

5S TECHNIQUE: THE RISING CONCEPT OF SERVICE QUALITY WITH SPECIAL REFERENCE TO INDIAN RAILWAYS.

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Abstract : The turn of the century has seen profound changes in the global economy. Services have played a crucial part in these changes, because services are becoming the way organizations meet with their markets. The organizations have already discovered that their survival no longer exclusively depends on the products they offer, but also on the additional offerings they make to their customers that differentiate them from their competitors. Innovative organizations, offering new services as well as unique customer services, are now succeeding in markets where established organizations have failed. The interaction between customers and service employees is vital for the actual success of service delivery. In Service sector 5S play a crucial role, 5S as a methodology has come out of the techniques within Total Productive Maintenance (TPM) and Toyota Production System (TPS). In this study, an effort has been made to understand the concept of 5S and its implementation on Indian Railways.

IndexTerms - Services Sector, 5S Concept, Service Quality, Toyota Production System, Indian Railways

I. INTRODUCTION

The world economy nowadays is increasingly characterized as a service economy. This is primarily due to the increasing importance and share of the service sector in the economies of most developed and developing countries. In fact, the growth of the service sector has long been considered as indicative of a country's economic progress. Economic history tells us that all developing nations have invariably experienced a shift from agriculture to industry and then to the service sector as the main stay of the economy. This shift has also brought about a change in the definition of goods and services themselves. The goods are no longer considered separate from services. Rather, services now increasingly represent an integral part of the product and this interconnectedness of goods and services is represented on a goods-services continuum.

Services' marketing is a sub field of marketing which covers the marketing of both goods and services. Goods marketing include the marketing of fast moving consumer goods (FMCG) and durables. Services marketing typically refer to the marketing of both business to consumer (B2C) and business to business (B2B) services. Services, which can be defined as deeds, processes, and performance, fall into several categories. Common examples of service marketing are found in telecommunications, air travel, health care, financial services, all types of hospitality services, car rental services, and professional services. Another category of service is customer service, which includes the service provided in support of a company's core products. Typically, customer service does not directly produce revenue but rather addresses customer requests, questions, and complaints, besides providing answers and solutions. Service can also be a value-addition for manufactured products. Many companies provide training, installation, and repair services for the goods they produce often for a fee. Finally, many services are derived from or are provided by manufactured products such as cell phones, computers, software, and mobile phones. In early writings on services, scholars distinguished services from goods by noting that they were intangible, perishable, variable, and that the producer and consumer were inseparable.

Indian Railways, 150 years old, is the largest railway network in Asia and world's largest railway system under a single management. It is one of the largest mode of travelling. Indian Railway is indeed the lifeline of the country. It has 115,000 kilometres of total track over a route of 65,000 kilometres and 7,500 stations. Most of Indian population largely relies on railway for their journey because of the convenience of the large railway network and its low cost. With an extensive network spread across the country, Indian Railways plays a key role in the social and economic development of India. Vanniarajan and Stephen (2008) identified the attributes that passengers use to evaluate the service quality of Indian Railways as reliability, assurance, empathy, tangibles, and responsiveness.

II. REVIEW OF LITERATURE

Kochhar et al. (2006) argued that India was a negative outlier in 1981 compared to other emerging markets as the share of services in value added and employment was below that of other countries. After the 1990s, the service sector grew, and in 2000 India became a positive outlier in terms of the share of services in value added but continued to be a negative outlier in terms of its share in employment. J. Michalska et al. (2007) studied that 5S implementation results in increasing of an efficiency, safety and reduction of the industry pollution. The proceedings to research clearly show that training of workers about the 5S rules is very essential. The important task is to divide activities on some main steps and to maintain the continuous improvement. It is also important to understand the need of executing the routine inspections of usage the 5S rule. This inspection is executed by helping of so-called check list and created on its basis the radar graph of the 5S, which serves to estimation of the workplace. Jose H. Ablanado-Rosas et al. (2010) presented that the 5S practice is used as the basis for advanced quality and continuous improvement philosophies and the organization measures the benefits from 5S implementation such as quality improvement. The

5S practice is worthwhile for production and service organizations and is universal to all organizations. The big challenge is how to incorporate the 5S practice in everyone's (employee's) life.

Shahryar Sorooshian et al. (2012) have experienced of implementing a 5S program and paper involves presentation of a real case study, specifically the influence of 5S on some basic work environment problems and the compensation power on the choice of implementation of 5S. This paper is simply representation of basic information with all pros and cons about the concept of 5S. Ravinder Kumar Panchal et al. (2012) focus on the methodology adopted in 5S and implementation of the same in the production industry. The 5S rules bring the great changes in the company, for example: process improvement by costs" reduction, increasing of effectiveness and efficiency in the processes, maintenance and improvement of the machines" efficiency, safety increasing and reduction of the industry pollution and waste. P. M. Rojarsra et al. (2012) explained the implementation of 5S methodology in the Krishna Plastic Company, Udhoygnagar, Amreli, and Gujarat. Out of the available various lean manufacturing techniques, 5S offers good potential for required improvement. Ten week study is carried out in the company. The results after the 5S implementations states that production system efficiency is improved from 67% to 88.8% in the successive week.

Arash Ghodrati et al. (2013) determined performance factors and characteristics in industrial organizations and identified the effectiveness of 5S implementation on organizational performance as well. Surveying method is used and data collection is carried out by distributing questionnaire among five target organizations which have implemented 5S techniques. The target organizations are chosen from different industries and diverse field of work. The results of this research obtained from a comparative measurement of organizational performance before and after 5S implementation. The results show that 5S is an effective tool for improvement of organizational performance, regardless of organization type, size, its production or its service. Consequently, 5S techniques would strongl

y support the objectives of organization to achieve continuous improvement and higher performance, identifying effectiveness of 5S implementation on the organization performance, has been achieved by using a comparative measurement between performance of organization before and after 5S implementation assisted by SPSS and Excel software. Finally it is concluded that 5S has positive effect on overall performance and could improve the quality, efficiency and productivity of industrial organizations. Marko Milosevic et al (2013) explained the methods and techniques of lean concept which uses to increase the efficiency of all processes in the company. Also show the results of the level of implementation this method in international and domestic production companies. It can conclude that large companies pay much attention to "lean" concept, both because productivity, and the satisfaction of their employees.

K.Ramesh et al (2014) has presented an industry application of 5S lean technology at a Hari Bio-Mass Processing Unit. It suggests that 5S lean technology is utilized to develop an infrastructure for continuous process improvement. A practical 5S methodology is implemented to 10 areas in the plant during the project period of 3 months to clean up the process and improve overall plant operations. Shraddha P. Deshpande et al (2015) defines 5S as relatively a simple technique which can be easily applied in any organization and the results of it are rapidly visible. It states that 5S helps to maintain Proper workplace management for better use of working area, time saving in searching for tools and materials due to proper location and identification it helps for huge cost saving from waste and unwanted materials and it also increased morale of the workers due to enhancement of working environment.

III. OBJECTIVES

The broad objectives of the study are as follows.

1. To understand and study the Service Sector.
2. To understand the emerging concept of 5s of Japanese Technology in Service Sector.
3. To evaluate the implementation of 5S technique in Indian Railways.

IV. CHARACTERISTICS OF A SERVICE

A service is defined as an intangible act that one party may offer to another, and that does not result in the ownership of a physical product. By definition, services have characteristics that greatly influence how marketers design marketing programs to promote them. The services posses the following characteristics:

- Intangibility
- Inseparability
- Variability
- Perishability
- Heterogeneity
- Lack of ownership

**Table 1: Constraints to the Management of Services
and Ways of Overcoming them**

Characteristics of Services	Some Implications	Some means of overcoming Characteristics
Intangibility	Sampling Difficult	Focus on benefits
	Places strain on Promotional element of marketing mix	Increase tangibility of service
	No patents possible	Use Brand Names
	Difficult to judge price and quality in advance	Use personalities to personalize services
		Develop reputation
Inseparability	Requires presence of producer	Learn to work in larger groups
	Direct Sale	Work faster
	Limited scale of operations	Train more competent service providers
Perishability	Cannot be stored	Better match between demand and supply
	Problems with demand fluctuations	
Heterogeneity	Standard depend upon who and when provided	Careful personnel selection and training
	Difficult to assure quality	Ensure standard are monitored
		Pre-package service
	Mechanize and industrialize for quality control	
Ownership	Customer has access to but not ownership of activity or facility	Stress advantage of non-ownership (e.g. easier payment system)

V. COMPOSITION OF SERVICE SECTOR IN INDIA

In India, the national income classification given by Central Statistical Organization is followed. The service sector includes the following:

1. Trade, hotels and restaurants (THR)
 - 1.1 Trade
 - 1.2 Hotels and restaurants
2. Transport, storage and communication
 - 2.1 Railways
 - 2.2 Transport by other means
 - 2.3 Storage
 - 2.4 Communication
3. Financing, Insurance, Real Estate and Business Services
 - 3.1 Banking and Insurance
 - 3.2 Real Estate, Ownership of Dwellings and Business Services
4. Community, Social and Personal services
 - 4.1 Public Administration and defence (PA & D)
 - 4.2 Other services

VI. 5S RISING CONCEPT IN SERVICE

5S as a methodology has come out of the techniques within Total Productive Maintenance (TPM) and Toyota Production System (TPS). Basically this concept was started in Japan, this 5S are now widely used in India. 5S is a simple tool for organizing workplace in a clean, efficient and safe manner to enhance the productivity, visual management and to ensure the introduction of standardized working. One of the most important factors of 5S is that it makes problems immediately obvious. 5S is a team run process and should be conducted by the people who work within the area in which the principles of 5S are being applied. It is not a tool that can be applied by an outsider onto an area without the knowledge and cooperation of the people within it.

5S is a methodical way to organize workplace and working practices as well as being an overall philosophy and way of working. It is split into 5 phases, each named after a different Japanese term beginning with the letter “S”; (Seiri, Seiton, Seiso, Seiketsu, Shitsuke) hence the name 5 S.

Table2: Five Distinct Phases of 5S Technique (with English descriptions)

5S	Variables
Seiri	Information clarity
	Programs
	Rules
Seiton	Simplify or Easy availability of tickets
	Condition of Railways
	Orderliness of seats
Seiso	Cleanliness
	Checking
Seiketsu	Quality
	Conformity / Attitude of Railway Employees
Shitsuke	Sustain / Cost
	Food & Drinks
	custom / Duty
	Time
	Safety

5S MEANING

Seiri or Sort is the first step in 5S, it refers to the sorting of the clutter from the other items within the work area that are actually needed. This stage requires the team to remove all items that clearly do not belong in the working area and only leave those that are required for the processes in question.

Seiton or Simplify is the process of taking the required items that are remaining after the removal of clutter and arranging them in an efficient manner through the use of ergonomic principles and ensuring that every item “has a place and that everything is in its place.”

Seiso or Sweep is the thorough cleaning of the area, tools, machines and other equipment to ensure that everything is returned to a “nearly new” status. This will ensure that any non-conformity stands out; such as an oil leak from a machine onto a bright, newly painted clean floor.

Seiketsu or standardize is the process of ensuring that what we have done within the first three stages of 5S become standardized; that is we ensure that we have common standards and ways of working. Standard work is one of the most important principles of Lean manufacturing.

Shitsuke The final stage is 5S Shitsuke or sustain, ensuring that the company continue to continually improve using the previous stages of 5S, maintain housekeeping, and conduct audits and so forth. 5S should become part of the culture of the business and the responsibility of everyone in the organization.

Table 3: Summarization of 5S Concept and their Inter-Connectedness

Lean Manufacturing Definition	Japanese Name English Translation	Preventive Maintenance Evaluation Definition
Organized : Distinguish between the less essential and the necessary	SEIRI Separate	Step 1 : Eliminate all non-value added task
Neat : Put things where they best meet their functional purpose.	SEITON Straighten	Step 2 : Reassign appropriate tasks to operations or to lubrication routes
Clean : Inspect for the eliminate waste, dirt and damage	SEISO Scrub	Step 3 : Eliminate all tasks that do not directly address a specific failure mode
Standardized : Maintain known agreed upon conditions	SEIKETSU Standardize	Step 4 : Ensure all remaining tasks follow a standardized format including clear definition, specific steps, necessary safety warnings, appropriate tools and required parts
Disciplined : Practice the habit of doing what is required even if it is difficult	SHITSUKE Systematize	Step 5 : Make sure all tasks are quantitative in nature with specific measurable activities detailing nominal measurements with minimum and maximum allowable limits.

5S is also known in some quarters as **5C**, with the “S” words replaced by

- Clearing,
- Configure,
- Clean and Check,
- Conformity and finally
- Custom and practice.

5S PRINCIPLES

The target of lean 5S is to create a safe and comfortable work environment by keeping the area in order, neat and clean by the workers themselves. In doing so, motivation in the workplace is fostered. 5S principles were created for lean production, cost reduction and employee empowerment. Lean 5S techniques work from the assembly line to the office. Where ever inefficiencies lie, lean 5S is a wonderful tool and philosophy to create order and motivation in the workplace.

5S workplace organization works on the principle that a workplace full of clutter is less productive and motivating than a clean and ordered area. Unnecessary items and dirt get in the way of employees and negatively impact productivity. From the Japanese point of view, cleanliness is indeed next to godliness. Cleanliness or the removal of all dirt is a form of beauty. Working in a beautiful environment creates positivity and good energy flow - necessities when it comes to motivation.

5S IMPLEMENTATION IN INDIAN RAILWAYS

5S is an approach for workplace organizations; it drives workplace efficiency and productivity improvement. Indian Railways are also putting hard efforts for implementing some of the variables under 5S. Based on a simple set of principles, Indian Railways not only helps to identify wastes in the workplace but also creates an environment wherein teams get involved in improvements. It is a movement to make sure that all the elements of a “workplace system”

VII. RESULTS AND ANALYSIS

The demographic characteristics of the respondents are presented in table 3. The gender distribution of the respondent passengers groups was quite uneven, with 58% male respondents and 42% female respondents. The age group of the respondents was 31-40 years (41%), followed by 21-30 years (35%), and 41-50 (24%). In terms of occupation, 32% respondents are businessmen/industrialist, 61% respondents government servants or professionals (including software engineers, doctors, lawyers, etc.) and 7% of them are students.

TABLE 3: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

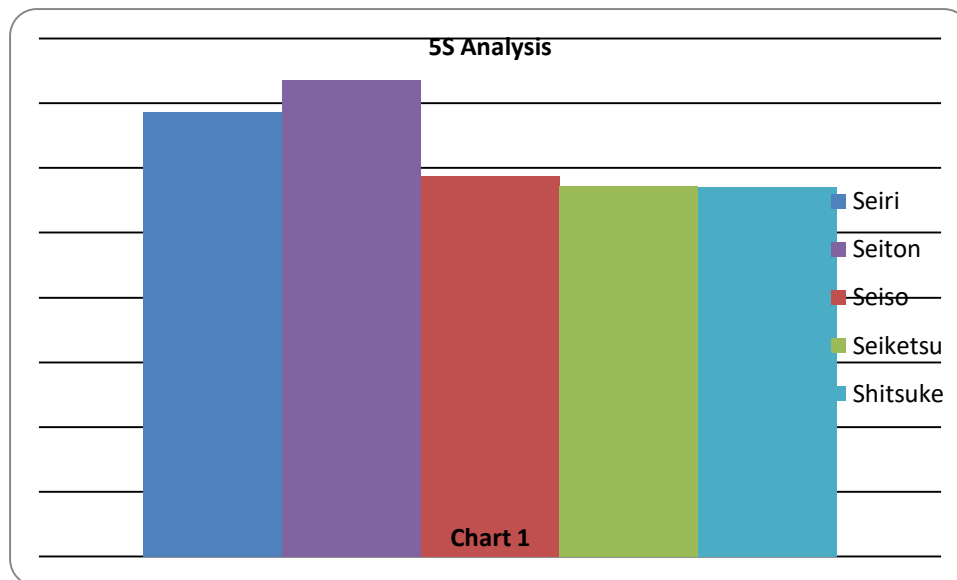
Respondents	Total	Percentage
Gender Wise		
Male	58	58%
Female	42	42%
Age Wise		
21-30	35	35%
31-40	41	41%
41-50	24	24%
Occupation Wise		
Business	32	32%
Service Man	61	61%
Students	07	7%

Table 4 presents the analysis of various 5S variables using Likert 5 point scale. The respondents has given preference to Seiton (Avg. mean 3.68) followed by Seiri (avg. Mean 3.43) and Seiso (avg. Mean 2.94). The least preference is given to Seiketsu (avg. mean 2.86) and Shitsuke (avg. Mean 2.85). Moreover, the differentiation between responses regarding Seiketsu and Shitsuke is negligible. The graphical analysis is also presented is figure 1.

TABLE 4: FACTORS INFLUENCING SERVICE QUALITY

5S	Variables	N	Mean	Average
Seiri	Information clarity	100	3.70	3.43
	Policies	100	3.18	
	Rules	100	3.43	
Seiton	Availability of tickets	100	3.66	3.68
	Condition of Railways	100	3.52	
	Orderliness of seats	100	3.88	
Seiso	Cleanliness	100	2.79	2.94
	Checking	100	3.09	
Seiketsu	Quality	100	3.00	2.86
	Attitude of Railway Employees	100	3.54	
Shitsuke	Cost	100	3.62	2.85
	Food & Drinks	100	2.43	
	Time	100	2.80	
	Safety	100	2.55	

FIGURE 1: GRAPHICAL PRESENTATION OF FACTORS INFLUENCING SERVICE QUALITY



VIII. CONCLUSION & SUGGESTIONS

Services have become an integral part of the world economy. Over the past decade the role of services marketing has become a dominant feature in the service industry. The rise in information technology has led to an increase in demand of services from customers. The organizations now no longer regard services as an option but rather as a necessity to gain a competitive advantage. It has been concluded that 5S technique is very useful, applicable and beneficial. The technique is appropriate for industrial organizations, with focus on total quality management. The efficient implementation of 5S technique leads to subsequent improvement in productivity of the manufacturing plant.

The Indian Railway transportation is gaining importance day by day. It is well known that offering better services is vital for the growth of the Indian Railways. The Indian Railways is further required to extend its attention to satisfy the needs of customers and made initiatives to improve the quality of service to enrich the satisfaction of customers. It has been found that all the 5S i.e. Seiri, Seiton, Seiso, Seiketsu, Shitsuke has great utility in Indian Railways. Every S has unique variables and all variables have different impact on customers. We find that Seiri and Seiton variables are more preferred by the customers and provide more satisfaction to them. It is therefore, recommended that the Ministry of Railways should take all possible steps to propagate the various services provided to the passengers by keeping adequate index boards and bulletin boards in all possible places like rest room, at the entrance, ticket counter, passengers' lounge and platform, work on cleanliness & quality improvement. It may enable the passengers to know about the facilities provided by the Indian Railways.

The 5S improves environmental performance and thus relate primarily in reduction of wastes in manufacturing. It promotes neatness in storage of raw material and finished products. The implementation of 5S within a service business delivers the following benefits.

- Reduces process lead times
- Facilitates workplace organization
- Standardizes operating procedures
- Improves customer response times
- Installs policies / guidelines that drive workplace
- Contributes to cost efficiency
- Helps to identify wastes
- Builds a culture of continual improvement
- Removes workplace clutter
- Reduces waste in the workplace
- Improves look-and-feel
- Errors are minimized leading to making defect-free products
- The morale and satisfaction of employees improves
- Time for searching tools, materials and document is minimize

It would be advisable to start the implementation with one selected area in the organisation and then after getting positive results to extend gradually to other areas. However for effective implementation, it would be important to:

- Sensitize management and all employees concerned about the importance and benefits of 5S and get their commitment.
- Conduct a status audit with photographs 'as is state'. The diagnostic tool given in the appendix may be used.
- Measure throughput, timely materials handling, floor space, flow distance, rack storage, engineering cycle times, annual physical inventory time, and defect ratios before and after the 5S implementation.
- Develop an implementation plan, with clear responsibilities and deadlines, in consultation with management and all employees concerned.
- Implement the 5S plan.
- Take photographs after the implementation and assess the difference.
- Share the experience and extend the implementation to other areas.
- Conduct periodic 5S Internal Audits with ratings to monitor progress.

Several companies have introduced annual 5S awards where efforts of work teams are recognized and rewarded. The brilliance of 5S is that it can be adopted by all throughout an organization. There are no burdens of complicated tools or difficult data analysis. 5S is a set of practices that needs to be practiced every day until it becomes a habit. Whether it is a CEO or a peon, everyone should practice 5S.

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