Disperse Slot Intimation System for Streamlined Distribution in Civil Supplies Department

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Abstract

Public distribution system is a government-sponsored chain of shops entrusted with the work of distributing basic food and non-food commodities to the needy sections of the society at very cheap prices. Wheat, rice, kerosene, sugar, etc. are a few major commodities distributed by the public distribution system. Fair Price Shop does not open every day, nor do they keep regular hours. Even on the days that the Fair Price Shop is open, ration card holders have to stand in long queues. But due to delay in supply all citizen needs to come to the fair price shop and ask them whether they are providing the items today. As social distancing was not followed at several fair price shops during the first phase of public distribution, the Civil Supplies Department has issued paper token to the beneficiaries, mentioning the date for them to avail food grains and relief fund. The proposed project aims to modernize the Public Distribution System (PDS) in India, specifically addressing challenges faced by Fair Price Shops. By implementing a virtual queuing system through the Q-Learning algorithm, the approach seeks to replace traditional physical queues with organized slot allocations. Ration cardholders would receive SMS notifications specifying the date and time for product collection, reducing the need for individuals to stand in long queues or frequent the Fair Price Shop every day. This not only saves time for beneficiaries but also aligns with social distancing measures crucial for public health. The incorporation of Q-Learning, a reinforcement learning algorithm, showcases a forward-thinking approach to problem-solving. Additionally, the system allows for two re-slot allocations, providing flexibility for those who miss their initial collection slot. This not only streamlines the process but also allows individuals to view product details online, saving time and enhancing accessibility. This project not only addresses immediate challenges in the distribution process but also sets a precedent for leveraging technology to enhance efficiency and adaptability in government initiatives.

I. INTRODUCTION

Many organizations are facing IT regulatory issues in governance, management, and IT service delivery. These issues are mostly concerned with revenue, the assessment of acceptable risks, and the use of enterprise resources. Studying the issues requires a conceptual framework that clearly defines duties and responsibilities. Generally, the ITSM standards and frameworks are complicated, and their implementation is considered problematic because the expertise and required keep improving on the best practises. Now, organisations are more interested in ITSM systems. Many companies focus on including IT services in their product line and providing value-added and quality services to their customers. ITSM, in general, is a set of guidelines for managing the delivery of IT services based on best practices. An effective ITSM implementation ensures all or most IT services are standardized, documented, and supported to achieve the organization's objectives. Continual Service Improvement is an ITSM process that helps improve SMS processes. The improvement in the processes can also be made using the lean approach, which eliminates any waste and focuses only on the deliverable values. The lean methodology can be adopted at any time after careful analysis of the inputs and outputs of SMS. A lean approach's basic purpose is getting work done effectively and efficiently while maintaining service quality, performance, and availability. An effective ITSM supports the stream of the DPBR (demand → plan → build → run) approach that is used for the documentation and communication of the processes and can be a tool or enabler for lean approach implementation competencies are not available to understand the processes and procedures, especially for SMEs. There is still a perception that IT is a technology to run computers and networks, but this concept is far from reality. Organizations offering IT as an additional service have become the reason for developing and implementing ITSM systems. Organizations

are now dependent on IT and related services, and for this reason, ITSMs are in high demand to cater to businesses' requirements and fulfil customers' expectations. ITSM has become more of a practise than a theory used in various flavours in the IT industry and still requires a great deal of understanding to initiated and successfully implemented many e-government projects in Punjab. Our selected PSO is responsible for legislation, policy formulation, and sectoral planning in Punjab's power sector. The PSO, manages its operation through twelve attached and autonomous bodies, contributes significantly to mitigating the shortfall of electricity in the province of Punjab and has established several state-owned and facilitated IPP mode power projects under the China Pakistan Economic Corridor (CPEC) and IT is one of the key support areas that facilitates and ensures uninterruptable IT support to achieve the organization's objectives.

II. LITERATURE REVIEW

The authors highlight that the organisations and businesses are rapidly transitioning from a goods-based to a service based economy. Because of this, there has been more focus on IT services innovation and ITSM standards, which help businesses create, offer, run, and manage IT services to reach their business goals. Managing growth while lowering costs is a demand for digital businesses, but it's particularly difficult for IT infrastructure and operations. The authors concluded their articles by claiming that many IT firms have begun automating their repeated and recurring activities and are moving toward an opportunistic approach to automating their IT procedures. The authors especially reviewed the automation scope of ITSM from an ITIL process perspective and discussed the potential benefits and drawbacks of automation in the IT industry. Authors claimed that operation-related service processes (75 to 85 percent) have the greatest potential for automation. Furthermore, various elements contributing to an effective ITSM function are also part of the study. According to the authors, a systematic approach to evaluating IT processes is essential for a successful implementation in large-scale ITSM automation projects. An ITSM scope matrix was also created to validate the automation method. The authors in their study state that ITSM considers a critical component of a company's IT development. The ITIL framework was discussed in this case study to improve IT services, and a fuzzy ITIL (FITIL) technique for measuring service level management (SLM) was introduced. The author claimed that by using FITIL, a model can be developed for measuring ITSM in an organization. The study's goal was to provide better IT governance and recommendations based on current (as is) and expected results (to be). The FITIL technique assesses maturity levels using ITIL v3 best practises and compares them before and after the process improvement results on the questionnaire-based protocol. The current maturity level of every cycle of ITIL is used as an input for FITIL. The authors divided the FITIL into four stages: 1: fuzzification, 2: knowledge base, 3: inference, and defuzzification for each ITIL cycle, and there was an improvement at each maturity level, and eventually there was an overall improvement in the SLM maturity level. Based on the research work, the maturity level for continual service improvement can be identified by applying the FITIL approach.

III. RESEARCH METHODOLOGY

In general, the research methodology used in this study can be classified as qualitative analysis [32], but it can also be identified as applied research because we reviewed various established ITSM standard frameworks and standards and proposed the most appropriate tool and its implementation roadmap as per the objectives of this study.
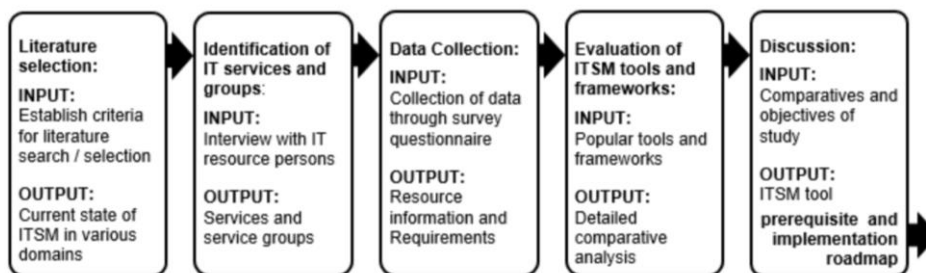

Fig 3a. Research Methodology

To identify IT services in the PSO, we conducted interview sessions with the IT resource persons of three entities. The three entities were selected based on the maximum number of employees, the minimum number,

and the average number of employees. In the interview, a general structure of the IT setup in the organisation was explained, and further, we discussed the various IT services in these organizations. After an initial assessment, we found that these entities work along identical. Internal and external communication is done through the internet, email, phone, and fax, and all entities are equipped with various equipment for the online meeting. Hardware, software, legacy system support, and IT-related procurements are standard and available across all entities. Some entities have developed or purchased supporting systems to facilitate them in their core areas of responsibility, and some of them are supported by PITB, which develops customised applications to facilitate them as an added support system. We have found that almost all entities use the time and attendance system developed by PITB, which is connected to the main server in PITB's data centre. The entities with a web presence use Content Management System (CMS) Drupal to develop and maintain their websites. PITB supervises the overall CMS portal and also provides data centre facilities to PSOs for website hosting. Based on the interview and assessment about working styles and IT services in the PSO, twenty most common IT services are identified and then grouped them into eight groups. Each group has multiple services, and each service will have different processes, all of which will be recorded in the Service Portfolio Management (SPM) of the PSO.

IV. CONCLUSION

ITSM standards and frameworks are a set of best practises for handling IT services in an organization. In this research study, we discussed, analyzed, and evaluated four popular standards and frameworks and found that each one has strong points that distinguish it from the others. While planning, designing, and implementing ITSM, complete knowledge of the particular domain must be kept in mind. Our key consideration during selecting the best tool and proposing the implementation roadmap was an expected reluctance to change the behaviour of the employees. Therefore, any stronger and more popular tool could have resultantly failed during its initial implementation phase. A flexible system is always considered good for an organisation lacking expertise. Keeping in view the specific requirements and organisational structure, FitSM, a lightweight ITSM toll covering the maximum requirements, is the most suitable one for the PSO. It requires less expertise, is easy to implement, and is free. We also proposed FitSM's implementation roadmap to streamline the IT services in the PSO. The constant review and continual improvement of ITSM were also discussed and are part of the implementation strategy. ITSM standards and practises have become more complex and laborious to implement from scratch. However, automating IT services, establishing processes and documentation, and defining tasks and responsibilities are advantageous for planning, monitoring, and evaluating the overall health of IT in an organization. As stated earlier, POSs work under the same principles, and their IT-related services and requirements are more or less common. As a result, this implementation can be replicated in the GoPb's other 300-plus entities. Finally, we were able to achieve the objectives of this study, which were selecting the most appropriate ITSM tool and its implementation model for a PSO.

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