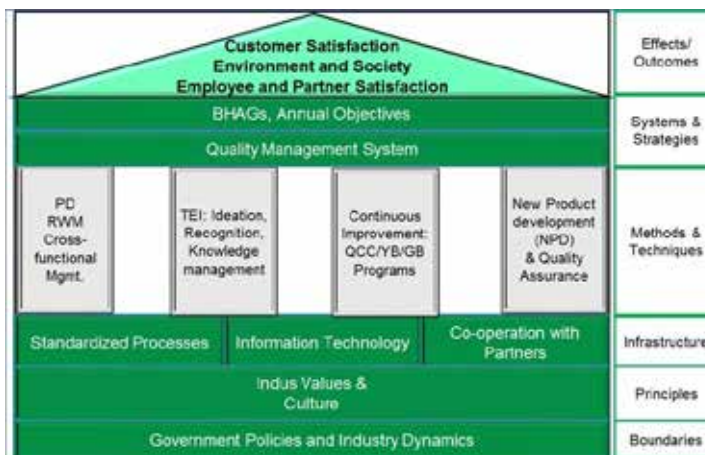


Fig-3.3 TQM framework at Indus

3.5 Process Excellence Scorecard

Indus has designed a Process Excellence Scoring System to measure the TQM health of various Functions (at Corporate office) and Circles. We named this as *Process Excellence Scorecard*. PE Scorecard was established in FY 11-12 and is refreshed every year with new parameters. The scorecard template is designed in the beginning of every financial year based on the priorities of the management. In initial phases, when the TQM culture was new to the organization, this scorecard helped us driving various elements of TQM.

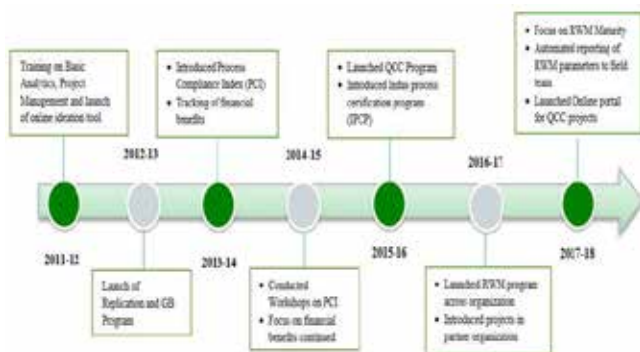


Fig 3.4 Journey of Indus TQM scorecard

	Unit of Measure (UoM)	%Wt
Value		
Value accrued from PE projects	INR Crs.	15
Total		15
Deming Readiness		
IPCP	%	10
Process Index	%	15
Project Sustainance	%	10
% of people YB certified	%	10
% of people TQM trained	%	10
RWM Implementation (including FSEs)	%	20
YB projects in partner organization	Num	10
Total		85
Total Weightage		100

Fig-3.5 TQM Parameters and weightage for FY 17-18

3.6 Policy Management at Indus

Policy deployment at Indus is built to achieve company BHAGs and ensure that individual goals are aligned to company goals. Policy deployment starts in December and ends in March. Policies are deployed from CEO to

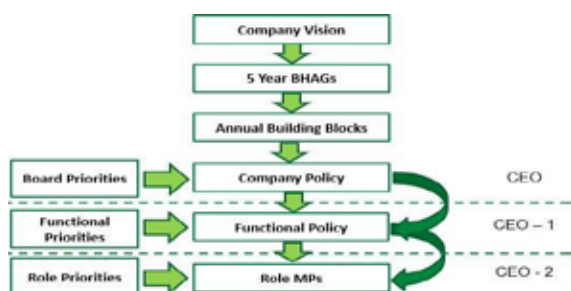


Fig-3.6 Policy Management framework at Indus

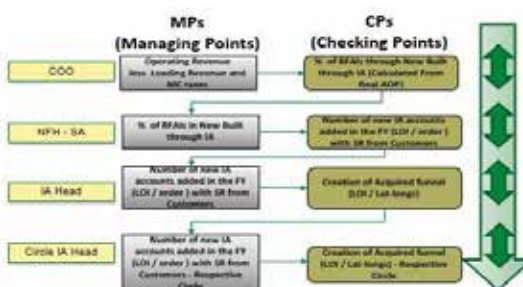


Fig-3.7 Example of Policy Deployment at Indus

functional heads through a catch ball process and national functional heads also identify objectives at functional level and cascade to their respective team in corporate and circle through a catch ball process. Following is the Policy Deployment Framework employed.

3.7 Routine Work Management (RWM)

Daily work management (DWM) at Indus is termed as Routine work management (RWM) as much of our work is not daily only but also done weekly, monthly and quarterly but certainly routinely. RWM is utilized as a critical tool to identify, monitor, analyze and improve the standards for key process parameters at each level based on roles and responsibility. RWM is implemented across all levels of the organization.

We have leveraged IT to provide us a frequent feed of targets and actuals for some of our key field roles in a standardized manner.



Fig-3.8 RWM Implementation Score trend

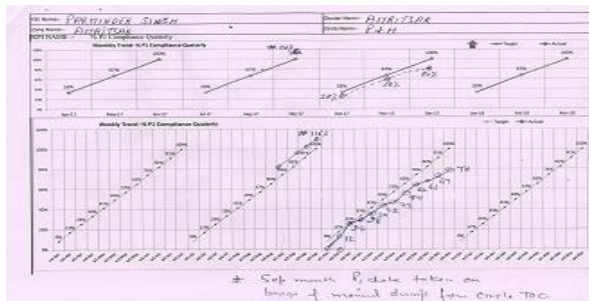


Fig 3.9 Tracking of performance in RWM sheets

3.8 Employee Idea Generation to drive Continuous Improvements

3.8.1 Overview

The improvement projects are classified into QCC Projects, Yellow Belt (YB) and Green Belt (GB) based on:

1. Complexity of problem
2. Geographical scope
3. Extent of impact on company's P&L
4. Solutions Known/Not Known
5. Depth of Analytics required

Selection Criteria matrix shown in following chapter



Fig 3.10: Linkage of Improvement Projects to Policy Management. Gaps in meeting targets play a vital role in Project selection across all levels

3.8.2 Indus Idea Incubator

All employees at are encouraged to submit ideas for driving Continuous Improvements. Everyone has access to our online idea submission platform 'Indus Idea Incubator'- an Indus designed platform and launched in Sep 2011 for Idea submission and available on Indus Intranet page. Entire workflow of idea submission by employee to idea approval

Parameters	Project Initiation	Type of Projects		
		GB Projects	YB Projects	QCC
Value in \$M	Corporate	8	-	-
	Circle	3	-	-
Scope	Corporate	Circles/Region	Within Function	-
	Circle	Circles	Within Function	Sites
Solution		Unknown	Unknown/known	Unknown/known
Idea Approved in Incubator		Y	Y	N

Fig-3.11 Project classification guidelines

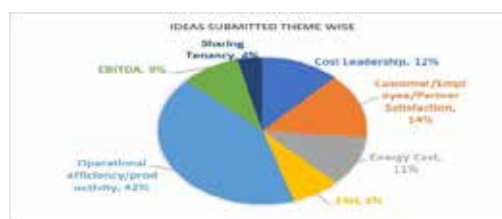


Fig- 3.12 Ideas Submitted in Incubator Theme wise

is automated. 11469 Ideas have been submitted by employees as of Dec'17 of which 3699 Improvement Projects have been closed.

3.8.3 QCC

Quality Control Circles (QCC) is aimed at resolving performance issues prevailing at sites leading to improvement in operational parameters. This is a program where field teams are engaged. At Indus Towers, QCC journey started in the year 2015. QCC structure consists of Field Support Engineer (FSE) as Team Leader & Technicians as Team Members. PE mentors impart training to the Team Leaders. FSE identifies the project and enrolls in the QCC Online module. Performance parameters like Automation, Sequence alarm, Energy cost, Thermal compliance, Equipment failure, Frequent Failure sites etc are considered. 6000+ QCC projects have been closed till Oct'18.

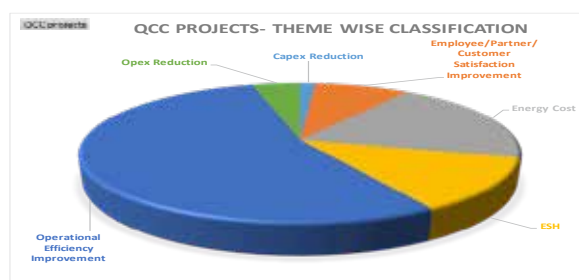


Fig-3.13 QCC projects Implementation Theme wise

3.8.4 Yellow Belt Program

The purpose of this program is to involve mid-level employees of organization in problem solving. Yellow Belt (YB) projects follow a PDCA approach. The major areas where employees have undertaken projects are Safety, EBIDTA, Energy Cost, Uptime, Cost Leadership, Tenancy Sharing, Operational Efficiency, Employee and Customer Satisfaction. The Project Manager can be any Indus employee. The Project Manager is mentored by the PE Mentor. 3800+ YB projects have been completed as of Oct'18. Best Practices from closed YB Projects are replicated across circles.



Fig-3.14 Idea Implementation theme wise

3.8.5 Green Belt Program

Green Belt (GB) Program at Indus has the intent of solving complex business problems, where solutions are not known and in turn to certify the Project Managers as GB post successful completion of the Project. The program aims at utilizing Structured Problem-Solving approach – DMAIC to address business pain areas with the usage of various Analytical / Quality tools. Key Participants of a GB Project are Project Manager (Drives the project), Project Champion (Provides direction to the project team), PE Mentor (Facilitates problem solving workshop). 60+ GB projects have been completed as of now.

Employees receives a GB certificate once they fulfill the following Criteria:

- 1) Completion of GB Training
- 2) Clearing GB exam
- 3) Project Closure following 5 successful Tollgate

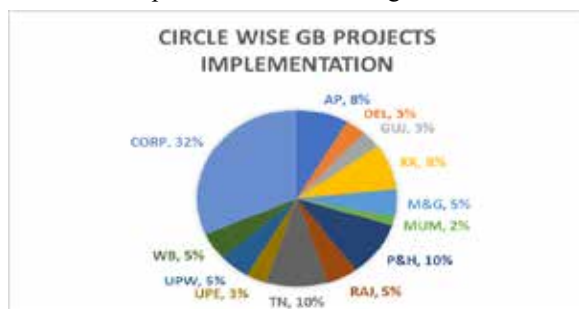


Fig 3.15 Circle wise GB projects implementation

3.8.6 Process Documentation & Refresh

Process for entire organization are made available in an online repository which can be accessed by all employees at given point in time. Processes in repository are available to users as per Function. They also initiate the process refresh exercise every year with the relevant stake holders of all processes. This is done to make sure the process repository is updated all the time and most recent processes are available. Total Number of Processes available online as of Oct' 18 is more than 425.



Fig-3.16 Snapshot of online process repository

3.8.7 Process Certification

Process Excellence team has a program to encourage all employees to get certified on the knowledge of the processes which are relevant to them. This program is called **Indus Process Certification Program (IPCP)**. The certification is facilitated through a web-based IT tool available to all Indus employees.



Fig 3.17 Process Certification process at Indus

3.8.8 Culture Building (TEI)

Recognition: A robust Recognition program across the organization recognizes key contributions of Indus Employee towards TQM on quarterly and annual basis.

Newsletter: PE Newsletter is published every month to increase the TQM awareness and update employees on TQM journey carried out.

Training: At Indus more than 90% of employees are trained on Basics of TQM. QCC Module focuses on basic analytics and covers FSE and Technicians. Yellow Belt Training Module focuses on PDCA approach, 7 QC Tools and Lean Concepts. Green Belt Training focus on DMAIC and advanced statistical tools.

Award Category	Presented to	Presented by	Quarterly	Annually
Best PE Circle	CCEO	CEO	Yes	Yes
Best PE Facilitator	PE Facilitator	CCEO	Yes	Yes
Best Ideator	Employee with Maximum Approved Ideas		Yes	Yes
Best YB Project	Project Manager		Yes	Yes
Best QCC Project	Project Manager (FSE)		Yes	Yes
Best GB Project	Project Manager		-	Yes

Fig-3.18 Award categories for employee recognition



Fig-3.19 Snapshot of Newsletter at corporate office

3.9 Effects

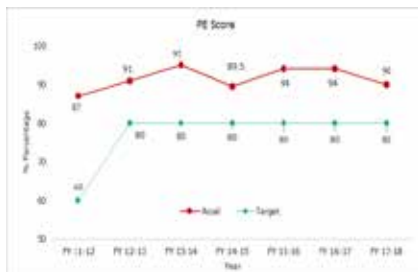


Fig-3.20 TQM score Movement YoY

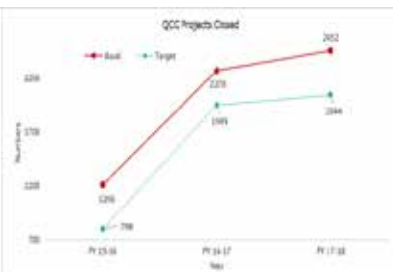


Fig 3.21 QCC projects closed (Number for FY 17-18 are till Mar '18)

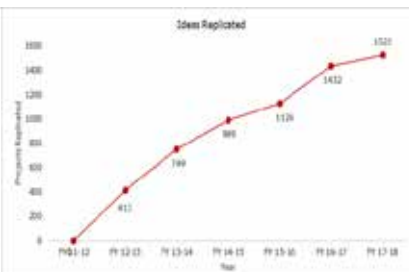


Fig 3.22 Projects replicated

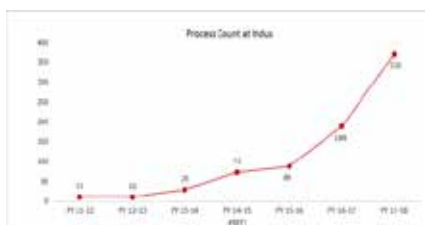


Fig 3.23 Process count at Indus. All process refreshed every year

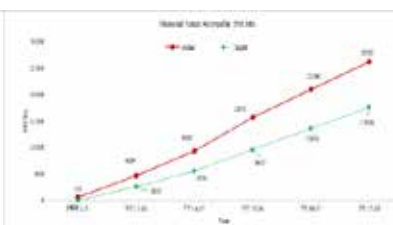


Fig 3.24 Values Accrued ((Number for FY 17-18 are till Mar '18)

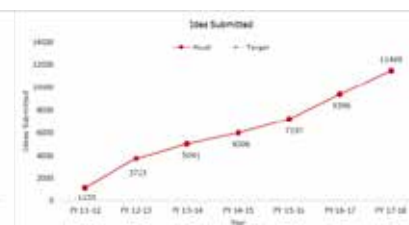


Fig 3.25: Ideas submitted in Incubator

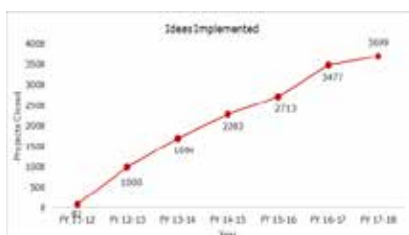


Fig 3.26: Idea Implementation Trend

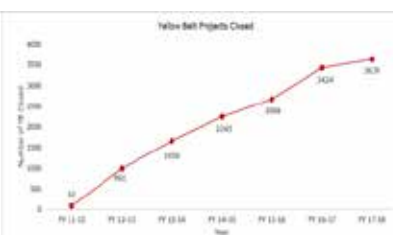


Fig 3.27: Yellow Belt Projects Closed

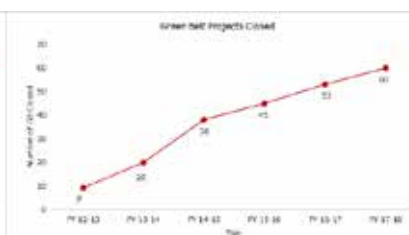


Fig3.28: Green Belt Projects Closed

3.10 Future Plans

- Creating 'Indus System of Business Excellence' for the organization in line with TQM
- Enhancing RWM Maturity levels, using IT System based RMW metric performance monitoring
- Create world class standards for Telecom Towers using TPM principles
- Competency Development and application of Advanced Analytics in RCA and problem solving

4.0 Quality Assurance

4.1 Overview

Quality Assurance in Indus Towers assures its customers (telecom operators) that new sites and their periodic expansions / up-gradations meet quality requirements for active installation as well as ensure the requirement of 99.95% uptime in each Circle.

The scope covers Launch, Build (Deploy) and Maintain (O&M) phases across all circles encompassing civil works, tower & structural erection and commissioning of electrical equipment customized to span across multiple wind zones, soil topographies, rural, urban and semi-urban & municipal areas. Delivering sites in institutional areas & public domains imposes additional market requirements like low footprint and camouflaging.

Quality process and requirements are defined by Indus and adhered by all Indus partners. Products are sourced from 93 Infra equipment partners, 380 Deployment Service Partners are engaged for site build including installation & commissioning, and various structural consultants and designers are used to address site specific customizations in the Circles. Maintenance services are sourced from 44 IME / OME partners for the upkeep of build sites and overseen by Indus field engineers & managers. Independent third-party inspection companies are engaged to certify that the above partners are fulfilling the requirements.

4.2 QA Framework

The quality framework aims to ensure consistent practices are followed across Indus Corporate functions and its Operating Circles with respect to Quality to meet Indus business requirements.

The below quality framework covers the customer value chain cutting across multiple functions and outsourced partners to ensure quality throughout all activities and provide a mechanism for consistent measurement of quality across the organization and drive continual improvements.

Quality records are digitized and stored in respective functional folders. Site quality records are digitized and stored in ISQ System (company server) for sites that are accepted by Circle Quality Heads. For sites falling under minor deployment classification, Deployment Head is responsible to maintain site documentation.



Fig-4.1 High Level Quality Assurance Framework

4.3 TQM Activities

Year	Initial Phase FY 2011-13	Development Phase FY2014-16	Consolidation Phase 2017-19
Objective	1. Delivery of quality sites as per scope / MSA (Master Service Agreement) signed with the Customers	2. Improve First Time Right (FTR) 3. Quality Assurance of Energy & Safety Projects	4. Zero defects (New Build & Sharing) 5. Quality Assurance for next generation telecom sites like smart cities, OFC & micro sites
Strategy	1a. Development of site acceptance process including guidelines and checklists for delivering new build / major upgrade sites as per specifications to customers 1b. Development of automated work flow (ISQ system) to manage inspection milestones 1c. Empanelment of 3rd party inspection companies for site inspection	2a. Identify and reduce sources of variability e.g.: Ready Made Concrete utilization 2b. Redefine IEC / IS standards for OEM as well as TSP procured items 2c. Ensure compatibility between different generations of equipment during product approvals 2d. Embed CTQs in product specifications 3. Extend quality process to Indus operational initiatives	4a. Use of automated construction techniques for defect elimination 4b. Use of AI / video analytics for remote construction monitoring of sites 4c. Devise and implement a strategy for measuring zero defects. eg: NDT for foundation 4d. Enhance the level of collaboration with partners to achieve top notch quality 5. Develop in-house quality team & achieve minimum 50% inspection coverage
Effects	1. Customer Acceptance > 99.50%	2. Improvement in first pass yield from 36% in 2012 to 82% in 2015.	3. Zero foundation defects as measured by NDT 4. Customer acceptance of new technology sites and ensure built hygiene and uptime.
Problems Carried forward	Low % of first time right (New Build & Sharing) Quality	Defects due to manual construction methods & limited supervision during build phase (in between quality milestones) Quality competence - high degree of flexibility to handle a wide variety of requirements / increasing complexity	

4.4 Effects

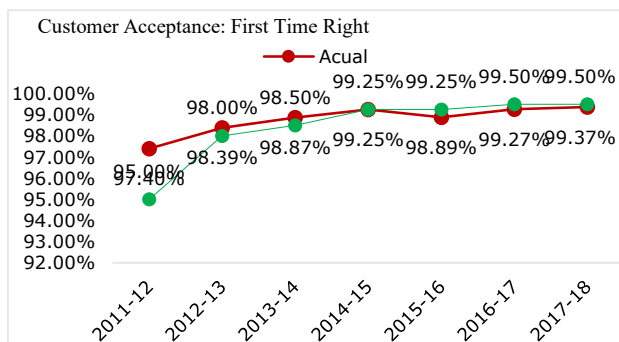


Fig4.2: Consistently achieving Customer FTR target score

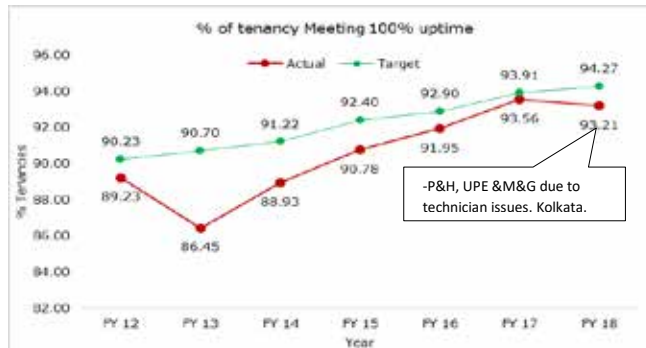


Fig4.3- Consistently improving

4.5 Future Plans:

- Re-alignment of quality assurance process and competence to fulfill evolving customer requirements from macro sites to micro, small cell sites to support their need for growth of data, migration of voice
- Competence development to certify infra for smart cities, OFC, street furniture.

Chapter 5: New Product Development (NPD)

5.1 Overview

Since inception in 2008, Indus has been creating innovative new products for building & maintaining best-in-class shared telecom infrastructure for telecom operators. Indus’s product portfolio comprises of total 314 products - divided into 3 key categories: **Tower** (*Structure for installing operator antenna & remote radio units at a certain height*), **Power** (*Equipment to provide uninterrupted DC power supply to active telecom equipment*) and **Space** (*Telecom and power equipment housing enclosures*).

Product Category	Total	Inherited	New Development	Obsolete	As on Jan'18
Tower	202	72	130	64	138
Power	68	23	45	11	57
Space	44	21	23	16	28
Total	314	116	198	91	223

Product portfolio has continuously been enhanced to meet evolving needs of customers (Operators, land owners, local community & municipal authorities) for rolling out 2G, 3G & 4G mobile services across geographies of the country.

Fig. 5.1: Indus Product Portfolio (No. of products)



Fig. 5.2: Product Portfolio Trend

During pre-TQM phase, the product portfolio comprised of limited off-the-shelf products which were not efficiently creating shared infrastructure for customers. A strong need was felt to enhance product portfolio with new products engineered to meet business requirements through New Product Development process. In, first step towards evolution of NPD process was established by defining standard product development requirements. Subsequently, NPD process was further evolved by adding detailed concept development, product engineering and proto evaluation steps for ensuring product robustness. Over a period of time, a comprehensive NPD process has been established with greater focus on understanding voice of customer & business.

5.2 Framework/Chart

For accomplishing Indus’s business goals and vision, New Product Development (NPD) at Indus is ensured by cross functional teams from *Technology, Sales & Marketing, Supply Chain Management, Acquisition, Deployment, Operations, Finance, ESH and IT functions*. For ensuring robust and faster development of new products as per evolving business needs. NPD process at Indus is governed by structured 3 stage gate reviews covering entire product development cycle including capturing voice of customer & business, concept development, product engineering, proto development & testing, seeking business case approval and obtaining customer sign-off before product launch. Regular customer feedbacks and learnings from field are incorporated by bringing-in continuous product improvements or upgraded products.

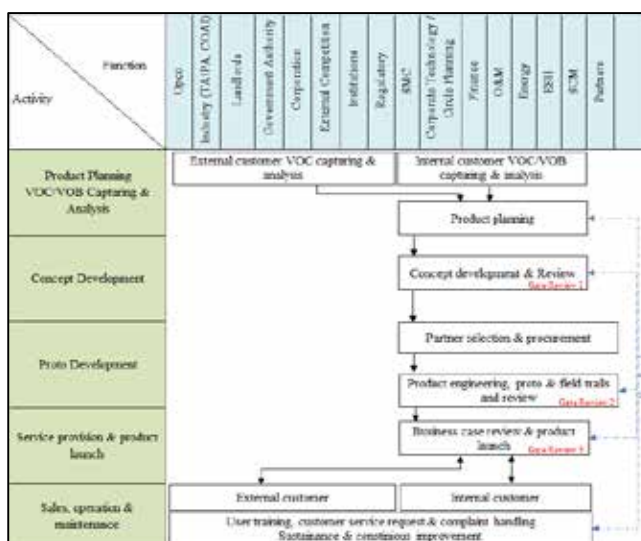


Fig. 5.3: New Product Development: Three Stage Gate process

Key Acronyms: VOC - Voice of customer; VOB - Voice of Business; SMC - Sales, Marketing & Corporate Communication; O&M - Operations & Maintenance; ESH - Environment, Safety & Health; SCM - Supply Chain Management; COAI - Cellular Operation Association of India; TAIPA - Tower and Infrastructure Providers Association

New Product Development Evolution




































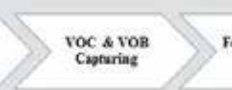
Time		Pre-TQM Phase 2008-10	Initial Phase 2011-13	Development Phase 2014-16	Consolidation Phase 2017-19				
Customer Needs	Telecom Operator	2G Rollout	2G & 3G rollout <i>(Coverage maximization & Energy Cost reduction)</i>	3G & 4G rollout <i>(Capacity maximization, CAPEX reduction)</i>	4G, Small Cells & Wifi hotspots <i>(Network densification – Indoor & Outdoor)</i>				
	Land Owners / Local Community			Low footprint & Aesthetic Sites <i>(Low footprint & aesthetic sites with clean architectural forms)</i>					
	Municipal Authorities			Digital India drive: Smartcity Rollout <i>(Integration of street & telecom infra, smart furniture, wifi hotspots)</i>					
New Products Evolution	Tower	 Inherited 1T Tower	 Latticed 4T Tower	 Latticed 2T Tower	 Nextgen 1.0 Low Footprint	 Nextgen 2.0 Aesthetic & Low Footprint	 Nextgen 3.0 Zero Footprint, Smart integrated with city infra (Street lights, Display boards, Wifi hotspots, Surveillance Camera)		
	Space (Equipment Enclosures)	 Inherited Puff Shelters	 Puff Shelters 4T	 Naturally Cooled Tower encapsulated	 Nextgen 1.0 Aesthetic, Low Footprint & Underground	 Nextgen 2.0 Aesthetic, Low Footprint & Underground	 Nextgen 3.0 Aesthetic, Smart integrated city infra (Public Toilet, Sitting Space)		
	Power	Power Management System	 Inherited PIU & SMPS	 Indus PMS & SMPS (Enhanced Capacity)	 IIPMS (Integrated, Temper proof)	 Outdoor SMPS (Low cost, energy efficient, high yield electricity utilization)	 Outdoor SPS (High Coefficient of Performance)	 Silent DG (Modular, Smart IoT enabled, Live Energy Monitoring)	
		Cooling System	 Inherited Air-conditioner	 Air-conditioner (Modular)	 Free Cooling Unit (Air-conditioner run-hour reduction)	 Natural Cooling Unit (Eliminate Air-conditioner for low tenant sites)	 Air-conditioner (High Coefficient of Performance)	 Solar Cooling Unit (Eliminate Air-conditioner for low tenant sites)	 Inverter Air-conditioner
		Storage System	 Inherited VRLA Battery	 VRLA + Battery (Fast charging, Long battery life, long battery back-up)		 Li-Ion Battery (Ultra fast charging, High efficiency, Deep discharge)		 Mobile Battery – Li-Ion (Battery on Demand, Cost optimization)	
	NPD Process Evolution		 Inherited Products	 Product Requirement Standardization	 Product Engineering	 Proto Evaluation & Testing	 Field Pilots (Limited Deployment)	 VOC & VOB Capturing	 Formal Product Launch

Fig 5.4: New Product Development Evolution

Key Acronyms: 2G – Second Generation; 3G – Third Generation; 4G – Ultra Generation; 1T – Single Tenancy, 2T – Two Tenancy; 4T – Four Tenancy; PIU – Power Interface Unit; SMPS – Switch Mode Power Supply; PMS – Power Management System; IIPMS – Indus Integrated Power Management System; SPS – Simple Power Solution; VRLA – Valve Regulated Lead Acid; Li-Ion – Lithium Ion

5.3 TQM Activities

Year	Initial Phase FY 2011-13	Development Phase FY 2014-16	Consolidation Phase FY 2017-19
Objective	1. Development new products to accommodate multi-tenancy	2. Develop new cost-efficient towers 3. Develop new energy efficient products 4. Develop low footprint towers for city deployment	5. Expand product portfolio for enhanced social acceptance and smart city deployments
Strategy	1a. Develop standardized tower designs for multiple tenancy 1b. Develop multi-tenancy power capacity & cooling equipment	2a. Develop value engineered towers for low tenancy regions 2b. Develop products to enhance power efficiency & energy saving products using natural air as a cooling mechanism. 2c. Develop sleek towers and compact equipment enclosures gelling with street infrastructure	5a. Develop aesthetic towers & new street furniture products (Tower, power & space) integrating infrastructure for telecom & smart public services (Wi-fi, street lighting, city surveillance, public toilets, sitting spaces etc.)
Effects	<ul style="list-style-type: none"> • 34 new tower products developed • 11 new power products developed 	<ul style="list-style-type: none"> • 'i-Trans' tower developed & deployed on 3814 sites resulting in substantial CAPEX and OPEX savings • Developed 19 energy efficient products leading to 25% reduction in energy cost per customer. • 30 new Nextgen towers developed & deployed on 1042 sites leading to additional revenue generation. 	<ul style="list-style-type: none"> • Aesthetic towers deployed on 1169 sites leading to additional revenue generation. • New Nextgen towers developed leading to 3 smart city wins
Problems carried	<ul style="list-style-type: none"> • High CAPEX for site build • High Energy cost • High footprint conventional towers posing difficulty for congested city deployments & causing increased public resistance 	<ul style="list-style-type: none"> • New products required for emerging demand of smart city rollouts 	

5.4 Effects

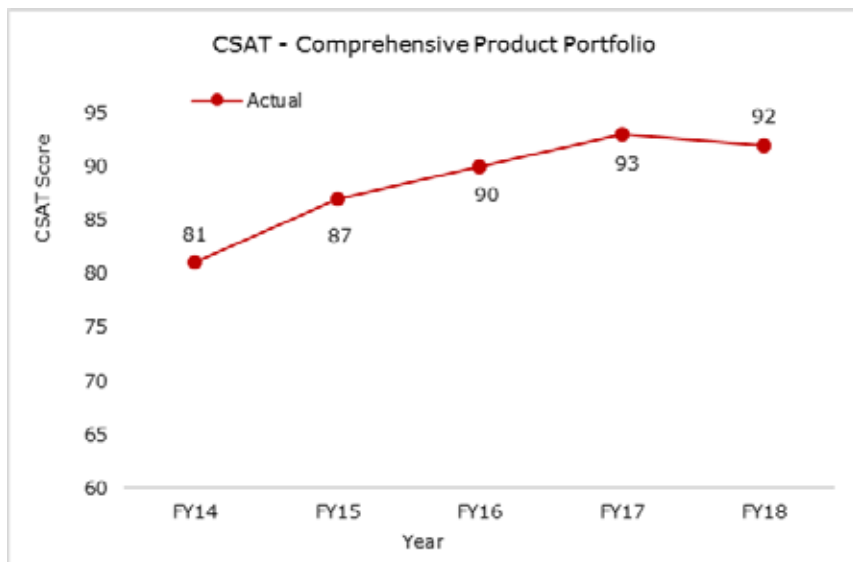


Fig 5.5: CSAT Score Improving across comprehensive Product Portfolio

5.5 Future Plans:

Future strategy for new product development being adopted by Indus is as follows:

1. Expanding product portfolio to meet needs of business, customers and community:
 - a. For creating **Digital Age Infra** – smart street furniture integrated telecom sites.
 - b. For bringing **Energy Nextwave** – Energy storage technology transformation.
 - c. Ensuring **Disaster Readiness** – for faster structure & energy restoration
2. For developing disruptive new products at a speed matching with the speed of telecom & digital technology disruption, automation of NPD process is being planned for significantly reducing product development time.

Chapter 6: HR Management

6.1 Overview

At Indus HR, we believe that in order to support the changing environment and rapid growth there is a strong need for our employees to be focused on creating and building a sustainable institution.

Best in class people practices go a long way in ensuring our employees also the prime role of Human Resources department at Indus Towers. While continuing to sustain the recognition of being a **‘Great Place to Work’** we also ensure employee commitment to highest levels of Customer Satisfaction and Business Growth. Our aim is to focus on creating a sustainable institution which is defined by best in class people practices.

6.2 Human Resource Framework

Cross functional framework helps in involving the employees to align collection of practices, programs and policies to facilitate the achievement of the organization’s strategic objectives. It integrates all HR programs & initiatives within a larger framework.

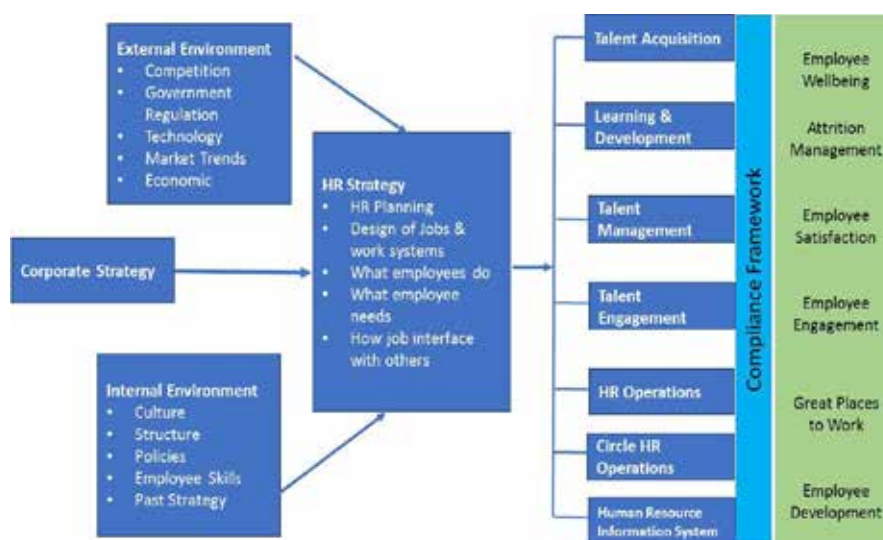


Fig 6.1: Cross functional framework of Human Resource at Indus Towers

6.3 TQM Activities

Year	Initial Phase FY2011-13	Development Phase FY2014-17	Consolidation Phase FY2017-19
Objective	<ol style="list-style-type: none"> Enhance skills, Knowledge of employees Improve employee engagement 	<ol style="list-style-type: none"> Enhance employee engagement Build field resource competence Build Functional competence 	<ol style="list-style-type: none"> Enhance employee engagement including FSEs Enhance the coverage of <ol style="list-style-type: none"> i-FCP CDP Improve financial & social status of employees Policy should be available with all the On-roll employees by 1st April every year.
Strategy	<ol style="list-style-type: none"> Strengthen L&D Development Plan for the organization Launch ‘i-Appreciate’ platform and predictive L&D calendar, Focus on career development & conversation 	<ol style="list-style-type: none"> Measure Managerial Effectiveness, Ensure Leadership accountability Introduce online training module to increase the coverage 	<ol style="list-style-type: none"> Celebrate value achievements in ExCITE award night. Celebrate value weeks Introduce online platform to increase the coverage Create wellbeing structure to address all 4 needs, social, financial, health and community

		5. Launch i-FCP (Indus Field Competency Program)	9. Deploy policy management to achieve business results
Effects	<ol style="list-style-type: none"> 1206 unique employees attended 3733 unique training programs. On an average one employee attended 3 training programs (a) Engagement score increased to 4.11 from 3.65 on scale of 5 (b) Engagement percentile improved from 37th to 68th 	<ol style="list-style-type: none"> Engagement score improved from 4.19 to 4.52 48 employees have progression from Engineer to Sr. Engineer a. Average score improved by a minimum of 5% b. Uptime improved from 99.976% to 99.981%. 	<ol style="list-style-type: none"> Engagement score improved from 4.52 to 4.61 a) 256 batches and 45905 learning hours devoted for i-FCP b) CDP extended to 59 roles and 32 programs delivered a.) 14% coverage of NPS, 368 employees enrolled made b.) 38 enrollments in Car Lease c.) 51 employees have touched 7782 lives by teaching students & engaged with community a. Deployed policy for all the on-roll employees (16-17) in the month of April 2016 b.) Deployed policy for Year 2017-18 for all the on-roll employees taking consideration of learnings of last year in the month of March, 2017
Problems carried	<ul style="list-style-type: none"> Employee engagement score still not at Industry benchmark 	<ul style="list-style-type: none"> Engagement Score to be improved to 4.57 from 4.52 Less coverage of i-FCP and CDP due to only classroom setup 	<ul style="list-style-type: none"> Revamp the I-FCP & CDP program to match technology changes Continue the New Policy Deployment framework

6.4 TQM Highlights

6.4.1 Initiative -1: Employee Satisfaction - a Successful Journey

Background/Problem: Since the beginning of Indus' operations, the organization was facing challenges in the form of high attrition, low productivity and uptime. To address all such issues, there was a need to do a dipstick check on employee satisfaction levels.

Approach & Tools Used: Indus had decided to participate in an engagement survey to know the engagement levels of employees and area of concerns. The first survey was conducted in 2011 and thereon, Indus decided to participate in the satisfaction survey every year, to measure the outcome of interventions.

Key Solution Implemented and Improvement Journey:



Fig 6.2: Employee Satisfaction Score Journey

Effect: Engaged Workforce at Indus has increased from 30% to 81% in 7 years

Increase in Overall Satisfaction scores to 4.64 in 2017 from 3.64 in 2011. Loyalty scores have gone up to 4.59 in 2017 from 3.64 in 2011 and advocacy scores to 4.71 in 2017 from 3.73 in 2011. They have also resulted in 51% positions being closed through Internal Job Postings in 2017. While the Telecom landscape in India is undergoing a huge change, productivity of employees is on a continuous rise with higher deliverables year-on-year.

6.5 Effects:

Continuous increase in employee satisfaction score for the Indus employees:

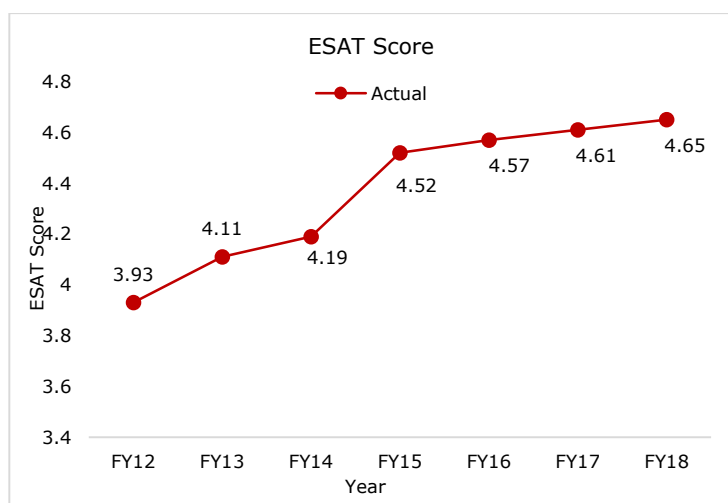


Fig 6.3: Employee Satisfaction Score Trend

6.6 Future Plans:

- **Employee Well Being Framework:**
Focus on further strengthening the wellbeing program at Indus Towers, with an aim to enhance Physical, Social & Emotional, High purpose, Financial wellbeing. Further strengthen the initiatives which have already taken in previous year.
- **E-SAT score:**
Further improve the E-SAT score in all the parameters as defined
- **High Performer Attrition:**
Provide a structural development plan to reduce the high performer attrition.
- **Internal Job Opportunity:**
Further increase in % age of positions closed by internal candidates
- **Employee Development:**
Movement / role change for employee without a role / location change in last 5 year
- **Learning & Development:**
More focus on e-learning to further increase the %age adherence of learning hours as per planned calendar.

Chapter 7: Corporate Social Responsibility (CSR)

7.1 Overview

With tagline of ‘Putting India First’, Indus Towers is involved in creating social impact through CSR programs & touches millions of lives across operating circles. Our core objective is ‘to enhance life of deprived section of society while bringing social & economical change’. Indus strongly believes in impactful CSR having long term sustenance. Our CSR program is aligned to deliver economic, social & environmental benefits for all stakeholders. In line with same, Indus has created its own CSR policy to ensure all CSR initiatives are selected, executed & governed in line with Company Objectives

Even though the Government guidelines on CSR came in 2014, our CSR journey started in FY 2012-13 by partnering with NGO-TERI & expanded with 13 NGOs, implementing 13 programs across all Indus Circles.

Indus CSR focus:

CSR is a dedicated function within Indus under the leadership of CEO, supported by Chief Sustainability Officer. Indus’s CSR initiatives are broadly divided into 4 broad categories:

Environment Sustainability	Promoting Education	Empowering Women	Swachh Bharat (Clean India Drive)
<p>Objective: Creating environment friendly energy access and livelihood for deprived community through TERI program LaBL (Lighting a Billion Lives)</p> <p>Program detail: Adopted a program of providing solar lanterns to the unelectrified villages</p> <p>Impact: Total 17450 nos. of lanterns distributed.</p>	<p>Objective: Supporting end to end education serving the deprived section of society.</p> <p>Program detail: Adopted various programs to support primary education, scholarships, girl child education, digital education, mid-day meal through partnering with Satya Bharti school, AWOOF & IIMPACT, NIITF, Akshay Patra respectively.</p> <p>Impact: Supported 46,000 students in 254 schools, 3300 girl’s children in 110 learning centers & 438 scholarships awarded</p>	<p>Objective: Empowering women & enhancing their entrepreneurial skill sets.</p> <p>Program detail: Provided digital enablement through mobile based ERP (Enterprise Resource program) for selling & purchasing rural produce.</p> <p>Impact: Benefited 98,000 women entrepreneur</p>	<p>Objective: Eliminating open defecation through creating public based toilets.</p> <p>Program detail: Supported in construction of 61 public toilets complex at DMRC location</p> <p>Impact: Providing clean Toilets to over 9Mn people</p>
12.8Mn lives impacted, Year on Year			

7.1.1 Personal Social Responsibility

While prospering the business, giving back to the society is at the heart of Indus employees. Indus enables their employees to fulfill the desire through Indus employee PSR program. Under this employee gets an opportunity to connect with community around the business, for 6 days in row to understand & deliver their needs within the means available. This not only develops strong emotional connect but also enhances Indus’ acceptance & social respect within the society significantly.

7.2 Success Stories

Almost every touch point of our CSR program has emerged as a success story, developing strong emotional connect with the individual beneficiaries & society at large. Key Program illustrated below:

7.2.1: The Lighting a Billion Lives (LaBL) Program

Background: In rural areas of UP, there is void access to electricity. The irregular grid power supply has impacted the productivity of livelihood activities leading towards poor economic condition. To support the rural communities, Indus partnered with TERI to implement the LaBL program and facilitate income generation activities under CSR initiatives.

Approach: Overall approach is based on Public- People partnership model. Based on need assessment, focus group discussion with potential beneficiaries was organized and identify the village level entrepreneur. To make a self-sustainable model, multiple capacity building exercise was organizing to train the village level entrepreneur and deployed the solar charging station at their house. The design of the model is such that it benefits the users as a livelihood

opportunity for the entrepreneur of the services who rent the lanterns to the villagers daily or provide a lighting services in lieu of nominally daily or monthly fee.

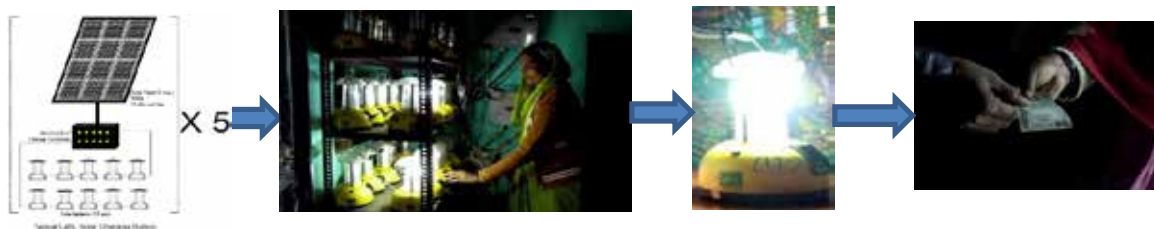


Fig 7.1: LaBL program: Solar powered Lantern generating income for rural residents

Program Impact:

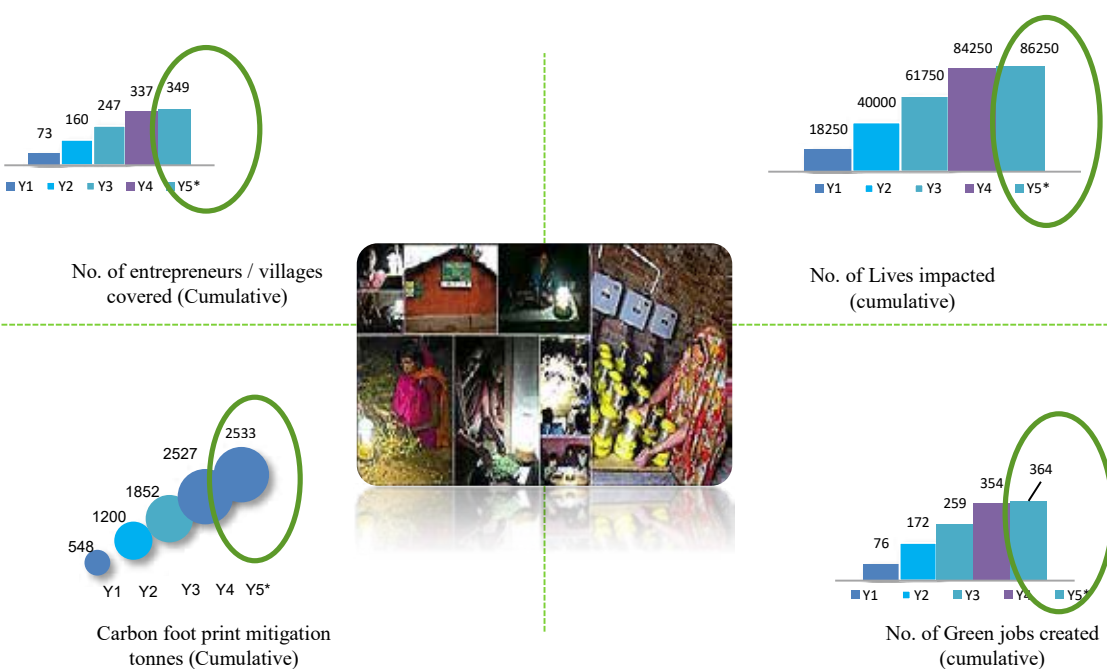


Fig 7.2: LaBL program: Social Economic Impact

7.4 Impact:

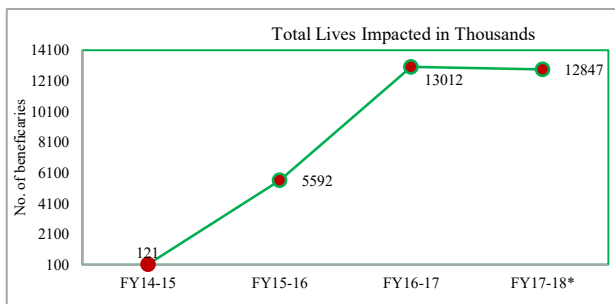


Fig 7.3: YOY Lives Impacted by Indus CSR Programs

7.5 Future Plans:

- Sustenance of all our Programs to benefit the society while expanding our social footprint.
- To develop a robust PSR program for Indus Employees to contribute to the CSR Cause

Chapter 8: IT Enablement at Indus

8.1 Overview

While customer facing departments drive at the front, IT at Indus has the challenging mandate of connecting the various business functions together to serve our customers, partners, employees, associates and other stakeholders as well as supporting the key processes of the company. Given the highly outsourced nature of Indus' operations (~2500 employees managing ~123,191 towers), managing the various activities of the partners who are engaged in various activities requires a strong IT backbone Fig. 9.1 illustrates the utilization of IT across Indus Towers in detail.

8.2 TQM Activities

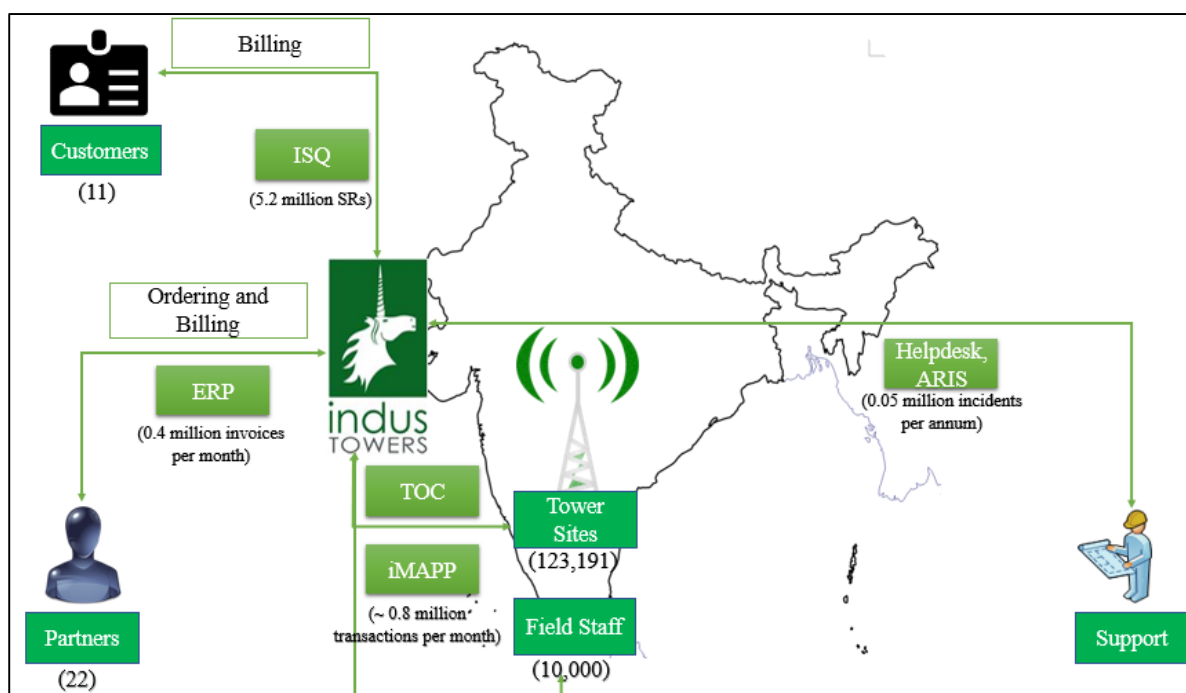


Fig. 8.1: Utilization of IT across Indus

Year	Initial Phase 2011-13	Development Phase 2014-16	Consolidation Phase 2017-19
Objective	<ol style="list-style-type: none"> Effectively manage orders from all customers Enhance Employee involvement for process improvement activities Business processes available to all employees 	<ol style="list-style-type: none"> Increase automation of Order Management Process Ensure business operations continuity and customer access to Indus through BCP plan Enable on-site real time data capture and ticket closure to avoid errors and improve performance. Enhance Employee Engagement through Idea Incubator 	<ol style="list-style-type: none"> Enable Technicians and Site Acquisition team for all order related activities Enable Site-wise Cost Booking
Strategy	<ol style="list-style-type: none"> Launch Order Management System Launch Idea Incubator Launch Online Process Repository 	<ol style="list-style-type: none"> Automate Safety Portal with existing Order Management System Set up Disaster Recovery Center Implement Mobile Application to facilitate real-time information to and from field 	<ol style="list-style-type: none"> Integrate Order Management system with IMAPP application and Launch i-Acquire System for Site Acquisition

		7. To create a module for Best Practice Sharing across Indus	9. Increase Digitization with transformed ERP and Order Management system
Effects	1. ~396,000 Orders captured in system 2. More than 3,886 improvement ideas submitted and 1,696 closed 3. Key processes (27) were documented and made available to all employees on online process repository	4. ~900,000 Service Requests captured in system, 12,379 sites captured for tower strengthening check 5. 100% operational data available through Disaster recovery center 6. Trouble Ticket Clearance and Closure increased from 72% to 93% and 6% to 80%. 7. Approx. 3K ideas implemented across and 713 ideas replicated across Indus.	8. 100% Orders flowing to technician 9. Results awaited
Problems carried	a. Tower strengthening module was not available in current system b. No system available to prevent Application Data Loss	c. At the ground level, ISQ and other solutions were working in silos which for the team became cumbersome d. No visibility of SR to Field staff	

8.3 TQM Highlights

8.3.1 Launch Order Management System Order Management System (iSQ Application)

Background:

Indus' customers are telecom operators whose objectives are primarily around coverage and capacity. These goals are achieved by installation and commissioning of radiating ("active") telecommunications equipment at various locations scientifically determined to optimize coverage and capacity based on end-customer demand for voice and data services in and around those locations. A customer order, therefore, is for space and power for a particular equipment to be installed at a particular company site and for us to ensure uptime of that equipment at that site.



Fig. 8.2: Shortlisting of solution system

Approach/Tools used: After brainstorming our internal needs and customer requirements, we decided to go with a workflow-based system (shortlisted from many available candidates based on certain parameters). Customer was given limited application access to fill the Service Request details and then the request was to flow through and within Indus Towers to different functions to execute the order.

Key Solution implemented:

Indus implemented the iSQ application in year 2009 to fulfill the above requirements. As a base functionality, Indus implemented the following processes and capabilities:

- SR to RFAI process (Basic Order to Fulfillment Process for the Customer)
- DC Energy Meter Reading module
- Electricity Board Portal to record the electricity bills
- Milestone - Milestone details from SR to RFAI

Effects:

iSQ provided a centralized platform to capture all service requests and provide status visibility to Indus. Over the years there has been a constant growth in the number of Service Requests captured due to enhancement in Order Management system as shown in Figure 9.3. As a result of continuous improvement, many additional transactions related to Service Request are also getting captured in the system.

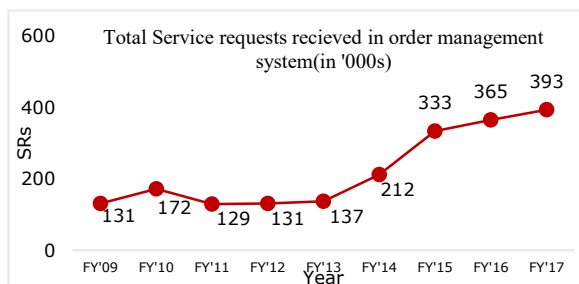


Fig. 8.3: Increase in service requests

8.4 Effects

Indus implemented iSQ as a centralized order management system and to track the status of Service Requests through the different stages of SR to RFAI process. Over the years, incremental functionalities were added, and we are currently achieving ~49% automation and digitization of the overall SR to RFAI steps.

Through the implementation of IMAPP, the network stability has improved from 89% in 2011-12 to 94% in 2016-17, ref fig. 9.11

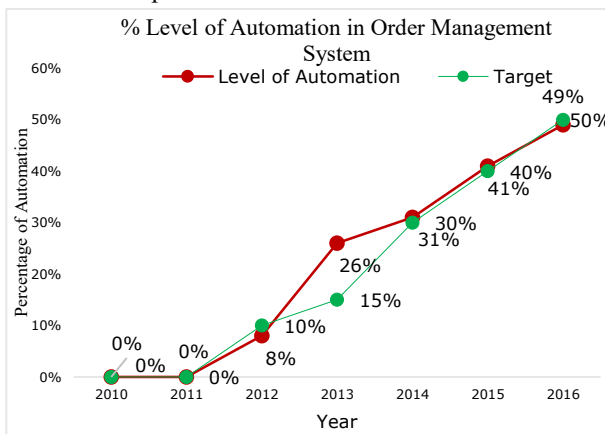


Fig. 8.4: Automation level improvement in order management system

Users of the major IT applications in Indus (Billing, iSQ, ERP and TOC) have faced several incidents requiring support over the years. As part of our Continuous Improvement initiatives (despite continuously adding new functionality) we have aimed to reduce the Turn Around Time (TAT) for resolution of these incidents and over the years have achieved distinct reduction in the same. Analysis of the incidents reported has also led to development of training material and usability improvement. Fig. 9.12 illustrates the movement of TAT for incident resolution for two key applications – Billing and iSQ – over the last two years. Some of the spikes are due to release of significant new functionality and gaps till training achieves the effect.

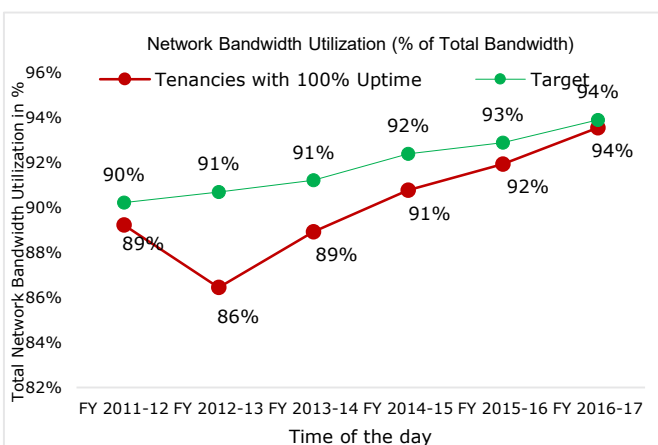


Fig. 8.5: Improvement in Site uptime

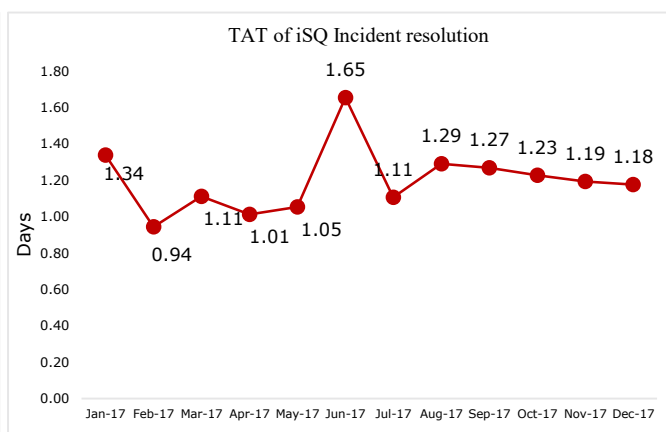


Fig.8.6: Improvement in incident resolutions – iSQ

8.5 Future Plans:

IT at Indus will continue to move further to integrate the core processes of the company and maintain our goal of continuous improvement in the time taken to provide new functionalities to the users of the major applications (iMAPP, iSQ, ERP, TOC and Billing).

On the support front, we will continue to ensure prompt assistance to users who are facing issues, both by improving and simplifying the user experience as well as improving the quality and tools available with our support teams to better see and understand what users are doing in real time.

Chapter 9: Overall Effects of TQM Implementation

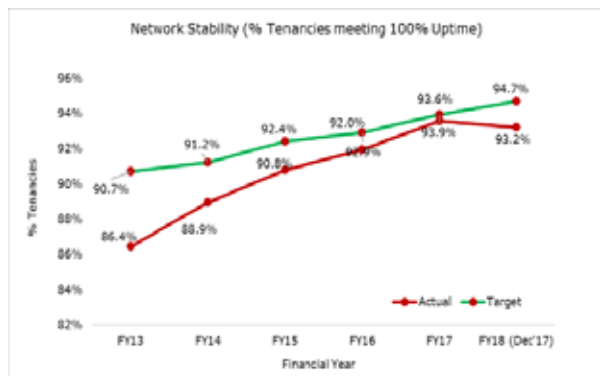


Fig 9.1: 7% Improvement from FY12 to FY17.
*FY18 Nos slightly lower due to Environmental challenges in 2 circles

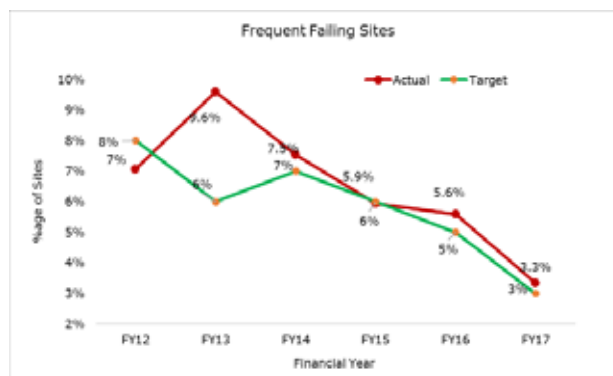


Fig 9.2: Over 47% reduction in Frequent Failing Sites from FY12 to FY17



Fig 9.3: 38% Improvement in C-Sat scores from FY12 to FY17



Fig 9.4: Consistent Best in Class P-Sat scores post huge improvement between FY12 & FY15

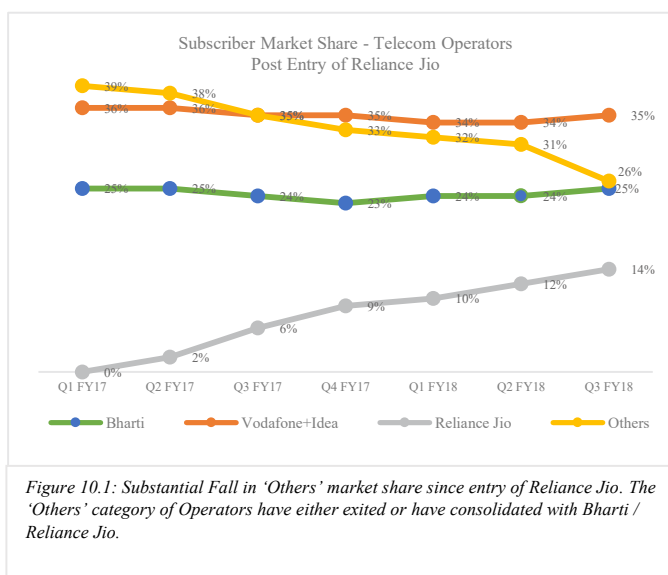


Fig 9.5: Consistent Improvement in E-Sat scores YOY. 17% improvement from FY12 to FY17

Chapter 10 – Future Plans of Organization

Telecom industry has seen a shift in model from Voice based to Data based supply, heightened competition and tariff wars, predominantly due to the entry of Reliance Jio in September 2016. This has led to consolidation in the Telecom operators who are the customers of Indus, impacting our revenues due to exits of tenancies from our towers. There is further impact existing business being impacted by coming in due to proposed merger of Vodafone and Idea (2 major customers of Indus).

Also, competition within the Telecom Tower industry has intensified as American Tower Corporation (ATC) with its international expertise, established business model and now a greater footprint (~85,000 towers) with acquisition of VIOM's (independent telecom tower company), Idea's and Vodafone's captive tower business has become a force to reckon with. Consolidation of Telecom Operators has led to base tenancy business loss for Indus. Network expansion through coming 2 years would only offset that loss, leaving us with almost a flat business growth trajectory.



Due to hyper competition in Telecom Operator space, majority of our customers are facing financial pressures. Passive Infrastructure costs contribute 30-40% of the total Operating costs for our Customers. Thus, for them to tide over this phase, Indus would need to support them by bringing in further efficiencies in our operating model and pass on the benefits to them. Hence, initiatives which lead to lesser cost for them will need to be focused on. This can happen by delivering to customer demand for:

- Lower configurations – lower priced sites (new products),
- Acquiring sites at lower rentals for them in traditionally high rental locations,
- Reducing energy cost (Diesel and EB power),
- Enabling faster roll outs for them to match competition speed and most importantly
- Provide 100% Uptime which is extremely critical in data intensive networks.

From a shareholder perspective, to protect our margins in a scenario where revenues are falling / remaining flat, company would need to focus on:

- Controlling Capex and Opex by enhancing visibility / granularity of costs, build consciousness, fix accountability and reduce cost while enhancing value
- Putting in place processes and systems to find and plug every revenue leakage by enhancing integrity of information in Systems vs deployed configurations on ground.
- Drive deployment of digital transformation initiatives to enhance data analytics-based decision making, eliminate wastes and improve productivity.

Glossary

	S. No.	Word	Meaning
A	1	ARIS	Architecture of Integrated Information Systems, online process repository
	2	AT	Acceptance Testing
B	1	BRC	Battery Revival Centre
	2	BCP	Business Continuity Planning
C	1	CTQ	Critical to Quality
	2	CSAT	Customer Satisfaction
	3	CFT	Cross Functional Team
	4	Cr	Core - 1 crore is equivalent to 10 Million
D	1	DCEM	Direct Current Energy Meter
	2	db	Decibel (Sound)
E	1	ESAT	Employee Satisfaction
	2	EMF	Electro Magnetic frequency
F	1	FTR	First Time Right
H	1	HA	Hard Acquisition
I	1	ID	Indoor
	2	iMAPP	Indus Mobile Application Platform
	3	IPCP	Indus Process Certification Program
	4	iSQ	Indus Smart Qube (or Indus Smart Cube)
L	1	LBG	Load Based Guidelines
	2	LSR	Life Saving Rule
M	1	Mn	Million
N	1	NB	New Built
	2	NCU	Natural cooling unit
O	1	OME	Operations and Maintenance Expert
	2	OEM	Original Equipment Manufacturer
	3	OD	Outdoor
P	1	PI	Compliance as per Checklist
	2	PPE	Preventive protection equipment
	3	PM	Preventive Maintenance
	4	PLVA	Poles Loading Validation and Analysis
Q	1	QA	Quality Assurance
R	1	RFAI	Ready for Active Installation
	2	RCCB	Residual Current Circuit Breaker
	3	RRU	Remote Radio Unit
S	1	SPOC	Single Point of Contact
	2	STN	Site Transfer Note
T	1	TLVA	Tower Loading Validation and Analysis
	2	TSP	Turnkey Service Provider, a supplier of tower installation and up gradation services
U	1	UOM	Unit of Measurement
V	1	VRLA	Valve Regulated Lead Acid, a type of Battery