A Case on the Project Failure of Water Vending Machines of Indian Railways : Financial Concerns and Beyond

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Abstract

The provision of clean water in remote areas and public places is crucial for public health. The Indian Railways implemented a revolutionary project to install water vending machines (WVM) on railway platforms to provide affordable water access to passengers. However, after 5 years of implementation, the project failed, leaving many questions unanswered. This study aimed to explore the factors associated with the project's failure and its probable solutions. The study used the Socio-Ecological Model (SEM) and Fishbone diagram to categorize the factors and their plausible solutions. Seventeen interviews were conducted with railway staff, operators, and passengers using a semi-structured questionnaire. The study identified six significant factors associated with the project's failure: machine and equipment-related issues, people and management-related concerns, financial concerns, maintenance and repair issues, communication and delegation issues, and environmental concerns. The study recommended awareness enhancement at the intrapersonal level and operator training at the interpersonal level to address the project's challenges. Communication improvement and delegation of authorities at the institutional and community level, effective policy implementation, and sustainability awareness are essential to enhance the project's efficiency. Multilevel problem analysis is crucial before implementing any project to reduce uncertainty and improve its efficiency. Besides highlighting the factors associated with the failure of the WVM project implemented by the Indian Railways, the findings and recommendations of this study will be beneficial to project managers in the future, helping them to overcome the challenges associated with similar projects and make them more viable.

Keywords : **water vending machine (WVM), Indian railway, socio-ecological model (SEM), clean water**

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Indian railways are considered the nation's lifeline because they provide a unified connection to the country and carry more than 8 billion people annually (Statista, 2022a). The Indian Railways has recently undertaken several projects to improve customer satisfaction and basic service facilities. Water vending machines (WVMs) were installed on the railway platforms as part of a significant step to increase affordable access to clean drinking water. Access to safe drinking water is essential for achieving Sustainable Development Goal 6 and enhancing public health, as 10% of the burden of waterborne disease can be reduced by improving drinking water quality, proper management, hygiene, and sanitation infrastructure (WHO, 2022). However, many passengers relied on platform-based drinking water, so protecting the water quality for billions of passengers became essential. The WVM installation started in 2016, according to the 2015 commercial circular (Commercial Circular No. 36/2015) (Ministry of Railways, Government of India, 2015). The number of machine installations increased from 550 in 2016 to 1,011 in 2017, 632 in 2018, 619 in 2019, 685 in 2020, and 685 in 2021 (Statista, 2022c). It was a costly and revolutionary step by the Indian Railways Ministry toward maintaining sustainability in platform-based drinking water services (Kumar, 2018).

Global deaths projected from diarrhea, a waterborne disease, will reach up to 829,000 per year due to contaminated water and improper hygiene and sanitation facilities (WHO, 2022). However, this pressing problem can be resolved by raising awareness and taking preventive action by the government. Rail Neer (IRCTC-based packaged drinking water for railways) sales increased from ₹ 721.1 million to ₹ 1722.6 million between 2014 – 2022 (Statista, 2022b). The higher sales of packaged drinking water on the Indian Railways platforms showed positive changes toward water quality concerns. However, the Ministry of Railways and IRCTC (Indian Railway Catering and Tourism Corporation) rolled out a plan in 2016 to enhance drinking water access to poor people with the help of WVM installation in the platforms. The selling price for WVM dispensed water in 2016 was minimal, as highlighted in Table 1, and the price was revised and increased to ₹ 1 for 300 ml water in 2018 (Sengupta, 2018).

Past research shows that WVM is a crucial step toward providing clean water to passengers (Kumar, 2018) and enhances passenger satisfaction. The future of WVMs on Indian Railways platforms seems uncertain due to a trifecta of issues, including the burden of electricity bills, communication breakdowns between IRCTC and railways, and maintenance challenges, as reported by Bengrut (2022) and Rao (2022). Despite their popularity and convenience, the discontinuation of WVMs highlights the need for innovative solutions to ensure passengers' hydration needs are met efficiently and effectively.

This intriguing case study delves into the failure of the WVM project on Indian Railways platforms, using the fishbone diagram to identify the complex cause-and-effect relations. By applying the socio-ecological framework, the study reveals different levels of concerns and possible solutions for passengers, accounting for both Indian Railways and individual-level factors of failure. This unique approach allows us to comprehend the intricate mechanisms behind project failure and empowers us to devise effective solutions. Furthermore, the study

Table 1. ***Price of WVM Dispensed Clean Water***

Amount of Water	Refill Price (2016)	Refill with Container
300 ml.	₹ 1	₹ 2
500 ml.	₹ 3	₹ 5
1 Litre	₹ 5	₹ 8
2 Litre	₹ 8	₹ 12
5 Litre	₹ 20	₹ 25

Data source : Press Information Bureau, Government of India (2016).

sheds light on how multilevel social factors and systems impact projects in diverse situations, making it a valuable resource for anyone interested in understanding the complexities of project management.

Context and Theoretical Background of the Study

Indian Railways

Indian Railways (IR) is a statutory body under the Government of India's Ministry of Railways, and the organization controls the entire railways activities across India. IR is the world's fourth railway system by its size and carries more than 23 million daily passengers with the help of its 67,415 km route length, 13,169 passenger train, and 7,325 platforms. In recent decades, the IR has taken several steps toward ensuring sustainability, such as toward carbon neutrality, energy efficiency and conservation, clean energy and alternate fuel, water conservation, solid waste management, bio-toilets, and policy initiatives toward maintaining sustainability (Indian Railways, 2021). Particularly, the government has taken several initiatives towards managing water on the railway platforms, such as water recycling plants, rainwater harvesting, water body restoration, water policy, and water audit to achieve the target by 2030, i.e., 20% efficiency in water use (Indian Railways, 2021; Ministry of Railways, Government of India, 2017). The IR and Indian Railway Catering and Tourism Corporation (IRCTC) launched the WVM installation policy on June 16, 2015, to enhance potable drinking water access to platform passengers (Ministry of Railways, Government of India, 2015).

Water Vending Machine (WVM)

Mr. Siya Ram, the visionary Group General Manager of Rail Neer, introduced the revolutionary idea of installing WVMs on Indian Railway platforms to provide clean drinking water to millions of Indians still deprived of quality water, even after 70 years of independence, as reported by Kumar (2018). This initiative's primary goal was to establish guidelines to provide willing railway passengers with high-quality drinking water at an affordable price, according to the Ministry of Railways (2015). To ensure compliance with BIS standards and IS 10500:2012 specifications, WVMs employed state-of-the-art reverse osmosis (RO) technology and other superior technologies. Notably, these machines use a seven-stage process to filter raw water, including dual media filter, activated carbon cartridge block, antiscalant dosing, micron cartridge filter, RO Membrane, pH correction and re-mineralization, and UV sterilization, as described by Roy (2016) and Kumar (2018).

Revenue generation from the WVM project operates under a 15:85 sharing ratio between the Indian Railways (IR) and Indian Railway Catering and Tourism Corporation (IRCTC), as outlined in their Memorandum of Understanding (MoU) since WVMs fall under the category of passenger amenity items (Category 1). The principal source of revenue comes from license fees, which vary depending on the station's category. For instance, the operator must pay a minimum license fee of 40,000 INR/year/WVM for operating in A1 and A category stations. In contrast, operators must pay 25,000 INR/year/WVM as license fees for operating WVM in the B and C category stations. However, the IR fixed 10,000 INR/year/WVM for WVM machine operations in D category stations and 2000 INR/year/WVM for operations in E category stations (Ministry of Railways, 2015). Mr. Siya Ram, the mastermind behind the WVM project, envisioned that it would bridge the gap between tap and packaged drinking water. However, he also cautioned that the project's success would depend on the vendors' patience regarding return and sustainable revenue generation (Kumar, 2018).

Theoretical Linkage

The socio-ecological theory, developed by Urie Bronfenbrenner in 1980, is a valuable tool for analyzing the dynamic social factors that impact development. Originally designed to explore child development, the model has been widely adopted by various fields, including medicine, social sciences, and business (Al-Jayyousi et al., 2021). The socio-ecological model incorporates five levels of influence: intrapersonal, interpersonal, institutional, community, and public policy (Mahmudiono et al., 2019; Pereira et al., 2019). These levels represent the various subsystems that interact to shape a person's attitudes, behaviors, and environment. The model suggests that development is impacted by multiple factors across all levels rather than a single direct component.

Previous studies have applied the SEM theory to explore potential factors for various projects, such as promoting Gender Equity in Livelihoods Projects (Serra et al., 2022), identifying gender-based violence factors (Jones et al., 2020), and characteristics associated with diabetes-structured education programs (Bamuya et al., 2021). In this study, the SEM model will be used to investigate the failure of the WVM project in the Indian Railways. By applying the SEM theory, we can identify the various factors that may have contributed to the project's failure at each level – from individual attitudes and behaviors to public policies and regulations.

Case Context

The Ministry of Railways took a revolutionary project concerning WVM machine installation at the railway platforms : (a) to ensure sustainability, (b) 20% efficiency in water use, (c) bridge the gap between packaged water and tap water, and (d) improving clean water access on the platforms with affordable price (Ministry of Railways, Government of India, 2015). The policy was granted on July 16, 2015, and the machines started getting installed in 2016. The principal drivers behind the project's success are its huge passenger base, 24×7 water availability, smooth operations, people's awareness of clean water, and better collaboration. However, after two years of the project, several issues started coming to light concerning the machine's maintenance and repair, hygiene, electricity loss, and out-of-service. However, the Ministry of Railways considered the issues and revised the project's management guidelines. In the new guidelines, several significant changes were observed based on the CVC report, such as (a) the operator needs to provide only 12% of the total return revenue except for water and electricity bills, (b) license fees will be enhanced to a minimum 10% over prevailing license fees, (c) DRM will be responsible concerning the WVM installation location, (d) Principal Chief Commercial Manager (PCCM) is principally delegated powers to formulate the (Standard Bid Document) SBD for WVM (Ministry of Railways, Government of India, 2021). However, it is noticed that the Central Railway stopped its WVM operations in 2022 instead of repairing the WVMs. The statement highlights that there are still so many issues concerning the WVM project operations. One senior railway official from the Western Railway region stated, “the IRCTC installed these WVMs, and it is their responsibility to restart them.”

On the other hand, Rahul Himalian, Group General Manager, Western Region of IRCTC, claimed that “we are not reviving tenders or giving contracts to vendors for new WVMs. These have been handed over to the Railways.” Surprisingly, railway authorities also claimed that “there is no written communication from the IRCTC about the handover of these WVMs, that these continue to be under their possession, and it's their responsibility as well” (Rao, 2022). In this context, it is clear that there is a significant communication gap along with a delegation of authority and responsibility that leads to the project's failure as both groups are washing their hands from the situation. According to sources, there are unpaid bills of more than INR 50 lakhs from multiple contractors who operated the WVMs (Rao, 2022). From this statement, it is clear that the project is in a severe complex stage, close to the failure stage. VK Tripathi, Chairman and CEO of the Railway Board, stated that the WVM will not start again as it is considered a failed scheme (“Mumbai: “Water Vending Machines...”,” 2021, 2022). However, Subhash Gupta, President of Rail Yatri Parishad, and Nandkumar Deshmukh, president of

the Federation of Suburban Rail Passengers, support repairing and continuing the WVMs on the railway platforms to serve cold water in summer (Rao, 2022).

Methodology

We utilized a qualitative research design with a semi-structured interview method to uncover the factors associated with project failure and probable solutions (Sharma & Mathur, 2022). Our research technique was chosen to provide a detailed understanding of the topic rather than a statistical evaluation (Westenberger et al., 2022). To ensure the accuracy and reliability of our findings, we put in place several mechanisms, including redundancy data analysis, critical debate, and reflection on techniques and outcomes (Aguinis & Solarino, 2019; Alam, 2021). We also used a purposive sampling technique to select participants who could provide valuable insights and accomplish our study objectives. Our study is not only insightful but also engaging, providing an in-depth understanding of the factors associated with project failure and probable solutions.

We conducted our study between May and June 2022, focusing on three main sample units: Railway staff, WVM operators, and passengers. We selected these groups as they each play a crucial role in the initiative and can provide valuable insights into the factors associated with project failure and probable solutions. Passengers were particularly important to us as they are the primary consumers of the WVM product. The opinions of WVM operators were also vital as they are involved in the full operations of the initiative, acting as the primary medium between passengers and authorities. Railway staff members were also included in our study as they are the

Table 2. ***Interviewee Details***

Interview code	Date (DD/mm /YY)	Interviewee Category	Interview Area	Knowledge of Platform	Interview Duration (approx.)	Demographic characteristics			
						Gender	Age	Education	Occupation
IC1	2/5/2022	Passenger	Midnapore	Midnapore and Howrah	15 min	Male	43	10th class	Worker
IC2	4/5/2022	Passenger	Howrah	Howrah and Mumbai	15 min	Male	21	Graduation	Worker
IC3	4/5/2022	Passenger	Howrah	Howrah and Mumbai	17 min	Male	23	12th class	Worker
IC4	4/5/2022	Passenger	Howrah	Howrah and Chennai	15 min	Male	23	10th class	Worker
IC5	27/5/2022	Passenger	Midnapore	Midnapore and Howrah	25 min	Male	28	Graduation	Student
IC6	27/5/2022	Passenger	Midnapore	Midnapore and Howrah	25 min	Male	27	Graduation	Student
IC7	2/5/2022	Passenger	Midnapore	Midnapore and Howrah	17 min	Female	24	Masters	Student
IC8	15/5/2022	Passenger	Howrah	Howrah and Chennai	18 min	Male	38	Masters	Private job
IC9	15/5/2022	Passenger	Howrah	Howrah and Surat	17 min	Male	51	Masters	Business
IC10	2/5/2022	Railway staff	Midnapore	Midnapore	20 min	Male	32	Graduation	Govt job
IC11	3/6/2022	Railway staff	Midnapore	Midnapore	20 min	Female	28	Masters	Govt job
IC12	3/6/2022	Railway staff	Midnapore	Midnapore	20 min	Male	49	Graduation	Govt job
IC13	15/6/2022	Railway staff	Howrah	Howrah	25 min	Male	35	Graduation	Govt job
IC14	24/6/2022	Railway staff	Howrah	Howrah	20 min	Female	33	Graduation	Govt job
IC15	24/6/2022	Railway staff	Howrah	Howrah	23 min	Male	37	Masters	Govt job
IC16	25/6/2022	Operator	Midnapore	Midnapore	30 min	Male	34	Graduation	Catering
IC17	27/6/2022	Operator	Howrah	Howrah	27 min	Male	29	Graduation	Catering

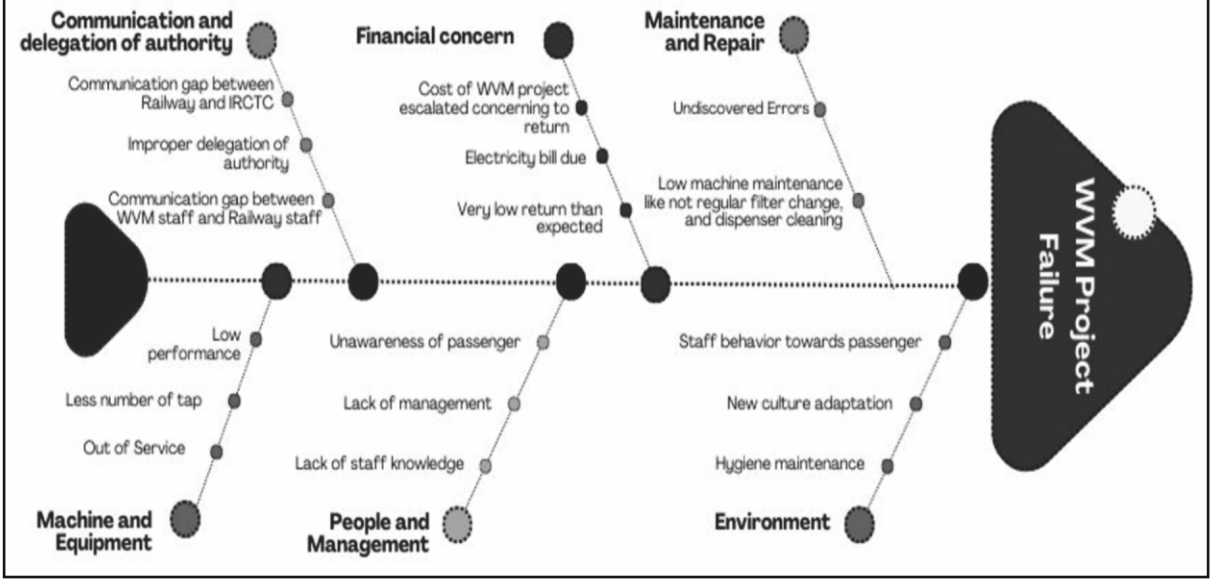
immediate concerned authority concerning decision-making. However, it was observed that some passengers were not aware of the WVM initiative, so we only interviewed those who were already using it for drinking water. To ensure the accuracy of our findings, we provide detailed information about the interviewees in Table 2.

Fifteen carefully crafted questions were posed to gather demographic data and explore project awareness, failure, and potential solutions. Only comments that explicitly referenced failure causes and potential solutions were considered in the analysis of the findings presented in the following section. Each interview was conducted in person, utilizing a semi-structured questionnaire. The interviewee's consent was obtained before the discussion, and the entire interview was recorded using a tape recorder. The resulting recordings were transcribed manually (Westenberger et al., 2022). An inductive approach was used to code the transcripts openly, with codes being combined into themes and sub-themes based on similarities. These themes and sub-themes were then utilized to create a fishbone graph highlighting the cause-effect relationships between them. Finally, based on the interviewee's responses, a socio-ecological model (SEM) was developed to depict the most pressing concerns and their potential solutions.

Findings : The Challenging Areas

In this study, 17 interviews were conducted from three principal categories (passenger, railway staff, and operator) to accomplish the study's objectives. The details of demographic characteristics and passenger details are presented in Table 2. Among 17 respondents, 23.54% were from the worker category, 17.65% were students, 35.29% were government job holders, 11.76% were operators, 5.88% held private jobs, and 5.88% were from the business category. After analyzing the interview transcripts, it was noticed that several factors are associated with the failure of the project, and IR needs to give special attention to address these challenges. The fishbone diagram (Figure 1) categorizes all the challenges related to the project's failure. It is categorized into six themes: machine and equipment-related issues, communication and authority delegation issues, people and management issues, environment-related issues, financial issues, and maintenance and repair-related issues.

Figure 1. ***Fishbone Diagram Showing the Cause-Effect Relationship of WVM Project Failure***



Machine and Equipment

Factors associated with the equipment and machine service concerns are categorized into machine and equipment categories. IC5 stated, "… I highly benefit from the machine as it provides clean water at minimum cost. However, the maximum time I observed the machine is out of service, and now it is not on the platform anymore." A similar comment was noticed by two students who regularly travel by train to attend university (IC6 and IC7). It indicates that the machines and equipment are not commonly monitored, which may lead to project failure. IC7 specified, "… all the people are in a hurry due to train time, and a skilled operator is required to manage the queue." IC17 stated that "… the water demand becomes high in certain moments than its capacity. However, the number of taps enhancement can reduce the concern." On the other hand, IC16 stated that "… more machines on the platforms can enhance the clean water access at an affordable price." IC6 stated, "… proper demand and supply analysis is essential to overcome this challenge."

Communication and Delegation of Authority

The second most notable aspect came up while questions were asked about the communication and delegation of authorities. In this concern, IC4 stated, "… I observed so many days that the machine is out of service and no one is observed concerning the machine operation." Similar comments were observed from IC1, IC8, and IC9. IC17 stated that "…the authorities are not showing interest regarding any support while the machines have issues... There is a lack of communication from the authorities." Contrastly, IC10 stated, "… I know my responsibility, and it's difficult to always look into this matter." A similar comment was given by IC11, IC12, and IC15. However, IC14 stated, "… it's a crucial factor, and it is the main reason for the chaos in this project." In line with this, IC17 stated, "… to overcome this challenge, proper management team and right delegation of authorities is essential."

People and Management

The third significant aspect that has come up from the interviews is people and management concerns. All the concerns associated with passengers and management are summarized in this group. IC1 specified that "… though the Indian Railways is doing wonderful and is taking revolutionary steps to improve service in the country, the railway's management is not up to the mark concerning WVM operation, and it leads the project failure." IC13 specified, "… railways is finding it difficult to find the right talent to implement this project due to shortage of skills." In line with this, as IC15 stated, "… to overcome this challenge, finding the right talent is crucial for implementing this operation at a mass level." On the other hand, IC12 claimed that "people's awareness is crucial to overcome the challenge… this was not done properly." A similar comment was received from IC17 and IC4. However, IC17 explained that "… training of existing employees should be top priority… to enhance skill and performance."

Financial Concerns

The fourth aspect is related to financial concerns. One respondent (IC16) expressed financial concerns by saying, "...the earnings from the WVM are not satisfactory...we need to provide electricity, water, and annual fees, and sustainable earning is crucial." A similar statement was noticed from IC17. However, IC11 opined that "… electricity bill and water bill may be a challenging issue for the operator to operate on the platform-based WVMs." On the other hand, IC1 stated, "…the machines are so costly… but the affordable price makes it more complex to get a good return from it." IC7 also stated a similar view, "…the project cost may be heightened than returns, and

IR stopped to install new machines." However, IC8 opined that "…the increased pricing may be a good way to get a good return from it .. but it should be affordable to everyone."

Maintenance and Repair

The fifth remarkable aspect arose while the question was about maintenance and repair. In this concern, IC4 stated that "the lack of maintenance during the pandemic phase may be the principal reason behind the project failure." In line with this, IC3 stated, "after installing the machine several times, I noticed the machine stopped working due to maintenance issues." IC5 also highlighted that "fast services in machine repairing and maintenance are crucial … as the machines help to serve people clean water regularly." However, IC17 stated, "IR and IRCTC have a very complex procedure, and it took so much time to repair the machines, which creates a major concern in operations." A similar comment was noticed from IC16. IC10 stated, "…Railways need to operate WVM separately to enhance operational efficiency and tackle challenges." On the other hand, IC3 suggested that "…training of the operator for a minimum level of maintenance skill development, filter change, and hygiene maintenance is essential to overcome the primary challenges regarding maintenance and repairing issues." The comment is similar to the comment of IC2 and IC4.

Environmental Concerns

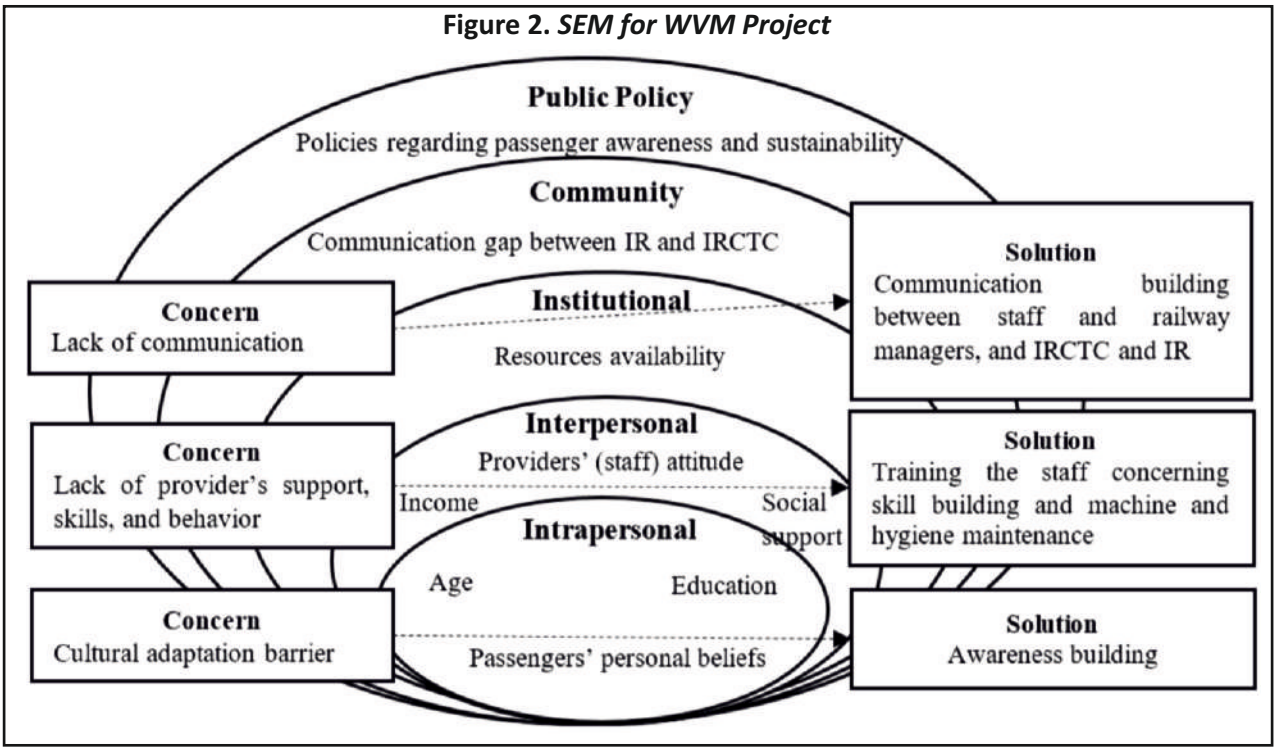
The sixth and another crucial aspect is environmental concern. It principally includes the surrounding environmental conditions that affect the project, summarized under this aspect. People's unawareness and cultural barriers were noticed when we talked with IC2, who stated, "…water is god gifted, and why should I pay for water access?". However, IC8 stated, "…the water quality is so good, and it is provided within a reasonable price. For this reason, I used this for refilling my water bottle and was satisfied with it." However, IC4 stated, "…I was in a hurry for my train and operator's bad behavior during bottle filling offended me." In line with this, IC13 stated "people need more time to adopt this culture." However, one operator (IC16) stated "…due to time constraints, some passengers may not be getting water and ignoring the WVM for the next time." To overcome the challenge, IC1 stated that "…hygiene maintenance is essential for the operator to improve the passenger satisfaction." Similar comment was observed from IC6, IC4, and IC3.

Discussion

The results of our study uncovered numerous factors that could potentially derail the WVM project. As we delved deeper into the subject, we discovered fascinating insights that shed light on the root causes of the project's failure. While equipment-related issues and maintenance problems are the most apparent reasons for the project's shortcomings, our interviewees emphasized a myriad of non-technical concerns, such as poor management, communication breakdowns, delegated authority responsibilities, financial constraints, and environmental considerations. Specifically, most interviewees highlighted the lack of managerial capability, vendor's ability, and communication gaps as the most significant factors contributing to the project's downfall. These findings echo the concerns expressed by Siya Ram at the outset of the project and underscore the challenging direction highlighted by Kumar (2018).

While preventing every factor that could undermine a project's success is impossible, we sought to identify probable solutions to resist project failure. We employed the SEM model to overcome the challenges mentioned above, such as addressing management capacity and communication gaps at the management level while individual passengers faced challenges at the individual level. Our study categorized the problems into five

Figure 2. ***SEM for WVM Project***



distinct levels, and we developed potential solutions at each stage to safeguard the project's ultimate success (Figure 2).

The success of any project lies in the hands of its stakeholders, and the water vending machine (WVM) project is no exception. Research has shown that passengers' attitudes, beliefs, and sociodemographic factors all play a vital role in the adoption of the WVM culture (Kumari et al., 2017). However, passengers' dynamic nature and perceptions can significantly challenge this project. To ensure the project's efficiency, it is essential to raise passenger awareness of safe drinking water's importance to health. The management team must also identify the factors influencing usage intention to enhance purchase behavior (Pahari et al., 2023). Proper risk analysis and human resource policies can help deal with the adoption of a new culture for passengers (Mainrai, 2019).

At the interpersonal level, staff behavior, skill, and support from authorities are crucial to managing the WVM. Operators must undergo training in skill-building, machine repair and maintenance, and hygiene maintenance to overcome these challenges (Khatri et al., 2022). Good behavior toward passengers and prior experience can also contribute to the project's success. Communication and responsibility delegation is crucial to overcoming the challenges at the institutional and community level. Regular monitoring by top management and effective change management implementation are necessary for project success (Gupta, 2018). Finally, national-level policies and governmental support are essential to enhancing passenger awareness and sustainability perception (Kapoor & Singh, 2023). With proper attention to these factors, the WVM project can overcome challenges and become a success story in providing safe drinking water to passengers.

Teaching Notes

Synopsis - Case Study Summary

Clean water access is a fundamental human right, but it remains challenging in many public places and remote

areas. That's why the Indian Railways and IRCTC took a revolutionary initiative to install water vending machines (WVMs) in platforms in 2016 to provide affordable and clean water access to over 3 million daily passengers. The project aimed to maintain sustainability, improve water usage efficiency by 20%, and bridge the gap between packaged and tap water. Despite its noble objectives, the WVM project faced several challenges after implementation. The case study reveals six broad factors that contributed to the project's failure, including financial, technical, and equipment concerns, maintenance and repair issues, and people and management problems. However, the most significant challenge was the communication gap between IRCTC, IR staff, and WVM operators. While the WVM project was a groundbreaking approach in the history of Indian Railways, it highlights the importance of effective communication and delegation of authority in project management.

The case study underscores the need to address communication gaps to ensure the smooth operation of such initiatives. With proper attention to these factors, the WVM project can be a beacon of hope for providing clean water access to the masses. However, the failure of the water vending machine (WVM) project in Indian Railways history highlights the crucial need for a comprehensive and multilevel approach to tackle project failure. The SEM model analysis identified several factors, including cultural barriers, lack of operator skills and behavior, communication gaps, and policy issues. These factors require specific solutions at each level, starting from increasing passenger awareness of WVM and its benefits to staff training and communication improvement. National-level policies are also necessary to enhance water quality perception and public health awareness. By implementing a multilevel problem analysis and its probable solutions, managers and policymakers can proactively address potential project failures and ensure project success.

Learning Objectives

- To understand the multilevel factors that might have affected the WVM project.
- To understand and analyze the possible ways to enhance the WVM project's efficiency.
- To understand what behavioral challenges can be addressed to resolve the dilemmas in adopting and implementing WVM.

Position in Course : The Target Audience

- This case can be used in programs on the contemporary topic at the master's level.
- This case can be used in marketing, human resources, and finance programs at the bachelor's and master's levels.
- The case can be used in programs in business administration at the bachelor's and master's levels.
- This case study can also be used in master's in project management course.

Assignment Questions

- Explain the challenges to WVM implementation in Indian Railways.
- Explain the potential benefits of adopting WVM.
- Explain the possible solutions in the context of WVM project failure.

Suggested Teaching Strategy

Discussion Point	Time (Minutes)
Introduction to WVM	5
Analysis of the vision of Railway and Govt.	15
How WVM is the potential to create value in Railways?	20
Discussion on technology adoption	20
Challenges in adopting WVM	20
Need for monitoring and control of WVM adoption	20
Conclusion	5

Discussion Questions

(Q-1) What are the challenges to WVM implementation in Indian Railways?

(Ans) The implementation of water vending machines in Indian railway stations was a revolutionary approach to improving clean water access for millions of daily passengers. However, since its implementation, the project has faced numerous challenges, including high installation costs, lack of maintenance, and a communication gap between IRCTC and the Indian Railways. These issues have led to significant inefficiencies in the project, jeopardizing its overall success. Moreover, the cultural barrier among passengers and operator inexperience also contributed to the project's failure. To tackle these challenges, Indian Railways must focus on implementing WVMs on the most crucial platforms to ensure efficient project management. Training operators and enhancing communication channels are also critical to addressing operator behavior and communication gaps. Raising awareness among passengers about the importance of safe drinking water and the effectiveness of WVMs can encourage cultural adoption. Finally, developing national policies to improve water quality perception and public health awareness can enhance people's understanding and acceptance of the new culture. Overall, addressing these challenges with a multilevel problem analysis can help managers and policymakers tackle future project failures effectively.

(Q-2) Explain the potential benefits of adopting WVM.

(Ans) The introduction of water vending machines (WVMs) at railway platforms holds tremendous potential for providing millions of passengers with access to clean water. This initiative not only offers affordable clean water options but also creates job opportunities for operators. Moreover, the installation of WVMs is a step towards achieving the goal of improving the efficiency of clean water access by 20%, thereby creating a new source of revenue for the railways and IRCTC. Apart from these benefits, the WVM installation can have a significant positive impact on public health by reducing the risk of waterborne illnesses.

Additionally, the initiative can promote sustainability by decreasing the use of plastic water bottles. Nevertheless, challenges arise during the WVM installation and operation, such as maintenance issues and communication gaps between the IRCTC and the railways. By addressing these issues with effective communication and training, policymakers can overcome these challenges and increase public awareness and acceptance of this new culture. Overall, the introduction of WVMs has the potential to transform clean water access for railway passengers while creating numerous socioeconomic benefits.

(Q3) Explain the possible solutions in the context of WVM project failure.

(Ans) The failure of the WVM project highlights the importance of a multilevel analysis of the issues that arise during implementation. By identifying the challenges at each level, policymakers and managers can develop effective solutions for the successful execution of such projects. At the intrapersonal level, the cultural barrier is a significant issue that can be overcome through increased awareness and education about the benefits of WVMs. By educating people about the effectiveness of WVMs, they will be more likely to adopt this new culture and support the project. The second level highlights the need for training operators in maintenance and operating skills. By improving the skills and behavior of operators, the project can run more efficiently and effectively.

The communication gap at the community and institutional levels creates significant challenges in the project's execution. Effective communication and delegation of authority among railway staff, operators, IRCTC, and Indian Railways are crucial to improving project efficiency. Finally, policies concerning improving water quality perception and public health awareness at the national level can enhance people's awareness and encourage them to adopt the new culture. By working together to overcome these challenges, the WVM project can successfully provide affordable clean water access to millions of passengers.

Authors' Contribution

Dr. Subhajit Pahari and Dr. Debasish Biswas conceived the idea and developed the design to undertake the case study. Atanu Manna extracted highly reputed research papers, filtered these based on keywords, and generated concepts and codes relevant to the study design. Dr. Sudhir Rana verified the methods and supervised the study. Dr. Subhajit Pahari conducted the interviews, and Atanu Manna wrote the manuscript in consultation with Dr. Sudhir Rana and Dr. Debasish Biswas.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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Disclaimer

The authors prepared this case using secondary sources to encourage and facilitate classroom discussion. Cases are not intended to serve as endorsements or sources of data or illustrations of effective or ineffective management.

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