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## **VISION**

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## AN OVERVIEW ON SOCIAL MEDIA IN MARKETING

**Mohit Rastogi\***

\*Assistant Professor,

Department of Marketing, Faculty of Commerce, Management & law,

Teerthanker Mahaveer Institute of Management and Technology,

Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: mohit.management@tmu.ac.in

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### ABSTRACT

*People all around the globe are heavily invested in web 2.0 technologies and social media platforms. Businesses, on the other hand, are beginning to see such technology as useful ways to engage more with their consumers. Academics and scholars have also focused on related problems of social media marketing in order to extend their existing knowledge of such occurrences in the marketing field. As a result, the primary goal of this research is to analyze and assess existing studies in the field of social media and marketing in a methodical manner. The researchers were able to give an overview of the major topics and trends covered by the relevant literature by examining roughly 144 publications, including the impact of social media on advertising, electronic word of mouth, customer relationship management, and company branding and performance. In addition, the most frequent research methods used to investigate the associated problems of social media marketing have been examined in this study. There is also further debate, as well as an explanation of the present review's shortcomings and suggested research paths for future studies.*

**KEYWORDS:** Advertising, Adoption, Customers, Marketing, Social Media.

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### 1. INTRODUCTION

People are increasingly seeing social media apps as an essential part of their everyday lives, and they are more inclined to shift their interactions to virtual platforms (i.e. Facebook, Instagram, LinkedIn and Twitter). this has a beneficial impact on their attitudes and behaviors regarding all types of social media technology. As a result, social media applications have been identified as one of the most efficient and influential implications that have gradually been integrated into most aspects of people's lives (i.e. social life, commercial life, business life, educational sector, and political life)[1]. Social media has generally been recognized as an effective tool that helps to a company's marketing objectives and strategy, particularly in terms of consumer engagement, customer relationship management, and communication. For example, from the viewpoint of national governing bodies, social media may deliberately improve two-way contact between businesses and consumers, resulting in customers being more attached to the brands of the organizations[2]. This is in addition to social media's capacity to convey information visually, vocally, or textually, or a combination of textual, visual, and verbal content (Okazaki and Taylor, 2013). Firms have been looking forward to using social media in many areas of their interactions with consumers in many settings, such as enabling information search, interactivity, promotion,

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and improving customer purchasing behavior (Zeng and Gerritsen, 2014). As a result, organizations have created a range of interactive methods and processes to improve their brand identity and marketing effectiveness.

In reality, a significant amount of effort and money have been allocated to this sector in order to attract more consumers, either via participation or through online customer relationships, the majority of businesses (about 93 percent) across the globe have embraced and used such innovative platforms and tools in their communication and customer service processes[3]. In general, practitioners and academics have been interested in learning more about how social media applications may be effectively accepted and deployed. This is due to the need to learn more about the key criteria for effective deployment of such technology, as well as the financial feasibility of such investments[4]. In this respect, Hutchins (2014) emphasized the significance of studying the function of social media in many settings in order to broaden current understanding on such critical social media problems. In a similar vein, Pedersen (2014), Knoll (2016), Pegoraro (2014), and Rowe (2014) attributed the importance of addressing the related issues of using social media platforms to the innovative nature of these technologies, as well as the fact that current research in this area is beyond the preliminary, exploratory stage, necessitating further interest and understanding.

Furthermore, (2015) debated in their recent review study that, despite the large number of studies that have examined social media and its applications in various fields of interest, there is still a need to propose a theoretical model covering the most important dimensions that could have either a positive or negative impact on the success of implementing such a system. Indeed, scholars have begun to focus on analyzing and exploring the major aspects of social media applications in a variety of settings, cultures, locations, and perspectives. The overwhelming majority of social media studies were found to be inside the marketing sector, according to researchers that have looked into social media marketing problems have tested and explored a wide range of dimensions and structures. Furthermore, scholars have used a variety of methodologies and strategies in their efforts to investigate and study this topic. As a result, this research recognizes the need of doing a thorough assessment and analysis of the existing literature on social media marketing. As a result, it will be able to have a better understanding of the most essential topics addressed as well as which areas need more attention. The main goal of the current study, according to the discussion above, is to systematically scan and review related studies of social media in the marketing field, as well as to synthesize and organize the main aspects considered in these studies and how such studies have addressed the related issues of social media marketing[5].

### *1.1 Social Media Concept:*

It's crucial to understand the difference between social media and social networking. Networks, as according to Wiki, are “an electronic service, application, platform, or site utilized by people who share a similar interest, beliefs, attitudes, culture, activities, and real-life relationships.” Wikipedia, on the other hand, addressed the idea of social media as communication tools that allow individuals to broadcast as well as approach and influence additional people. As a result, Wells (2011) defined social networking as the use of social media to directly contact and engage with people with whom one has a genuine connection or would want to have a relationship. According to Zeng and Gerritsen (2014, p.28), “social networking sites, consumer review sites, content community sites, wikis, Internet forums, and location-based social media” are great

examples of social media platforms. Scholars proposed some other definition: “new media innovations facilitating interactivity and co-creation that allow for the development and sharing of user-generated content between many and between organizations (e.g. teams, government agencies, and media groups) and individual people (e.g. customers, athletes, and journalists)”. Indeed, the idea of social media has been used in a variety of settings. However, since the present research is focused on the impact of social media on marketing, it is necessary to approach it from a marketing viewpoint. According to Dwivedi social media marketing is “a conversation often triggered by customers, or a business/product/services that circulates amongst the stated parties to set in motion a revealing communication on some promotional information so that it allows learning from one another's use and experiences, ultimately benefiting all of the involved parties.” “The use of social media technology, channels, and software is to develop, discuss, provide, and trade products that have value for an organization's stakeholders,”.

## *1.2 Social Media and Advertising:*

According to scholars the company was able to earn more than 5.4 billion dollars from advertising in 2014, with a growth rate of 58 percent. Furthermore, Facebook's advertising income increased by 59% year over year to \$5.4 billion in 2014, demonstrating how businesses are shifting from conventional media advertising to digital interactive media advertising. The high degree of appeal and engagement seen in social media platforms may be attributed to this increasing interest. In accordance with this notion, Mangold and Faulds (2009) said that social media should be included by businesses as a necessary component of a promotional effort. Indeed, a social media promotional campaign may contribute to the achievement of many marketing objectives (e.g., customer experience, perception, awareness, knowledge, preferences, intent to purchase, and actual buying). Duffett is a character in the film *Duffett* (2015)[6]. Given the significance of social media in the advertising industry are just a few of the studies. In fact, the majority of these articles (89%) advocated for the use of social media to improve the effect of promotional efforts on consumer perception and awareness. For example, according to Duffett (2015), the efficiency and efficacy of social media advertising activities are mainly determined by how consumers perceive and develop their views about such activities[7].

Similarly said that in order to achieve such favorable consumer sentiments, hedonic elements of social media promotional activities must be properly handled in order to offer customers with a more personal and pleasant experience. Furthermore, as Mir (2012) found, consumers formed favorable views about advertisements placed on social media platforms, which may influence electronic consumer purchasing behavior. Scholars found that American students' views about Facebook advertising were unfavorable since the ads were not directly linked to the consumers' needs and information. As a result, such students are more likely to disregard such ads; according to the same research by Bannister et al., their buying choices are not represented by Facebook marketing (2013)[7], although advertising on social media networks have a beneficial effect on purchasing behavior, resulting in more competitive pricing, such commercials have a detrimental impact on both cognitive and emotional aspects of consumers' views. According to Kodjamanis and Angelopoulos (2013), who conducted a quantitative research in the United Kingdom, advertising complaints on Facebook had no effect on behavioural intention to buy or purchasing habits, as indicated by more than 535 survey participants, the effect of Facebook advertising on consumers' willingness and attitudes was not affected by demographic variables (i.e. age and gender) (2011).

- *Electronic Word Of Mouth And Social Media (E-Wom):* Consumers may evangelize their personal experience with many more customers by utilizing social media. As a result, technological word of mouth has a greater reach and impact than conventional human interaction-based word of mouth[8]. This, in turn, encourages a large number of researchers (about 14 papers) to focus on e-WOM problems in comparison to conventional tools, social media platforms enhance the effect and prevalence of WOM in 92 percent of these research[8]. Customers may successfully express their own experiences, whether good or bad, regarding companies, their products, and brands to a huge number of people as more interactive platforms with big community sizes emerge. Coulter and Roggeveen (2012), for example, looked studied the effect of a variety of variables (such as source, network, connection, and message/content) on consumers' reactions and responses to word of mouth disseminated through social media platforms. Their findings confirmed that conventional word of mouth may still have a greater effect than e-WOM. Coulter and Roggeveen (2012) also discovered that the size of a product community and how many members of that community are on a customer's friends' list have an important influence in influencing a customer's reaction. Chu and Kim (2011) attempted to identify the key variables that influence consumers' participation in electronic word of mouth (e-WOM). Their statistical results confirmed the importance of both trust and normative impact in consumers' e-WOM participation. In the tourist industry, consumers who were found to be more ready to utilize and participate in online communities also showed a greater desire to promote good word of mouth and suggest businesses to others. Scholars found that social media had an effect on consumers' emotions and relationships with festival brands in the tourist environment, as well as on customers' propensity to share good word of mouth[9].
- *Social Media Adoption:* Modern companies and directorsshould pay more attention to the younger generation's behavior and views regarding social media apps, as well as how consumers interact with such systems.This is because a better knowledge of social media platform use patterns may assist businesses in forming a clear picture of prospective consumers' perceptions and behaviors toward these businesses and their brand identities. The length of use, log on duration, log on frequency, and profile update incidence of social media platforms) as well as how consumers may access their mobile phones, PCs, and iPads) are all characteristics of the platforms. These are critical factors to examine when evaluating the impact of such platforms on consumer attitudes, intentions, and behaviors, as Duffett has said. In this respect, Scholars found that increasing one's use rate of social media apps makes people more likely to have a favorable opinion about them[10].
- *Customer BehaviourAnd Perception In The Age Of Social Media:*A significant number of publications have focused on social media and its effect on consumer behavior and perception. In fact, social media is rapidly being seen as a primary source of information to which a consumer may turn when making a buying choice. Furthermore, the information shared on these platforms has a significant influence on their own behavior and perspective. Customers have been seen using social media throughout the buying process (gathering information, assessing options, and selecting the best option) as well as after the purchase (sharing their own experience on social media. When it comes to buying new goods, for example, more than 20% of consumers say social media is an essential source of knowledge. Furthermore, the high level of interaction and personalization available on social media platforms such as Facebook may play a significant role in improving consumers' willingness



to purchase as well as their views toward businesses and brands. Duffett was also able to experimentally validate the beneficial effect of Facebook advertising on millennial consumers' intention and actual purchase in South Africa.

## 2. DISCUSSION

The vast and increasing number of studies and publications that have addressed the associated problems of social media marketing in recent years has clearly validated the significant attention given to such phenomena. A closer examination of the time period during which this phenomenon occurred reveals that the majority of these studies were published in the years 2016; 2015; and 2014, respectively. As a result, there is compelling evidence that social media and its applications should be the focus of both practitioners and academics' attention. Researchers discovered that there are many marketing applications and topics addressed after analyzing the major body of literature on social media marketing (144 studies). As well as other variables and techniques that these research have taken into account in order to offer a clear and in-depth understanding of such problems. Seven major topics have been identified by current research according to the area of focus for 144 studies examined in section three). The first topic looked at how utilizing social media applications might help with promotional and advertising activities. Even while studies like this help academics and practitioners better understand the basic aspects that should be addressed when advertising is used on social media platforms, there are still certain areas that need to be investigated further. For example, it is necessary to determine the influence of the kind and character of social media platform (for example, Facebook, YouTube, and Instagram) on the efficacy of promotional efforts to reach targeted consumers. In accordance with this, Filo et al. (2015) urge for further research to understand how consumers' views may be shaped differently depending on the kind of Facebook advertising they see. Other factors and dimensions (such as social presence and telepresence) must be considered, as well as the use of various research methods to provide a clear picture of social media advertising

## 3. CONCLUSION

While social media has been disregarded in a significant number of research in fields such as education, politics, and sociocultural settings, it has been neglected in a great number of marketing studies. As a result, future research may want to take into account these studies performed in various regions. Even though this study makes a contribution by theoretically scanning the main body of literature, statistical evidence from these studies is still needed by conducting a meta-analysis study, especially given the large number of quantitative studies that have been conducted in the field of social media marketing. As a new trend and subject, academics should focus their attention on how such phenomena may act differently across platforms; between nations (developed, emergent, developing); cultures (collectivism vs individualism); and settings (tourism, sports, governance). Despite the fact that this research examines all of the major aspects covered by previous work on social media marketing, it does not properly enumerate the key variables and how they interact (which antecedences and which consequences). Future research may find this to be a good path. As a result, a theoretical basis for examining the associated problems in this developing field would be established. The major research techniques used by the evaluated studies were discussed in just a limited portion of the present study. As a consequence, future research may devote more time to analyzing various techniques and determining which methods are most suitable for producing more accurate and trustworthy findings in future empirical investigations. This is in addition to the necessity to

explore how future research might adapt and enhance new methodologies and approaches for studying customer behavior in the social media marketing field.

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## STANDARDS, RULES, AND ANALYTICAL TECHNIQUES FOR SEWAGE SLUDGE MANAGEMENT

Dr. S.R.Ali\*

\* Professor,

Department of Civil Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: drsr.ali.engineering@tmu.ac.in

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### ABSTRACT

*This article discusses the most common sewage sludge management techniques, as well as the unit activities and procedures that relate to them. Reclamation and adaptation of lands to specific needs; plant cultivation not intended for human consumption or food production; use in agriculture; use in construction; recovery of phosphorus, rare earth metals, or fats and use in industry; production of combustible pellets, granulates, or other usable materials such as absorbents; and storage on treatment territory Stabilization processing results in the creation of materials that may be contaminated with a range of organic chemicals. Because this method of management often involves dumping processed sludge on the ground, it has the potential to contaminate soil with unknown organic substances. Thermal processing of raw sewage sludge, on the other hand, virtually eliminates this possibility. The vast majority of organic stuff is converted to a simple, mineralized state. In this instance, the most serious concern is heavy metal poisoning of sewage sludge ash. The identification of heavy metals in ashes is, however, considerably easier than that of organic molecules. Chemical analysis may be extremely helpful in determining the environmental safety of sewage sludge that has been treated and handled. As a result, there are many analytical approaches in use that are likely to aid in the process of developing and implementing innovative economically and ecologically sound methods of sewage sludge reuse. The method of technical sewage sludge use at Gdansk's Wastewater Treatment Plant "Wschód" is also explained. The technical line has just been updated.*

**KEYWORDS:** *Analytical Techniques, Disinfection, Fermentation, Sewage Management, Sludge Management*

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### INTRODUCTION

Sewage sludge management is becoming more and more of a concern. Directives are introduced in all European Union nations, requiring each member state to develop appropriate legislation. Management techniques that include storage are now being replaced by ways that lead to trash stabilization and safe recycling, according to European laws[1]. legislation, programs, and developmental initiatives Their goal is to encourage pro-ecological sewage sludge management, among other things. Storage-based management techniques are being phased out in favor of procedures that lead to stabilization and safe recycling. As a result of these techniques, valuable raw materials may be recovered from potentially hazardous materials, which can then be

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processed for use in agriculture, different industries, or heat and energy recovery[2]. The properties of sewage sludge vary at each step of processing. The microbiology of sludge is altered during disinfection; the methane fermentation process reduces total carbon content; and thermal processing, depending on the temperature, may result in sludge densification or even the transformation of all organic matter into inorganic molecules. As a result, several distinct types of processed sewage sludge are produced, each with its own chemical makeup. They may also differ in terms of physical characteristics, consistency, and even factors like pollutant toxicity and stability[3].

All of these variables may influence whether a substance is categorized as safe or dangerous. The above-mentioned parameter values may have an impact on modifications in processing technology and the development of new management techniques. As a consequence, it is critical that the resultant material be submitted to a thorough chemical examination at each step of the waste processing process[4]. Other approaches and analytical procedures will be helpful in each situation due to their variety. As a result, the choice of an appropriate analytical technique is influenced by the sewage sludge management strategy, which in turn influences the technology utilized to treat them. This research focuses on explaining sewage sludge management techniques and demonstrating the benefits and drawbacks of various approaches. Analytical techniques are said to be a strong instrument that aids in the management process[5].

We have included not only management methods reported in peer-reviewed journals but also acts related to raw and processed sludge management because the subject is still developing in some countries and there is a large number of legislation including European Union directives and many countries ordinances. The maximum allowed concentration of pollutants and key parameters are also included in the legal issues discussed. There are additional references to studies published in technical journals and publications[6]. The present applied technology at Gdask's Sewage Sludge Treatment Plant "Wschód" was described using as-built documentations, specifications, and flow sheets. This facility serves as an example of a growing treatment plant that uses cutting-edge technology to produce environmentally friendly and cost-effective raw sewage sludge management techniques. There are still instances when raw sewage is dumped into bodies of water nowadays. This is particularly common in developing and developing nations. The Federated States of Micronesia, for example, where almost 30% of sewage is discharged into the Pacific Ocean without being treated, is an excellent example. Treated sewage is also discharged into the sea, with just a portion of the solid component removed, increasing the carbon content in coastal waterways and causing excessive development of local fauna and plants[7].

Fortunately, since the ocean is such a vast body of water and coastal waters mix with ocean waters, eutrophication is seldom an issue. In bodies of water that do not have direct access to the ocean, such as the Baltic Sea, the situation is different. Two straits, Skagerrak and Kattegat, divide it from the Atlantic Ocean, preventing saltwater from freely mixing with ocean water. The introduction of raw sewage into such a tiny body of water would result in eutrophication occurring at a rapid rate. As a result, improving wastewater treatment procedures is critical to ensuring that sewage discharged into surface waterways and subsequently transported to lakes, marine, and ocean waters is free of biogenic chemicals like phosphates[8]. The European Union developed appropriate regulations, such as the Council Directive on Municipal Waste Water Treatment of May 21, 1991, to minimize environmental deterioration caused by eutrophication and the entry of hazardous chemicals into waterways, such as heavy metals. It is assumed that

wastewater should be treated more completely in all regions prone to eutrophication, such as the Baltic Sea catchment area. This regulation also applies to Poland, which is a European Union member state.

As a consequence, new wastewater treatment facilities are being constructed at an increasing rate, while older ones are constantly being upgraded. Regulations on sewage discharged into water or soil are becoming more stringent Ordinance of the Minister for the Environment on the criteria to be met when discharging sewage into water or soil & on chemicals that are particularly hazardous to the environment [9]. As a result, purifying procedures must still be enhanced. Excess sewage sludge is accumulating an increasing quantity of contaminants, not only organic ones. As a result, its application is becoming more of a challenge. In 2011, Poland alone generated more than half a million tons of sewage sludge by dry weight. It should be noted that these sediments are often hydrated to more than 90%, making their treatment an extremely difficult task. At Poland, surplus sludge is now kept for two years in landfills and sewage treatment facilities. The technique of storage was the most often utilized method of management. This is because sewage sludge must satisfy stringent requirements in order to be re-used, for example, in well-known agrochemical treatments[10].

## DISCUSSION

They will vary based on the country and the uniqueness of the management style. Furthermore, all recycling and management techniques should be preferred approaches including the use of landfills, according to Directive 2008/98/EC of the European Parliament and the European Council. By 2020, landfills must have a biodegradable composition of 35 percent. It is also suggested that the finest available technology be utilized to deal with all types of trash and to create new alternative goods. Those goods must satisfy all legislative criteria for environmental safety in a broad sense. They are unlikely to endanger water, soils, air, plants, or animals, and they do not emit smells or other contaminants into the environment when used.

Over ten million tons of dry solid sewage sludge were generated in 2012. Approximately 40% of the surplus sludge was speeded onto land for agricultural purposes. If sludge is utilized as a fertilizer for producing crops for human consumption or animal feed, the biological and chemical safety of this material is paramount. When trash is utilized to restore soils to meet particular requirements, its physical properties may become increasingly significant. In all instances, however, excessively large, uncontrolled quantities of potentially hazardous substances seeping into the soil or groundwater cannot be tolerated. Heavy metals, grease, phenolic chemicals, and polycyclic aromatic hydrocarbons may all cause significant changes in the soil's flora and fauna, lowering fertility and altering other characteristics.

Different technical methods such as disinfection, stabilization on sludge drying beds, or stabilization using earthworms, as well as their combinations and/or alterations, may be used to prepare sludge prior to its usage, satisfy legal requirements, and be sufficient in terms of intended end-use. Apart from removing harmful bacterial flora, disinfection and stabilization processes on drying beds are used to prepare sludge for use as a fertilizer or for other treatments such as soil reclamation. This procedure causes dewatering of the sludge in addition to hygenisation. Compared to thermal processing, the investment and operational costs are far cheaper. Despite the fact that surplus sludge is usually 97-99 percent hydrated, drying is a critical process. If a basic drying step is skipped, the soil into which unprocessed sludge is put will undergo significant physical changes.

The quantity of organic carbon in sewage sludge is decreased when earthworms are employed to stabilize it, but the amount of accessible phosphorus rises. As a result, after approximately 100 days of stability, the carbon to nitrogen ratio decreases, improving the fertilizer's quality. The amount of potentially hazardous substances like heavy metals is also decreased throughout this procedure. This is most likely owing to the fact that these chemicals collect in the bodies of earthworms, which are then eliminated from the final product at the conclusion of the process. This is a benefit of this alternative method over traditional stabilization, since heavy metals in wastewater, particularly from industrial and huge agglomerations, may be a major issue, preventing the use of sludge in such treatments.

Anaerobic stabilization may be used instead of aerobic stabilization. In this scenario, in addition to the previously stated restriction on pathogenic fauna growth, the organic carbon content of the sludge is also decreased, resulting in a product with a lower C:N ratio. After fermentation, the sludge may be used in agriculture and soil reclamation. Biogas with a high methane concentration is also generated. Biogas was formerly handled as trash and burnt as methane in a torch flame. It can no longer be released directly into the atmosphere since it is a greenhouse gas with a twenty-five times greater greenhouse potential than carbon dioxide. It may, however, be utilized as a fuel and burnt in gas turbines to recover energy. Because the energy gained in this process comes from a renewable source, it is one of the most desired waste management methods. It may be utilized on-site or sold to the grid. Furthermore, getting electricity from biomass or other renewable sources reduces CO<sub>2</sub> emissions. Even yet, there are certain drawbacks to this technique of sewage sludge management.

Fermentative microorganisms must be given the right circumstances to grow in order for the methane fermentation process to be successful. This process's optimal and limit parameter are given. Furthermore, process inhibitors such as pesticides and other plant protection agents should not be present in sludge. To enhance the efficiency of the process, it is sometimes necessary to add excipients, such as enzymes, or to mix surplus sludge with other plant waste. The cost-effectiveness of the methane fermentation process for relatively big sewage treatment facilities, equating to many tens of thousands of people, is the constraint (PE). Although sludge from many smaller wastewater treatment plants may be collected, the expense of transportation limits the profitability of the methane fermentation process.

The fermentation process' precipitate may be utilized not only for agriculture and soil reclamation, but also for additional processing, such as thermal processing. There are a variety of sewage sludge thermal treatment methods available. Pre-treatment is required for the majority of them. Processing raw sewage sludge prior to thermal treatment is often required from a technical and economic standpoint. Drying is a very basic technical process that involves providing energy to a system in order to evaporate water and cause it to densify. This method may be used before any additional heat treatment. or the last stage, the result of which may be used in agriculture as stated in the preceding sludge stabilization techniques. Drying does not always necessitate the use of additional energy. As a result, there is no need to incur additional expenses.

Bio drying is an alternative that uses heat produced by microorganisms to complete the drying process. These technologies enable lower operating costs. Methane fermentation, which was mentioned earlier, could be a step before drying. When the final product, such as a pellet, appears to be low-caloric, it may find use in the construction industry, such as road ballast or other practical applications. Dried sewage sludge, on the other hand, may be utilized as a fuel in

a number of processes if it is rich in caloric content. The most common method for treating and managing sewage sludge is thermal utilization. Other types of trash, such as medical or municipal waste, are also often incinerated. This is because the incineration process is one of the most well-known waste treatment methods.

The amount of sewage sludge disposed of is substantially reduced when it is incinerated. It is critical in highly populated areas such as Japan, where residents must contend with high sludge output and limited land availability. There has already been a 55 percent increase in the amount of sludge burned there. As previously stated, bio drying is an example of such a process. Another option is to utilize the thermal energy produced during the incineration process to heat amenity buildings on sewage treatment plant grounds or to pre-dry burned material. Alternatively, heat from sewage sludge combustion may be used to make clinker. Because sludge has a poor calorific value when prepared for incineration, it is sometimes essential to construct a co-incineration process with other energy utilities (coal, fuel oil or natural gas). The biogas generated in the plant may be used as a source of alternative energy. In this instance, it's crucial to see whether incinerating it in turbines for combined heat and electric energy cogeneration is more cost-effective.

The heat may then be utilized for social reasons, or for heating process utilities or early processing of raw materials, as stated above, while the electric energy can be used in the treatment plant or sold to the grid. In addition to the economic factors of choosing an energy utility, it is critical to consider energy demand, which is dependent on the calorific value of the sludge to be incinerated, and, more significantly, the potential of introducing additional pollutants into the final product. It is also feasible to transport sewage sludge to a heat and power plant, where it may be utilized as an admixture in the co-incineration of combustible utilities. Instead of being used as a fertilizer or a medium for soil restoration, sewage sludge may be used for another environmentally friendly purpose. In this instance, the process's starting raw materials are mainly ash left over after incineration. However, sewage sludge mixed with crushed granite rock may be used to make a safe and long-lasting brick. The pulp is burned after gravel is added to produce crystalline phases. Ashes and cementitious materials may both go through the solidification process.

These procedures are carried out to immobilize pollutants found in processed sewage sludge that may be harmful to the environment. This method may also be used to provide cementitious materials concrete form and shape. The characteristics of ash cement are determined by the reactants employed in the cementation process and their proportions. The addition of ashes from the energy sector to a cementation process is often needed to enhance the degree of immobilization of pollutants such as heavy metals. Solidified blocks in this condition may be kept in wastewater treatment facilities or waste dumps without presenting a danger to the environment. About 40% of the dry mass of trash is made up of ash.

## CONCLUSION

According to existing regulatory restrictions, large quantities of hazardous chemical compounds that may arise in processed sewage sludge are out of control. Organic pollutants are the primary issue when sewage sludge management methods do not include high temperature treatment. Because of the intricate matrix, identifying this kind of contaminant is usually very difficult. In this scenario, analytical methods such as gas or liquid chromatography, as well as a variety of preparation procedures, may be required. Organic contaminants may come in a huge variety of

sizes and shapes. All of this adds to the preparation, analysis, and, of course, the overall expense of the management process. It also has an impact on the time and expense of maintaining additional control over controlled media. As a result, dealing with sewage sludge that has been treated at a high temperature is easier in certain ways. Almost all organic molecules are obliterated. As a result, sewage sludge ashes are free of organic contaminants. However, since a large portion of the matrix is mineralized, ashes may include additional pollutants such as heavy metals or ions. However, heavy metal analysis at the European Union level may be less complex and less expensive.

Heavy metal removal, extraction, or immobilization from processed sewage sludge or sewage sludge ash may be critical throughout the management process. It is critical to create a safe technique for managing processed sewage sludge in order to reduce environmental risk. Poorly developed methods may result in chemicals being released into the environment, which can have a detrimental impact on the ecosystem and, as a result, human health. Each treatment plant's sewage sludge management method should be designed individually. Only thus can management techniques be justified in terms of both the environment and the economy. For the development of sewage sludge management techniques, comprehensive chemical characteristics as well as toxicity characteristics are required.

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## AN OVERVIEW ON SKILLS MANAGEMENT

Pirtibha Sharma\*

\*Associate Professor,

Department of English, Faculty of Commerce, Management & law,  
Teerthanker Mahaveer Institute of Management and Technology,  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: ica.pratibha.pdp@gmail.com

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### ABSTRACT

*Individuals in managerial positions must have the knowledge and abilities to carry out particular management activities or duties. Managerial abilities are crucial for a variety of reasons. Being a manager in an educational environment gives you the opportunity to lead and solve problems in a variety of circumstances, both basic and complicated. However, it has been noticed in Thailand that certain management abilities need to be improved. Managers of schools should improve and expand their skills in order to manage successfully and efficiently. This mixed-methods study examined school administrators' management abilities in terms of conceptual, human, and technical skills in a number of private catholic secondary schools in Bangkok, Thailand. The respondents self-assessed their management abilities using a checklist, and interviews were performed to verify the findings and identify professional development requirements based on the lowest-scoring categories by the school administrators. To collect data, Goodarzi designed a questionnaire based on Robert Katz's idea of management abilities. When it came to the evaluation of school administrators' management abilities, the majority of them rated themselves as excellent in terms of conceptual, human, and technical skills. In terms of conceptual skills, the identification of informal organization, articulation of strategy, and capacity to anticipate are the professional development requirements of private catholic school administrators. In terms of human skills, school administrators, on the other hand, need training in dispute resolution, report production, and official communication. Finally, in terms of technical skills, they need professional growth in financial management, computer skills, and marketing.*

**KEYWORDS:** *Administrators, Development, Managerial, Needs, Professional.*

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### 1. INTRODUCTION

Professional growth is needed throughout one's career in teaching. Pinto.it promotes professionalism and offers educators with equitable chances to acquire and develop information and skills relevant to their work performance, according to Pinto.it. According to Bush, Middle wood, and Briggs' study of the impact of school leadership development: evidence from the new visions program for early headship, leadership and management development is needed as it is gradually becoming accepted in other countries, but in order to meet the needs of school leaders and managers, training is important to be appropriate and one's career advancing. Many studies

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think that innovative leadership methods may have a significant effect on followers' attitudes and improve employee happiness and commitment, according to Nazaro. Abbas performed a research on management skills tools for democratic leadership imperatives. Management skills are all-encompassing.

Managers must have management skills in order to achieve the vision and purpose of their companies. They are required as a component or aspect of managerial efficiency and effectiveness. In Thailand's public sector, Thai leadership reigns supreme. Thailand is one of the Asian nations where Buddhism is revered by the majority of the population. Thai culture places a premium on harmony and tranquility. Managers in Thailand want to participate in community events with their workers because they think that by doing so, they will get a better knowledge of their staff and will be able to grow their team. Secondary school administrators in Bangkok, Thailand, play a vital role in ensuring that the systems are functioning successfully and efficiently. They demonstrate a high degree of excellence in every area of study in a practical manner. They also guarantee that all instructors and staff are producing or creating something toward a shared objective while simultaneously raising standards and improving conditions, and they offer leadership as well as organized positive views for the future of the educational institutions they serve[1].

### *1.1. Related Literature:*

Leadership is one of the human social debates. The effectiveness of collaboration is contingent on good and efficient management. An efficient and successful leader for a group of individuals is required to accomplish their goal and meet mutual goals. An effective manager, according to Kheirdmand, Lofty, and Etebarian, must be skilled in four areas: technical skill, cognitive skill, human skill, and political skill. Managers and leaders must have management skills that allow them to place their actions in the appropriate perspective. In today's environment, no manager will be successful unless they have fundamental management abilities, according to Goodarzi, Nazaro, and Esan. To put it another way, managers are expected to be well-versed on the dynamic of their workplace. As a result, management skills determine the efficiency and effectiveness of managers and leaders.

Effective sports directors, according to Nazaro, Hashmi, and Sahrawi, must plan ahead in order to enhance communication and management abilities in their companies. Also, according to Goodarzi, Nazaro, and Esan, managers who consider effective communication networks and develop human capabilities, such as communicational and management skills of sports managers, as well as describing the connection between them, may improve communication. This, in turn, will result in organizational effectiveness. Managers are the guarantors of an organization's success or failure. Managerial effectiveness and penetration are determined by the quality of management at all levels. The ability to manage an organization's operations is determined by organizational management and human resource management abilities. These abilities are the manager's capacity to use his or her technical knowledge and personal experience. Special talents and characteristics to govern and manage oneself and others are referred to as human skills[2].

### *1.2. Articulation of Strategy:*

The 10 chosen school administrators were questioned by the researcher. What particular training do you need to improve your ability to articulate strategy? Effective methods, such as engaging

the whole company in decision-making, are taught. Good strategic management training is essential for sharpening leadership abilities in order to face the difficulties of strategy execution and managing the team and organization in order to achieve the company's objectives. Focus on student success and greater school improvement practice. Training on successful methods such as choosing, creating, enhancing, and maintaining the school's and staff's capacity to execute an intervention in a way that benefits children effectively and efficiently. It is critical to get training in instructional leadership.

Collaboration with leadership is essential for a successful company. I believe that instructional leadership training is necessary since it is the cornerstone to the school reform process and its efficacy for students. It cultivates the implementer's mentality in every school administrator, which is focused, disciplined, and accountable, and ensures that tangible actions toward objectives are done every day. Create a comprehensive instructional coaching program for all teachers. Broadening the secondary department's worries about academic activities, such as international research training/seminars/workshops on trends and problems in non-native English speakers' academic growth. For school administrators, training and seminars on strategic planning are available. It is necessary to get training in strategic thinking ideas[3].

### *1.3. Ability of Prediction:*

The 10 school administrators were questioned by the researcher. What kind of training do you need to improve your prediction skills? Training on cognitive abilities such as the fundamental skills that the brain utilizes to think, read, and learn, as well as remembering, reasoning, and paying attention. Within the school, there is cooperation training. Make a long-term strategy and consider its benefits and drawbacks. School administrators will attend a training/seminar on predictive analytics.

Personnel management training, seminars, and workshops, as well as administrative and academic skills training, are all available. To anticipate the plan's potential outcomes, computer literacy is required. Long-term planning skills training. You can predict the anticipated outcome after you understand how to create a long-term strategy. Training and seminars are available to enhance cognitive capacity, which includes improving listening skills. For school administrators, a seminar-workshop on developing a long-term plan to predict the anticipated outcomes of school programs was held. Seminars, seminars, and trainings for school administrators on how to anticipate the good and negative outcomes of school programs. Administrators will get cognitive training.

### *1.4. Controlling Conflict:*

The respondents were questioned by the researcher. What particular training do you need to improve your ability to manage conflict? Understanding human behavior is a skill that can be learned. Every school administrator should be aware of his or her workers' actions and be aware of other people's views and expectations. As much as possible, training on recognizing the obstacles that exist both outside and within the school. Conflict resolution and negotiation skills training Leadership tactics training is required. We cannot avoid confrontations in any job.

However, I believe that every school administrator or manager should get training or attend a seminar on how to properly control people's conduct. To improve getting along with the employees and people, as well as the social connection within the administration, leadership and social training are required. Respectfully communicate. Respect for one another is extremely

essential in Thailand, particularly for school administrators. The school will be more calm and conflict-free if everyone respects one another. A seminar-workshop on conflict resolution. Seminars, workshops, and training on conflict resolution are required, in my opinion. Every school administrator should study and be trained in conflict resolution. To improve this ability, I believe we should train or have a seminar-workshop on dispute resolution. It can help us develop our conflict resolution abilities in this manner[4].

#### *1.5. Report Generation:*

The 10 chosen school administrators were questioned by the researcher. What kind of training do you need to improve your report-writing skills? Training on how to quickly and simply generate actionable reports. Training on how to have the confidence to voice ideas that contribute to school development. Effective research training is provided. Set report goals and choose the most relevant data. Research training is utilized to improve reports that are trustworthy and current with worldwide trends. Make it a habit to seek clarification. I want everyone to feel comfortable to ask questions at any time. Training or a seminar-workshop, in my opinion, may be a good way to enhance or strengthen report creation. Every school administrator, in my opinion, should study and be trained in effective research so that they may get trustworthy materials for report creation. The greatest approach to enhance report creation, in my opinion, is to have a seminar-workshop on reporting. It is critical to get training on how to improve communication. Because a lack of communication is an issue. Those who use reports don't always communicate directly with those who produce them[5].

#### *1.6. Official Correspondence:*

The respondents were asked: What particular training do you need to improve your official communication skills? Being a school administrator necessitates the ability to write in English. I believe that the English writing seminar will aid in development. Because some school officials in Thailand are unable to communicate in English. Organize a class or workshop on how to write formal letters, particularly in English. The majority of Thai school administrators struggle with English writing. Organize a workshop or seminar on how to write in English. In Thailand, not all school administrators can write in English.

Additionally, ensuring that the letter's final result is simple to read and has a good effect. Organize a session on how to write effectively. Learn how to create a concise mission statement with language and composition in mind. Business and technical writing seminar/workshop. Understand your audience; recognize various writing formats and how to choose the most effective one or ones to accomplish your goal. Training on how to improve report writing abilities as well as English grammar, punctuation, and proofreading. Develop your ability to comprehend the audience. To enhance this ability, I believe we should train in effective writing abilities since we may be required to create many types of business letters. Research training is one method to enhance official communication[6].

#### *1.7. Computer Skills:*

The following question was posed to the respondents: What particular training do you need to improve your computer skills? Familiarize yourself with computers and the internet. You should have a basic knowledge of what a computer is and how it operates before learning any specific technical abilities. Learning how the internet works may also be beneficial in certain situations. Technical texts should be read. Reading books or attending a computer seminar/workshop is one

of the greatest methods to enhance technical abilities[7]. Organize a lecture or workshop on how to use and understand a computer. Seminar/workshop for school administrators on computer skills such as the use of the internet and email, computers, word processing, graphics and multimedia, and spreadsheets.

To facilitate his or her transactions or encounters with his or her staff people, an administrator must be technologically sophisticated. Excel, SPSS, and social networking are therefore required. Apply what you've learned and get some practice. Essential computer skills training, including email, online surfing, and searching. Take computer literacy courses. Incorporate a wide range of software to enhance your general ability to get things done via software, try out a variety of various software applications online or offline. Learn how to code. Programming, in my opinion, is the skill of telling a computer how to do something. Learning to think like a computer is the key to achieving this goal[8].

### *1.8. Marketing:*

The respondents were asked, "What particular training do you need to improve your marketing skills?" Learn to communicate effectively with the students' parents. School administrators, in my opinion, should learn how to sell themselves. I believe that communication skills training is essential to acquire since knowing how to communicate effectively can lead to you becoming a successful marketer. Develop your public speaking skills. Learning how to communicate effectively can benefit you in a variety of ways. Take a time management class. Knowing how to utilize time wisely is one of the most essential things that any school administrator should do in marketing because knowing how to pay attention to the amount of time you spend on things may sometimes ensure success.

Training for school campaigns, social media training, and advertising Student enrollees will benefit from training. Prepare to use social media to communicate with stakeholders. Extend your reach by promoting blog articles and videos on Facebook, YouTube, and other social media platforms. Marketing seminar-workshop Make a pitch to high-achieving kids. Although marketing to students may be unpleasant, it is something you will almost certainly have to do. Design asset organization training[9]. The heart of the marketing materials is the design assets. Improve the school's online experience. Have a fantastic chance to give a godly experience while also making a good impact on the parents. On the advertising, training, seminars, and workshops are available.

### *1.9. Professional Development Plan:*

The researcher determined the professional development requirements of school administrators based on the three lowest mean scores in each area. As a foundation for presenting a professional development plan, the requirements were verified via the conduct of interviews. According to each category, the plan is split into three sections. The overall aim, specific goals, planned activities/programs, strategy, timeframe, person(s) engaged, resources, and anticipated result are all included in each section. The contents of the professional development plan were derived from the combined findings of the study's interviews with chosen respondents[10].

## **2. DISCUSSION**

According to the study, the ability to establish positive connections with employees at all levels is the most essential managerial talent. A successful manager, for example, sets a positive example and understands how to utilize their talents to inspire their staff to achieve, as outlined

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in the book's approach to relationship development. Successful managers collaborate with their workers, coach team members, and foster a diverse workplace. To be a successful manager, you must communicate work together to enhance cooperation, and as we progress in one area, we may see advantages in another, generating a momentum that will lead to optimum performance.

### 3. CONCLUSION

Managerial skills refer to an individual's knowledge and ability to do particular management activities or duties in a managerial role. This is a skill that can be acquired and practiced. When school administrators study and apply the habits, methods, and strategies of other effective school administrators, they may improve their management skills. If they follow the same steps as other successful managers, they will soon see the same outcomes.

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## **E-CHALLAN: ONLINE TRAFFIC RULES VIOLATION PENALTY AND MANAGEMENT SYSTEM**

**Aaditya Jain\***

\*Assistant Professor,

Department of Computer Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: aadityajain58@gmail.com

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### **ABSTRACT**

*The objective of this article is to create an online platform to facilitate the drivers and the traffic police to handle the penalties for traffic infractions. E-Challan System is the online platform geared at offering a broad variety of assistance in controlling and monitoring the traffic fines, enabling users about the difficulties people encounter in paying for their challan. The E-challan System is essentially an interaction between Police and drivers simply via an internet portal or an app. This project prototype explains how challan becomes easier for people by keeping it online. The online platform seeks to minimize the paperwork, manual procedure and boost the convenience for the users. A system which makes the people obey the laws and drive safely, without breaking any regulations. E-Challan is that foolproof controlled mechanism. E-Challan is an online governance system to enable the traffic administrators to handle the traffic infraction as well as for the drivers to manage the penalties.*

**KEYWORDS:** *E-penalty, E-challan, Online, Network, Traffic Violation.*

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### **1. INTRODUCTION**

Governance is a problem in a nation as varied, large and rapidly growing as India. India requires a fresh and latest technology for large-scale transformation and implementation of government objectives. While India is among the fastest developing economies in the world, India's fair growth remains a key priority. This initiative is an effort in this very direction of e-governance for a nation like India with a large population and high density. India's road network has expanded at an annual average of 4 percent since 1951. Along with the rural and urban population density the density of roadways has increased in India.

The increasing population has resulted in more cars on roadways. This has led to a high rate of accidents. One of the main causes for the large number of accidents on the road is that traffic regulations are broken and not followed. According to a study, 78 percent of the accidents happen due to violation of traffic laws by the driver such as speeding, driving under the influence of alcohol or drugs, and hit and run instances[1–6].

India requires a highly controlled failsafe system of governance to prevent these preventable accidents and manage the traffic on the roadways. E-Challan offers a broad variety of assistance needed for handling and monitoring traffic fines. It is also a type of decentralized information system which enables all the stakeholders to obtain the required information anytime anywhere.

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This Project is primarily about an e-governance management system which offers various features to the stakeholders related to challan, car information and licensing details. The software contains various kinds of users that are reliant on search other for the complete functioning of the program. The software enables to build and manage a database containing information about various registered users, their license details and challans issued. The system also keeps a database of cars which are registered with the local RTO. This information may be utilized to check drivers and in case of any infraction of traffic regulations to issue a challan to the motorist.

Also, the software enables the system administrator to access \sand update the databases when a new driver or vehicle is registered. The system admin also generates initial login credentials for the traffic department employees. The administrator is the only authority who can modify all the information in these databases.

The paper discusses an electronic governance model of electronic challan and traffic penalty system using an integrated existing method of penalty in India. A similar approach is followed by which implements the model using an automatic challan system using MATLAB. The model captures the image of the vehicle and extracts the number plate of the vehicle which breaches the traffic law. The model further processes to generate an automatic E-Challan which can be directly paid by the driver at RTO office or can avail other online payments also. The project mainly focuses on the individual data extraction from multiple databases. The paper discusses the traffic violation detection using computer vision. The model extracts the license plate using a new deep learning network structure which is used to detect and locate the license plate automatically. The vehicle no is detected and the information of the owner is extracted. The information is used to generate.

## 2. DISCUSSION

An E-Challan and an instant appropriate fine message is sent to the owner. Implementation of the whole model is very efficient and requires very less human intervention. A new approach is suggested by [4] using a pi-code suggesting an innovative e-challan application using encoding and decoding of the pi-code. The paper has discussed and illustrated an efficient method to read the pi-code and generate a challan for the traffic violators using QRcode encoder.

The project has utilized a number of front and back end frameworks for implementations such as:

1. HTML: For front-end development
2. CSS: For front-end development
3. JS: For animations and display time
4. Php: For front and back end connections, session creation and inquiries
5. AJAX: With Ajax, web application may transmit and receive data from a server asynchronously without interfering with the appearance and behavior of the existing page.
6. jQuery: For animations
7. MySQL: Back end development

The program offers a variety of functions such as show vehicle information, display driver details, pay challan and issue challan. It maintains a centralized database to preserve accurate

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records and offers offenders an online payment option. Django, JQuery, Sql, PHP, and Scipy are used to create the project.

On the site, there are three different types of users:

1. *Traffic Police Personnel*: A traffic police officer who is a registered employee and may issue challans to drivers who have broken any traffic regulations in the city.
2. *Drivers*: Licensed individuals who have been given permission to drive cars around the city and have been issued a challan for violating any traffic regulations. These individuals may use the site to pay for and manage their issued challans.
3. *System Administrator*: The system administrator is in charge of managing the accounts of the aforementioned users, as well as providing login credentials to traffic cops and entering new car, driver, and license information into the database[7–13].

*A. Traffic Police Personnel:*

1. The new personnel SHALL be issued an initial login ID and a password by system administrator.
2. The new personnel SHALL be able to generate his/her login ID and a password
3. The personnel SHALL be able to login using his or her ID and password.
4. The personnel SHALL be able to reset his or her password in-case he or she forgets it.
5. The personnel SHALL be able to input the details of the license.
6. The personnel SHALL be able to get the details of the owner of the license.
7. The personnel SHALL be able to input the details of
8. the vehicle.
9. The personnel SHALL be able to get the details of the owner of the vehicle.
10. The personnel SHALL be able to input the details required for issuing the challan like offence, location, time and comments.
11. The personnel SHALL be able to issue a challan successfully.
12. The personnel SHALL be able to see the challan history of the driver.
13. The personnel SHALL be able to see the challans issued by himself or herself.

*B. System Administrator:*

1. The Administrator SHALL be able to login using his or her ID and password.
2. The Administrator SHALL be able to reset his or her password in-case he or she forgets it.
3. The Administrator SHALL be able to generate new admins by issuing them an initial login ID and password.
4. The Administrator SHALL be able to insert the details of the new vehicle registered.
5. The Administrator SHALL be able to insert the details of the new license registered.

6. The Administrator SHALL be able to generate new personnel credentials by issuing them an initial login ID and password.

7. The Administrator SHALL be able to get the details of personnel.

### 3. CONCLUSION

The project primarily focuses on issuing and view or pay challan along with details extraction of cars, license numbers and challan information. The project may be expanded to a full stack functional website in future offering additional services such as license creation, RTO car registrations and many more.

The system may also be changed by utilizing the latest technologies as mentioned in the literature study like QR code sand RFID scanner. This will minimize human involvement and will result in a more efficient model of the current system.

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## SOLID WASTE MANAGEMENT- A REVIEW

Amit Kumar\*

\*Assistant Professor,

Department of Civil Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: amit.engineering@tmu.ac.in

DOI: **10.5958/2249-877X.2021.00135.1**

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### ABSTRACT

*It is well recognized that waste that is discarded can be reused in a variety of ways. The methods and practices of solid waste management in India are the subject of this paper. Solid waste management encompasses a wide range of waste kinds, including industrial, agricultural, transportation, municipal, and so on. Although all wastes are destructive, municipal solid trash (now referred to as Solid Waste) is the form of waste that may be effectively managed without polluting the environment or harming other species. The focus of this study is on municipal solid waste. Various strategies for managing solid waste have been described, ranging from organic composting to energy generation. As a result, reducing pollution to decrease the risk of ill health, preserve the environment, and improve our quality of life is an important part of sustainable development.*

**KEYWORDS:** *Municipal, Organic, Pollution, Solid, Waste.*

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### 1. INTRODUCTION

India is the world's second most populous nation and has the world's second fastest expanding economy. Rural regions have a population of 852 million people, whereas urban areas have a population of 325 million people. In the last 50-60 years, the country's urbanization rate has risen from 26.5 percent to 38 percent, with 44 percent predicted by 2026. In India, rapid industrialization and population growth have resulted in migration from rural to cities, resulting in the generation of hundreds of tons of MSW per day.

As the country aspires to achieve the status of an industrialized nation by 2020, the MSW quantity is anticipated to rise substantially in the near future. The disparity between India's growing urban population and its accessible services and resources is stark. India has a huge gap to close in terms of solid waste management (SWM). To deal with the growing quantity of trash, proper municipal solid waste (MSW) disposal facilities are lacking. Current SWM services are inefficient, costly, and of such poor quality that they pose a risk to human health and the environment.

Citizens of India today are experiencing unprecedented economic development, increasing ambitions, and quickly changing lifestyles, all of which will increase public health and quality of life demands. When these expectations aren't fulfilled, people may experience a decline in their quality of life. Pollution, whether in the air, water, or on land, reduces productivity over time, causing a country's economic situation to deteriorate.

Large cities gather about 70-90 percent of MSW produced, while smaller cities and villages collect less than half of that. More than 91 percent of MSW collected officially is dumped on open land or in landfills. MSW open burning and landfill fires emit a total of 22,000 tons of pollutants into the sky. Carbon Monoxide (CO), Carcinogenic Hydrocarbons (HC) (including dioxins and furans), Particulate Matter (PM), Nitrogen Oxides (NO), and Sulphur Dioxide are among the contaminants (SO).

## *1.1 Waste Management Hierarchy:*

The most environmentally friendly waste management strategy is to reduce the usage of resources and reuse them. The first step in source reduction is to reduce the quantity of trash produced and reuse resources to keep them out of the waste stream. As a result, trash is not produced until the conclusion of the "reuse" phase. Waste must be collected after it has been produced. Material recovery from trash, such as recycling and composting, is widely acknowledged as the most efficient method of waste management. The majority of MSW produced in India ends up in landfills due to technological and economic constraints in recycling; product design; insufficient source separation; and a lack of sufficient markets that can utilize all sorted materials. Local governments should begin collaborating with their partners to encourage source separation. While this is being accomplished and recycling rates are rising, plans should be developed to deal with the non-recyclable wastes that are now being produced and will be generated in the future[1]–[3].

The most effective methods to minimize trash production are also to reduce and reuse. It is estimated that up to 95% of a product's environmental effect occurs prior to its disposal, mostly during its manufacture and the extraction of virgin raw materials.

Recycling, on the other hand, requires a distinct waste stream, whether it is separated at the source or subsequently after collection. Due to limits in source segregation, trash is collected in a mixed form known as municipal solid waste (MSW). It's tough to separate mixed trash. Paper, plastic, glass, and metal that have been physically separated may then be recycled. Separating these elements from SW requires a lot of energy and effort, therefore it is seldom done. As a consequence, waste mixing will always produce a percentage of residues that can't be recycled or composted and must be combusted in RDF or WTE facilities to prevent landfilling and create energy. Source separated organic wastes may be composted, and the compost produced can be utilized as an organic fertilizer, similar to the recycling of inorganic materials. Fertilizer is used on farmland. Plant macronutrients such as nitrogen, phosphorus, and potassium, as well as other important micronutrients, are abundant in organic compost[4]–[6].

When mixed garbage is composted aerobically, it becomes polluted with organic and inorganic elements, mostly heavy metals. Heavy metal contamination of MSW compost may damage human health and the environment, which is one of the main reasons for its limited agricultural usage. As a result, mixed waste composting is not a viable solution for long-term waste management, although this fact is not well known. In countries like India, where more than 91 percent of MSW is land filled and there are no other options, mixed waste composting is extensively used and regarded superior. Fertilizer is used on farmland. Plant macronutrients such as nitrogen, phosphorus, and potassium, as well as other important micronutrients, are abundant in organic compost.

When mixed garbage is composted aerobically, it becomes polluted with organic and inorganic elements, mostly heavy metals. Heavy metal contamination of MSW compost may damage human health and the environment, which is one of the main reasons for its limited agricultural usage. As a result, mixed waste composting is not a viable solution for long-term waste management, although this fact is not well known. In countries like India, where more than 91 percent of MSW is land filled and there are no other options, mixed waste composting is extensively used and regarded superior.

(SLFs) are designed to keep wastes out of the environment and make them harmless via natural biological, chemical, and physical processes. UNEP also identifies three fundamental criteria that must be met in order for an SLF to be designed: Compaction of wastes, daily covering of wastes (with soil or other material), and control and prevention of harmful effects on public health and the environment are all things that must be done.

1. Sanitary land filling is divided into three categories according to the waste management hierarchy.
2. SLFs that recover and use methane (CH<sub>4</sub>) SLFs that recover and flaring CH<sub>4</sub> SLFs that do not recover CH<sub>4</sub>.
3. Observance of the Sustainable Waste Management Hierarchy

When comparing SWM in India to the hierarchy of sustainable waste management, the picture isn't quite rosy. It denotes a developing nation with a large population and a rising economy, as well as dispersed but continuing SWM activities. Local governments and policymakers are also aware of the importance of SWM. The SWM industry in India has moved in the correct direction in recent years, particularly with the establishment of the Government of India's Jawaharlal Nehru National Urban Renewal Mission (JnNURM) (GOI).

However, it continues to be hampered by a lack of administrative and financial resources, as well as public awareness of the problem. There is still a long way to go in this industry. More widespread integration of the informal waste sector into the formal systems, increased building of composting facilities, new RDF, WTE, and Sanitary Landfill facilities, and capping of certain landfills for landfill gas (LFG) recovery are all anticipated changes in MSW disposal in the near future.

The current state of SWM in metropolitan settings poses a risk to human health and the environment. Inhaling bioaerosols, as well as smoke and odors generated by open trash burning, may cause health issues. In addition, germs inhaled via the air is contagious. Toxic chemicals found in solid waste are linked to respiratory and dermatological issues, as well as eye infections and a shorter life expectancy. The fine particle range is dominated by carbonaceous fractions and hazardous metals such as Pb, Cr, and Zn. The introduction of heavy metals into the food chain is a less well-known secondary consequence of poor SWM in India[7]–[10].

Heavy metal contamination is prevalent in compost from mixed waste composting facilities. The use of this compost on agricultural areas will lead to heavy metal pollution of the soil. Zinc (Zn), Copper (Cu), Cadmium (Cd), Lead (Pb), and Chromium (Cr) are heavy metals present in mixed garbage composts (Cr).

## 2. DISCUSSION

Diseases spread by stray animals, vermin, and insects drawn to wastes are also a danger to public health. Solid trash clogs sewers and drains, providing mosquito breeding grounds. In 1994, improper SWM in the city of Surat resulted in a city-wide bubonic plague outbreak, which subsequently turned Surat into one of India's cleanest towns. Other illnesses like cholera and dengue fever are spread by stray animals and insects.

When SWM in India is compared to the hierarchy of sustainable waste management, the picture isn't very rosy. It denotes a developing nation with a large population and rising economy, as well as dispersed but continuing SWM initiatives. Local governments and policymakers are also fully aware of the importance of SWM. The SWM industry in India has made significant development in recent years, particularly with the establishment of the Government of India's Jawaharlal Nehru National Urban Renewal Mission (JnNURM) (GOI). However, owing to a lack of management and financial resources, as well as public knowledge about the problem, it continues to suffer. There is still a lot of work to be done in this field. More extensive integration of the informal waste sector into formal systems, increased construction of composting facilities, new RDF, WTE, and Sanitary Landfill facilities, and capping of some landfills for landfill gas (LFG) recovery are some of the changes expected in MSW disposal in the near future. (SLFs) are designed to keep wastes out of the environment and make them harmless via natural biological, chemical, and physical processes. UNEP also identifies three fundamental criteria that must be met in order for an SLF to be designed: Compaction of wastes, daily covering of wastes (with soil or other material), and control and prevention of harmful effects on public health and the environment are all things that must be done. Sanitary land filling is divided into three categories according to the waste management hierarchy. SLFs that recover and use methane (CH<sub>4</sub>) SLFs that recover and flaring CH<sub>4</sub> SLFs that do not recover CH<sub>4</sub>.

Problems are getting more sensitive as urbanization, development, and industry increase, necessitating quick and stringent response. The correct disposal of municipal trash is not only essential for the maintenance and growth of public health, but it also offers enormous resource recovery potential. It is projected that the country produces about 1,00,000 MT of municipal solid waste. Waste production per capita in large cities varies from 0.20 kg to 0.6 kg. In most major areas, collection efficiency varies from 70 to 90 percent, whereas in some smaller communities, it is less than 50 percent. The ULBs are expected to spend about a ton on solid management operations such as storage disposal and so on. About 60-70 percent of this amount is used for waste street sweeping, 20-30 percent for waste transportation, and less than 5% for final disposal, indicating that organized and safe disposal sites are not yet recognized by municipalities, and landfill sites have been particularly local bodies don't have resources. The collection efficiency suffers as a result of the reduced availability of disposal locations.

Despite the lack of national statistics, CPCB has looked into a number of metropolitan regions. Consider some of the main cities that produce, such as Mumbai, Chennai, Bangalore, and Kolkata. Since the past several decades, waste management has been a critical environmental problem. Population, industrialization, and urbanization, among other factors, have all been seen. This article examines the waste management system, its components, and waste disposal systems. The article discusses the need of a waste management system, the negative consequences of poor management, and different problems that arise in dies. It has been determined that the waste management system should include proper waste collection, storage,



processing, transportation, and disposal in order to reduce the negative effects of is an open access article distributed under the Creative Commons Attribution License, which allows for use, distribution, and reproduction in any medium as long as the original work is properly cited.

Problems are more problematic as a result of urbanization as a result of planned economic development and industrialization, and urgent and stringent response is required. The correct disposal of urban trash is not only essential for public health, but it also offers enormous resource recovery potential. A total of 1,00,000 MT of municipal solid waste is produced every day in the country, according to estimates. The average amount of trash produced per person in large cities is 6 kg. In most major areas, collection efficiency varies from 70 to 90 percent, whereas in some smaller communities, it is less than 50 percent. It spends around Rs.500 to Rs.1500 per ton on solid waste management activities such as storage and collection, with 70% of this amount going to waste street, 20% to 30% going to waste transportation, and less than 5% going to waste final disposal, indicating that waste disposal safety is given very little thought. Many towns have yet to identify landfill sites, and in some municipalities, landfill sites have been depleted, and local governments lack the means to purchase additional property for filling. The collection efficiency suffers as a result of the reduced availability of disposal locations.

### 3. CONCLUSION

Solid waste management is one of the most challenging challenges facing the globe; changes in people's habitats and fast growth are responsible for huge amounts of garbage production; in India, cities like Delhi and Mumbai generate more than 5000 MT of rubbish each day. This trash is causing issues with public health, drainage, and aesthetics in cities, necessitating the implementation of effective waste management systems in both cities and villages. The system should use proper trash collection, storage, processing, transportation, and disposal to reduce waste's negative effects and enhance people's quality of life.

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## A STUDY ON CONTENT MARKETING AS A NEW TREND IN MARKETING

Kirti Dubey\*

\*Assistant Professor,

Department of HR & Finance, Faculty of Commerce, Management & law,

Teerthanker Mahaveer Institute of Management and Technology,

Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: drkirti.management@tmu.ac.in

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### ABSTRACT

*Content marketing evolves to be a powerful marketing tactic in the digital, fast moving, information driven world. It is not a new strategy but more and more enterprises begin to engage in content marketing gradually. So what are the reasons of the rise of content marketing in today's society? This paper discusses about the use of content marketing in businesses and how it brings benefits to the companies. The conclusion summarizes six strategies companies use during the implementation of content marketing in their businesses. Consumers believe that user-generated contents are far more trustable because they are not paid to spread positive word of mouth about certain brands. Lastly, it is crucial for firms to be ethical and honest with public. Public hates to be deceived and manipulated. Five carefully selected theories of content marketing proposed by experts in the field has been collected, compared and displayed as originally and scientifically as possible in this thesis. The chosen theories provide a diversified perspectives of content marketing from different experts. Thus, this gives a bigger picture of how marketers around the world are perceiving and experiencing with this new form of marketing.*

**KEYWORDS:** *Content Marketing, Implementation, Benefits, Information, Digitalization.*

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### 1. INTRODUCTION

Content marketing is a management method in which a company uses digital content supplied through electronic channels to detect, analyze, and satisfy client demand in order to profit. Marketing relies heavily on data. Market analysis and customer behavior have a strong relationship. They gather data about customers and future customers in order to improve the market exchange's value for customers and, as a result, the organization. Customers serve as the foundation for all marketing efforts. In the market, customers and businesses are intertwined. Companies want and need to carry out marketing operations in order to meet the needs of their customers. Customers demand factual and valuable information to guide them in their decision-making process in this knowledge era. Sharing relevant material with a target audience is the art and science of content marketing. Customers today are savvy and well-informed. They are aware that they have the right to select what information they receive, in what format it is delivered, and whether or not they believe the content.

Because they can access the internet through their pcs, laptops, and mobile phones, most customers are tuned in and connected to the digital world all day. Online material consumption is

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becoming a frequent practice among internet users. According to a survey, almost 48 percent of Facebook users aged 18 to 34 admit that the first thing they do when they get up is go on to their social media site. Furthermore, certain audiences choose different channels such as traditional media, television, radio, billboards, and others. This audience expects to be answered and entertained 24 hours a day, seven days a week. As a result, businesses are investing substantially in offering the most up-to-date information through various marketing platforms in order to pique customers' interest. Content marketing differs from advertising in that it emphasizes storytelling over swagger. To put it another way, a company can advertise if it wants to tell the world that it is a rock star, but if it wants to demonstrate and prove it, it must have amazing content. Here are some examples of how content marketing can be used to develop an effective marketing plan[1].

## *1.1 Localization:*

When doing business abroad, most multinational firms (MNCs) engage in content marketing and focus on customizing their message to target the correct audience (Content Marketing World looks at the significance of linguistics in brand strategy, 2014). It is critical for marketers to adapt material so that it is culturally relevant while also ensuring that it is appropriate and truthful in order to maintain a good brand reputation. People, business processes, and system are the three essential components in managing global content. In order to develop a clear and uncluttered brand image in each international office, all branches in different countries must work together. Localization has historically aided multinational corporations in surviving and prospering in nations other than their home country. This is related to cultural differences, as well as differences in client values and perspectives. As a result, using the same standards and tactics in multiple countries is nearly impossible. According to Pierce, having standards on which people disagree is a much bigger issue than not having sufficient norms (Content Marketing World looks at the significance of linguistics in brand strategy, 2014). Content is more successful when it is localized and translated for the target market and culture. The necessity of having localized content is to ensure that the message is delivered in a language and format that local customers can comprehend. Brands cannot presume that "this is how we do things in the United States" and apply the same concept to another nation (Content Marketing World looks at the significance of linguistics in brand strategy, 2014). Brands that adopt this mindset are doomed to fail because they focus solely on who they are and what they can do rather than attempting to understand what customers want. In this competitive economy, customers are given options and choices. When customers choose them, businesses must ensure that the content operates the way they want it to. Within a culture, it's not enough to have the appropriate words; it's also necessary to have the right location and timing[2].

## *1.2 Personalization:*

Customers are increasingly expecting individualized customer experiences that represent their individual wants, attitudes, and circumstances. Customers want to be treated as individuals and to feel like they are part of a community. This is referred to as a requirement for "inclusive individuality." They're looking for sensations of independence while also being dependent. They want to be recognized as individuals, and they also want to be respected as part of a group. They don't want to feel like outcasts in their neighborhood. Content marketers can satisfy their need for "inclusive individuality" with the help of digital technologies. Marketers have the ability to create customized content that is relevant to each individual customer. Consumers, on the other

hand, have the ability to personalize their experience and then share it with the communities to which they participate, regardless of geographical location, so because internet connects individuals all over the world. Content marketers are being pushed to develop new marketing techniques that appeal to both individualism and inclusion as a result of changing consumer behavior. Marketers use content marketing on the internet to better customize information for their customers. Customers use social media sites on a regular basis in order to receive useful, relevant, and up-to-date content such as articles, videos, blog entries, and other types of content. They are looking for a personalized and high-quality experience while accessing content on the internet[3].

To market their brands, global brands used to employ standardized content. Consumers, on the other hand, are entering the age of inclusive individualism as time goes on. As a result, marketers are able to overcome the problems of global, regional, and personalized marketing. A tailored message assists businesses in reaching a high-quality target audience. Coca-Cola is a fantastic example of a multinational firm that has successfully sent individualized messages to customers. Coke Zero hosted a social media event dubbed "my fave dancing movements," which reflects accepting individuality[4].

### *1.3 Emotions:*

The ability of a content marketing message to go viral is one of the success markers. A company's article or video is regarded successful if it receives a large number of clicks and shares. It was established that the success of an article was determined by two elements. A military family, a single father, and a same-sex couple with two children are featured in the video. It is not a typical advertisement in which these families revolve around the company's products. Honey Only a few occasions in the documentaries do made graham crackers appear. The tale focuses on these families and their struggles, and as the novel unfolds, it hints at what makes their family life healthy. This advertising stands out because it is enthralling, heartfelt, and real. People are reminded of their own families as a result of the story, and are inspired to fill their lives with more love every day. It has been proven that when people can relate to the message, they would share or forward articles to their friends[5].

### *1.4 Diversification of Methodology:*

Marketers may adopt a diversified regimen to overcome the issue of content marketing overwhelm. It can be exhausting for content marketers to come up with new innovative ideas and inspiring phrases on a regular basis in order to keep consumers' attention. Customers may grow tired of hearing the same voice from marketers who have run out of ideas. Customers may become disinterested and finally detach from a brand if the same marketer consistently shares similar content formats. There are many alternatives on the market, and shoppers choose appealing brands and fresh content. The following strategies should be used to shake up a company's routine. Hiring a talented journalist aids the marketing department in producing effective content and presenting new ideas from a different perspective. The main topic ideas can be provided by content marketers, and the journalist can compose publicity material as he or she pleases. A good journalist can come up with unique stories about the company and convey them to customers in a new way. Another option is to engage a professional editor. Marketers will offer their material and the editor will extract it from the facts. By converting a PowerPoint presentation into a fascinating video clip, a video editor can help spice up the information[6].

## *1.5 Trust and co-creation:*

Co-creation occurs when online users seek a way to contribute to the generation of information for enterprises seeking consumer insights. The modern concept of co-creation is based on three factors. First and foremost, because to technology advancements and the rise of digital communication, people have been able to communicate with others all over the world since the 1990s. Online users with similar interests can create their own communities and trade ideas on goods and services using digital technology. The second aspect is that businesses encourage customers to engage in their operations in order to gain a better understanding of them and to instill a sense of belonging in them. Some businesses have taken advantage of this chance to engage customers and transform them into partners and co-developers. According to a study, allowing customers to contribute information to businesses makes content exploration easier. Organizations that implement co-creation into their operations reap a slew of benefits[7]. It improves the capacity for consumer insights, establishes good relationships with consumers, and reduces risk, in addition to bringing value to new products.

## *1.6 Honesty and ethics:*

Customers may be resistive to a hard pitch when paid and owned media are insufficient to attract them. Customers dislike push marketing because it forces them to receive information. They prefer pull marketing, such as content marketing, on the other hand. Customers have the flexibility to explore and read while marketers generate appealing and unique content and broadcast it on numerous channels. Even though he believes that successful native advertising is indistinguishable from journalism, McCambley believes that brand sponsors must provide complete transparency. He quotes, "If your stuff is good, own it." He further points out that labeling is only questioned when the content is poor. To grab public's attention, content marketers should not use deception[8].

## **1. LITERATURE REVIEW**

Rowley et al. studied about the relevance of digital content to business and society increases, this paper argues that a comprehensive view of the concept and nature of digital content marketing is needed (DCM). Along the way, it becomes clear that customer value is a recurring issue in DCM, which leads to the article's second key contribution: an examination of the concept of customer value in digital content marketplaces. 'Bit-based things disseminated through electronic means' is how digital content is defined. In order to uncover some of the distinctive aspects of digital content marketing, a structured study is undertaken based on a series of questions. The research is based on a review of the literature as well as an examination of a number of websites that provide various forms of digital information. The conclusion summarizes the distinctive properties of digital content as well as the implications for digital content marketing. It examines the influence of the difficulties in defining "value" in the context of digital material, as well as the implications for supply chain architecture, pricing strategies, promotional tools and branding, and license and digital rights management. Furthermore, all stakeholders in the supply chain affect the consumer's experience of digital content, and the customer is required to engage in learning and co-creation of the experience. The 'value-in-use' notion of customer value is presented as a possible foundation for ensuring that consumers are actively involved as stakeholders in the content economy. On this foundation, practical recommendations and further research are built[9]. According to Baltes et al. In this era of digitization, the role of online marketing has grown from year to year as a component of

marketing strategies used by businesses of all types and sizes. Because digital marketing necessitates the presence of a content marketing strategy, the success or failure of a company's online communication is largely determined by the quality of its content marketing. In this context, in addition to enhancing high-quality content marketing, online marketers must do a target analysis in order to adjust their content and determine the best strategy to promote it. This article discusses the notion of content marketing, its role in marketing policy, and the necessary methods for establishing a successful content marketing strategy[10].

## **2. DISCUSSION**

Story marketing is another term for content marketing. It all comes down to providing quality content to enlighten and persuade audiences in order to raise awareness or influence their image of a brand. Better content may encourage customers to buy goods or services, turn them into loyal customers, and even encourage them to tell others about it. Material marketing is also a strategy for establishing and maintaining relationships with a target audience by distributing valuable content. It improves the purchasing process by giving clients more value. As the present marketing strategy evolves, content marketing converts marketers into publishers. Although it is difficult for marketing gurus to change their ways of marketing items substantially, the number of larger firms that do so is gradually increasing. For example, Kelly Service's marketing budget is estimated to be spent on content generation and distribution operations at above 60%. Content marketing is becoming increasingly important to businesses. In 2011, Google launches the Zero Moment of Truth research initiative. It looks into how people look for information, how information influences their behavior, and also what brand decisions they make. In comparison to the previous year, buyers look through twice as much content online, resulting in a purchase decision. The number of items of material viewed by average customers increased from five to ten between 2010 and 2011.

Organizations must ensure that they have successful content marketing techniques in order to avoid being eliminated by consumers in the current trend of content marketing. User-generated content also encourages people to participate in crowdsourcing, submit brand ideas, and provide relevant information to other users. Consumers consult online product reviews during the purchasing process because they trust what other customers have to say about the companies. As a result, marketers start to understand how internet reviews are formed. Many firms make an attempt to encourage consumers to engage with one another and subscribe to one another in order to increase the number of reviews on their website. Another benefit of a content marketing approach is that it allows businesses to position their items. Positioning is determined by a company's market reputation as well as the quality of its goods and services. Marketers develop and distribute useful material that helps to reinforce a company's positioning. Who'd have predicted that the future of marketing is actually publishing, rather than marketing? Exaggeration and marketing tricks will not satisfy customers. To activate purchasing behavior and impact buying habits, appropriate, valuable, and rich information is required.

## **3. CONCLUSION**

Brands will now achieve their marketing goals by generating and disseminating the best useful information on the world for that specific niche, rather than relying on interruptive media. Although content marketing has been around for a long time, few businesses used it at the time. Nonetheless, due to changes in customer behavior and technology considerations, it has recently become the new trend in marketing. Customers understand the value of knowledge and how it

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may help them make smarter purchasing decisions. As a result, people begin to demand more information. Furthermore, they are becoming increasingly intelligent, leaving marketers with no choice but to create truthful and engaging material, as information manipulation no longer works in the digital age. To create good content marketing, a few characteristics must be considered. The importance of message localization increases the likelihood of reaching the intended audience. Due to regional differences and varying client expectations, using a single message globally is dangerous. Following that, it is preferable to have personalized content because consumers expect uniqueness. They want to be treated as unique individuals who are valued. When a message is customized and incorporates powerful emotions, customers are more likely to build deeper relationships with the company. On the other hand, it is better if content is prepared in a variety of ways: outsource, collaborate, and use voice. Different methods of communicating a message might pique the audience's interest. When marketers and customers work together to create information, the results are entertaining and trustworthy. Because they are not paid to create favorable word of mouth about certain products, consumers believe user-generated material is considerably more trustworthy. Finally, it is critical for businesses to be ethical and truthful with the public. The public despises being duped and exploited. To develop trust and preserve client loyalty, content marketers must ensure that the contents are authentic and transparent. The marketing trend is evolving to the point where marketing is being replaced by publication.

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## REVIEW ON USE OF MEMBRANE PURIFICATION IN RADIOACTIVE WASTE MANAGEMENT

Kul Bhushan Anand\*

\*Assistant Professor,

Department of Mechanical Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: anurag.engineering@tmu.ac.in

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### ABSTRACT

*The dangers of radionuclides emitted by nuclear power plants are well recognized. To condense the radionuclides and prevent their diffusion into the environment, separation methods are employed. The current study discusses recent developments in the treatment of radioactive waste utilizing membrane separation technology. The first section covers membrane techniques for collective radionuclide separation, whereas the second section covers membrane techniques for selected radionuclide separation. Reverse osmosis, precipitate followed by ultrafiltration or microfiltration, and membrane distillation are all techniques for separating radionuclides. Liquid assisted membranes, polymer inclusion membranes, solid synthetic polymer electrolysis, nanofiltration, electrochemical salt-splitting technique, and other sophisticated separation technologies have been used to isolate individual components.*

**KEYWORDS:** *Membrane purification, Purified radioactive source, radioactive wastes, Electrolysis.*

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### INTRODUCTION

Nuclear fuel cycle activities (uranium conversion and enrichment, fuel fabrication, and spent fuel reprocessing), procedure of nuclear power stations, disinfecting and decommissioning of nuclear facilities, and organizational uses of radioisotopes (medicine, industry, agriculture, research reactors, and test facilities) are indeed the main sources of radioactive waste. Liquid radioactive waste must meet extremely stringent demands in order of radioactive element and other impurity limits in order to be released into the environment safely (suspended particulates, biofoulants and organic or inorganic chemicals). The waste must be processed to meet the requirements outlined in national laws, which include mass loss as well as the reduction of radioactive substances and other dissolved substances in the effluent. Chemical precipitation, sedimentation, ion exchange, thermal evaporation, biological methods and membrane permeation are some of the methodologies used to treat fluid radioactive waste. In addition to waste disposal, radioactive isolation and purifying for specific uses are also required. Insulation materials have shown good potential from the front end of the nuclear fuel cycle, i.e. mining, to the back end, where irradiated wastes are digested for safe disposal. When subjected to the action of a driving force, a membrane acts as a protective layer between two phases, remaining impermeable to specific particles, molecules, or substances. The membrane allows some elements to pass through into the permeate stream, while others are maintained and accumulate in the retentate stream[1].

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Membranes come in a variety of thicknesses and structures, including homogeneous and heterogeneous. Membranes may also be categorized based on the size of their pores. There are three distinct pore diameter (dp) size categories according to the International Union of Pure and Applied Chemistry (IUPAC): microporous (dp < 2 nm), mesoporous (2 nm < dp < 50 nm), and macroporous (dp > 50 nm). Particle transport may be active or passive, and membranes can be neutral or charged. Pressure, concentration, chemical, or electrical gradients across the membrane may help with the latter. The various membrane processes. With the advancement of membrane technology, custom-made membranes for specific separations have become commonplace. Group colloid removal (concentration-based separation) and particular element purification are two of the ways in which the technique is used. The former involves removing activity using a mix of radionuclides found in the waste stream[2].

Individual elements such as molybdenum, iodine, cesium, strontium, tritium, lanthanides, and actinides are separated in the latter. The number of reviews on membrane applications in radioactive waste treatment is rather small. The role of reverse osmosis (RO) and membrane distillation (MD) in the disinfection of low-level wastes has indeed been extensively discussed. Other membrane technologies, such as supported films, haven't yet before been investigated. The current review provides information on various recent membrane filtration applications in the diagnosis of radioactive wastes. Membranes' use for both collective and selective radionuclide removal is also discussed[3].

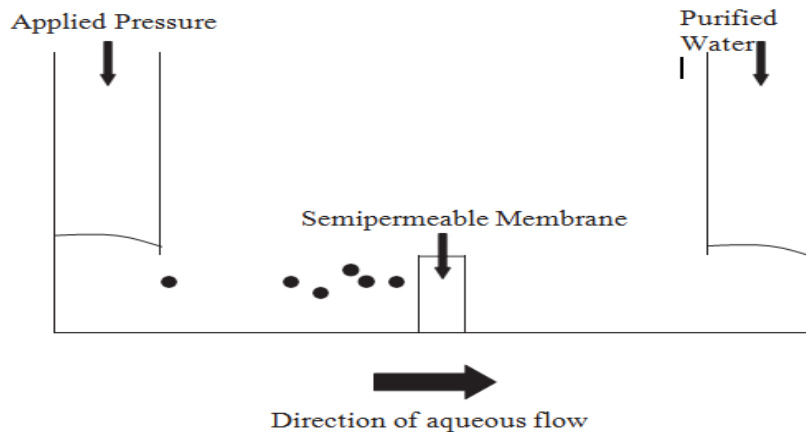
## DISCUSSION

### *1. Collective ion and colloid removal:*

RO and MD have been widely used in purification methods for collective radio-colloid elimination. By putting pressure to the solution while it is on one side of a selective membrane, the RO filtering technique eliminates inter-correlated from solutions. As a consequence, the solute is kept on the pressured side of the membrane while the pure solvent (typically water) is permitted to flow through. Figure 1 depicts a schematic of the RO process. This barrier should not allow big particles to pass through the holes in order to be "selective," but smaller components of the solution (such as the solvent) should be allowed to flow freely. The greatest separation is achieved in a thick barrier layer in the polymer matrix of reverse osmosis membranes. The membrane is usually constructed to allow just water to flow through this thick layer, blocking the passage of solutes (such as salt ions). This procedure necessitates a high pressure, typically 2-50 MPa, on the highly concentrated side of the membrane. Elements such as Cs, Sr, and Co are the primary beta-gamma emitters, whereas actinides are the primary alpha emitters. It is feasible to produce activity concentration discharge values of less than 10 kBq/m<sup>3</sup> for beta and gamma emitters, and less than 1 kBq/m<sup>3</sup> for alpha emitters. The variance in discharge levels is mostly due to size differences. Synthetic polymeric Micropores cannot handle acidic or alkaline solutions above the 4-9 pH range, despite their ability to tolerate a significant amount of radiation exposure. MD is based on the relative volatility of different components in the feed solution. The partial pressure differential across the barrier provides the driving force for transit. Separation happens when a convection or diffusive process allows solvent vapor (typically water vapor) to flow through the membrane pores [4].

The vapor pressure differential between the two remedy interfaces owing to a temperature difference is the driving factor for vapor transport in this process. MD has some similarities to pervaporation (PV), another membrane-based separation method, but there are several key

distinctions. Direct contact of the membrane with a liquid feed and evaporation of the penetrating components are used in both techniques. PV, on the other hand, utilizes nonporous membranes whereas MD uses porous membranes. Instead of molecule weight or size, the chemical nature and shape of the polymeric membrane, as well as the degree of interaction between the polymer and the permeants, are key variables to consider in nonporous membrane. A solution diffusion process transports across nonporous membranes, and separation is accomplished by variations in solubility and/or diffusivity. As a result, the pore size and average pore diameter of such membranes cannot be used to describe them[5].



**Figure 1** Schematic of reverse osmosis In a typical U-tube experiment liquid level is shown by curved lines[5]

### 1.2 Ceramic membranes:

The usefulness of RO membrane in the pH range has indeed been addressed before. This claim was made in reference to polymer-based membranes, which have been widely utilized in the application. When compared to organic polymer-based membranes, ceramic membranes are thought to be superior in terms of fouling resistance. Because of their excellent thermal, mechanical, and chemical durability, zeolite membranes have gotten a lot of interest in this area. Furthermore, due of their distinctive pore structures, zeolite membranes offer a lot of potential for separating mixtures of molecules through adsorption and molecular sieving. Separation by photovoltaics (PV) and vapor permeation (VP) utilizing ceramic membranes may be a cost-effective and energy-efficient alternative to traditional distillation, especially for azeotrope or close-boiling liquid combinations. On various substrates, several kinds of supporting polycrystalline zeolite membranes with minimal inter-crystal holes were created.

Atomic sieving, competitive adsorption, and diffusion are some of the general processes for separation across ceramic membranes. Supposedly, zeolite membranes are appropriate for ion removal from aqueous solutions by RO, according to a molecular dynamic simulation. The simulation showed that utilizing RO via zeolite membranes, 100 percent Na rejection could be accomplished, MFI being one commercialized kind. The size exclusion of hydrated ions, which have kinetic sizes (0.8-1.0 nm for  $(\text{Na}(\text{H}_2\text{O})_x)$ ) considerably greater than the opening of the MFI zeolite membrane, is the separating mechanism of flawless MFI zeolite membranes (diameter 0.51 nm)[6].

## 2. *Selective radionuclide removal:*

Membranes are changed for various treatment methods in order to separate particular components. Ion-selective membranes, fluid membranes, and ion-exchanger-based membranes are the three main types. Supported liquid membrane and polymer inclusion membranes are two types of liquid membranes. Membrane cells are used in electrochemical processes to remediate waste components. The salt is electrochemically divided and allowed to flow across a cation sensitive or anion selective membrane in this technique, resulting in a final solution that really is cation or anion free. Electrochemical systems have the benefit of being able to handle a variety of wastes, or streams containing specific waste components, in a single treatment unit. For industrial electrochemical operations, a variety of ionselective membranes have been created[7].

Supported liquid membranes (SLMs) integrate extraction and strip into a single phase, while traditional methods such as solvent need two distinct steps. Solvent extraction of metal ions just at interface between a feed solution and a membrane, transport of a extracted species to the contrary side of the membrane, and rear at the other side of the barrier between the membrane and an able to receive solution are the three processes involved in metal ion separation using maintain the position membranes. The greatest driving power for the separation of a target species is provided by a one-step liquid membrane method. The organic liquid immersed in the pores of a microporous support, such as microporous polypropylene hollow fibers, is the liquid membrane phase in SLMs. When the biological liquid comes into touch with the microporous support, it quickly wets the team's pores, forming the SLM. The organic-based SLM is located between two aqueous solutions, the feed solution and the strip solution, for the harvesting of a target species from an aqueous feed solution, where the SLM acts as a semipermeable membrane again for transport of the target organisms from the feed water to the strip solution. The SLM's organic component is immiscible in the water feed and strip streams and consists of an extractant, a diluent (usually an inert organic solvent), and a modifier. Facilitated transport is the method by which the target species moves from the feed solution to the strip solution in SLMs[8].

## 3. *Ceramic membranes:*

The usefulness of Filter medium in the pH range has been addressed before. This claim was made in reference to polymer-based membranes, which have been widely utilized in the application. When compared to organic thermoplastic membranes, ceramic membranes are thought to be superior in terms of fouling resistance. Since of their excellent thermal, mechanical, and chemical durability, zeolite membranes have attracted a lot of interest in this area.

Furthermore, due of their distinctive pore systems, zeolite membranes have a high potential for separating mixtures of molecules through adsorption and molecular sieving. Separation by photovoltaics (PV) and vapor permeation (VP) utilizing ceramic membranes may be a cost-effective and energy-efficient alternative to traditional distillation, especially for azeotrope or close-boiling liquid combinations. Various kinds of supporting polycrystalline zeolite films with minimal inter-crystal holes have been produced on various substrates. Molecular sieving, competitive adsorption, and diffuse are some of the general processes for separation across ceramic membranes. Theoretically, zeolites are appropriate for ion removal from aqueous solutions by RO, according to a molecular dynamic simulation. The simulation showed that utilizing RO via zeolite membranes, 100 percent Na rejection could be accomplished. MFI being

one commercial kind. The size restriction of hydrated ions, which have kinetic sizes ( $0.8e1.0$  nm for  $(Na(H_2O)_x)$ ) considerably greater than the opening of the MFI zeolite membrane, is the separation mechanism of flawless MFI zeolite films (diameter 0.51 nm). In Table 3, the sizes of hydrated ions are listed. The results of simulations and experiments using mesoporous membranes to completely separate ions and dissolved chemical molecules from aqueous solutions revealed that zeolites may be able to separate ions and disintegrated organic compounds simultaneously from aqueous solutions using RO. Another zeolite-based membrane, Zeolite NaA membranes (NaA is the commercial name), was produced by hydrothermal treatment on a porous  $\alpha$ -alumina substrate with subsequent growth crystallization and tested for low-level nuclear solution decontamination using the RO method. More than 99 percent rejection factors were found for ionic solutions of 0.001 M Cs,  $Sr_2$ , and  $MoO_2$ . The hydroxyl sodalite barrier is another example of this kind of membrane. At high temperatures, the performance of this membrane was shown to be better to that of zeolite membranes. In the temperature range 303-473 K and pressure 22 MPa, sodium salt rejection of w99.99 percent was recorded[9].

#### 4. *Distinguishing particular components:*

The radioactive wastes produced by nuclear fuel cycle operations come in a variety of forms. Depending on the kind and amount of radioactivity, as well as the chemical composition and physical condition of the waste, each form of waste needs a unique treatment. High Level Waste (HLW) is one of the most dangerous wastes generated in the nuclear industry, accounting for approximately 99 percent of the overall radioactivity emitted in various waste streams throughout the nuclear fuel cycle. Remanufacturing may recover valuable nuclear elements such as uranium and plutonium (produced by neutron irradiation of  $^{238}U$ ) from spent fuel. The PUREX method, which is built on a solvent extraction approach, is the most popular aqueous cleansing method. As an extractant, it utilizes tri-n-butyl phosphate (TBP) dissolved in a hydrocarbon diluent such n-dodecane. After dissolving the spent fuel in nitric acid, the uranium and plutonium are recovered into TBP and peeled using appropriate strippants. After the recovery of uranium and plutonium, the highly radioactive waste raffinate includes numerous radionuclides as well as large amounts of actinides such as neptunium, americium, and curium, which are poorly recovered in TBP. In addition, this waste solution contains tiny percentages of uranium and plutonium that were not removed throughout the processing. Evaporation concentrates the raffinate, which contains all of these radioactive nuclides, into highly radioactive liquid waste (HLW). This trash contains a wealth of useful radioisotopes that may be separated and purified for specific uses. Membrane technique has been successfully proven for the separation and purification of particular radionuclides, and it has applications in a variety of fields[10].

## CONCLUSION

The information presented in this article suggests that capacitors have a broad use in radioactive waste handling. On an industrial scale, communal element removal has been implemented; nevertheless, the bulk of data on individual element separation comes from experimental size studies. This indicates that additional effort is needed to go from a modal to an actual scale. The use of nanoparticle-encrusted screens in water filtration is becoming more popular. The use of nanoparticles in membrane fabrication provides for more control over fouling as well as the capacity to create desired structure and functions. Both sorption and catalytic degrading

applications have been used with them. There are no studies on these for the purifying of radioactive waste, thus this is an essential new field to research.

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## **AN EMPIRICAL STUDY OF THE INDIAN AUTOMOTIVE INDUSTRY'S EFFECT ON KEY SUCCESS CRITERIA FOR ADOPTING GREEN SUPPLY CHAIN MANAGEMENT TOWARDS SUSTAINABILITY**

**Harish Kumar\***

\* Lecturer,

Department of Mechanical Engineering, Faculty of Engineering,  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: harish.engineering@tmu.ac.in

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### **ABSTRACT**

*The management of 'sustainable' supply chain problems is gaining a lot of interest from academics and business. Organizations that integrate ecological and societal issues into their business strategy have found sustainability to be a major concern. As a result, this article examines the significance of Critical Success Factors (CSFs) in implementing Green Supply Chain Management (GSCM) for long-term sustainability, using the Indian automotive sector as a case study. The suggested framework's predicted connections were put to the test by examining data from 123 Indian automotive companies. Using multiple regression analysis, this research looked at the effects of CSFs to adopt GSCM towards sustainability on existing green practices in the Indian automotive sector and anticipated organizational performance results. According to the findings, the 'Regulatory' CSF is the one that plays the most important role in promoting green practices. The CSFs 'Internal Management' and 'Competitiveness' are critical in achieving anticipated performance results. The current study will help practitioners and managers better understand various GSCM implementation issues and improve their practices and performance in the direction of long-term sustainability.*

**KEYWORDS:** *Critical Success Factors (CSFs), Descriptive Statistics, Empirical Investigation, Green Supply Chain Management (GSCM), Multiple Linear Regression Analysis, Questionnaire based Survey.*

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### **1. INTRODUCTION**

Organizations are working hard to improve their sustainability through various strategies such as environmental management systems, lean, agile, resilient, green and world-class manufacturing, eco-effectiveness, and competency in today's competitive environment (Cabral et al., 2012; Gunasegaram and Spalanzani, 2012; Haleem et al., 2012; Hsu et al., 2013; Seuring, MANU, 2013). In recent years, changing financial, regulatory, and competitive pressures, as well as increasing customer demands and complex environmental regulations, have heightened interest in sustainable supply chains and reverse logistics activities within them (Jain, 2012; Jindal and Sangwan, 2013; Diabat et al., 2014; Shaharudin et al., 2015). Organizations are increasingly under pressure to decrease emissions across the supply chain as environmental awareness grows throughout the globe (Kumar et al., 2014a). To get a competitive advantage over others, they must carefully consider combining their manufacturing and service sector business processes

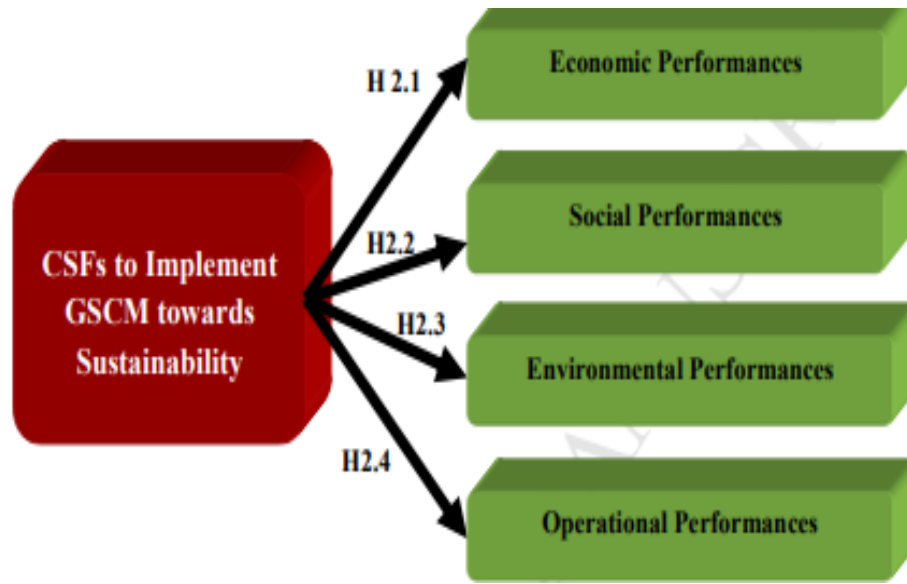
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with sustainability and reducing supply chain costs (Seuring and Müller, 2008; Gunasekaran and Spalanzani, 2012).

With growing concerns about environmental issues, Green Supply Chain Management (GSCM) issues have piqued the interest of a large number of academicians and SC practitioners around the world in recent years (Mudgal et al., 2009; Luthra et al., 2011; Mishra et al., 2012; de Sousa Jabbour et al., 2013; Luthra et al., 2013; Mangla et al., 2013). GSCM has been identified as a critical component in promoting organizational sustainability (Sarkis et al., 2011; Rath, 2013). As environmental problems worsen, it has become a long-standing community concern in developed countries and has recently reawakened the green/sustainable movement in developing countries (Chen and Chai, 2010; Govindan et al., 2013; Jay ram and Avittathur, 2014; Kumar et al., 2014b; Neves et al., 2014; Luthra and Haleem, 2015; Tyagi et al., 2015). In the past several years, GSCM research has sparked widespread interest throughout the world, including in India (Mohanty and Prakash, 2014; Mangla et al., 2014b; Luthra et al., 2015a). In India, the automotive industry is one of the most important employment generators. Furthermore, the Indian automotive industry is engaged in the business in one or more ways, accounting for approximately 22% of the country's manufacturing GDP (GDP). India is also the world's seventh-largest car producer, and by 2015, it is expected to become the fourth-largest automotive market by volume (<http://www.ibef.org>) [1]. Due to competitive, governmental, and community pressures, the Indian automotive industry has begun to recognize the significance of GSCM (Luthra et al., 2014a) [2].

Although a number of studies exist in the literature to measure the impacts of GSCM practices on expected performance outcomes (Zhu et al., 2007a, 2007b; Azevedo et al., 2011; Eltayeb et al., 2011; Yusuf et al., 2013; Zhu et al., 2013; Grimm et al., 2014; Mitra and Date, 2014; Mohanty and in the age of globalization, Indian businesses are under more pressure to discover ways to improve profitability and long-term viability in today's market (Sundharam et al., 2013; Govindan et al., 2016b). It is difficult for businesses to be sustainable while retaining their competitive advantage, resulting in economic advantages and environmentally pleasant surroundings (Wu et al., 2015). There has been many research that have found sustainability patterns in industrialized nations, but there have been few studies in developing economies like India (Jayaram and Avittathur, 2014). From an Indian viewpoint, there is little information on the implementation of GSCM/SSCM procedures (Mitra and Datta, 2014; Gandhi et al., 2016). As a result, it is necessary to understand the effects of CSFs on green practices and anticipated results in order to apply GSCM towards sustainability in the Indian automotive industry. Figure 1 discloses the impacts of CSFs to implement GSCM towards sustainability on expected performance outcomes [3].





**Figure 1: The impacts of CSFs to implement GSCM towards sustainability on expected performance outcomes.**

## 2. DISCUSSION

For GSCM techniques to be implemented, management of the internal environment, including commitment and support from top and middle level managers, may be required (Zhu et al., 2005). One of the most important CSFs for businesses to adopt GSCM processes is internal management. Changes/increases in adoption of environmental practices and implementation level may be influenced by pressure from existing employees, leadership and support from environmentally motivated top management, and perceptions of environmental risks (Holt and Ghobadian, 2009; Hu and Hsu, 2010; Yusuf et al., 2013).

### 2.1.2 Customer service

Kumar et al., 2013; Kumar et al., 2014b) believe that customers may play an important and significant role in greening supply chains. In reality, emerging nations like India have been under a lot of pressure to adopt green supply chain techniques in order to meet their consumers' growing demands and compete in the market (Xu et al., 2013; Omkareshwar, 2013). To realize GSCM advantages, customer participation becomes critical (Zhu et al., 2007a).

### 2.1.3 Regulatory

As environmental concerns have grown in significance throughout the world, regulatory and other government agencies have been compelled to develop tougher rules (Jayaram and Avittathur, 2014). Organizations are obliged to reduce the negative effects of their supply chains on the environment in order to make it green, and regulatory agencies have been drafting tough environmental laws to limit environmental harm (Mathiyazhagan et al., 2013; Mangla et al., 2014a; Mathiyazhagan et al., 2014). Since, conformity with regulations is becoming increasingly important for conducting proactive ecological strategies and necessary to achieve environmental performances (Ageron et al., 2012; Lin, 2013; Brandenburg et al., 2014), industry must maintain competitiveness while also complying with regulatory requirements (Tseng and Chiu, 2013).

## *2.1.4 Managing Suppliers*

Suppliers and consumers must be actively involved in GSCM processes (Hu and Hsu, 2006; Srivastava, 2007; Hu and Hsu, 2010; Testa and Iraldo, 2010; Awasthi and Kannan, 2016). Regular interactions with vendors' staff, green partnership agreements, and openness in adopting innovative practices may lead to improvements in environmental and business performance toward each other (Kaushik et al., 2014). (Iraldo et al., 2009) [4].

## *2.1.5 Social Issues*

Sarkis et al., 2011; Zhu et al., 2012; Gunasekaran et al., 2013; Ketikidis et al., 2013; Wang and Sarkis, 2013; Yusuf et al., 2013) showed the significance of social aspects in attaining green/sustainable supply chain practices. Organizations must provide full information about their activities' impact on society to the public as public knowledge and concern about environmental problems grows (Hughey and Sulkowski, 2012; Shen et al., 2015). NGO groups may be successful in putting pressure on businesses to accomplish social goals (Yusuf et al., 2013).

## *2.1.6 The ability to compete*

Kagan et al., 2003; Zhu and Sarkis, 2007; Mudgal et al., 2009; Kim and Rhee, 2012; Toke, 2012; Wang and Sarkis, 2013) have all shown that competition and related variables may play a bigger role in GSCM/SSCM implementation. Competitiveness has been shown to enhance GSCM practices more than governmental laws or a company's desire to preserve the environment (Yusuf et al., 2013). Additional voluntary and competitive factors may have influenced the adoption of sustainable SCM methods (Wang and Sarkis, 2013).

## *2.2 Environmentally friendly methods*

Literature has identified and described six green practices (Green Design, Green Purchasing, Green Production, Green Management, Green Marketing, and Green Logistics Practices) for achieving environmental sustainability. In their study, Büyüközkan and İfçi (2012) claimed that green design approaches may decrease approximately 80% of product and process-related environmental effects. Sarkis, 1998; Beamon, 1999; Gungor and Gupta, 1999; Parikka-Alhola, 2008; Eltayeb et al., 2011) utilize green design techniques to minimize the environmental effect of goods throughout their useful life. Many ideas, such as green raw materials, cleaner technological processes, and reverse logistics techniques, are included into green product and process design (Hasan, 2013) [5].

### *2.2.2 Environmentally friendly buying methods*

Buying products that have desirable environmental characteristics such as recyclability, reusability, and the absence of hazardous materials (Handfield et al., 2002; Rao, 2002, 2004; Hu and Hsu, 2010; Eltayeb et al., 2011) are examples of green purchasing practices. Environmental concerns have prompted buying experts to rethink their purchasing strategy and position in the supply chain network (Min and Galle, 2001; Handfield et al., 2002; Hu and Hsu, 2010; Govindan et al., 2015d).

### *2.2.3 Environmentally friendly manufacturing methods*

Green manufacturing techniques are the use of environmentally and socially responsible methods to reduce the negative effects of industrial operations while still achieving economic advantages (Baines et al., 2012; Govindan et al., 2015b). GSCM production methods and associated

concepts assist a company in achieving profit and improving process efficiency (Zhu and Sakis, 2006; Chien and Shih, 2007; Mangla et al., 2014b; Zailani et al., 2015). Green manufacturing methods enhance suppliers' and manufacturers' worldwide competitiveness in the automotive sector (Gunasekaran and Spalanzani, 2012; Tseng, 2013; Canils et al., 2013; Subramanian and Gunasekaran, 2014). The biasness of convenience sampling was evaluated by splitting 123 answers from Indian automotive companies into two groups: convenience sampling (44.71 percent) and late responses from random sampling (25.71 percent) (55.29 percent). The responses obtained from these subgroups are as follows:

“Early respondents” are those who responded before the first reminder was sent (i.e., within 6 weeks of the initial mailing), while “late respondents” are those who responded after that. The Chi-square test was performed to see whether there were any significant variations in answers between early and late respondents for the nine variables of respondents and businesses studied. [6]there are no significant variations in the answers of early and late responders across all categories of respondents and businesses. As a result, on-response bias is not a [7] problem in this research, and the whole data set of 123 answers obtained [8] from Indian automotive companies may be used to assess the suggested propositions. The two most essential properties of any measuring method are reliability and validity. Descriptive statistics are critical for understanding current trends in variables and using GSCM effectively. Multiple regression analysis is used to forecast changes in the dependent variable (actual GSCM practices, anticipated performance results) as a result of changes in the independent factors (CSFs to implement GSCM towards sustainability). All factor loadings in our research are considerably over 0.5. Due to low factor loading, one of the twenty-six variables, "Efficient strategic planning," was removed from the EFA findings. The other 25 variables were divided into six CSFs (internal management, customer management, regulations, supplier management, social and competitiveness) in order to apply GSCM in the Indian automotive sector, which accounted for 67.893 percent of the total variation. Similarly, by implementing GSCM to achieve sustainability in the Indian automobile industry, sixteen expected organizational performance outcomes were extracted into four categories of expected performances (Economic, Social, Environmental, and Operational), accounting for 73.91 percent of the total variance (Luthra et al., 2015b). Furthermore, the key items selected in this study have been subjected to reliability, validity analysis, and descriptive statistics [9].

### 3. CONCLUSION

Environmental and sustainability problems have become significant concerns for governments, international organizations, and corporate groups in recent years. As a result, corporate organizations are battling to become more sustainable. The automobile business is one of India's most important industries. As a result, using the Indian automotive sector as a case study, an effort has been made to objectively evaluate the effect of CSFs to adopt GSCM towards sustainability on current green practices and anticipated organizational performance results. Using extensive research, six CSFs (25 components), six green practices (37 sub practices), and four anticipated performance outcomes (sixteen performances by adopting GSCM practices) were found. To identify the significance of CSFs in implementing GSCM practices, the current state of green practices, and the importance of anticipated performance results, a questionnaire-based survey was performed. The significance of different constructs utilized in this research was explained using descriptive statistics. The identification of critical success criteria for implementing GSCM, green practices, and significant organizational anticipated performance

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results by its implementation is based on empirical study of collected data. According to empirical findings, the majority of green practices in the Indian automotive sector are in the early stages of implementation, i.e., the implementation plan is in the works or the practice has just been adopted. Internal management and competitiveness CSFs have been critical in achieving anticipated performance results and ensuring sustainability [10].

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## HOSPITAL WASTE MANAGEMENT: A MINI REVIEW

**Mohit Rastogi\***

\*Assistant Professor,

Department of Marketing, Faculty of Commerce, Management & law,

Teerthanker Mahaveer Institute of Management and Technology,

Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: mohit.management@tmu.ac.in

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### ABSTRACT

*Various types of hazardous wastes may be generated as a result of health-care operations. Mismanagement of these wastes may put the environment and workers' health at jeopardy. When it comes to the proper management of hospital wastes, developing nations are limited by resources. The major problems in hospital waste management in developing nations are summarized in this research. According to a study of the literature, rules and legislation focused on hospital waste management are relatively new in many of these nations. The way these regulations are implemented differs from one hospital to the next. Furthermore, trash production rates vary greatly both inside and between these nations. This is mostly due to a lack of consensus among academics on terminology and methods for measuring such wastes. Furthermore, inadequate waste segregation, collection, storage, transportation, and disposal procedures plague hospitals in many nations, posing occupational and environmental hazards. In the lack of training for hospital personnel, knowledge and awareness of appropriate waste management remain low. Furthermore, sanitary personnel and scavengers working in hospitals are not provided with safety equipment or vaccination. Illegal recycling of non-segregated trash poses additional safety concerns. In general, medical waste management in poor nations is fraught with difficulties. Sustainable waste management techniques may help to mitigate the negative consequences of hospital waste.*

**KEYWORDS:** *Infectious waste, Clinical Waste, Medical Waste, Waste Generation, Sustainable Development.*

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### INTRODUCTION

Today, there is a rising recognition throughout the globe that trash is a resource that should not be discarded and dumped in landfills. Studies on trash treatment and recycling methods and processes abound in the literature. However, certain wastes are deemed too dangerous to be recycled or reused without first being pre-treated. One kind of trash is infectious healthcare waste. According to the World Health Organization (WHO), about 75 percent to 90 percent of waste produced in healthcare institutions is non-hazardous; nevertheless, the remaining 10–25 percent cannot be overlooked. This may include things that are contagious, radioactive, poisonous, or genotoxic. These waste materials are hazardous to the environment and to workers' health[1]. Due to a rise in population, the number of healthcare facilities, and the usage of disposable medical goods, the production of hospital trash has grown considerably in recent

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years. Many industrialized nations have stringent regulations in place for the segregation, storage, and transportation of medical waste[2]. When it comes to efficient hospital waste management (HWM), developing nations are reported to be resource limited.

Hospital waste management is a critical activity that must be handled carefully. Hazardous waste management requires specialized knowledge and laws, and it must be carried out by experts in the area[3]. Large amounts of trash are transported to dumpsites. Waste from wealthy countries, on the other hand, is mostly disposed of in developing countries. Untreated residents pay a financial price for garbage on the sides of the road and on empty areas. It also pollutes the environment in the area. Hazardous pollution levels are growing, causing changes in the ecosystem and increasing the cost of garbage in terms of health concerns, as well as having a negative impact on infrastructure. Authorities' perspectives have changed on it[4].

Despite being a relatively new problem, waste management has attracted the attention of governments all over the globe. Management of waste nowadays refers to the collecting, sorting, processing, recycling, and reuse of things that would otherwise be thrown away[5]. This article examines strategies for managing medical waste using five case study hospitals as examples. The Waste Management Rules 2005, which were adopted under the Pakistani government's Environment Protection Act, established the criteria (1997). Until recently, medical waste management was not considered a concern. In the 1980s and 1990s, concerns about human immunodeficiency virus (HIV) and hepatitis B virus (HBV) infection spurred investigations into the hazards of medical waste. Hospital waste generation has become a major concern due to its many consequences as a risk factor for the health of patients, hospital staff, and the general public[6].

Hospital waste management refers to the treatment of garbage generated by hospitals with the goal of preventing disease transmission. Hospital waste management, including segregation, collection, storage, transportation, and disposal, is not well understood in poor nations. According to studies, approximately 2.0 kilogramme of trash is generated per bed every day in Pakistan, with 0.1-0.5 kg classified as hazardous waste[7]. Hospital waste management is a significant issue in the majority of nations. With the introduction of reusable needles, syringes, and other similar products in recent years, medical waste disposal has become even more problematic. Hospital wastes are divided into various groups based on their weight density and contents. Medical waste is divided into five categories by the World Health Organization: contagious, sharp objects, pathology, pharmacological, and radioactivity[8].

Human tissues and body parts, animal corpses, syringes, knives, saws, medicines, vomits, urine, chemicals, and laboratory fluid are all examples of infectious waste. HIV/AIDS, hepatitis B, and C virus infections are all caused by infectious health-care waste. Injuries from needles and sharp items contaminated with human blood are the most common way for these viruses to spread[9]. Human tissues and body parts, animal corpses, syringes, knives, saws, medicines, vomits, urine, chemicals, and laboratory fluid are just a few examples of infectious waste. Infectious health-care waste is a leading source of HIV/AIDS, hepatitis B, and C[10]. Injuries from needles and sharp items contaminated with human blood are the most common routes of transmission for these viruses. The degree of sensitization of health managers and other professionals, as well as existing local laws and available resources, all influence healthcare waste management in any nation. Despite the presence of the Pakistan Biosafety Rules 2005, neither adequate hospital waste management systems nor the relevant health experts and

managers are aware of the severity of the problem that has resulted. The entire amount of trash produced by health institutions is typically disposed of alongside municipal rubbish or burnt outside, posing environmental risks. The aspect of waste segregation followed by suitable disposal techniques for different parts of the trash is virtually non-existent, and waste storage before disposal is typically open.

According to studies in Pakistan, about 2.0 kg of trash is generated per bed each day, of which 0.1-0.5 kg is classified as hazardous waste. Various health outlets create about 4 to 2,000 Kg of trash each day, of which 75 percent to 90 percent is non-risk waste produced by health care premises, housekeeping, and administrative activities, and only 10-25 percent is infectious and requires more cautious disposal. Furthermore, failing to properly dispose of spent syringes, blades, and other medical devices results in their reuse, increasing the risk of disease transmission. In Pakistan, landfills and incinerator are the most common ways for disposing of medical waste. Hospital trash is buried underground in the landfill technique, but according to health specialists, not a single landfill is built on scientific lines. When clinic waste is burned, toxic gases like dioxin and chemicals are released into the air, which can be a potential carcinogen. Crematoriums installed in various locations also lack proper filters and scrubbers, and when clinic waste is burned, toxic gases like dioxin and chemicals are released into the air, which can be a potential carcinogen. Only a few hospitals have incinerators that are up to code. Medical trash should be separated from solid garbage and kept in specific containers, according to health experts. Proper landfills should be built, and any landfills without screens or scrubbers should be closed down promptly.

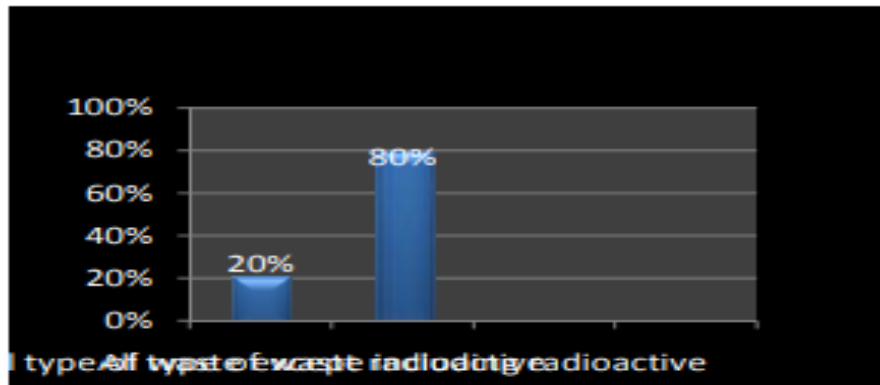
## **MATERIALS AND METHODS**

At July 2010, a cross-sectional research was performed in five hospitals in Lahore: Children's hospital, Sheikh Sayed hospital, Shakta Khanum hospital, Main Mushy hospital, and Shalamar hospital. This research is based on an assessment of existing medical waste information, including its nature, effects, and management methods. Considering the infrastructure requirements for hospital waste management as well as compliance with Pakistan's HWM Rules 2005. For all 5 hospitals, storage and segregation methods at the ward/department level, internal and external transportation, and on-site ultimate disposal / off-site disposal were investigated. A literature study and an internet search were used to gather information. Following a thorough review of the literature, a questionnaire was created to gather information on the disposal of biological waste produced in hospitals. The hospitals were visited, and the institutions' administrations were questioned, in order to get a thorough understanding of their waste management policies & staff training. They were informed about the research and verbal permission was acquired. The estimate of simple percentage was the statistical method utilized to analyze the obtained data.

## **OBSERVATIONS AND RESULTS**

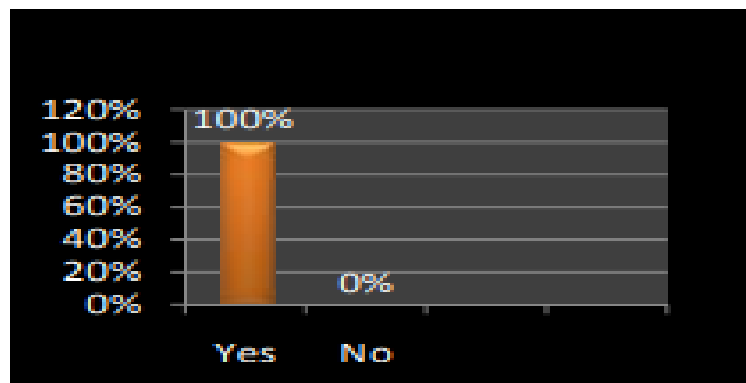
Convenient sampling was used to perform a cross-sectional research at five teaching hospitals in Lahore. Hospitals from both the public and private sectors were included in the study. The existence or lack of waste management techniques was observed in the hospitals. The administrators of the institutions were interviewed in order to get a better understanding of their waste management policies and staff training. Percentages were used to evaluate the data gathered from the questionnaire. Figure 1 depicts the many kinds of waste generated in hospitals,

including radioactive waste. This demonstrated the need of appropriate waste disposal in all hospitals.



**Figure 1. Type of waste material in hospital**

Figure 1 illustrates the many kinds of waste generated in hospitals, including radioactive waste. As a result, all hospitals must have appropriate waste disposal.



**Figure 2. Is there segregation of waste?**

In ordinary medical practice in poor nations, such as Pakistan, overuse of injections is prevalent. The person in charge must cut or break any disposal medical equipment and supplies, such as syringes, needles, plastic bottles, drips, and infusion bags, and make them non-reusable at the point of use. In 60% of hospital, a needle cutter is utilized.

## CONCLUSION

Pharmaceutical waste must be properly collected and separated. Medical waste management methods and their effect on public health and the environment are not well understood. Medical waste removal and management are also insufficiently practiced. However, there is a need to raise awareness about medical waste and the problems that surround it. An in-depth examination of current waste management methods in public and private hospitals. Creating appropriate training programs for hospital employees and health professionals. Hospital waste management initiatives are being monitored and evaluated. The necessity for health-care waste management planning in order to make it easier to put in place the required steps to address the current situation. Pharmacists play an important role in this field. "If we sell it, we're also responsible for collecting and disposing of it," one pharmacist said. Pharmacists' responsibilities include the



following. Creating a disposal procedure, potentially in collaboration with associations, manufacturers, and hospital management. Creating a program for the return and disposal of unwanted medications, which involves encouraging patients to return their medications to the pharmacy, Patients' expired, discontinued, and unused medications are collected. Calculation and recording of waste volume, as well as the rationale/causes/sources of waste, and use of this data to justify the necessity for waste reduction initiatives and obtain or retain sponsorship.

## DISCUSSION

In many poor nations across the globe, HWM is a significant issue. HWM flaws may put all stakeholders in such societies at danger of health, safety, and the ecosystem. A thorough evaluation of their existing HWM methods in resource-constrained nations is required to address the problem. This may aid in the identification of gaps and the prioritization of available alternatives. These choices may be standardized and then utilized for monitoring and assessment in the future. This is a particularly pressing problem in underdeveloped nations. The bulk of these nations are in Asia, Africa, and Latin America, and their urbanization and population growth rates are typically high (2010–2014). In Pakistan, for example, 35 percent of the population lives in cities, and this number is expected to increase to almost half of the population within a decade. Cities in the developing countries lack the capacity needed to fulfill the demands of growing urbanization. Despite these obstacles, the government in these nations has not given public healthcare the attention it deserves. As a result, many critical healthcare actions go unnoticed. One of these activities is the safe handling of healthcare waste. Despite the fact that healthcare waste is controlled by law in many nations, the practical execution of these regulations is dubious. In these nations, the number of studies that measure hospital waste by categories and assess compliance with laws is inadequate. Members of disadvantaged minorities make up the majority of sanitary and housekeeping personnel in hospitals.

In the lack of training for hospital personnel, knowledge and awareness of appropriate waste management remain low. As a result, appropriate segregation protocols are rarely followed, and medical waste often ends up in landfills or open dumping grounds alongside household trash. People who live near these locations are exposed to public health hazards as a result of this. In certain cases, this trash is burnt without even any safeguards in place, posing environmental and occupational hazards. Furthermore, sanitary staff at hospitals and waste pickers in landfills labor without being immunized or wearing protective gear. This puts children at risk of infection and injury from needles and sharps. Near garbage dumps, stray animals and drug users are also prevalent, posing additional epidemiological hazards. The media has reported on the illegal selling of medical waste for recycling and reuse. These materials are used into toys and drinking straws. Laboratory liquid and chemical wastes are often discharged into public sewers without ever being treated. During floods and monsoons, clogged drains expose the population to additional health risks.

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## AN OVERVIEW ON DIAGNOSIS AND SURGICAL MANAGEMENT OF GALLBLADDER CANCER

Dr Alok Singhal\*

\*Professor,

Department of General Medicine, Faculty of Medicine,  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: dralok27@redifmail.com

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### ABSTRACT

*Gallbladder cancer is among the most deadly cancers, and it continues to present surgeons with numerous challenges. Cholelithiasis, an abnormal pancreaticobiliary junction, and focal mucosal micro calcifications are all known risk factors for gallbladder carcinoma. The most common histologic type in most patients is adenocarcinoma, which is frequently associated with Kras and p53 mutations. Endoscopic ultrasonography, magnetic resonance cholangiopancreatography, as well as helical computed tomography, as well as radiologic or endoscopic improvements in endoscopic ultrasonography as well as magnetic resonance cholangiopancreatography, have improved preoperative staging. Cholecystectomy (subsegmental surgical excision of segments IVB but instead V plus a hepatoduodenal ligament lymphadenectomy) for advanced disease without indications of distant metastasis (T2-4/N0-N2) or a radical cholecystectomy (subsegmental resection of segments IVB as well as V plus a hepatoduodenal musculotendinous lymphadenectomy) for severe stages without indications of distant metastasis. More extensive hepatic resection, such as extended right hepatectomy or central segmentectomy with caudate lobectomy, has been recommended by certain surgeons. Patients who underwent a pancreaticoduodenectomy to enhance distal ductal margins as well as lymphadenectomy for T3 or T4 malignancies were studied by Japanese surgeons. These patients had a reduced incidence of tumor recurrence but no benefit in terms of survival. Adjuvant treatment options are still restricted. The most frequent postoperative treatment is radiation therapy with fluorouracil radio sensitization. Capecitabine, oxaliplatin, & bevacizumab are now being studied in the treatment of gallbladder cancer in clinical studies.*

**KEYWORDS:** Biliary, Cancer, Cholecystectomy, Endoscopic, Gallbladder.

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### 1. INTRODUCTION

Gallbladder cancer (GBC), the most frequent malignant tumor of the biliary system and the sixth most common gastrointestinal cancer, is a rare and extremely deadly illness. In the United States in 2005, it was projected that 7,480 instances of biliary tract cancer, the majority of which sprang from the gallbladder, were identified, with 3,340 people expected to die from the illness. GBC usually appears at an advanced stage in most patients, typically at the time of cholecystectomy for suspected chronic cholecystitis. GBC presents a challenge to both clinicians and surgeons in terms of improving results[1].

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### *1.1.GBC affects*

Women more often than men in all populations, with prevalence's three to five times greater for females in certain studies.<sup>4</sup> Gallstones are more common in women over 65 who have a lengthy history of gallstones. GBC has a global geographic distribution that corresponds with the incidence of gallstone disease, according to our experience at Mayo Clinic Rochester. Bolivia has the greatest frequency of GBC in the world, although it is also found in Chile, Northern India, or Central Europe. The incidence of GBC varies by ethnic group in the United States, with Native Americans as well as Mexican Americans having the greatest rates. With a frequency of 1/100,000, African Americans have the lowest rate of GBC[2].

### *1.2.Pathogenesis and Risk Factors:*

The pathophysiology of GBC is poorly understood, and the illness is presently thought to have a complex origin. Obesity, a high fat and carbohydrate diet, numerous pregnancies, and the use of estrogens are all linked to an increased risk of gallstone disease. The most well-known risk factor for GBC is cholelithiasis. Chile, which has the highest GBC mortality rate in the world, also has one of the highest rates of cholelithiasis. Gallstones affect the overwhelming majority of individuals with gallbladder neoplasms. Patients with gallstones have a four to five times greater risk of GBC than those who are acalculous.

In a survey of 2,583 Rochester, Minnesota residents with cholelithiasis, researchers discovered a threefold increase among the incidence of GBC in males with stones. Surprisingly, women's risk was not raised. The mechanism that causes cholelithiasis to predispose to GBC is unknown. Gallbladder neoplasia has been linked to a big stone size and the length of time that gallstone symptoms have been present. In other investigations, the risk of GBC was related to the size of the stones. Because gall bladder size is linked to the age of the calculus, the length of time the stone has indeed been present in the pathogenesis of GBC is likely the most important component. Gallstones may cause chronic inflammation of the gallbladder mucosa, which can lead to malignant transformation in the form of atypia, dysplasia, carcinoma in situ, and ultimately invasive cancer. The p53 gene mutations may play a significant role in this chain of events[3].

The majority of asymptomatic gallbladder polyps are benign lesions that do not develop to malignancy. Neoplastic polyps are a risk factor for GBC because they may contain carcinoma foci. Polyp diameter larger than 10 mm, patient aging greater than 50 years, existence of gallstones, solitary polyps, and symptomatic polyps are all linked with an increased risk of cancer. Polyps greater than 10 mm should be treated by cholecystectomy, while polyps less than 10 mm may be monitored with serial ultrasonography in individuals without additional risk factors. Xantho granulomatous cholecystitis, persistent typhoid infection, gallbladder adenomyomas, as well as inflammatory bowel illness are all linked to an elevated incidence of GBC[4].

### *1.3. Pathology:*

In the literature, the dysplasia–carcinoma sequence for GBC has been suggested. In most specimens with invasive GBC, black revealed regions of cancer in situ. <sup>29</sup> It is predicted that it will take 10 to 15 years to develop from dysplasia to cancer. <sup>30</sup> GBC is characterized by a background of persistent mucosal inflammation rather than adenomatous polyps. The common

incidence of an adenoma–carcinoma sequence, as observed in colon cancer, has yet to be validated in GBC[5].

Papillary carcinomas develop into the gallbladder's lumen are much less aggressive. They are less likely to infiltrate the liver and become less likely to spread to lymph nodes. The gallbladder may be the location of distant metastasis from other cancers, with lung or melanoma being the most frequent. Studies looking at the molecular changes in GBC have shown that p53 and K-ras mutations are common. The frequency of GBC with p53 mutations has been found to vary from 35 to 92 percent. GBC has been linked to K-ras and p53 mutations in AJPBD patients, indicating that pancreatic juice reflux may contribute to a carcinogenic environment. 36 The identification of a K-ras mutation may be helpful in the early diagnosis of GBC in patients with AJPBD[6].

#### *1.4. Clinical Significance:*

The delayed clinical manifestations of GBC in most patients, owing to a lack of specific symptoms as well as low clinical suspicion, is a major obstacle to improving GBC outcomes. So because symptoms of GBC are often vague, at least 20% of patients are identified with biliary colic and cholelithiasis after cholecystectomy for biliary colic and cholelithiasis. The most frequent symptom of GBC is abdominal discomfort (73%) followed by nausea and vomiting (43%), jaundice (37%), anorexia (35%), as well as weight loss (35%). (35 percent ). Ascites, a palpable tumor, and constitutional symptoms are all signs of advanced illness with a dismal prognosis. Duodenal blockage, gastrointestinal bleeding, or hematemesis owing to invasion of neighboring intestines or arteries are less frequent presentations[7].

#### *1.5. Staging:*

Because the degree of penetration through the gallbladder wall and the amount of lymph node metastases determine surgical treatment and correlate with prognosis, GBC staging is an important part of the complete management and reporting of this tumor. GBC is also divided into grades according on the degree of differentiation, with grade 1 being the most differentiated and grade 10 being the least differentiated. The most frequent malignancies are those of grade 3. GBC grading has no bearing on prognosis. GBC has a number of different staging categories. Newer categorization methods have superseded the Nevin–Moran classification system, which was first published in 1976 and was widely used in the past[8].

The Japanese Biliary Surgeons Society staging system, the customized Nevin–Moran classification, the TNM system developed by the International Union Against Cancer as well as the American Joint Committee on Cancer (AJCC), and the TNM system developed by the International Union Against Cancer as well as the American Joint Committee on Cancer (AJCC), and also the TNM system developed by the International Confederation Against Cancer and the American Working Group on Cancer (AJCC), and the TNM system developed by the International Union Against Cancer as well as the American Joint Committee on While there is still debate over whether method is better for predicting survival, the TNM system is the most often utilized[9].

#### *1.6. Surgical Intervention:*

The aim of GBC treatment is to achieve a R0 resection. Only a third of patients are surgical candidates due to their advanced stage upon presentation. The liver parenchyma, hepatoduodenal ligament structures, and surrounding organs are the primary targets of GBC (duodenum, transverse colon, stomach, and small bowel). The patient is not suitable for surgical resection if

preoperative imaging shows hepatic metastases, encasement of the main portal vein or appropriate hepatic artery, or extensive celiac or para-aortic lymphadenopathy. Because of the high incidence of undetected metastatic GBC, staging laparoscopy should be done regularly before to celiotomy.

If laparoscopy reveals metastatic illness, tissue biopsy may be used to prevent a nontherapeutic laparotomy. Gross vascular invasion including encasement of major vessels (T4), ascites, widespread hepatic participation, distant metastases, as well as poor functional status are all contraindications to surgical removal. Despite these dismal statistics, surgical resection remains the sole chance for a cure. Only 38% of GBC patients treated in their hospital during the past 20 years were suitable for resection, according to Ito and colleagues. In comparison to 13 percent, the group that had full resection (all phases considered) rather than palliative surgery had a better overall survival rate. 59 Patients who did not have surgery had a 0% 5-year survival rate, according to the same study

#### *1.7. GBC and PD:*

When it comes to GBC surgical treatment, western doctors are often less aggressive than their Japanese colleagues. The usage of PD for GBC is one such example. The possibility of performing a PD for certain T3 and T4 GBCs has been documented in many Japanese research. Infiltration of malignancy into the pancreatic head and metastasis to peri-pancreatic lymph nodes are the most frequent reasons for PD. Araida's series of PD (n=93) for GBC was the biggest. 75 T2–T4 lesions were seen in all PD patients.

If there was no hepatoduodenal ligament invasion or microscopic lymph node metastases, there was no survival advantage for individuals who had extensive (N2, N3) lymphadenectomy alone. Patients with PD who had microscopic lymph node metastases, on the other hand, had a reduced recurrence rate. According to this research, PD may assist a small group of patients, but for the vast majority of GBC patients, a complete lymph node excision of the N1 and N2 nodes will be more beneficial for long-term survival and lower recurrence rates.

#### *1.8. Treatment for Palliative Care:*

Palliative treatments may be considered if the patient's GBC is determined to be unresectable after surgical investigation. Biliary blockage affects more than 60% of individuals with GBC. The treatment is personalized, although in certain individuals, a Roux-en-Y hepaticojejunostomy at the proximal common hepatic duct or hilum may be necessary. Gastric blockage occurs in about half of all GBC patients who also have biliary obstruction. In this patient group, a gastrojejunostomy is often done to relieve or prevent this disease. In patients with low functional status, short life expectancy, or severe comorbidities, nonoperative alternatives such as percutaneous or endoscopic end biliary stents, as well as endoscopic enteric stenting as well as feeding tubes, may be utilized.

In this patient group, no controlled studies have evaluated the use of stents vs surgical bypass. Patients who were palliated with a biliary-enteric bypass had fewer septic sequelae than those who were palliated with a biliary stent, according to a tiny research published around ten years ago. Given the significant morbidity associated with stents, it is preferable to conduct a biliary enteric bypass on patients who are determined to have locally advanced, unresectable illness during abdominal exploration. Nonoperative treatment of biliary and intestinal blockage

generally offers a superior method of palliation for patients with metastatic illness who have a short life expectancy[10].

*1.9. Adjuvant Therapy is a kind of treatment that is used to help:*

For GBC, no pharmacological treatment has been shown to be effective. Fluorouracil has traditionally been included in adjuvant chemotherapy regimens. External beam radiation is often employed in fluorouracil chemo sensitization, although there is little evidence to back up its effectiveness. Over a 12-year period, Mayo Clinic gave adjuvant radiation (54 Gy) with concomitant 5-fluorouracil (5-FU) to 21 consecutive patients. The overall 5-year survival rate was 33%, with stage I–III illness having a 65 percent 5-year survival rate and stage IV disease having a 0% 5-year survival rate. Patients with large residual disease (R2), micro residual tumor (R1), and no residual disease (R0) had median survivals of 0.6, 1.4, &5.1 years, respectively. This research found that the survival rate was higher than that of historical controls.

## **2. DISCUSSION**

Gallbladder cancer is one of the most lethal tumors, and it continues to provide a number of challenges for surgeons. Gallbladder cancer is linked to cholelithiasis, an aberrant pancreaticobiliary junction, and localized mucosal microcalcifications. Adenocarcinoma is the most frequent histologic type in most people, and it's commonly related to Kras and p53 mutations. Preoperative staging has improved thanks to advances in endoscopic ultrasonography, magnetic resonance cholangiopancreatography, including helical computed tomography, as well as radiologic and endoscopic advancements in endoscopic ultrasonography and magnetic resonance cholangiopancreatography.

Cholecystectomy (subsegmental resection of segments IVB and V plus a hepatoduodenal ligament lymphadenectomy) or radical cholecystectomy (subsegmental surgical excision of sections IVB as well as V plus an effective and efficient ligament lymphadenectomy) for advanced disease without signs of distant metastasis (T2-4/N0-N2) If a Tis or T1 tumor is discovered by chance, a GBC has the best chance of being healed. A simple cholecystectomy is all that is required to treat these cancers. More advanced GBC has a poor prognosis, although evidence that extensive radical surgical therapy, most often radical cholecystectomy and regional lymphadenectomy, may improve results. With increased suspicion and rigorous surgical resection, survival rates for those with minimal GBC should improve. Because the preponderance of GBC patients have visible or concealed metastases, they will not be treated until and until new systemic medications improve the results seen with current therapies.

## **3. CONCLUSION**

A GBC has the greatest chance of being cured if a Tis or T1 tumor is found by accident. For these malignancies, a simple cholecystectomy is sufficient treatment. The prognosis for more advanced GBC is generally bleak, although intensive radical surgical treatment, most frequently radical cholecystectomy as well as regional lymphadenectomy, has been shown to improve outcomes. Survival results for individuals with limited GBC should improve with greater suspicion and aggressive surgical resection. Because the majority of GBC patients have visible or hidden metastases, they will not be treated until novel systemic medicines improve the outcomes observed with existing treatments.

Certain surgeons have advocated for more extreme hepatic resections, such as an extended right hepatectomy or a central segmentectomy with caudate lobectomy. Japanese surgeons looked at

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patients who had a pancreaticoduodenectomy to improve distal ductal margins after lymphadenectomy for T3 or T4 cancers. These individuals had a lower risk of local recurrence but no improvement in survival. Treatment options for adjuvant therapy are currently limited. Radiation therapy using fluorouracil radio sensitization is the most common postoperative treatment. In clinical trials, capecitabine, oxaliplatin, and bevacizumab are being investigated for the treatment of gallbladder cancer.

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## A REVIEW STUDY ON MOSQUITO MANAGEMENT

Dr Jigar Manilal Haria\*

\*Professor,

Department of General Medicine, Faculty of Medicine,  
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, INDIA

Email id: dr.jigar.haria@gmail.com

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### ABSTRACT

*For so many viral, bacterial and protozoans' illnesses mosquitoes serve as vector. In term of disease transmission and public health significance mosquito are regarded as highly significant category of insects. Population of mosquitos grows exponentially that is big issue for many nations because mosquito transmits the filarial, encephalitis, malaria, Yellow fever, chikungunya, Japanese encephalitis, dengue, Lyme disease and pandemic poly-arthritis. Different kinds of insect repellents such as synthetic chemicals, fragrant oils and botanicals are employed against mosquitoes. This study is performed at the University of Gujrat Pakistan. The primary goals of the study were to discover optimal technique of mosquito management, to explain various ways of mosquito control, different plants extracts that are used against mosquito and to compare either chemical or botanical control is better. In term of disease transmission and public health significance mosquito are regarded as highly significant category of insects. Chemical mosquito repellents offer an amazing protective profile, however they are toxic as comparison to the plant based repellents.*

**KEYWORDS:** *Chemical Repellents, Mosquito Traps, Plant Based Repellents, Synthetic Repellents.*

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### 1. INTRODUCTION

Annually globally the 200 million-450 million illnesses are induced by the Anopheles mosquito that leads towards 2.7 million fatalities. In more than 100 emerging nations it remains endemic illness. Virus of Japanese encephalitis develops in the children with malnutrition and present in the regions that are associated with animal reservoirs especially with pigs. On the other side primary reason for the encephalopathy is encephalitis. According to the BBC world service health show the mosquito is regarded as the world's most deadly animal[1]-[4].

Mosquito is vector and it produces serious illnesses which may lead toward death therefore precise action is essential to stay away from the sickness as soon as feasible. There are many ways that may be taken to protect oneself from the biting of mosquitoes. When we are working outside we should wear long pants inserted into socks and long-sleeved shirts. As well as when we are in inside we should present in the places that are screened, dwell in air conditioned and may utilize bed nets. Mosquito breeding may be prevented by removing the standing water from the drains and can use repellents to destroy the mosquitoes. In the middle of the 20th century new pesticides were initially developed that were utilized for the control of pest. At that time it was regarded the greatest control for the insects.

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### *1.1. Mechanism of action of repellents:*

Repellency usually depends on the biochemical or physiological processes. Repellency that is produced by the DEET is dependent on the receptor blocking such as lactic acid receptor blocking. Every product that we utilized against mosquitoes has varying degree of effectiveness. Lactic acid and carbon dioxide that is found in the perspiration of warm blooded animals' serves as appealing material for mosquitoes. Level of CO<sub>2</sub> is sensed by the olfactory pulp while host associated odor is detected by olfactory receptor of antennae. The sense of the smell is via antennae that contain the chemoreceptors.

In the body of warm blooded animals lactic acid is present that attracts the female mosquito. *Aedes aegypti* is drawn toward the lactic acid that is utilized for behavioral research. More evidence for the involvement of lactic acid in host seeking comes from research of mosquito physiology after a blood meal. After taking a blood meal host seeking activity in *Aedes aegypti* stops. It is believed that after consuming blood meal sensitivity for the lactic acid in neurons is reduced and after oviposition mosquito again will be normal. Species of mosquitoes such as *Culex* and *Pipiens* are more sensitive that is 6.9 times more sensitive as comparison to the *Anopheles* and *An. albimanus*. Tolerance of repellency is essentially non-adaptive that is awakened owing to the spontaneous mutation. Molecular weight range for the efficient mosquito repellent is 150-250. To check the mosquito repellent activity vapor pressure is regarded as the essential characteristic.

#### *1.1.1. Mosquito repellents:*

Anything that is used to apply to clothes, skin or other surfaces that prevent the mosquito from attracting and biting on that surface is known as mosquito repellent. Some mosquitoes repellent that are based on the ultrasound having high frequency sounds are also accessible in market. Older techniques of mosquito repellents include the rubbing of mana, vinegar and plant oils on the body. Ancient people also used to burn the bay, black cumin, oregano and galbanum to limit the insects. Burning of plant or plant materials create the smoke that is oldest way to control mosquito.

One technique for the management of the mosquito is fogging that is temporary approach for controlling pests but is mainly necessary in the scenario of health risks from severe insect occupants and for an outdoor movement where these pests are unwanted. Mostly thermal fogging is employed wherein each gallon includes the 5.0 percent piperonyl Butoxide and 0.5 percent pyrethrins. Another technique is transdermal technology where insect repellents are infused into the blood stream to defend itself from the mosquito bite. This kind of repellent includes the thiamine or Vitamin B1 and it is recognized as most efficient repellent known to date. Female mosquito stays repellent to the scent of Thiamine that is key mechanism for the control of mosquito[5]–[7].

#### *1.1.2. Chemical repellents:*

Different kinds of insect repellents such as synthetic chemicals, fragrant oils and botanicals are employed against mosquitoes. Chemical mosquito repellents offers an amazing protective profile but they are poisonous against the nervous system and skin like eye irritation, edema, low blood issue, rashes and worse problem.

### *1.1.3. Natural repellents:*

Natural repellents are essentially derived from the plants and known as essential oils. Substances that are found in the various odoriferous plants and have volatile nature are known as essential oils. It is produced from the different sections of plants and have volatile fragrance with the form of concentrated hydrophobic liquid. Essential oil may be extracted by different techniques such as steam distillation, solvent extraction and hydro distillation. Soil and climatic conditions are key variables that influence the various plant species and composition of essential oils. Synthesis and accumulation of the essential oils associated with the secretory structure of the plants such as resin ducts, glandular ducts and trichomes. Storage of the essential oils occurs in the leaves, woods, flowers, rhizomes, fruits and roots. These plant based essential oils are utilized for the repellency of the mosquitoes and haematophagous insects[8]–[11].

Many study efforts showed that essential oil molecules and their derivatives are alternate regulating measure for mosquitoes. Essential oils owing to their volatile nature require for regular reapplication to preserve their effectiveness. They dissipate entirely and thus their efficacy is short lived and hence full protection cannot be obtained. Many plant origin essential oils are known to have insect repellent qualities viz. citronella oil, lemon grass oil, rosemary, dill, eucalyptus, lavender, soybean, chrysanthemum, clove, castor, tulsi, camphor, limeone, geranium, Neem, galbanum, pepper mint, cedar essential oil and basil.

### *1.2. Non-Chemical repellents:*

Non chemical techniques include the physical and mechanical processes.

#### *1.2.1. Physical technique:*

It is important to replace the water in the bird baths, pools, and fountains and rain barrels once a week. During the dawn and dusk it is essential to wear the long sleeved clothes. Screening of doors and windows is also extremely essential to defend oneself from the mosquito assault.

#### *1.2.2. Mosquito Net:*

These nets are regarded as more protective than coils and other repellents since their usage does not create any health issue. Sleeping beneath netting can protect against the assault of mosquitoes. There are two kinds of nets such as medicated nets and non-medicated nets.

#### *1.2.3. Medicated Net:*

Mosquito nets may be made treated by K-O pills that contain the 25 percent deltamethrin. In one liter of water one pill is combined, net is soaked in it for ten minutes and then dried it in cold area. This net stays effective for six months and mosquito will remain away. World Health Organization authorizes the medicated nets and these nets are more effective than the liquidators or coils.

#### *1.2.4. Non-medicated Net:*

Different sizes and forms of mosquito netting is available that may be constructed of different materials such as polyester, polyamide and cotton. Style of net is essential to protect itself from the mosquito bite. It is essential to purchase a net that includes the mesh size big enough to flow the air and tiny enough to protect from the mosquito bite. Mosquito nets are an operational method to naturally protect against mosquitoes.

#### *1.2.5. Mosquito traps:*

Mosquito traps are used to catch and entice the female mosquitoes. These traps mimic the different mosquito attractants such as body heat and exhaled carbon dioxide. Most of the traps are powered by the propane or electricity so their usage is safe. Traps include impeller fan when mosquito is drawn near the trap it will adhere to the sticky surface of the trap and will be electrocuted.

#### *1.3. Mechanical Methods:*

Mechanical approach includes the equipment such as mosquito magnets and electric mosquito zapper.

##### *1.3.1. Electric mosquito zipper:*

For capturing the mosquito this gadget works by utilizing the ultraviolet light and then death of mosquito happens when mosquito contact with the deadly charge of electric charge.

##### *1.3.2. Mosquito Magnet:*

Its concept relies on replication of mammalian characteristics such as giving out heat, moisture and carbon dioxide. When mosquito gets near to the gadget it draws in and abruptly dies. This magnet also coupled with the octenol and may be used for the sand flies, black flies, midges and mosquitoes.

#### *1.4. Biological control of mosquitoes:*

##### *1.4.1. Entomopathogenic Fungi:*

For protection from the mosquitoes fungal spores are employed in the curtains, cotton pieces, interior home services and outside traps. Fungus may be utilized with DDT to employ successfully against the pesticide sensitive and insecticide resistant mosquitoes. *Anopheles gambiae* is more sensitive to the fungus infection as comparison to other insecticides although rate of fungal infection is sluggish as compare to the insecticide action

##### *1.4.2. Bacterial Agents:*

For the malarial vector control *Bacillus sphaericus* (Bs) and *Bacillus thuringiensis* (Bt) may be employed since they are ecologically safe, highly effective, exhibit selective effects and non-toxic in nature. Strains of *Bacillus* are readily handled, locally produced, practically applied and inexpensive and having the potential of rapid spreading. As comparison to the *Aedes*, *Culex quinquesfasciatus* and *A. arabiensis* the impact of Bs and Bt is greater on the *A. gambiae*. Bs and Bt induce the formation of the endotoxin proteins that damages the stomach of larvae and its death happens. There two kind of endotoxin proteins such as Cry and Cyt1A that function by interlinking with each other. Cyt1A delays the resistance to the Cry proteins and causes its long lasting usage

##### *1.4.3. Larvivorous Fish:*

The oldest technique for the control of mosquito is the employment of the predatory fish. *Gambusia affinis* and other species such family Cyprinodontidae were mainly utilized for the mosquito larval control. Use of larvivorous fish is regarded as more effective technique as comparison to the chemical control. They may be utilized since it shows reduced danger of mosquito resistance, inexpensive manufacturing, safe for both wildlife and human and used at

low dosages. When utilizing the larvivorous fish two essential aspects must be taken into account such as fish must adapt to the environment.

Using of the larvivorous fish has certain drawbacks such as when *Gambusia* introduced exotically it has detrimental effect on the ecosystem. *Gambusia* eat on various food such as zooplankton, algae, young ones and eggs of the amphibians and aquatic insects thus it is known as opportunistic predator. These fishes have aggressive temperament and may battle with other species for space and food. Origin of hazardous ecological changes in the environment leads to increased temperature of water, boosted phytoplankton, decrease the water clarity and raised the dissolved organic phosphorus. For increased activity of fish clearance of vegetation is required.

#### *1.5. Mode of action of phytochemicals in insect body:*

Plant extracts are usually recognized as the secondary metabolites that protect them from the herbivores. These metabolites are usually poisonous that are detrimental for the insects and impact on the target molecules that include bio membranes, nucleic acid, cellular components and proteins. Insect physiology is disrupted that influence the neurological system such as production of neurotransmitter, storage, release and activation of receptors. With the assistance of essential oil acetylcholinesterase inhibition, thymol inhibits the GABA gated chloride channel, rotenone inhibits the cellular respiration and pyrethrin inhibits the potassium-sodium exchange. Most significant suppression of the activity of acetyl cholinesterase that is primary enzyme for the transmission of nerve impulse. So when repellents are employed against the insect acetylcholinesterase enzyme is inhibited that impede the nerve transmission since AChE is the sole resistance mechanism for bug.

## **2. DISCUSSION**

Population of mosquitos grows exponentially that is significant issue for many nations because mosquito transmit the various illnesses such as filarial, Japanese encephalitis, Lyme disease, Yellow fever, encephalitis, malaria, chikungunya, dengue, and epidemic poly-arthritis. In tropical and subtropical areas mosquito transmitted illnesses are major issue. Mosquito has about 3500 species and occurs in tropical and subtropical areas Major genera of mosquitoes that serve as vector for different illnesses include *Culex* (Japanese encephalitis, west Nile, chikungunya, Anopheles (filariasis, malaria) and *Aedes* (chikungunya, dengue, Yellow fever) (chikungunya, dengue, Yellow fever). Major reason for the chikungunya and dengue is *Aedes aegypti* that serve as vector for the illness and infect the 2.5 million individuals every year. Feletti, vivax Grassi, protozoal parasites, *Plasmodium ovale stephens* and *Plasmodium falciparum* welch are the main cause of malaria that are transmitted by Anopheles mosquito. Most significant cause for the rise of dengue fever are more breeding sites for the *Aedes* mosquitoes, less efficient control of mosquito, more urbanization and accelerated growth of population.

## **3. CONCLUSION**

In many ethno botanical assessments plants serves as repellent agents. In many areas of the globe plant repellents are utilized. Plant based repellents do not offer risks of toxicity to the domestic animals and people and can be readily biodegraded. As opposed to the synthetic chemicals natural goods are safer for human usage. Use of synthetic repellents creates the pesticide resistance in mosquitoes, negative impact on non-target species and poses danger for the ecosystem. Due to the minimal effect on environment and cheap budget plant based repellents

gained significant interest of consumers. Innovative medication delivery methods of plant based active components are need of the time.

Modern methods in standardization and separation of herbal medicines motivation are required. Mosquito repellent equipment such as nets of various kinds are also required for capturing of mosquitoes. On the other hand biological management of the mosquitoes with the aid of bacterial agents and larvivorous fish is also taken in account. Essential oils owing to their volatility act for a shorter period. Also several creams with essential oil core may be a smooth distribution method. Such topically applied compositions will be appropriate for individuals to put on and discontinue. Essential oils abundant in nature and apart from its taste and therapeutic worth, their application in repelling mosquito may be regarded as sustainable and biocompatible delivery method as green option.

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## UNDERSTANDING UNEMPLOYMENT

Ziphozonke Oscar Mbatha\*

\*Doctor of Ministries,

Department of Theology and Religious studies,

Adventist University of Africa Nairobi,

Kenya, EAST AFRICA

Email id: mbathaz@aua.ac.ke mbathaz@toc.adventist.org

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### ABSTRACT

*The primary focus in this paper is on understanding the impact of unemployment in Sandton, Johannesburg. In order to address this, as a starting point, it is noted that unemployment and the crisis of joblessness remains a problem in both low-density as well as high-density population areas. I have emphasised the development initiative to promote employment opportunities for the unemployed to enhance entrepreneurship amongst those with appropriate livelihoods. This could be understood, based on the understanding of the causes of unemployment and could provide relevant intervention strategies within the context of the people intended to be reached. The focus of the article is to suggest ways to provide training, share information, skills development and implement practical contributions to alleviate poverty in the community. It investigates the impact of unemployment in human lives with a view to understand how to balance life and employment. The article found a positive contribution on how to improve human life through job creation. **Purpose:** The purpose for the article is to explore the impact of unemployment in human lives and to establish strategies to assist unemployed people to create jobs by practicing the skills development to enhance a balanced lifestyle. **Findings:** An investigation focused on the recognition that the high rate of unemployment in Sandton, Johannesburg, especially among those who are lacking skills and skills mismatch in a labour market, can be best resolved by the promotion of training and the creation of opportunities to start new businesses within the community. The causes of unemployment and its effect on human lives are also discussed.*

**KEYWORDS:** Work, Work Ethics, Poverty

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### INTRODUCTION

The article reviews the literature on the different aspects of work and unemployment. The challenges of unemployment or underemployment in our society have been viewed as a social issue that affects the community in multiple dimensions. The first attempt in this section is to present the outline of the researcher's intention to provide important views and findings on how other authors have contributed to the subject presented in this project. To achieve this, the researcher reviews the literature in the following section, divided into six sub-divisions. First, the terms of unemployment or underemployment are understood, concerning how other scholars have conceptualised them. Second, the effect of unemployment on human life is discussed. Third, the causes of unemployment and poverty in contemporary times is investigated. Fourth,

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the impact of unemployment and poverty in the community is analysed. Fifth, the impact of unemployment on the economic growth is discussed and last, the costs of unemployment on individuals, as well as the society at large is discussed. Definitions used are:

**Work:** To do something that involves physical or mental effort, especially as part of a job.

**Work team:** A work team is a group of people with complementary skills who are committed to a common mission, performance goals, and approach for which they hold themselves mutually accountable.

**Poverty:** Poverty is a state of want or deprivation in which those who suffer from it have no basic, minimum requirements for survival. The poor suffer from basic economic needs, and they are deprived of material goods necessary to live with dignity.

### **Methodology**

The study adopts the literature review by prominent writers who have contributed on the causes of unemployment and its impact in human lives. Library sources, and other scholarly articles that are relevant to the aspect of unemployment or underemployment have been used.

## **RESULTS AND DISCUSSION**

### **The Effect of Unemployment in Human Life**

First and foremost, the researcher argues about the effect of unemployment in human life. The unemployed, as individuals, suffer both from their income loss while unemployed, and related social problems caused by long periods of unemployment. Society, overall, loses from unemployment because the total output is below the potential level<sup>[1]</sup>.

This contributes to low self-esteem in an unemployed individual and community social exclusion. Having argued about unemployed and marginalised prospects, the term 'unemployment' is used to describe anyone who is able to work but does not have an occupation. Even though unemployment is one of the most common chronic complications in the cities, it is a concern for individuals, as well as global communities. As a result, unemployment is expressed as a percentage of the total available workforce that is unemployed but actively seeking employment and willing to work, which is known as the unemployment rate. There is a link between unemployment and poverty which is considered as the major effect in human life. The level of unemployment varies with economic situations and other circumstances in the community. This is based on the discussion of this project with an emphasis on the ministry to the unemployed in Sandton. Unemployment remains the biggest challenge that affects life and hope among the people residing in Sandton. In short, unemployment undermines human dignity. In other words, unemployment is mostly described as economic issues, but the researcher has argued that it poses a threat to human dignity, therefore, it must be viewed as a serious concern. To strengthen the argument further, there are three major effects of unemployment: (i) There are financial problems which result from prolonged unemployment. Focusing on the loss of income, unemployed individuals struggle to meet financial needs. As a result of this financial crisis, unemployed individuals are unable to maintain the minimum standard of living; (ii) Unemployment has a social dimension. There are problems an individual faces socially as a predicament of unemployment. As an indirect effect of unemployment, many find it easy to abuse alcohol and drugs, thus even leading to cases of domestic violence, in some instances. In addition to the stated challenges of high unemployment, there is often an observed



increase in the rate at which of marriages break down, community divisions, and discrimination in society. The number of suicide cases also increases, due to the lack of self-esteem caused by financial instability; (iii) Unemployment bears negatively also on personal human social relations. There is a certain stigma attached to the poor and disadvantaged which is associated with certain supposed problems attached to them, such as poor hygiene, illness, disease, and poor/ no education. According to this view on the effect of unemployment, these prejudices lead to distance between the poor and the rich and contribute to mistrust in the labour market.

The essence of this argument is that poverty is more than a lack of resources to meet basic needs. Poverty inflicts physical, psychological, and spiritual pain in people's lives in all ages, who strive for wellness and resist the oppressive burden of destitution. In conclusion, the various effects of unemployment are financial, social, and psychological problems. The effect of unemployment influences not only the personal well-being of the individual but also the wellness of the broader society. The leading challenge that affects human life, health, economy, and community is unemployment. The impact of unemployment felt by the unemployed is worth noting. Unemployment causes workers to suffer financial difficulties that may lead to emotional destruction. There is a demand for employment in Sandton, but due to an influx of job seekers every day, it is difficult to arrange jobs for all these new workers. In this case, the demand of workers will be more than the available positions. When this happens, consumer spending leads to a recession or even a depression when left unaddressed. The evidence shows that unemployed people suffer low-self-esteem and discrimination. In addition, when the challenge of unemployment is handled and addressed, community members may empower all the beneficiaries of development programmes by enhancing their skills and assist in breaking away from the dependency mentality.

## **Unemployment and Poverty Today**

Employment is one of the basic ingredients of human activity and has always been considered an important aspect of life in most, or even all, cultures. There is a connection between poverty and unemployment. The study explores more deeply the different ways through which poverty and unemployment affect people and how it perpetuates inequality. Poverty is the condition of lacking sufficient money or goods to meet basic human needs, such as food, shelter, and clothing. In making this comment, the problem of unemployment which causes poverty, is complex and produces many faceted challenges. However, proposing to address unemployment and poverty in this section is motivated by the fact that there is a link between unemployment and poverty which is investigated in this section of the project. There are many factors which contribute to unemployment in the affluent community. In addressing the question of unemployment and poverty, most, if not all, of them such as low-quality education, lack of adequate food, healthcare, and geographic location - can be traced to the legacy of discrimination that plagues people in Sandton. Ultimately, many factors contribute to poverty, as a result, many people have been confronted by lack of employment and underemployment for a long period.

To put it simply, many people live in poverty in Johannesburg, Sandton, because they are unable to find a job that pays a living wage or to find a job at all. Many people assume that not everyone who is unemployed lives in poverty, hence this study unearths how unemployment and underemployment contribute to poverty. Lötter stated, "A major cause of poverty is unemployment, especially in a situation where individuals have no social or family support. It is

worth noting that poor communities are often characterised by the virtual absence of people who are formally employed”<sup>[2]</sup> but he did not describe the behaviour. Having just argued that people of low class suffer from both unemployment and poverty, not everyone experiences the same challenge in Sandton. In many cases, even those who qualify for certain jobs find themselves unemployed. You would think that people who live in poverty are lazy, individuals are rarely responsible for their unemployment and poverty.

## **Poverty and Moral Values**

In recent discussions on the impact of unemployment, a controversial issue has been investigated whether unemployment is the major cause of poverty. From this perspective, poverty erodes people’s morale as desperation to make a living provides the incentive for behaviour that the rest of society regards as immoral. To describe someone as poor, thus indicates that a person has fallen below the standard of life deemed appropriate for a human being in a specific society. Lötter stated:

“Poor people may argue that morally acceptable methods of earning a living did not work for them; they followed the rules of society to no avail, therefore, they are in a position where making a living through immoral means becomes a serious option. They may indeed lack material means to continue living a moral life”<sup>[2]</sup>

To put it clearly, unemployment and poverty become a cause of moral decay. To see whether these findings apply to unemployed and poor people, the researcher proposed to include another dimension of moral decay as Lötter argues, “that goes into the extent that a poor person can decide to enter the underground economy by engaging in illegal trading of goods like alcohol, diamonds, drugs, or sex”<sup>[2]</sup> Furthermore, if immoral behaviour leads to financial success and social power, it might become easier to slip deeper into immoral and criminal behaviour than to return to a moral lifestyle. While focusing on the contribution of employment to household income is particularly important since work tends to be more reliance on families than on individuals.<sup>[3]</sup> By focusing on poverty and moral values, it helps to understand the damage unemployment does in human lives. Admittedly, the consequences of unemployment or lack of income in the society may contribute to multifaceted challenges that are investigated in the following sections of this project.

## **The Psychological Effects of Unemployment**

It is worth noting that unemployment appears to contribute to psychological development and behavioural disorders, as indicated in the previous section. It is true that the complexity of the problem of community non-participation and gross unemployment rates may produce behavioural disorders. According to Vorster, “the fear of losing one’s job and associated anxieties of unemployment is quite absent from the soviet economy”<sup>[4]</sup>. Having just argued that the unemployment rate, as an economic measure, produces a higher incidence of life stress which in turn, produces behavioural changes in the affected population, unemployment may result in life stress and a subsequent increase in symptoms, such as depression and physical illness, but this does not necessarily mean that an individual who loses his or her job will then report life stress and experience illness. An observation has been made during the period of the state of disaster necessitated to curb the spread of the coronavirus (COVID-19) outbreak in South Africa that employment decreased while the number of people admitted to mental institutions increased. Those who lost their jobs during the period of the COVID-19 pandemic

suffered economic stress which precipitated and induced mental illness. One explanation for the psychological effects finding is the fact that semi-skilled and skilled workers had somewhat higher levels of education and it was this group that suffered most economic loss due to unemployment. After that, those who suffered large losses were business entrepreneurs who were assumed to have the highest educational levels. Having argued that intolerance of mental illness grew during periods of economic depression, this was the result of the families that might have been able to support mentally ill members during times of relative prosperity, might have found the burden too great when financial resources were depleted. In conclusion, unemployment induces greater life stress which in turn, increases heart disease and excessive consumption of alcohol and family violence. As a result, the psychological effect of the unemployment rate has contributed to social challenges, such as abuse, suicide rates, homicide, morality and crimes against people and property. In addition to the psychological impact of unemployment, it is necessary to include the challenge of the COVID-19 lockdown period in South Africa, which contributed to stress and uncertainty to those self-employed with no extra income source. Vorster suggested:

“The psychological experience and the impact of unemployment need to balance because work is a fundamental ingredient of an individual’s identity, self-esteem and general wellbeing; work is central to family development, and it determines the order and quality of life in societies at large”<sup>[4]</sup>.

Having selected the above prominent writer, Vorster, because he addresses the important idea in the recent studies on being unemployed and religious, brings in a deep analysis on a balanced view between the individual and the community. Moreover, this is equally important in this project which brings our support for the unemployed and our solutions to change the condition to one of opportunity.

### **The Impact of Unemployment on the Community**

According to Nadene Peterson and Roberto Cortéz González, “work is the medicine for poverty.”<sup>[5]</sup> It is worth noting that unemployment and underemployment have negative impacts on the community’s welfare, the workers attributed this to the poor standard of living which is not unconnected with the meagre stipends they receive at the end of the month as salary. As a result, they cannot meet the necessary amenities needed to live a comfortable life; this consequently affects their family as well as their children. For instance, they could not get good accommodation, nor eat a balanced diet as well as wear decent clothes, nor could they afford a good education for their children.<sup>[6]</sup>

Having just argued that long periods of high unemployment are, without a doubt, detrimental to unemployed workers and the health of the economy, however, there are other, less known consequences. Further work in this area may lead to the development of social consequences of a prolonged jobless period that may be significant as this has economic consequences. In other words, the aggregate relationship between the employment rate and illness in terms of individual stress, it is necessary to show that changes in employment rate leads to psychological and physical stressors. There is strong evidence that shows that various life stresses produce illness behaviours. These findings have important consequences for the broader domain on the impact of unemployment on the community. To some extent, these findings implicate those who have qualifications and moderate degrees of education, experienced greater illness in response to job loss and economic construction. Garret suggests:

“Studies on unemployment and crime suggest that a high unemployment rate is positively linked to an increase in property crime. An increase in the unemployment rate is accompanied by soaring property crime, while a decline in the unemployment rate followed by only a gradual drop in property crime.”<sup>[7]</sup>

It has become common today to dismiss the fact that serious property crimes may further damage the economic development and social welfare in urban areas, especially in the inner-city neighbourhood. However, the impact of unemployment may escalate when social issues in human behaviour are not in balance. These may include family breakdown among married couples, excessive drug abuse, increased anxiety, stress which is caused by alcohol consumption, physical and mental illness. In examining unemployment from the perspective of the unemployed, it is argued that the increase of crime rates is associated with an impact of unemployment on the community.

### **Social Effects of Unemployment**

Socially, unemployment and underemployment tend to strain relationships, even between the members of the family and the community where an individual resides. Sometimes, as a result of unemployment, an individual may abandon the family members, relatives, and friends. It is worth noting that people who are jobless and unemployed are subjected to stigmatisation and are marginalised. Ultimately, what is at stake here is how stigma is defined, “as a social construction that defines people in terms of distinguishing characteristic or mark and devalues them, therefore, stigma occurs when society labels someone as tainted, less desirable, or handicapped.”<sup>[8]</sup> In understanding the personal and social costs of unemployment it is seen to include severe financial hardship and poverty, debt, homelessness and housing stress, family tensions and breakdown, boredom, alienation, shame and the stigma of increased social isolation, crime, erosion of confidence and self-esteem, the atrophying of work skills and ill-health.<sup>[9]</sup> While it is true that unemployment falls disproportionately on already disadvantaged groups in society, especially for those of lower-income earners, recently arrived migrants and indigenous people in the city of Sandton, unemployment is the major reason for poverty with those who cannot find jobs who are on the highest rate of poverty with almost 70 per cent of the unemployed being those who have no qualifications. It is, however, a cause of concern that the proportion of the unemployed people with no educational qualifications is relatively high - more than half. The number of people with standard ten certificates is also gradually increasing, and they come out from secondary school without a relevant skill to generate income. This implies a high cost for the country in terms of expenditure on this person’s education, in addition to the hardship suffered by all unemployed persons. Moreover, persons with high education qualifications become frustrated more easily if they do not find jobs, and this increases the potential for crime and civil unrest.<sup>[10]</sup> The essence of this argument is that unemployed people experience hardship and a decline in their standard of living. As a result, this may lead to social exclusion if an individual is without employment for a long period. Unemployment reduces social contact and social support. In our industrialised society, the fact of being employed, the type of job, the status, one’s position and role are central to personal identity and self-esteem. In making this comment, low self-esteem, total dependence on others and an inability to provide for self and others are the important negative effects of unemployment. In conclusion, research findings indicate that the physical and psychological health of the individual is related to the state of employment in the family.

### **Emotional Effect of Unemployment**

In recent discussions on the impact of unemployment, a controversial issue has been whether unemployment contributes to the individuals' emotional state. On the one hand, some argue that being unemployed hurts. Many may experience depression and can find it extremely difficult to overcome the stress of being marginalised, rejection and hopelessness. To be precise, most individuals' basic life requirements are met through employment. In terms of this project, regarding the emotional effects of unemployment, those who are unable to get employment may suffer emotional instability. Although this should have been indicated earlier, unemployment produces symptoms such as depression and anxiety which are significantly greater to the unemployed individuals in society. The evidence on the emotional effect of unemployment shows that the psychological pattern occurs in an individual and that is associated with present distress with a significantly increased risk of suffering death, pain, disability, or an important loss of freedom.<sup>[11]</sup> However, the cure of the emotional effect of unemployment is, of course, work on the straightforward premise that work is good for emotional health. In addition to these individual effects, unemployment may act as a social bad, that is, people may be unhappy about unemployment even if they are not themselves out of work.<sup>[12]</sup> Having argued that, the aspect of helping community efforts to address social, psychological, and emotional disorders is to offer work to those who have not been employed for a particular period.

### **Economic Effect of Unemployment**

The researcher shares the new light on the economic and social costs of unemployment, which may include components such as, personal costs to the unemployed (lost income, loss of sense of value, less on-the-job training). Also, the economic effect of unemployment includes costs to government (lost tax revenue and higher benefits spending); costs to society in general, social problems, alienation, and lost GDP.<sup>[13]</sup> Tejvan Pettinger argues that "potential loss of income can leave people without sufficient income to meet housing costs." He is right in making such a valid point, but he omitted the important point which Mafiri elucidates, that unemployment in South Africa has a socio-economic impact which leads to criminal activities as the only means of survival for certain groups of the unemployed people. Here, many writers on the issue of the impact of unemployment would probably object to this statement, since not every unemployed person is involved in criminal activities. Ultimately, what is at stake here is that, when it comes to the subject of the socio-economic effect of unemployment, most scholars agree that personal cost of unemployment is on a loss of earnings to the unemployed which leads to poverty. On the other hand, I agree with Pettinger that, "long periods of unemployment can push households into debt and increase rates of relative poverty."<sup>[13]</sup> It is noteworthy that those who are unemployed will find it difficult to get work in the future since they may suffer the hysteresis effect, while it is true that being unemployed can also affect the future confidence of the unemployed and they become less employable in the future. In general, it does necessarily follow that the conception when people are out of work, they miss out on the job training and latest working experiences and trends. During the state of the nation address by President Cyril Ramaphosa, the outbreak of Covid-19 pandemic left over 10 million South African jobless as from 25<sup>th</sup> March 2020 until the end of April 30 (Integrated Development Plan: 2020, pp.16-26). Numerous official documents have been issued addressing the impact of the COVID-19 pandemic on unemployment and poverty during the country's lockdown period and present the important information to be considered in this section. The situation is so serious that the Department of Agriculture offered an amount of 4 billion R to assist those who are doing essential services on agriculture or food

industry. The Coronavirus Aid, Relief and Economic Security (CARES) has increased the social grants and expanded unemployment benefits to the self-employed, part-time workers through the Pandemic Emergency Assistance, which paid R500 for social grants and R350 for those who are unemployed until the end of October 2020. In short, unemployment compensation is the result of the risk brought about by the COVID-19 pandemic. Unemployed workers receive funding from the state because of the lockdown period and retrenchments as a result of the pandemic. Unemployment credit insurance or (UIF) benefits workers who have lost their jobs during the quarantine period of the COVID-19 pandemic (South Africa) have also benefitted. Certain amounts of money were allocated to benefit those without income as from 25<sup>th</sup> March-December 2020. The evidence shows that the impact of COVID-19 lockdown in the country has affected the GDP in the second quarter in September 2020 by 51%. According to Stats SA, the record plunge was due to “the impact of the COVID-19 lockdown restrictions since the end of March 2020”. This extends South Africa’s recession for yet another quarter, as the economy continues to battle the COVID-19 pandemic and growing unemployment. In conclusion, the socio-economic status of society is determined by the employed people who contribute to the labour market. What is more important, high unemployment indicating the economy is operating below full capacity and is inefficient; this will lead to lower output and incomes. Having argued that, a rise in unemployment can cause a negative multiplier effect. Unemployment has costs to a society that are more than just financial. By the way, the socio-economic effects of unemployment contribute to crime and vandalism. While economics and academics make convincing arguments that there is a certain natural level of unemployment that cannot be erased, elevated unemployment imposes significant costs on the individual, the society, and the country. When an individual loses a job, there is often an immediate impact on that person’s standard way of living. Unemployment tends to disturb the physical well-being of an individual.

### **Physical Effect of Unemployment**

The evidence shows that unemployment indirectly contributes on the physical effect of people who may not be employed. The researcher’s assertion is based on the following contribution by being unemployed. Joblessness may contribute to depression, mental anxiety, and other health issues. Another study found that common outcomes of unemployment include depression, substance abuse, admission to psychiatric hospitals, death by suicide and violence. While the previous literature has addressed the social, economic, and emotional, it has neglected the aspect of whether unemployment affects the physical well-being of an individual. Gleeson suggests that “the longer the unemployment goes on, the more severe the health consequences, with increased depression and other health consequences, with increased depression and other health issues worsening over time.”<sup>[14]</sup> In summary, our studies show that the persons who are distressed emotionally due to loss of a job may suffer excessive misuse of alcoholism, drug abuse and domestic violence which may lead to an increase of medical care attention. Numerous studies have revealed the relationship between unemployment and psychological problems which affect the physical wellbeing of an individual. Therefore, an unemployed person may be forced to adjust their lifestyle, for instance, by changing their diet, their place of residence which may influence their physical behaviour. Finally, it is worth noting that results have shown that the physical effect of unemployment stress is exacerbated by the lack of social support. It is important to note that unemployed individuals may experience a problem with insomnia. Having argued that, unemployed individuals visited physicians, took more medications, spent more days in bed sick, the anxiety and stress of being without work contributes to premature death. Holland

insists that “the effects of unemployment on physical well-being, when people lose their jobs, they are not only affected financially but their stress can manifest physically as well”,<sup>[15]</sup> It is true that being unemployed may indirectly produce physical symptoms of loss of appetite, sexual interest is exacerbated by more worry which affects physical performance. One underlying leading disease which has been diagnosed as the factor of unemployment is cardiovascular function that is related to premature death due to unemployment.

### **The Costs of Unemployment to an Individual**

Unemployment is mostly described as an economic issue, but it is argued here that unemployment poses a threat to human dignity and should, therefore, be a theological concern.<sup>[16]</sup> By contrasting the costs of unemployment with the theological themes, it is grounded on the fact that indicates how unemployment undermines human dignity. Certain theological themes on human dignity are outlined in the previous sections of this project. Unemployment is an economic condition in which individuals actively seeking jobs remain unhired. The problem of unemployment is indeed a serious reality; the developed countries, as well as the developing countries, suffer from it. This is not to say that employment is all about depending on the income, but rather unemployment has an impact on society more than just financial sustainability. Unemployed individuals not only lose income but also face a challenge to their physical and mental health. To put it another way, the societal costs of high unemployment, include higher crime and it also exacerbates poverty. In short, costs to the government go beyond the payment of benefits to the loss of the production of workers. To take a case in point, the costs of unemployment to the individual are not hard to imagine. In summary, this section shows that the experience of unemployment (either direct or indirect) can alter how workers plan for their futures - prolonged unemployment can lead to greater scepticism and pessimism about the value of education and training and lead to workers being less willing to invest in the long years of training some jobs require. When unemployment becomes a pervasive problem, there is often increased calls for protective and severe restrictions on those who cannot be absorbed into any labour market. Further to that, the absence of income created by unemployment can force families to deny educational opportunities to their children and deprive the economy of that future. Studies have shown that prolonged unemployment harms mental health and can worsen physical health and shorten lives.<sup>[17]</sup> Other social costs include how people interact with each other. It is common today that because there is absent a wage-paying job, people may turn to crime to meet their economic needs. The last component of the costs of unemployment affects the country in many ways. It is worth noting that companies pay a price for high unemployment as well. You would think that only unemployed individuals experience financial challenges in our society until you realise that unemployment benefits are financed largely by taxes assessed on businesses. The bottom line is that the costs of unemployment can have a self-perpetuating negative impact on business and the economic health of the individual. This suggests that the costs of unemployment have an impact on the country. The costs of unemployment have been investigated which while mostly damaging, can sometimes also be positive and best understood by identifying the meaning of work. This can help to explain why people do not experience work and unemployment similarly.

### **Pastoral Contribution to the Unemployed**

The main objective on the concept of understanding unemployment is the implementation of an intervention strategy which will focus on establishing candid relationships with the unemployed

in order to create a wedge through a relational approach to reach them on their level. Moreover, to help in creating an opportunity for skills development programmes. Gleaning from this intervention, the unemployed will be able to share their challenges as individuals or a group. In addition, a data base of their acquired skill will assist for better marketing and potential employers to utilise their skills. A spiritual approach will be implemented as a way of introducing the Gospel to the unemployed in the community.

## **Recommendations**

The evidence shows that unemployment has affected the community and destroyed the individual's confidence in participating in the activities of community development. As the starting point, the findings shows that unemployment is increasing; the only way to meet the needs of the community is to increase opportunities for skills development and participation of the unemployed in the community. As indicated in the findings, limited skills on the part of the unemployed creates low absorption rates in the labour market which contributes to low income. In addition to the recommendation, people must be encouraged to be self-employed so that they are able to provide for their families. It is recommended that the Department of Labour, in partnership with humanitarians, should establish programmes to cover independent workers, and self-employed community projects that will generate an income for its workers. Finally, it is recommended that an urban agricultural project would be able to provide families with meals that would work toward alleviating poverty among the unemployed in Sandton, Johannesburg. The Centre of Influence will also be a good institution to be considered in the city.

## **CONCLUSION**

In conclusion, the concept of unemployment has been discussed in this article to show the deeper impact on society and the fact that it is usually applied only to humans. It refers to a condition that results in people not being able to live without work in which they can participate in the range of activities that show an expressive nature as human beings. There is still more to be learned when it comes to the causes of unemployment. The researcher has investigated the understanding of unemployment as a social issue that has affected all classes of people in the community. It has been argued that unemployment has contributed to the society's lack of decency and respect. As the concluding remarks, unemployment has affected people who are unable to have basic needs met and the lack of resources which forces them to live below a good standard of life. Unemployed people still feel that they are not regarded as community members and are being treated with disrespect. Also, unemployed people suffer humiliation, being seen as not worthy to contribute to community activities. This lack of respect contributes on low self-esteem and participation in community development. At this point, the strategy to address this community challenge has been stated and has already been implemented in certain areas which demonstrates its usefulness. The findings show that much can be learned from the strategies to be employed that are well-designed which are accompanied by a careful evaluation process planned for community projects to alleviate poverty and establish a long-term plan for employment.



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Faculty of Management Studies and Commerce  
University of Jaffna, SRI LANKA  
Email: [ratnammkg@yahoo.com](mailto:ratnammkg@yahoo.com)

**Poongothai Selvarajan**

Lecturer  
Department of Economics and Management,  
Vavuniya Campus of the University of Jaffna,  
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Lecturer  
Department of Financial Management,  
University of Jaffna, SRI LANKA  
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