Customer Promise Equipment Management System in Oman Tel Company: A Review

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Abstract

Telecom companies measure their level of success with the services they provide to subscribers and employees. Oman Telecommunication Company (OTEL) is making great efforts to develop its CPE management system to ensure business continuity and provide service to subscribers with high efficiency. The aim of this research is to study CPE management system in Oman Tel in terms of Methods, Impact, benefits and challenges. This paper presents a theoretical approach related to the CPE management system, the ideas to enhance CPE system and provide solutions that appear on different level of CPE system. This paper employed a systematic literature review methodology, which identified 43 publications. The findings of the study suggests that correct CPE management leads to more profits and efficiency. Correct CPE management includes strategies that cover all technical, logistical and financial requirements. In order to improve CPE management, systems integration can be utilized at the lowest costs without having to completely change them, as well as using modern technologies. The use of modern technology, such as big data in stock management improves the pace of work, provided that there is sufficient knowledge and skill when using these techniques.

Key Words: Customer Promise Equipment, Management, Tele communication, Service Delivery, Broad Band

Introduction:

The first telecommunications service provider in the Sultanate of Oman is Omantel since 1970. The government of the Sultanate of Oman holds the largest shares in the Oman Telecommunications Company, which enhances its presence through the members of the company's board of directors. Omantel continuously develops its services and works to modernize its system in the field of communications, in line with the global progress in wireless and telecommunications. Omantel focused to provide innovative services to subscribers and employee's .For this, the Omantel strategy is always the evolution of its various programs through the discovery of deficiencies and knowledge of the defect. Omantel's investment in technology through its subsidiary companies which are Oman Data Park, Omantel France and internet of things. Omantel holds varying interests in these companies. In addition, there are associate companies such Oman fiber and info line ,these companies provide support services in serving subscribers and linking regions with optical fibers. Omantel's market share in the fixed phone is 58% and in the mobile phone 59%. (Omantel, 2017).

In order to provide the best services to subscribers, Omantel has many programs that enhance its competitiveness. Among these programs is the inventory management system, which works to control inventory and the mechanism for distributing inventory from stores to the last point for subscribers or contractors. With multiple services provided by Omantel in all areas of telecommunications, it needs a system of inventory management in order to provide services with high efficiency.

Stock management is one of the important steps in managing and tracking stock, whether inside or outside the store. The goal of inventory management is to know the level of inventory to avoid inventory shortages. The clarity and organization of inventory by using modern technologies leads to success in other operations (Walts, 2019).

In telecommunications, CPE refers to the terminal and the associated hardware devices, which are located at the customer's premises and connected to the telecommunication circuit of the carrier to a certain demarcation point. Examples of CPEs are modems and telephones, or any devices owned by the service provider. Customer promises equipment include telephone handsets, satellite or cable television set-top boxes, routers, residential gateways, network switches, home networking adapters, DSL and broadband internet routers and any other customized hardware. Customers can own CPE equipment or they can rent out from various telecommunication companies. CPE also encompasses the interior wiring on the customer's place, which then interconnected to the service provider's equipment or communication device. Some other materials that are used to access providers' communication services within a local area network such as manuals and cable packages, cable adapters are termed as CPE- peripherals (Owens, 2018)

To facilitate and provide services to subscribers, CPE devices are used. The frequently used devices are routers or modems, and internet service providers (ISP) own them. With the devices owned by the ISP, the customer is protected from incurring huge costs for the technology upgrades, and the ISPs have a lot of control with regard to service delivery (Kerr et al., 2015). On the other side for rationalization of tunnels, the company must control and monitor the devices, whether they are active on the network or still in the store
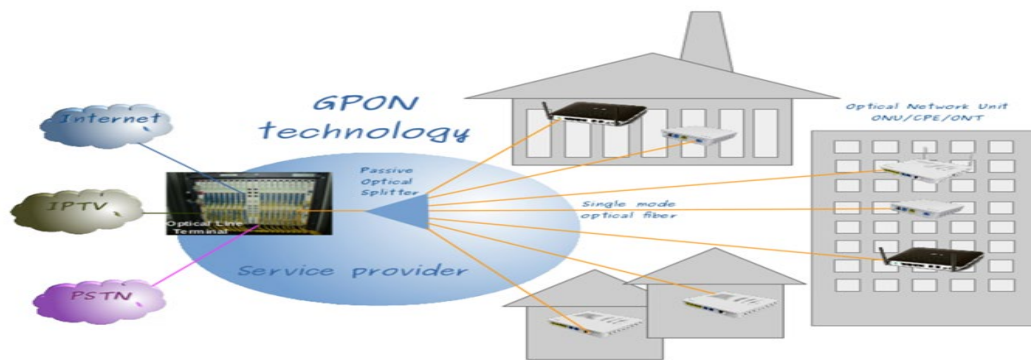

Figure 1 CPE mangment system

Methodology

This section presents a description of the research process followed in this research and how the data was collected to identify papers relevant for this study. As the first step the research questions addressed by this study are:
RQ1. What are the key concepts about the Customer Promise Equipment (CPE)?
RQ2. How the CPE is managed in telecommunication sector?
RQ3. What are the challenges affecting the CPE management system?

The followed step was to define the inclusion/exclusion criteria: (1) Search limitations to papers, (2) considering only papers written in English language, and (3) Exclusion of papers not accessible as full-text.
For the next step, data collection, the keywords used were defined as: Customer Promise Equipment, Management, Tele communication, Service Delivery, Broad Band. Then used to search them in online journals databases and scholarly databases (Emerald insights, Taylor & Francis Group) and also Google Scholar. The keywords should be found in the paper title, paper keywords and/or paper abstracts. Then the papers were read to assess their relevance and contribution to the present study, and as a final step the discussion of the findings for the future work.

Review of Literature:

Most companies are now enforcing various digital data management systems since there has been a considerable data intake that tends to disrupt the manual data recording in the business. It is no longer a secret that it is tough to manage an organization or company without an automated system. For instance, it will be tedious for one to manage and look for specific data in the system in the absence of an automated system, particularly where there is the handling of extensive data. However, with an up-to-data management system, records can be accessed fast, data can be safely stored, also the intake is relatively easy, and just a click of a button can retrieve anything. Additionally, with today's businesses deploying computerized management systems to carry out their operations, essential company data secured since some systems secured with login passwords. Having an efficient managing system in the company will help make informed decisions, and this will ensure the smooth running of the company.

There are many ways to manage CPE and all of these methods based are on two important things, which are reliable programs with their supporting strategies as well as the correct information and ways to classify them. Correct CPE management based on reliable data and information and the program that handles information and data. In some businesses, the I.T service management (ITSM) software apparatuses may engaged to help in tracking telecom inventory items. So, when utilizing this software, it is advisable to ensure that it can manage all potential detail corresponded with the telecom assets. An ultimate telecom management platform draws detail down through the feature level as it assigns it automatically (De Carvalho, 2017). Customized fields permit inventory to facilitate. Furthermore, customized fields promote the optimization of inventory data. With the customized fields, it becomes possible for the platform to store documents, pictures, instructions, or even notes based on the equipment in conjunction with the services. Examples of inventory tracking systems known as the VC4 WMS. It is schemed to track the telecom items by utilizing serial number tracking. This is enhanced by integrating this serial number tracking with reconciliation functionality and network discovery and combining it with the financial asset system that contributes to timely asset control (Liotta and Holmström, 2016). This feature seems to be unique because it cannot traced to another area, and it would be impossible to experience a loss of costly assets following the integration of the WMS.

The power of timely data in the warehouse reduces time utilized on every task and, at the same time, promoting accuracy at every step through cross checking. The warehouse management, including both spares and stock functionality, trails the movement in conjunction with the storage of the telecom assets within the warehouse and again processing corresponding transactions like getting, putting away, along picking. Ideally, it trails the overall life cycle, starting from ordering supplies from the suppliers through the network's fixing, like discharged from the network back to the warehouse (Gventer et al. 2016). The system utilized in optimizing the levels of stock along with advancing the processes to reduce the costs. The distinct network auto discovery and reconciliation tends to be extravagantly feature to ensure that the commodities in the telecom company controlled all the time. This seems to be meaningful because the company will no longer lose its costly assets. The system attempts to make a comparison between N.E. and NMS/EMS network data with the data in the inventory database. The feature presents an auto discovery while registering any new active item even if it may have followed the wrong procedure. Workflow, warehouse, and inventory management are engaged in the same system. Automatic asset data synchronization between the technical and finance units contributes to steadiness between the presence in the field and the details of the equipment storage. Field service personnel can develop trust towards unswerving information that is critical for necessary network operations (Sanders, 2016)

There are many benefits when using systematic program to manage inventory especially CPE. The below point, highlights some of the benefits:
- Minimizes asset loss
- Accurate and efficient material tracking
- Optimizes general warehouse effectiveness, minimizing costs of labor

- Augments shipping accurateness
- Reduces the costs along with the volume of the warehouse space
- Precise financial asset values

The WMS is schemed to conceptualize the difference between spares (Fault Handling) and stock (Service delivery). A critical proponent as network materials utilized for spares in the fault-handling procedure may not engaged by the service delivery procedure and vice versa. The WMS institutes all material information plus trailing like:
- Tracking and barcode generation
- Item lists ordered at the in store, suppliers, and warehouse
- Item templates to order materials in a click

- Procurement order and corresponding material order list
- Spares management
- Cable management
- Assign apparatus for network projects or customer
- Dashboard and Reports

Dashboards in conjunction with reports encourages one to develop clear insight information based on data quality, capacity, procedures and workflow orders, and KPI and SLA. All dashboards and report can be exported to dissimilar file types like RTF, image, PDF, docx, and excel.

To ensure that the inventory of every company and their corresponding financial values updated, it would be vital to synchronize network inventory, financial, and the warehouse systems. While it seems to sound easy, it may not be the case, because most employees prefer engaging a path marked with less resistance and this means that they may not adhere the guidelines all the time, hence contributing to loss of assets (Govindan et al. 2018).

Challenges affecting CPE management system

Since CPE is associated with inventory management, the difficulties CPE encounters are very similar to the difficulties and challenges in inventory management. The difficulties faced by CPE can summarized in three main points, which are the compatibility of the systems with each other, the lack of clarity of inventory management strategy for all departments in the organization, as well as the lack of human expertise in implementing the strategy. The different CPE management platforms lead to the inaccuracy of existing data and thus the direct impact of the operations. Performance management- this function measures the performance of the different network components such as software, hardware, and even the media. The primary goal of carrying out this function is to ensure that the performance of the network maintained to a certain acceptable level. However, there have been challenges in ensuring that the network performance maintained at acceptable levels (Martinez et al., 2014, 2207-2230).

Configuration management, which charged with the responsibility of managing network devices remotely, has not been its challenges. Usually, the configuration data of a device should be monitored by the configuration management and have the operations of both hardware and software elements managed. However, even though a problem is identified by tracking and monitoring network operations, finding a solution is cumbersome and may take time before the issue is resolved (Muelas et al., 2017, 1124-1136). The compatibility of the systems with each other has a great role in alleviating the challenges of CPE management. Through the existence of a unified platform for managing CPE inventory, it can facilitate the follow-up process from the warehouse until the service delivered to subscribers. This platform must be easy and flexible in order to make it easier for everyone to work with.

According to (Kegley, 2018) strategy in inventory management refers to a holistic view of basic and non-core inventory management elements. The basic elements are the ones that needed throughout the year and need constant follow-up, and the non-essential elements are those that needed seasonally and linked to a specific time. The holistic view focuses on several aspects, the most important of which is the volume of demand in terms of quantity and form, as well as the time needed to implement the request. According to IBM around 79% of inventory mangers reported that lack of vision directly affects inventory management

Findings:

It is not an easy task to manage CPE for many reasons, the most important of which are changing technology, shipping and delivery on time. There must be a holistic view of telecom inventory management by linking all systems that have to do with inventory with one system. The holistic view should include seeing the expenditures, costs and usage according to the site and the user. The basis of retail business is inventory management, through inventory management systems and inventory tracking operations. Inventory management is the primary step for tracking CPE quantities and knowing what is inside and outside the store. When we manage inventory properly then other procedures for providing the service are on the right track. Failure to properly organize leads to multiple errors, for example stock out, wrong shipments and excess stock and these mistakes cost money and effort for human resources. Inventory management is very crucial in enhancing effective supply chain management in any business. Therefore, integrating inventory systems is very crucial to telecom companies to track physical assets as well as service agreements. As a result, these companies reduce their operational costs and manage infrastructure properly (Gluhov & Ilin, 2014)

There are different types of inventory management like ERP, POS and other programs. Some companies use both programs and each program connected to the other. Although POS & ERP is outdated software, it still works in many companies. Integration of programs with each other, continuous updating, as well as the introduction of modern technologies can improve inventory management. The integration of systems leads to improved use of the program

by stakeholders and end users. With successive developments in inventory management programs, it is necessary to focus on reforming the entire information systems. These reforms may take a lot of time, but the benefit is great. In order not to have to switch inventory systems, there are many solutions to improve inventory management and increase features. One of these solutions is the integration of systems and continuous updating of them, in addition to improving the inventory strategy (Fritsch, 2015). Several reasons support integrating the inventory system in telecom companies. The first benefit for a company is establishing a balance in demand and supply, therefore stabilizing prices for services and products. Having an inventory system enables the company to know when the market is flooded so they can reduce production, and when there is a high demand to increase production (Gluhov & Ilin, 2014).

In addition, telecom companies enjoy the benefits of economies of scale by having an inventory system. A company shielded from unpredictable supply and demand cycles by having useful information gathered from inventory an inventory system with the help of big data analytics. Through consumer insight data collected from big data, telecom companies can develop new niches by predicting consumer needs and specialize. Telecom companies can reduce operational costs by using an inventory system that will help reduce paying for unused or non-essential services. An inventory reduces cases of fraudulent claims through inaccurate invoices. For instance, a telecommunication vendor may find redundant assets such as telephone gadget. Still, the telecom company records it as active through an accurate inventory system; the vendor should be able to offer the telecom company an insight by comparing invoices and ensuring they pay only for services rendered. Another benefit of inventory system management is avoiding draining company resources and expenses leak (Gandani et al. 2014).

Inventory management is a strategic business for companies. In the world of communication, correct CPE management leads to more profits and work that is more efficient. Correct CPE management includes having strategies that cover all technical, logistical and financial requirements. CPE inventory management strategies must be aligned with the systems and equipment used. In order to improve CPE management, systems integration can be utilized at the lowest costs without having to completely change, them, as well as using modern technologies. The use of modern technology, such as big data in stock management, improves the pace of work, however provided that there is sufficient knowledge and skill when using these techniques.

Conclusion

CPE management system is a term that long elicited groans from business employees, though, its appeal can be questioned, yet it is difficult to doubt its value. At a business level, comprehending the cost of the assets where they are based along with what they truly are is integral. Apart from assisting companies to track their assets, inventory management can be meaningful in supporting other services like forecasting, procurement, and invoice auditing alongside other services (Bughin, 2016). That said, telecom companies should always look forward towards optimizing their inventory all the time.
We find below points after in depth search and reading:

- The CPE control and management is a vital problem affecting operational efficiency and revenue
- An inventory system is a set of policies and controls that monitor inventory levels and determine levels to maintain and when inventory must be replenished
- The primary purpose of CPE inventory analysis is to determine the order of the items and the size of the order
- Get many telecom companies to enter into a long-term relationship with sellers to supply their needs throughout the year
- Systems must be compatible with each other in order to obtain high performance and avoid manual practices in fixing errors
- The use of technology, such as big data, to handle errors and analyzes leads to higher operational efficiency and less waste

Limitation and future research

Inherent limitations associated with any single study provide avenues for future research. This paper uses a qualitative approach. Therefore, one direction consists of empirically testing the generalizability of the proposed findings. Further research using a quantitative approach to study the methods, impacts, benefits and challenges would be desirable regarding the CPE management in Tele Communication companies. The current study focused on the how CPE can be managed and the challenges in its successful management. Future research should specifically address the use of latest technologies like the big data in managing the CPE management system.

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