

Situational Analysis on Human Factors Related to ICT in Home Healthcare Services

By

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*Dissertation submitted for the partial fulfillment of the
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INTERNSHIP TRAINING

At: Portea Home Health Care Services, Bengaluru

SITUATIONAL ANALYSIS ON HUMAN FACTORS RELATED TO INFORMATION, COMMUNICATION & TECHNOLOGY IN HOME HEALTHCARE SERVICES

By

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Under the guidance of

Prof. Dr. Suresh Joshi &

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MBA in Hospital and Health Management

2014-2016



The IIHMR University, Jaipur

TO WHOMSOEVER MAY CONCERN

This is to certify that Dr. Sushma. R. Pathak, Roll no – 0230 of Batch 19th, student of MBA Hospital and Health Management from IIHMR University, Jaipur has undergone internship training at Portea Medical (Home Healthcare, Bengaluru) from 1st March, 2016 to 25th May, 2016.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfilment of the course requirements.

I wish her all success in all her future endeavours.



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And has successfully completed her Project on

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(From March 2016- May 2016)

She comes across as a committed, sincere & diligent person who
has a strong drive & zeal for learning.

We wish her all the best for future endeavors.

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation under the title: **Situational analysis on human factors related to Information, Communication & Technology in Home healthcare services (Portea)**, has been submitted by **Dr. Sushma. R. Pathak**, Enrolment No: IIHMR-U/01/2014-16/0230, under the supervision of Professor **Dr. Suresh Joshi**. This is for award of **MBA Hospital and Health Management** of the university carried out during the period from **March 1, 2016 to May 25, 2016**.

It embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Dr. Sushma. R. Pathak .

Signature: *Sushma R. Pathak*

Date: *26th May, 16.*

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I, **Dr. Sushma .R. Pathak**, the student of IIHMR University, Jaipur, consider it as privilege and honour to work as a management trainee at **PORTEA MEDICAL(Home Healthcare, Bengaluru)** for 3 months.

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List of Abbreviations:

Serial No	Abbreviation	Full Form
1.	HHC	Home Health Care
2.	ICT	Information Communication Technology
3.	IT	Information Technology
4.	B2B	Business 2 Business
5.	B2C	Business 2 Customers
6.	CE	Customer engagement
7.	CS	Customer Sales
8.	TAT	Turnaround Time
9.	BM	Business Managers
10.	RM	Regional managers
11.	WHO	World Health Organization
12.	EHR	Electronic health records
13.	MIS	Management Information System
14.	CPOE	Computerized physician order entry
15.	UN	United Nations
16.	E health	Enterprise of Healthcare
17.	E HP	E Health Points
18.	CC	Conference Calls

DISSERTATION REPORT

SITUATIONAL ANALYSIS ON FACTORS RELATED TO INFORMATION, COMMUNICATION & TECHNOLOGY IN HOME HEALTHCARE SERVICES (Portea, Bengaluru)

ABSTRACT:

Title: Situational Analysis on human factors related to Information, Communication & Technology in Home healthcare services, Portea, Bengaluru

Author: Dr Sushma Pathak

Guided by: Dr Suresh Joshi

Background:

Portea Home Healthcare (2012) is one of the pioneer start-ups for home healthcare in India with 24 centres across India and 4 centres in Malaysia. Portea is healthcare with technology. It provides primary healthcare more accessible, affordable and accountable to patients. As per UN 2013 report, with 25% increase in non-communicable disease burden, more focus is diverting towards- “**Distributed Care Setups**” which includes- Home Health Care, Community Health Care, Telemedicine and Day Cares.²

Advanced Home Healthcare is used in place of **ICT (Information and Communication technologies)-Based Home healthcare**. It comprises technological solutions as e-mail consultations, E health, etc. The patient may be less frequently visited than in regular basic home healthcare. Advances in telecommunications, web solutions, and social networking tools have the potential to support health care delivery and education. But ICT can be effective only when the internal staff/employees utilize it at optimal levels.

In this paper, the primary focus was to understand and analyse the factors of under/poor-utilization of ICT from employees’ perspective for Portea.

Categories to be considered in this context (always with the focus being the home) include:

- Customer Service/engagement/referral teams
- I.T Tools- Apps, portals, social media, digital marketing, conference calls, mails
- Inter departmental communication between Operations and Business Managers
- Data management and analytics- Lead/order tracker
- Time of execution/ Response time/TAT
- Behavior of complete staff
- Evaluation from different parameters: Usability, quality of care, organisational, economic, technical, clinical, ethical effects.

Rationale:

Home health care is becoming the need of hour with technological advancements. As per UN report 2010, 70% of patients’ need can be fulfilled at home.⁵With advanced homecare medical gadgets, ICT understanding and utilization from employees’ perspective was needed which was not up to the mark in the organisation. This could affect its market hold thereby creating challenge for sustainable profitable model.

Since Portea is healthcare with technology, IT based applications and solutions need to be given the foremost priority. For 100% effectiveness, optimal utilization of ICT resources is needed. This study provided the various human factors (employees’ perspectives) which were responsible for poor utilization of ICT at Portea Medical Services, Bengaluru.

The overall aim of this paper was to contribute in usability research and user-oriented development of healthcare technologies by:

- Informing the managers/employees about the current state of utilization of ICT systems,
- Increasing the understanding of usability aspects specific for operational context, and
- Encouraging a more holistic approach on studying utilization issues & prioritization of the same.

Research Question-

What were the human factors of poor utilization of ICT in Advanced Home Healthcare Services (Portea Medical Services)?

Objective:

To understand the human factors of poor utilization of ICT in Advanced Home Healthcare Services (Portea Medical Services).

Methodology:

- Study type- Descriptive study
- Study area- PAN India- 18 cities
- Study period- 3 months (March to May 2016)
- Study Respondents- Operations Manager, Business Managers, and Coordinators.
- Sample size- Census (28 BM, 32 Operations Managers, 33 Co-ordinators across 18 cities of India)
- Sample Method – Cluster Sampling Method
- Data type- Primary data
- Data collection tool – Semi-Structured questionnaire (online, telephonic, personal interview).
- Data collection technique- Face to face, Telephonic interview and direct observations, Conference calls, Business travel plan
- Limitation in data collection- Un responded questionnaire(2), People switched the organization (2)
- Data Analysis- The data analysis done in MS Excel
- Ethical Consideration- Data confidentiality will be maintained throughout the study, the data will be shared for the dissertation purpose only.

Results:

The questionnaire filled by respondents gave an idea about the current level of utilization of ICT from employees' perspectives. **Questionnaire results** indicated several usability problems and deficiencies/gaps which considerably hindered the efficiency of Home Healthcare ICT use and professionals' routine work. Systems lacked the appropriate features to support typical operational tasks, such as availability, delivery delays, process mapping, Approvals and inter departmental communication.

Thus from the study, the situational analysis shows that the major problem areas in ICT for HHC are:

- Response time/delays (24%)
- Interdepartmental Communication (22%)
- Training & Education (20%)

Major Parameters associated with the above factors are:

- Multiple Clearances/Approvals (65%)
- Availability (64%)
- SOP/ Quality issues/Compliance (51%)

There could be the permutation combination of any of these 6 major reasons which could change the situation of the ICT in HHC (Portea).

Conclusion:

The study was aimed to understand the human factors associated with ICT at Portea. Despite the technology resource & availability, there were some human gaps in each and every delivery point. Hence, there is a need to understand & improve the utilization of ICT resources as well as need to form strategies to eliminate the delivery point issues. This helps to understand the problems & thereby assist in improving the quality of services both internally and externally. When the internal collaboration is there in the organisation, it improves the external outcomes and quality. This will not only help to improve the operational part but also enhance the quality services with profitable sustainable models.

Key words: Distributed Care Setups, Advanced Home Healthcare, ICT, Underutilization

SITUATIONAL ANALYSIS ON FACTORS RELATED TO INFORMATION, COMMUNICATION & TECHNOLOGY IN HOME HEALTHCARE SERVICES (Portea, Bengaluru)

1.1 BACKGROUND OF THE STUDY:

Portea Home Healthcare (2012) is one of the start-ups for home healthcare in India. It has 24 centres across India and 4 centres in Malaysia. Portea is healthcare with technology. It provides primary healthcare more accessible, affordable and accountable to patients. It caters on primary physiotherapy, nursing care, post-surgical care, vaccinations, mother and baby care and lifestyle management. With the increase in non-communicable disease burden, more focus is diverting towards- **“Distributed Care Setups”** which includes- Home Health Care, Community Health Care, Telemedicine and Day Cares¹. In this paper, the focus will be on Home Healthcare Services.

Advanced Home Healthcare is used in place of **ICT (Information and Communication technologies)-Based Home healthcare**^{2, 3}. It may comprise technological solutions as e-mail consultations, advanced sensor surveillance (for collecting vital signs and physiological parameters), clinical robots, etc. The patient may be less frequently visited than in regular basic home healthcare. Advances in telecommunications, web solutions, and social networking tools have the potential to support health care delivery and education.

Categories to be considered in this context (always with the focus being the home) include:

- IT tools for improved information and communication access to ease the staff's work situation at home
- Improved information and communication tools for patients and relatives (chronically ill, elderly, palliative care)
- Monitoring equipment
- Virtual visits
- Smart home technologies when applied for care or prevention
- Evaluation from different viewpoints: Usability, quality of care, organisational, economic, technical, clinical, ethical and/or legal effects.

Portea has various levels of employees as per its business. Its business comes from 3 major sections:

- A. B2B: Business 2 Business – Like Key accounts of major hospitals, Doctor referrals, Nursing homes, Dealers and Corporate alliances
- B. B2C: Business 2 Customers- directly to the customers via marketing, camps, digital marketing, social media marketing, Packages
- C. Customer engagement and re-engagement programmes- for the existing customers

Business managers (BM) heads the sales and lead generation part. They are always in the field targeting the hospitals, doctors, nursing homes and corporate alliances.

Operations Managers takes care of the lead execution part- availability, TAT, and following the protocols for successful provision of services.

Coordinators work under Operations managers to coordinate the business development and managing the operational issues. Thus, they act as the connecting link between the Business managers and Operations Managers.

Regional managers (RM) heads both the Operations Managers and BMs.

1.2 INTRODUCTION:

Due to an ageing population and a shortage of hospital beds, it has become a challenge to find new ways to support and care for people with chronic illness living at home. Living with chronic illness changes the lives of those affected, who are often in need of support and nursing care in their homes. This will be performed at its best when the organisation is technology driven and its employees themselves are using the best means to communicate through various tools of EHealth^{3, 4}.

EHealth has the potential to become a means of providing good care at home⁷, which is especially challenging with regard to this emerging field⁵. EHealth refers to information and communication technology (ICT) tools and services for health, whether the tools are used behind the scenes by healthcare professionals or directly by patients and their relatives^{6, 9}.

ICT tools can be used to access a wide variety of technological solutions for communication, including text messaging, gathering and monitoring data, diagnosis and treatment at distances, and retrieving electronic health records^{8, 11}. According to the World Health Organization¹⁰, eHealth is used in the healthcare for transmission of digital data, including data stored and retrieved electronically to support healthcare, both at the local site and at a distance.

E-Health includes the interaction between patients and health service providers or peer-to-peer communication between patients and/or health professionals. Interest has primarily focused on the use of ICT tools in the care of older¹³ and severely chronically ill people¹¹. Although ICT has been increasingly used in healthcare in recent years, efforts across countries have been fragmented and could benefit from improved cross-border coordination. E-Health tools and services have been widely introduced and implemented, and the potential benefits ICT can bring people with chronic illness will increase significantly¹².

Today, hundreds of information and communication technology (ICT) systems are used in healthcare organisations to serve professionals in their daily work with patients. These systems cover a broad range of applications, from widely used electronic health records (EHR), MIS- Management Information System, Trackers, Conference Calls and mobile applications. Among other industries, healthcare has already profited extensively by the development of ICT¹⁴.

Although the technology-related benefits are obvious in theory, it seems that they are not clearly associated in the operating situations nor appeared in healthcare professionals' daily work. User-oriented research in the health informatics field has tended to focus on ICT adaptation and user satisfaction issues, rather than on usability.

Homecare like Portea is of no such difference. For Home care, even more advanced levels of technologies are required to track the customers need away from hospital premises. Here, utilization of ICT plays a major role in operations of Homecare services. Since the early 2000s, however, there has been growing interest towards usability and human-centred design issues. The motivation for usability studies derives from empirical study results as well as worrying statements about failures in technology development and adaptation (e.g. presented by professors Heeks¹⁵ and Haux¹⁶).

1.3 REVIEW OF LITERATURE:

A variety of ICT applications are described in the review. Bardram et al.¹⁷ stated that ICT applications used in home care must take into consideration the role technology should play in the use of patient and healthcare professionals. Neglecting this aspect may lead to technology that not provide the needed support for communication.

According to Koch et al.¹⁸, research and practice of health-enabling and ambient-assistive technologies may significantly contribute to that technical solutions are explored in a social context and in relation to individual needs.

Telehealth systems in the form of online and mobile tools are already opening up the possibilities for reduced hospitalization and an increased home care [26]. Various ICT applications will thereby offer healthcare professionals to become more flexible and able to address the differing needs of individual patients¹⁹, that is, a more person-centred care.

The results of this review show that people living with chronic illnesses and healthcare professionals were positive to the use of ICT applications, despite that ICT cannot replace a face-to-face encounter but can be used as a complement. Across the literature, outcomes for telehealth-based services are generally comparable to outcomes for services delivered face to face²⁰.

According to Charlton et al.²¹, the style and type of communication the healthcare professional uses influence care outcomes. A literature review²² shows that patients with possibilities of being cared for and using telecare at home preferred a combination of telecare and traditional healthcare delivery. Therefore, ICT applications must be used as an adjunct and not as replacements for standard care; otherwise, the positive results might not be replicated¹⁴. Many patients prefer being involved and participating in decision making regarding the care they will receive. Despite this, caring programs will be developed without caregiver's participation¹⁶.

The results from recent studies suggest that currently used healthcare information systems suffer from a high number of usability flaws which considerably hinder the use of computer systems. The evidence is strong: an EHR system has been reported with 103 flaws related to the complexity of information, a poor relation to work activities, and lack of support for mobility¹⁸; a commercial EHR in a large paediatric hospital has been reported with 134 flaws related to consistency, user control, flexibility, efficiency, and natural dialogue²¹; a CPOE system has been reported with 33 flaws related to user interface and user interaction issues¹³; and a handheld prescription writing application has been reported with 73 flaws related to interface design²².

All these review of studies clearly described the co relation between ICT and modern method of Home care technological solutions. These work best when there is proper utilization of these resources by the employees to serve best for the patients. The system will work efficiently when there is complete harmony between the internal and external environment. Poor utilization of ICT within the organisation will definitely affect the patient care and causes delays in delivering the Homecare.

1.4 RATIONALE:

Home health care is becoming the need of hour. As per UN report 2010, 70% of patients' need can be fulfilled at home.⁵ With advanced medical gadgets, most of the patient monitoring, which was earlier possible only in hospitals, can now be offered with remarkable ease at home. So the major drivers will be:

1. Aging population (1 in 5 Indians are above 60 years)
2. Chronic disease prevalence
3. Need for better quality care (Post-operative)⁶

Many new start-up ventures like Portea Home Health Care, India Home Health Care, Healthcare at Home, Homital Medicare Pvt Ltd, Nightingale etc. are coming up to explore the opportunity. Not only start-ups but also the established brands like Manipal Healthcare, Max Healthcare and Apollo are planning to enter the industry.

But entering the market with good hold and capturing the opportunity for sustainable period and becoming the market leader is the major challenge. Since Portea is healthcare with technology, IT based applications and solutions need to be given the foremost priority. For 100% effectiveness, optimal utilization of ICT resources is needed. From literature review, various studies pointed towards the factors which could cause

underutilization of ICT by the employees. This study will be providing the various human factors (employees' perspectives) which are responsible for poor utilization of ICT at Portea Medical Services, Bengaluru.

1.5 AIM OF THE RESEARCH:

Marc Berg²⁰, in his article about the healthcare information society in the year 2013, has stated that: *“We can make systems that help professionals do their work better: providing reminders, allowing free and fast communication, allowing fast access to patient information and so forth. . . . On the other hand, we can also make systems that require meticulous data entry for the sake of “completeness”, or that help managers’ overview and control the work of professionals.”*

Previous research in health informatics field has not provided a general picture of the success of ICT system development, although the results from usability studies have indicated serious challenges and failures in system use and adoption. Therefore it is unclear if we are closer to the first or second scenario described by Berg²⁰.

The overall aim of this paper is to contribute to usability research and user-oriented development of healthcare technologies by:

- Informing the managers/employees about the current state of utilization of ICT systems,
- Increasing the understanding of usability aspects specific for operational context, and
- Encouraging a more holistic approach on studying utilization issues & prioritization of the same.

1.6 RESEARCH QUESTION:

- What are the human factors of poor utilization of ICT in Advanced Home Healthcare Services (Portea Medical Services)?

1.7 RESEARCH OBJECTIVE:

- To understand the factors of poor utilization of ICT in Advanced Home Healthcare Services (Portea Medical Services)

1.8 METHODOLOGY:

The methodology involves the various dimensions derive from the definitions of usability and context of use analysis, and reflect the ability of ICT systems to have a positive impact on overall patient care by supporting employees in achieving their goals with a pleasant user experience.

The research data incorporated 93 statements from the respondents of Portea with a 10-point-scale on employees' experiences on usability of their currently used ICT systems. The ratings and experiences were divided broadly into 3 major categories:

- E stands for Excellent(10/10)
- G stands for Good (07/10)
- P stands for Poor (03/10)

For this, an intra-organisation survey was conducted which involved various operations managers, business managers and coordinators across 18 cities of India.

A semi structured questionnaire was prepared with both open and close ended questions that gives both qualitative and quantitative data.

Questionnaire results indicated several usability problems and deficiencies which considerably hindered the efficiency of Home Healthcare ICT use and professionals' routine work. Systems lacked the appropriate features to support typical operational tasks, such as availability, delivery delays, process mapping, and approvals and inter departmental communication.

1.1- Table showing various parameters of Methodology

Serial no	Parameters of Methodology	Description
1	Study Type	Descriptive study
2	Study Area	- PAN India- 18 cities of Portea i.e- - Bengaluru, Delhi – NCR, Mumbai, Hyderabad, Chennai, Kolkatta, Ahmedabad, Indore, Lucknow, Chandigarh, Jaipur, Pune, Solapur, Vijaywada, Manglore, Goa, Cochin, Calicut
3	Study Period	3 Months i.e March to May, 2016
4	Study Respondents	The respondents for the following were : - Operations Manager, - Business Managers, - Co-ordinators at the various Portea locations PAN India.
5	Sample size	Census (28 BM, 32 Operations Managers, 33 Co-ordinators across 18 cities of India)
6	Sample Method	- Cluster Sampling Method. Conference Calls were conducted every Monday and individual calls were done during the period of 3 months to record the feedbacks and fill the 93 questionnaires from the various cluster of people of Business, Operations Managers and Coordinators Business Development Travel Plans to various cities for observing the various aspects, challenges and feedbacks from the respective managers. Online mode via mails Face to Face interviews
7	Data type	Primary data

8	Data Collection Technique	Face to face, Telephonic interview and direct observations
9	Data Collection Tool	Semi-Structured questionnaire (online, telephonic, personal interview).
10	Limitation in collecting Data	• Un responded questionnaire: 2 (due to unavailability of contact details) • 2 Ops Managers have left the organisation in between the study so not taken into consideration. • 1 Unfilled questionnaire despite of contacting multiple time.
11	Data Analysis	The data analysis done in MS Excel
12	Ethical Consideration-	• Data confidentiality will be maintained throughout the study. • The employee ID and personal details are kept confidential. • This will be shared for the dissertation purpose only.

1.9 Study Location: PAN India with 18 major cities i.e-

- Bengaluru, Delhi – NCR, Mumbai, Hyderabad, Chennai, Kolkatta, Ahmedabad, Indore, Lucknow, Chandigarh, Jaipur, Pune, Solapur, Vijaywada, Manglore, Goa, Cochin, Calicut

1.2- Map showing Study location/cities across India



1.10 SCOPE & USE OF STUDY:

Information and communication technology (ICT) are becoming a natural part in healthcare both for delivering and giving accessibility to healthcare for people with chronic illness living at home. The use of ICT applications in home care is an expanding research area, with a variety of ICT tools used that could increase accessibility to home care.

Using ICT can lead to people living with chronic illnesses gaining control of their illness that promotes self-care. Its use within the organisation by the employees will automatically enhance the productivity and accessibility with the patients.

In the health informatics field, usability studies typically focus on evaluating a single information system and involve a rather small group of end-users. However, little is known about the usability of clinical information and communication technology (ICT) environment in which healthcare professionals work daily.

This paper aims at contributing to usability research and user-oriented development of healthcare technologies with three objectives: inform researchers and practitioners about the current state of usability of ICT systems within the organisation, increase the understanding of usability aspects, and encourage a more holistic approach on studying issues in poor utilization of various factors related to ICT in health informatics field.

For the purposes of the study, we described **three dimensions of ICT system usability** that reflect the employees' viewpoint on system usage:

- (1) Compatibility between ICT systems and professionals' tasks,
(2) ICT support for information exchange, communication and collaboration in patient outcome, and (3) interoperability and utilization

1.11 ANALYSIS & RESULTS:

Steps in Analysis:

1. Various factors were selected considering all the related departments to perform a **survey** for understanding the various factors affecting ICT in home healthcare.



2. Semi Structured **Questionnaire** is prepared and feedback is collected from PAN India level managers and co-ordinators (Total census- 93).



3. **Zones wise feedback collection of data**
Percentage calculation under 3 categories of excellent, good and poor:-
 - E stands for Excellent(10/10)
 - G stands for Good (07/10)
 - P stands for Poor (03/10)



4. **Cumulative scores** by calculating the average and median values to generalize the most affecting factors PAN India.

5.



6. By analysing cumulative excellent and good gives the picture of the **most compliant factors** and the cumulative poor will highlight **the most affecting factors** of ICT in HHC Poertea).



7. Various **parameters affecting the factors** were also analysed by asking the **difference/gap** between the actual and the expected levels.



8. Combining both the analysis, the 3 major poor factors with parameters were selected. These would help to **prioritise the factors and understand the root cause of poor utilization** of ICT at HHC Poertea.



9. **Suggestions and Strategies** can be formulated around the factors to have an optimum utilization of the ICT resources for HHC Poertea.

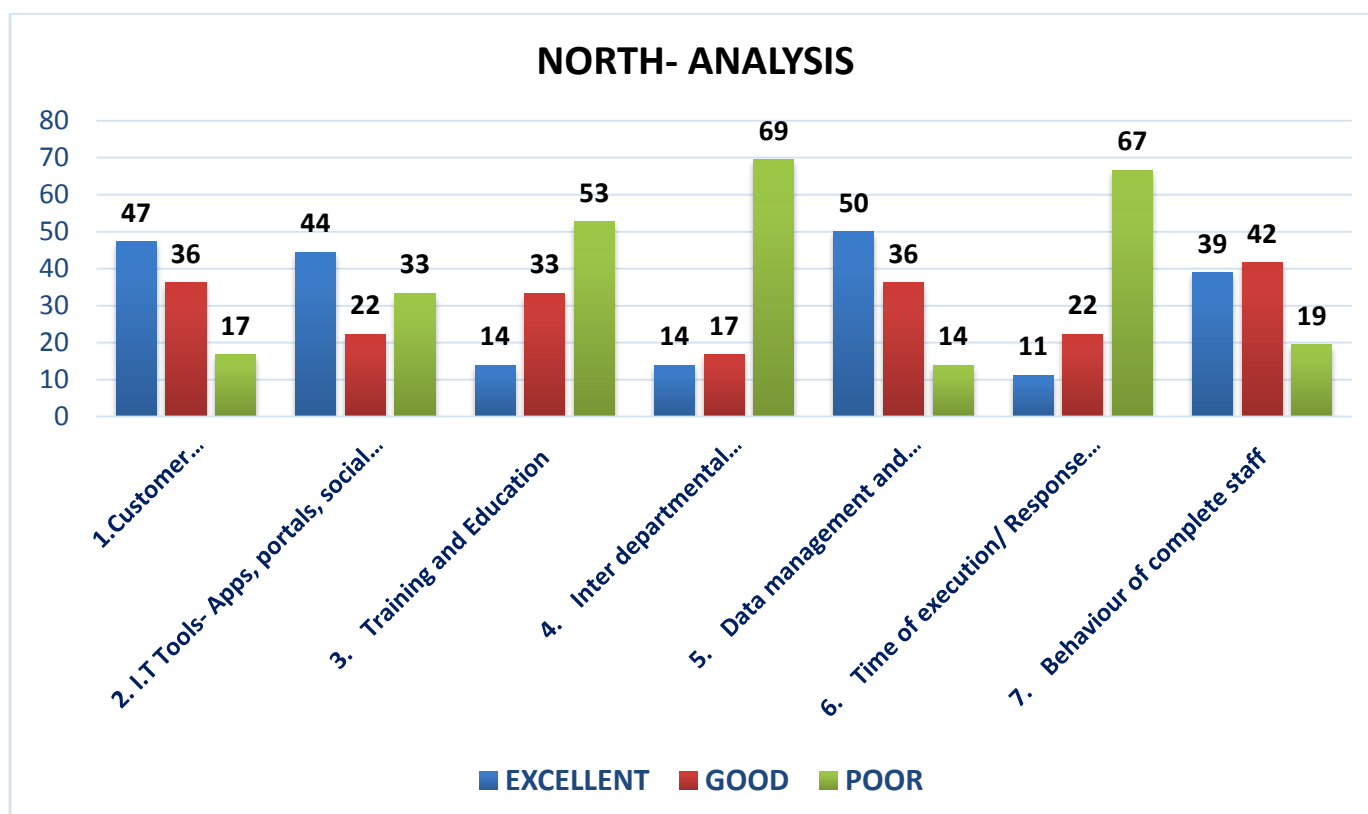
ZONWISE ANALYSIS & RESULTS OF VARIOUS CATEGORIES/FACTORS ASSOCIATED WITH ICT UTILIZATION:

NORTH:

1.3- Table showing percentage scores of categories for North zone

CATEGORIES/ FACTORS-- NORTH	EXCELLENT (%Score)	GOOD (%Score)	POOR (%Score)
1. Customer Service/engagement/referral teams	47	36	17
2. I.T Tools- Apps, portals, social media, digital marketing, conference calls, mails	44	22	33
3. Training and Education	14	33	53
4. Inter departmental communication between Ops and Business Managers	14	17	69
5. Data management and analytics- Lead/order tracker	50	36	14
6. Time of execution/ Response time/TAT	11	22	67
7. Behavior of complete staff	39	42	19

From the above table, various percentage scores of Excellent, Good and Poor for all the categories/factors has been calculated as per 93 respondents' feedback.



1.4- Comparative graph showing percentage scores of categories for North zone

Comments:

In North zone, the most compliant factor of ICT utilisation is Data management and analysis (50%) followed by Customer services (47%) and I.T tools (45%).

The poorest factor affecting the ICT utilisation is Interdepartmental Communication (69%) followed by Response time (67%) and Training & Education (63%).

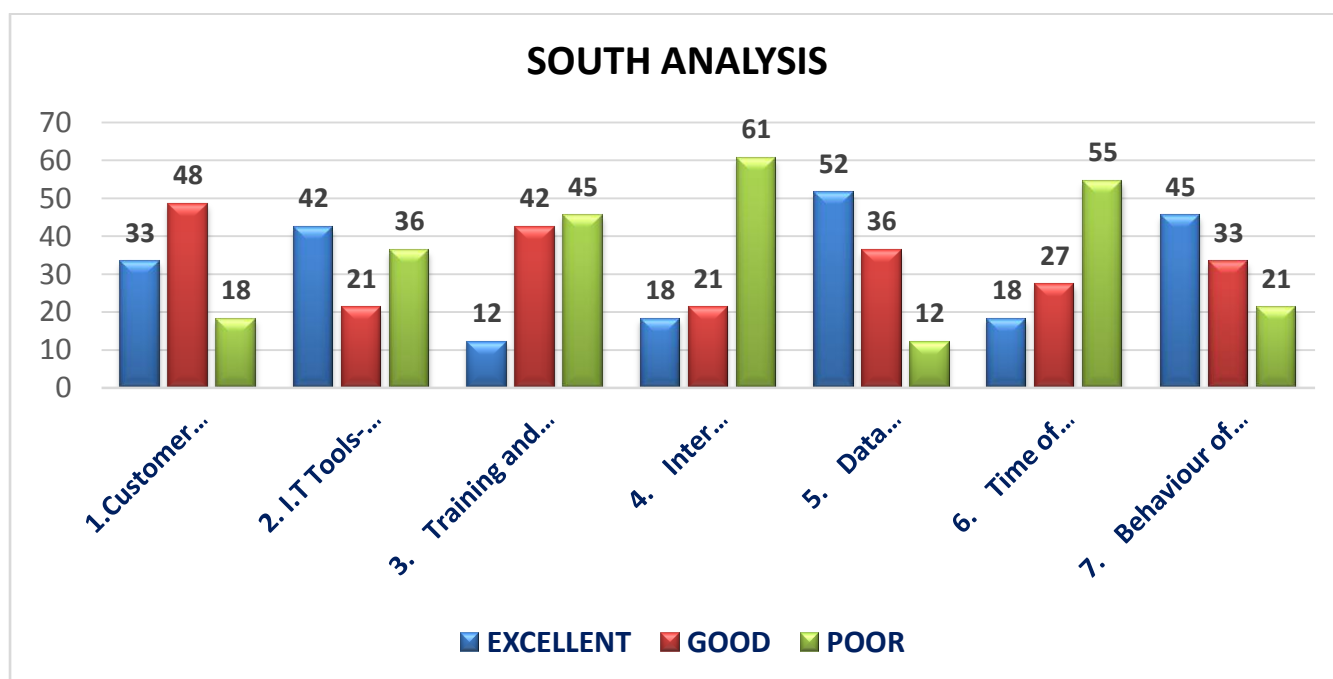
Rest other factors lie in the average/moderate zone.

SOUTH:

CATEGORIES/ FACTORS-- NORTH	EXCELLENT (%Score)	GOOD (%Score)	POOR (%Score)
1. Customer Service/engagement/referral teams	33	48	18
2. I.T Tools- Apps, portals, social media, digital marketing, conference calls, mails	42	21	36
3. Training and Education	12	42	45
4. Inter departmental communication between Ops and Business Managers	18	21	61
5. Data management and analytics- Lead/order tracker	52	36	12
6. Time of execution/ Response time/TAT	18	27	55
7. Behavior of complete staff	39	42	19

1.5- Table showing percentage scores of categories for South zone

From the above table, various percentage scores of Excellent, Good and Poor for all the categories/factors has been calculated as per 93 respondents' feedback.



1.6- Comparative graph showing percentage scores of categories for South zone

Comments:

In South zone, the most compliant factor of ICT utilisation is Data management and analysis (52%) followed by Behaviour of staff (45%) and I.T tools (42%).

The poorest factor affecting the ICT utilisation is Interdepartmental Communication (61%) followed by Response time (55%) and Training & Education (45%).

Rest other factors lie in the average/moderate zone.

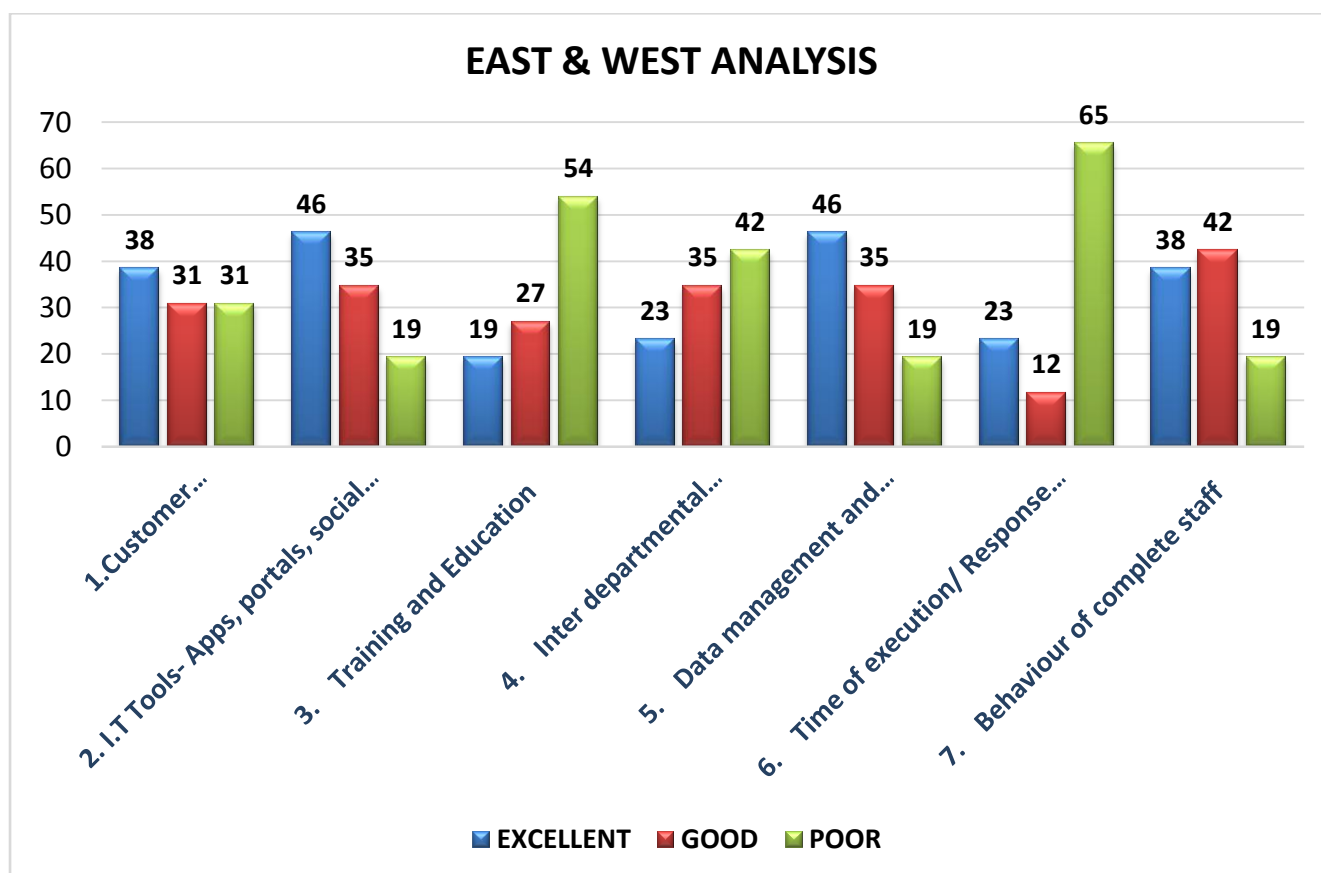
EAST & WEST:

1.7- Table showing percentage scores of categories for East & West zone

CATEGORIES/ FACTORS-- NORTH	EXCELLENT (%Score)	GOOD (%Score)	POOR (%Score)
1. Customer Service/engagement/referral teams	38	31	31
2. I.T Tools- Apps, portals, social media, digital marketing, conference calls, mails	46	35	19
3. Training and Education	19	27	54
4. Inter departmental communication between Ops and Business Managers	23	35	42
5. Data management and analytics- Lead/order tracker	46	35	19
6. Time of execution/ Response time/TAT	23	12	65
7. Behavior of complete staff	38	42	19

From the above table, various percentage scores of Excellent, Good and Poor for all the categories/factors has been calculated as per 93 respondents' feedback.

1.8- Comparative graph showing percentage scores of categories for East & West zone



Comments:

In East & West zone, the most compliant factors of ICT utilisation is Data management and analysis (46% and I.T tools (45%) followed by Behaviour of staff and Customer services with same score of (38%).

The poorest factor affecting the ICT utilisation is Response time (65%) followed by Training & Education (54%) and Interdepartmental Communication (42%).

Rest other factors lie in the average/moderate zone.

CUMULATIVE RESULTS:

To generalise and prioritize the factors in all the zones—Cumulative and Overall scores has been calculated by taking mean and median. This helps to understand the most common reason of poor ICT utilization. Also it signifies the most reliable and compliant factor across India for ICT utilization. Hence for optimal utilization, strategies can be formulated by taking account these findings, particularly for poor factors of utilization.

For recommending Portea to others—63% respondents said yes and rest 37 % said no.

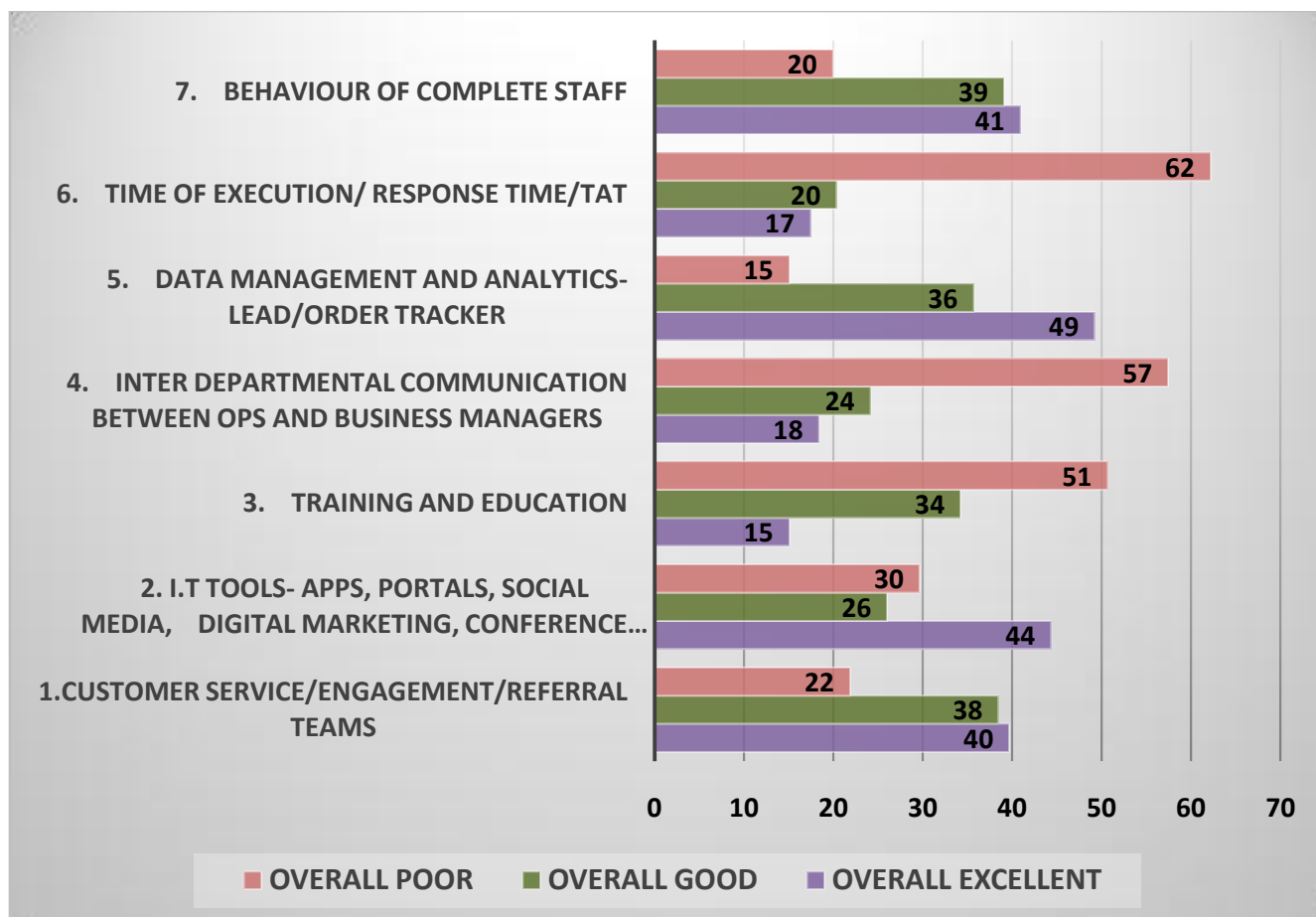
1.9- Table showing overall percentage scores for all the categories and Cumulative Excellent & Good

CATEGORIES/ FACTORS	OVERALL EXCELLENT	OVERALL GOOD	OVERALL POOR	CUMULATIVE EXCELLENT AND GOOD
Customer Service/engagement/referral teams	40	38	22	78
I.T Tools- Apps, portals, social media, digital marketing, conference calls, mails	44	26	30	70
Training and Education	15	34	51	49
Inter departmental communication between Ops and Business Managers	18	24	57	42
Data management and analytics- Lead/order tracker	49	36	15	85
Time of execution/ Response time/TAT	17	20	62	37
Behavior of complete staff	41	39	20	80

From the above table, the overall percentage scores of Excellent, Good and Poor for all the categories/factors has been calculated as per 93 respondents' feedback.

OVERALL ANALYSIS:

1.10- Comparative Graph showing overall percentage scores for all the categories



Comments:

Comparatively, all the 3 Ratings of Excellent, Good and Poor can be seen in one diagram giving a broader picture as per individual category/factor.

The most compliant factor for PAN India is Data Management and Analytics (49%) followed by I.T Tools (44%) and Behaviour of Staff (41%).

The poorest factor for PAN India is Response Time/delays (62%) followed by Interdepartmental Communication gap (57%) and Training & Education (51%).

CUMULATIVE EXCELLENT AND GOOD:

For defining the best practises amongst the factors and learning from the execution of those processes, author combined the excellent and good factors. This also helps to give the Phase level priority for different factors. Like for

- **Phase 1**—focus on the poor factors
 - **Phase 2**---focus on the moderate factors
 - **Phase 3**--- focus on all the factors including excellent for continuing the best practises for sustainable longer period of time with advancements.

1.11- Comparative Graph showing cumulative excellent & good percentage scores for all the categories

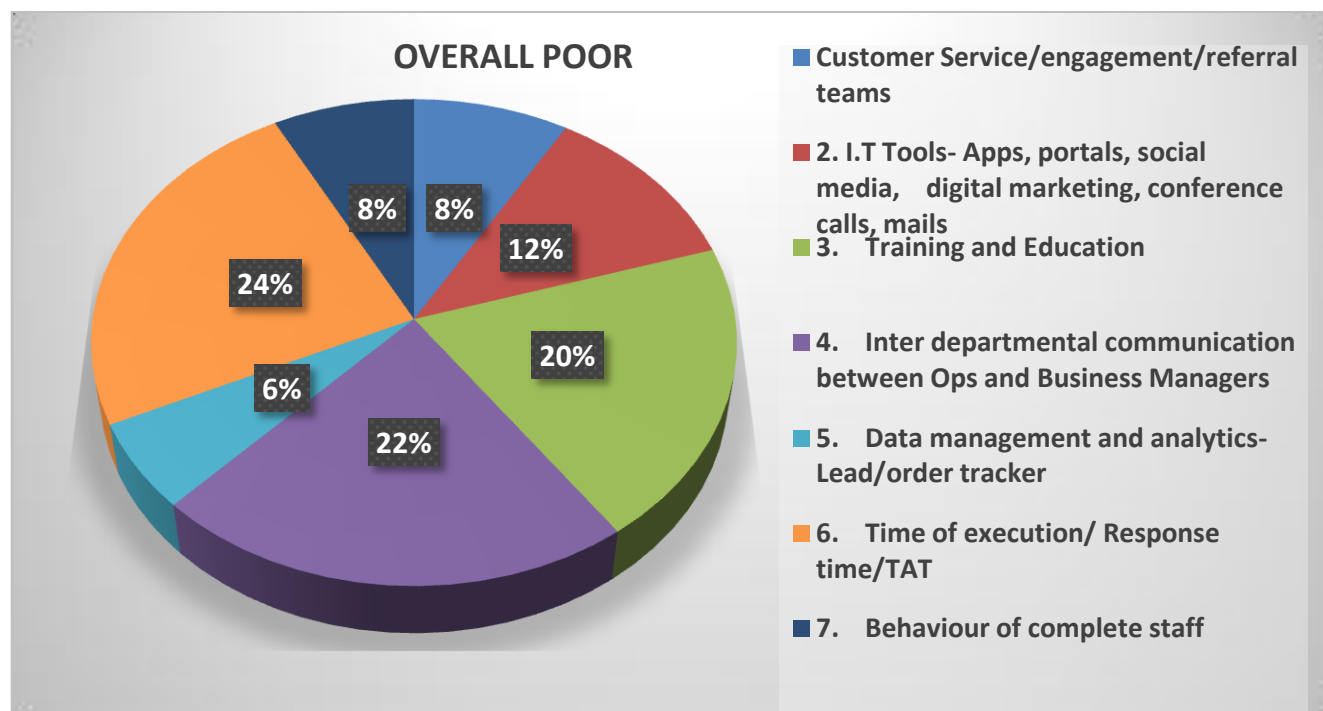
CUMULATIVE EXCELLENT AND GOOD



From the graph, it is clear that the most compliant factor for cumulative good and excellent score is Data management and analysis (85%) followed by Behaviour of the staff (80%) and Customer support teams (78%).

OVERALL POOR:

1.12- Comparative Graph showing Overall Poor percentage scores for all the categories



Comments:

Amongst the poor, the most challenging factor to focus foremost is Response time/delays (24%) followed by Interdepartmental Communication (22%) and Training and Development (20%).

RELATED PARAMETERS AFFECTING THE CATEGORIES/FACTORS:

There are various related parameters/variables which directly or indirectly affects the factors/categories of poor utilization of ICT in HHC (Portea). For formulating strategies, all the factors along with the parameters need to be accessed and analysed to come into an effective and efficient conclusion.

Here, for parameters-- GAP/Difference is calculated as per respondents Expected and Actual level of scores for each of the parameters affecting the categories for poor utilization of ICT at Portea.

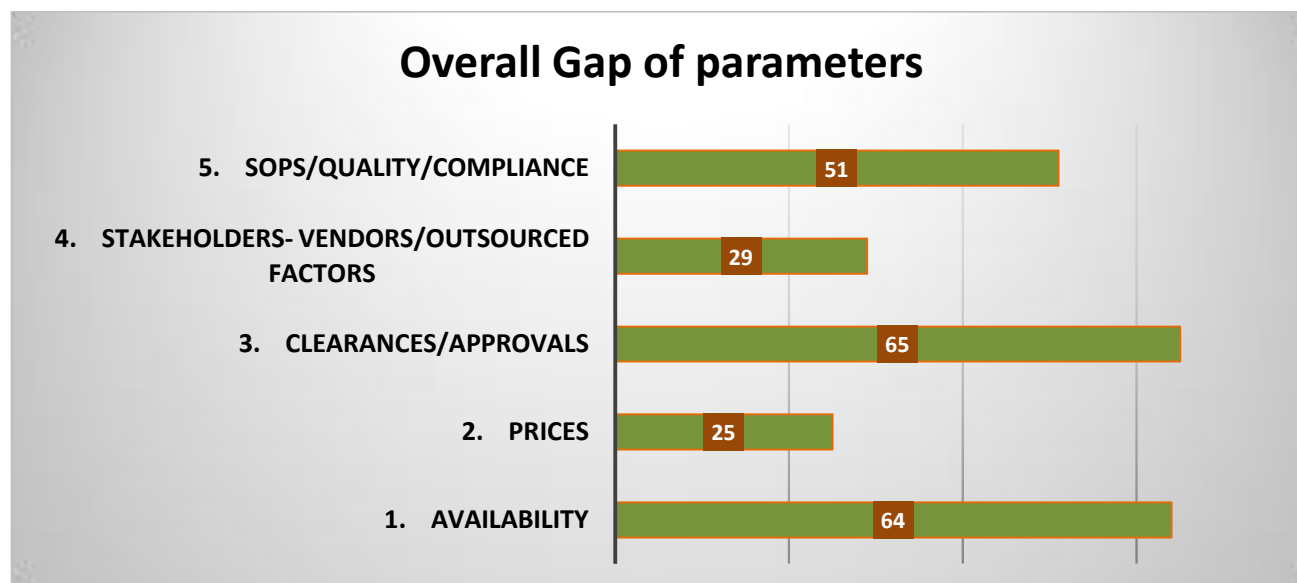
Note:

- Expected is taken as 100% and then actual is calculated based on the respondent's value.
- Like for Availability- Expected is taken as 100% and Actual in North is 38%.So the Gap is 68%. Similarly, it is calculated for all the zones for each of the parameter.

1.13- Table showing zone wise percentage Gaps for various parameters affecting the categories

Parameters affecting the categories for poor utilization	North Gaps in %	South Gaps in %	East and West Gaps in %	Overall Gap %
1. Availability	68	59	64	64
2. Prices	25	18	32	25
3. Clearances/Approvals	70	61	64	65
4. Stakeholders- Vendors/outourced factors	22	20	44	29
5. SOPS/Quality/Compliance	65	45	42	51

1.14- Line graph showing Overall percentage Gaps for various parameters affecting the categories



Comments:

For Gap assessment of parameters- initially zone level gaps has been estimated. Then to generalise and prioritize for PAN India level—Overall Gap has been calculated. This along with the poorest factors need to be focused first in Phase 1.

From the graph, out of the 5 parameter the top 3 most affecting factors are:

- Clearance/Approvals (65%)
- Availability of product/stock (64%)
- SOPs/Quality (51%).

Rest others are performing at optimal levels.

1.12 DISCUSSION:

Thus from the study, the situational analysis shows that the major problem areas in ICT for HHC are:

- Response time/delays (24%)
- Interdepartmental Communication (22%)
- Training & Education (20%)

Major Parameters associated with the above factors are:

- Multiple Clearances/Approvals (65%)
- Availability (64%)
- SOP/ Quality issues/Compliance (51%)

There could be the permutation combination of any of these 6 major reasons which could change the situation of the ICT in HHC (Portea).

The results match with the findings of the S. Koch S. and M. Hägglund's study on "Health informatics and the delivery of care to older people," in which the Major cause of delaying the service was Interdepartmental Communication and Training & Education. In it, the parameters were not discussed which could be the reasons for the factors/categories¹². So for recommendation of solutions these parameters could play a very important role.

The results of the Situational Analysis for Portea also matches with the findings of S. M. Finkelstein, S. M. Speedie, G. Demiris, M. Veen, J. M. Lundgren, and S. Potthoff's study, "Telehomecare: quality, perception, satisfaction," Telemedicine and e-Health. In it, the stress is more on the satisfaction parameters defining the positive results more. It also stated the co relation of quality of services and more number of patient coverage with the factors associated. It describes the underutilization consequences also¹⁶.

1.13 INTERPRETATIONS & CONCLUSIONS:

Thus, from the study, the primary objective was to understand all the reasons affecting the under/poor utilization of ICT in HHC (Portea). This includes the various factors/categories along with the parameters. By combining both, the foremost reasons can be determined.

This helps to understand the problems & thereby assist in improving the quality of services both internally and externally. When the internal collaboration is there in the organisation, it improves the external outcomes and quality. This will not only help to improve the operational part but also enhance the quality services with profitable sustainable models.

In the study, the survey questionnaire comprises of the following 7 Factors/Categories:

1. Customer Service/engagement/referral teams
2. I.T Tools- Apps, portals, social media, digital marketing, conference calls, mails
3. Training and Education
4. Inter departmental communication between Ops and Business Managers
5. Data management and analytics- Lead/order tracker
6. Time of execution/ Response time/TAT
7. Behavior of complete staff

5 Parameters affecting the factors:

1. Availability
2. Prices
3. Clearances/Approvals
4. Stakeholders- Vendors/outourced factors
5. SOPS/Quality/Compliance

The comprehensive findings and interpretations were listed below along with the suggestions for the strategies formulation to improve the ICT utilization:

1.15- Table showing comprehensive findings and conclusions

Sr. No	Topic	Findings	Conclusions & Remarks
1.	Zone wise Analysis	Scoring as per excellent , good and poor	Top 3 factors were selected.
	1.1 North	1. Excellent— 50%- Data 47% Customer services 45% I.T tools 2. Poor— 69%- Inter departmental communication 67%- Response time/delays 63%- Training and Education Rest other factors lie in the average/good zone.	* The most compliant factor of ICT utilisation is Data management and analysis followed by Customer services and I.T tools. *The poorest factor affecting the ICT utilisation is Interdepartmental Communication followed by Response time and Training & Education.
	1.2 South	1. Excellent— 52%- Data 45% Behaviour of staff 42% I.T tools 2. Poor— 61%- Inter departmental communication 55%- Response time/delays 45%- Training and Education Rest other factors lie in the average/good	* The most compliant factor of ICT utilisation is Data management and analysis followed by Behaviour of staff and I.T tools. * The poorest factor affecting the ICT utilisation is Interdepartmental Communication followed by

		zone.	Response time and Training & Education
	1.3 East & West	1. Excellent— • 46%- Data • 45% I.T tools • Behaviour of staff and Customer services with same score of (38%) 2. Poor— • 65%- Response time/delays • 54%- Training and Education • 42%-Interdepartmental Communication. Rest other factors lie in the average/good zone.	* The most compliant factor of ICT utilisation is Data management and analysis followed by I.T tools and Behaviour of staff and Customer services. * The poorest factor affecting the ICT utilisation is Response time followed by Training & Education and Interdepartmental Communication.
2.	Overall Analysis	For PAN India	
	2.1 Cumulative Scores	1. Cumulative good and excellent— • 49%- Data • 44% I.T tools • 41%- Behaviour of Staff 2. Cumulative poor— • 62%- Response time/delays • 57% Interdepartmental Communication gap • 51%- Training & Education	* The most compliant factor for PAN India is Data Management and Analytics followed by I.T Tools and Behaviour of Staff. * The poorest factor for PAN India is Response Time/delays (62%) followed by Interdepartmental Communication gap (57%) and Training & Education (51%).
	2.2 Overall Poor	Scores amongst the poor top 3 affecting factors— • 24%-- Response time/delays • 22%-- Interdepartmental Communication • 20%-- Training and Development	Amongst the poor, the most challenging factor to focus foremost is Response time/delays followed by Interdepartmental Communication and Training and Development.
3.	Parameters affecting Factors	Out of the 5 parameter the top 3 most affecting factors are: • Clearance/Approvals (65%) • Availability of product/stock (64%) • SOPs/Quality (51%).	*Thus, various levels of hierarchy and different persons of authority create lots of delays and underutilization of ICT.
4.	Combination of Factors & Parameters	The permutation and combination of either of the top 3 factors and parameters could cause poor utilization of ICT.	We can conclude that approvals could be the most affecting reason for the top 3 factors of underutilization of ICT, followed by Availability and SOPs following.

5.	Recommending Portea to others	63% respondents said yes - rest 37 % said no.	*There is average trust and loyalty on the Brand Portea by its employee. *This clearly defines that if there is trust deficient internally it will hamper customer service quality externally.
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The use of ICT applications in home care is an expanding research area, with a variety of ICT applications used to increase access to home care. The result shows that ICT in home care is mostly used as a tool for communication between healthcare professionals and patients or family members.

Healthcare professionals can, based on this result, advantageously use ICT applications in home care as a tool to support people living with chronic illnesses gaining control of their illness that promotes self-care.

For being able to evaluate the effects with advantages/disadvantages of ICT applications in home care, more extensive longitudinal studies are needed. To understand more about how ICT can be adjusted to home care, multidisciplinary and qualitative studies are needed from the perspective of the patient and their close relatives.

This study depicts the ICT underutilization factors and parameters from employees' perspective i.e Internal Environment of the organisation. This study would be helpful in formulating various strategies for optimal utilization of ICT for HHC (Portea). It can be indirectly linked with the ICT UTILIZATION FOR PATIENTS and their family members.

1.14 RECOMMENDATIONS:

1.16- Table showing Recommendations for various analysis as per findings

Sr. No	Findings	Recommendations
1.	Zone wise analysis- For Trainings and Education and Inter departmental communication along with Response time	- Zone wise needs and demands vary. - Due to central monitoring, complete control cannot be possible. - So zonal headquarters can be made to have a better control. - Training and Education plays a very crucial role so monthly intra-zone training modules and hands on should be promoted. - Proper process formulation and escalation matrix to avoid delays in Response time as per zone. TATs should be defined for each factor and it should be followed. Monthly forecasting of needs and demands zone wise.
2.	Over all Activities PAN India- For training and education and response time delays	Central training via Product managers for PAN India level. Business development tours and travelling by Head officials to see the real condition of each city. Mailers and videos can be made to spread the information every week to have all the details of products and updates. Newsletter can be promoted to enhance the visibility and detail information of updates and recent activities. Conference calls/ Video calls to have a better interactive

		sessions once 15 days.
3.	For Parameters affecting factors -In reference to delays due to approvals, clearance, SOP, Availability	• SPOC- Single point of contact should be made to avoid delays in approvals. • Single person of authority with backups can be made in case of absence of SPOC • Quality control checks and SOP formulations are needed to follow the best practises. • Availability issues can be solved more by putting a combination model of both local and central procurement and hiring. • Local Tie ups with central monitoring of rates and prices would be the most compatible solution.
4.	For combination of factors and parameters	• Combining both the strategies of Parameters and Factors will automatically reduce the overall issues of both. • Zone wise the combinations may vary. • Phase level strategy formulation as per excellent, good and poor factors
5.	For Recommending Portea to others	• Staff discounts and incentive mechanism plan can be formulated to promote recommending Portea to others. • Customer engagement programs and re- engagement offers can be an option to build trust in Portea both internally and externally.

Innovation in information and communication technology has a great potential to create large impact on modern healthcare. However, for the new technologies to be adopted, the innovations have to be meaningful and timely, taking into account user needs and addressing societal and ethical concerns.

In this paper, we focused on ICT innovations related to home healthcare domain, in which, employees' perspective of ICT utilization was evaluated based on various factors to formulate the strategies around it.

To ensure the adoption of new healthcare services, the new innovative technologies need to be complemented with new methods that can help patients to establish trust in healthcare service providers in terms of privacy, reliability, integrity of the data chain and techniques that help service providers to assess the reliability of information and data contributed by patients. This paper sketches various lines of research for the development of trusted healthcare services namely, patient compliance, reliability of information in healthcare, and user-friendly access control from employees' perspective for optimal utilization of ICT.

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1.16 ANNEXURES:

QUESTIONNAIRE TO DETERMINE THE HUMAN FACTORS AFFECTING ICT IN HHC:

Dear all, please spend few minutes to give your valuable feedback and suggestions. It will help us to understand the problems & thereby help in improving the quality of services and serve you better.

*Please rest assured that your name and identity will be kept confidential.

- Name: _____
- Age: _____
- Sex: _____
- Employee ID: _____
- Department: _____
- Designation: _____
- Contact No: _____
- City/state: _____
- Email id: _____

ASSESSMENT QUESTIONNAIRE:

CATEGORIES	Excellent (10/10)	Good (7/10)	Poor (3/10)
1. Customer Service/ engagement/referral teams			
2. I.T Tools- Apps, portals, social media, digital marketing, conference calls, mails			
3. Training and Education			
4. Inter departmental communication between Ops and Business Managers			
5. Data management and analytics- Lead/order tracker			
6. Time of execution/ Response time/TAT			
7. Behaviour of complete staff			

Parameters affecting the categories for poor utilization:	Expectation			Actual level
	Low	Moderate	High	
1. Availability				
2. Prices				
3. Clearances/Approvals				
4. Stakeholders- Vendors/outsourced factors				
5. SOPS/Quality/Compliance				

- Your additional comments and recommendations are appreciated:

- Would you recommend PORTEA to others? Yes/ No If No, give reasons

Thanking you for taking time to fill out this survey. You can be assured we will take corrective measures on your comments in the required areas to improve the services.

Wish you good health and good fortune.

Thank you very much for your cooperation.

The questionnaire was prepared to get two types of responses:

1. First to understand the **various human factors affecting ICT in HHC.**
2. Second to analyse and prioritise the factors as per rating to streamline for the solutions.

Researcher asked the patients to rate the facilities on a four point scale. A rating pattern was created for the scoring of the same.

1. Excellent= 10 Points
2. Good= 7 Points
3. Poor= 3 Points