Corporate intranet portal for knowledge management – A conceptual framework

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ABSTRACT

In this knowledge era, the success of an organization depends on the leverage of the knowledge available internally. There arise a question that how to leverage and manage the knowledge within the corporate environment. The web infrastructure has helped the knowledge managers to develop portals for managing the knowledge which can be accessed within the organization. In the present article, the concept of intranet portal and its contribution to the field of knowledge management, functions, structure, benefits and few successful intranet portals being implemented by the corporate sectors were discussed. The study concludes that intranet portal becomes an indispensable infrastructure for information access and use for an organization to continue its successful growth in a competitive world.

Key words: Portal, Intranet portal, Corporate intranet portal and Knowledge management.

INTRODUCTION

Knowledge management refers to management of the knowledge content, that is documented and owned by an individual and knowledge transfer channels. It has been proven in practice that effective knowledge management is helpful for an organizations in searching for useful information and producing new knowledge more efficiently. The economy of a country depends on the knowledge based society. In this competitive world the economic growth depends on the overall performance of an organization. To achieve continuous growth in organizations, the creation, capture, harvest, sharing, application of knowledge and expertise is essential. These process provide the ultimate competitive advantage for an organization. Hence knowledge is considered as an important resource for any organization. The knowledge generated within the organization has to be documented and managed for future reference, which is a challenging task. At this juncture the knowledge management concept has slowly been adopted in the organizations and developed intranet portal/knowledge repository using information technology tools that can be accessed within their organization. The most famous knowledge creation model of companies was developed by Nonaka (1994). This model deals

with the creation of knowledge as a converting process between tacit and explicit knowledge. After researchers and practitioners recognized the importance of knowledge, a very large amount of literature on knowledge management has emerged in research and development organisation (Davenport and Prusak, 1998). The present study aims to explain the concept of intranet knowledge portal, its evolution, functions, structure and a few samples of intranet Knowledge Management (KM) portals.

Evolution of portal

During 1990's corporate intranets became a very common in most of the organizations. When the corporate intranet grew in size and complexity the webmasters faced challenges in managing the content and its users. The advent of advanced networks, web based technologies and the developments of portals have provided a solution for the above task and finally it has become an achievable task.

Intranet portal

Cambridge Advanced Learners Dictionary defines that portal is a page on the internet that people use to search the world wide web and that enables them to access useful information such as news, weather and travel. Web portals provide links to diverse sources in a unified way and presents concise information to the user. Organization portal provide all the information in a single gateway, which has consistent look and feel with access control and procedures for multiple applications and databases. Portal is classified into two categories such as internet portal and intranet portal. Internet portal meant for the public access where as intranet portal meant for a specific community access.

Portals are considered to be a gateway for accessing horizontal or vertical knowledge domains, whereas website may not lead the user into a knowledge domain. Hence organizations develop their own knowledge portal with additional features focusing mainly on knowledge rather than information. Within a company a intranet portal is accessible faster than the website due to traffic spikes, server breakdowns and other network connection problems. However intranet network works more reliable and also there was no bandwidth connectivity problem. The intranet environment provides easy access to audio and video content with a high bandwidth. With the emerging web-based technologies and tools, intranet portal became reality and utilised for facilitating the knowledge creation, storage, sharing and managing knowledge within an organization.

Knowledge management through intranet portal

Knowledge can be defined as tacit knowledge and explicit knowledge. Knowledge owned by an individual/employee/member working in an organization is called tacit knowledge. This tacit knowledge is based on personal experience and individual's level of intelligence. Tacit knowledge possess an important cognitive dimension, which consists of beliefs, perceptions,

ideals, values, emotions and mental models ingrained. Knowledge when expressed in various forms is considered as explicit knowledge. The forms may be words, numbers, scientific formulae, product specifications, manuals, universal principles etc, which is shared in a data form. Explicit knowledge can be delivered or passed to the individual formally and systematically.

Modern organizations are facing a significant challenge that how to capture and utilize the existing knowledge for further improvement. Nonaka and Taukeuchi (1995) divided the knowledge creation process into five sub processes namely, knowledge acquisition, idea forming, knowledge sharing, idea modification and knowledge expression.

In the process of knowledge creation, knowledge is transferred between explicit and tacit knowledge. Among the five sub processes knowledge acquisition in an organization face several issues namely, identifying relevant knowledge, managing knowledge overload, knowledge loss while capturing, procedures and guidelines for organizing and transferring knowledge. But the level of intended knowledge depends on organizations goal and its activities.

Intranet knowledge portal and its characteristics

Since the advent of advanced networks, web based technology and the development of portals, knowledge management has occupied a significant place in organisations. Portals as the name suggests are gateways to a knowledge domain and portal technology provides the best infrastructure to store, access and transfer knowledge.

Portal modules and its characteristics

Forums/Groups/Networks are the part of portals where the employees/members of an organization can post messages or questions that are added to `threads' or `topics' on a real time basis. Other members are notified about this via e-mails and can respond or post new messages at their convenience. A forum provides the platform for members to discuss about a message and hence referred to as message boards. The portal modules that help to restore and transfer knowledge and its characteristics are as follows,

- Document repository is a collection of relevant documents that lists tacit knowledge about any event using textual, pictures and diagrammatic forms. Documents with short movie and audio clips can also be uploaded to the portal for additional knowledge transfer.
- Publication basket is similar to the concept of a shopping cart as in a real supermarket. The portal allows project partners to `shop' from the document repository and assemble a list of documents they require for their tasks.
- Data bases are the collection of information or other data that is organized in a structured fashion, which can easily be accessed, managed and updated in a real time environment.

- Chat rooms provide a real time discussion medium for the employees of an organization. They allow multiple members to log onto a real time interface and exchange ideas, drawings and converse with each other. Chat sessions can be planned and partners can meet and talk as in real meetings which reduces the cost and time.

However it is important to understand that this article discusses only the intranet portals and not web pages. Portals for the knowledge management consist of developing, applying, assessing, preserving, updating, transforming and transferring knowledge. Figure 1 describes how an user can access knowledge repositories through intranet portals.

Figure 1: Accessing the intranet portal
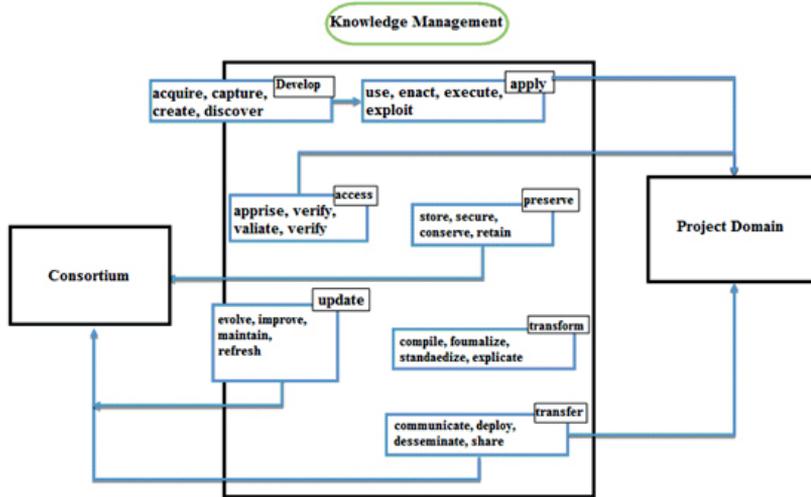
Some leading examples of the corporate intranet portal based knowledge management tools are listed below

- Microsoft Office SharePoint Server a, 3rd generation of intranet based enterprise content management system is a leading example for an corporate/enterprise intranet base knowledge management tool.

- Microsoft's IT group also has focused heavily on identifying and maintaining knowledge competencies for its workers by creating an online competency profile for jobs and employees within Microsoft IS, a project called Skills Planning `und' Development, or SPUD.

- Infosys was inducted into the Global Most Admired Knowledge Enterprises (MAKE) Hall of Fame in the year 2005 due to its innovative KM initiatives. A full fledged KM program

began in 1999 with the launch of K shop. Through K shop, knowledge generated in each project across the global operations of Infosys was captured. The case also highlights the benefits reaped by Infosys using KM in its day to day operations.

- The MITRE corporation has developed an award winning corporate intranet and has utilized it heavily for day-to-day operations and information sharing. This intranet has fundamentally changed the way the corporation operates and helps us leverage our extensive skills for the customers. The initial focus of the intranet, or MITRE Information Infrastructure (MII), was on locating and contacting people throughout a geographically dispersed organization. It also serves as a knowledge management terminal.

- IBM Corporation's intranet portal built on Web Sphere Portal Express allows its employee and members to share their knowledge.

- Cap Gemini Ernst and Young has introduced n-Portal, a knowledge management solution based on Microsoft's Solution for Intranets (MSI) that enables comprehensive knowledge sharing across corporate intranets.

- Wipro Technologies, one of the leading software technology/BPO giant uses the Microsoft Share Point Server 2007 for their internal operations mainly for the purpose of Knowledge Management.

Benefits of knowledge management

The process of knowledge management will provide the ultimate competitive advantage for an organization within and among its peers. The following are the benefits of KM:

- Optimised human assets within organisations
- Realised increased innovation
- Enhanced efficiency and flexibility
- Faster customer responsiveness
- Improved competitiveness of the firm
- Facilitate decision making
- Achieve faster response time in handling business issues and customer needs.
  The KM within an organization also enhances the overall performance of the organization.

CONCLUSION

It is really a challenging task for information technology managers and librarians to update their knowledge on a regular basis so as to provide knowledge creations and content. In this competitive world the business environment changes rapidly in and around an organization.

The knowledge-based business is seen as a paragon to help organisation's sustainable growth and to have an edge over competitors. The application of knowledge management facilitates organisations to maintain competitive advantage through leveraging of intellectual capital or inherent knowledge of individuals working in an organisation. Hence there is a greater realization that the competency of an organisation depends upon its capacity of knowledge creation, storage, transfer and application through an ongoing and continuous process of learning. The organizations must choose the right tools, techniques and processes to capture, archive and share the knowledge within the organization through an intranet portal for its increased productivity.

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Antifungal activity of *Eclipta alba*

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ABSTRACT

In the modern medicinal system, people have started looking at the ancient healing systems like Ayurveda, Siddha and Unani due to the adverse effects associated with synthetic drugs and growing number of multidrug resistant organisms. Herbal drugs play an important role in health care programs especially in the developing countries. Recently, a great attention has been directed towards plant extracts. Identifying the phytochemicals and their function in plants may further increase our understanding of the mechanisms by which they benefit humans. Biologically active compounds may be isolated from the plants offer a new source of antimicrobial agents to treat multidrug resistant microorganisms and diseases caused by them. This review paper gives the evidence based information of antifungal properties of *Eclipta alba.*

Key words: *Eclipta alba,* Microorganisms, Synthetic drugs, Ayurveda, Siddha and Unani.

INTRODUCTION

Eclipta alba is an erect or prostrate annual herb belonging to the family *Asteraceae.* The plant is bitter, hot, sharp and dry taste and grown commercially as medicinal crop in India. There are three morphotypes of this plant such as white flowering, the yellow flowering and the black fruiting where all three grows throughout India as weed in marsh, rivers and lakes or on the foothills of the Himalayas as well as in paddy fields (Sharma *et al.,* 2001). It is an active ingredient of many herbal formulations prescribed for liver ailments and shows effect on liver cell generation. It is used as tonic for debility, diuretic in hepatic and spleen enlargement, used in catarrhal jaundice and for skin diseases (Scott, 1998) and also used to treat hernias, night blindness, bronchitis and leucoderma (Kritikar and Basu, 1998). The plant is commonly used in hair oil all over India for healthy black and long hair (Nakaguchi *et al.,* 2001; Roy *et al.,* 2008). It is traditionally used for fever, cold, antiseptic, stomach ache, sperm motility (Hossan *et al.,* 2010) and popularly used to enhance memory and learning. The plant has a reputation as an antiageing agent in Ayurveda and also used to treat athlete foot, eczema and dermatitis (Jehan *et al.,* 2011).

Roots have been reported to possess emetic and purgative property (Guffin *et al.,* 1997). The tincture of this plant is used for liver and kidney problems and the leaf juice mixed with honey is also used for children with upper respiratory infections and also used for eye and ear infections

(Saxena *et al.*, 1993; Wagner *et al.*, 1986). The juice of the plant is used as a popular remedy for fever, painful swelling, anemia, dysentery, eye diseases, asthma and liver cirrhosis and it is also reported to have therapeutic potential against cardiovascular disorders. The fresh juice of leaves is used for increasing appetite, improving digestion and as a mild bowel regulator (Lans, 2007). Roots and leaves of this plant are also used to treat scabies (Sharma *et al.*, 2004). Kosuge *et al.* (1985) and Wiart *et al.* (2004) reported that the shoot extract of *E. alba* showed antimicrobial property. An aerial part of this plant was reported to cure jaundice and also possess vasorelaxant activity (Supaluk *et al.*, 2010).

Various biological activities are possessed by *E. alba* such as wedelolactone and demethylwedelolactone in leaves possess antihyperglycemic (Ananthi *et al.*, 2003), antivenom (Vianna *et al.,* 2003) and antihepatotoxic properties (Nazim *et al.,* 2010). Eclalbosaponins in aerial parts of plant has the property of antiproliferative (Khanna and Kannabiran, 2008), hair revitalizing (Rupali *et al.,* 2009), and dye (Meena *et al.,* 2010). Eclalbatin in roots possess antioxidant property (Karthikumar *et al.,* 2007). The plant possesses antigiardial, antinociceptive (Sawangjaroen *et al.*, 2005), antianaphylatic (Patel *et al.*, 2010) and antihelmintic properties also (Sujata *et al.*, 2010) and used as antimycotic drugs against infection of *Aspergillus niger* in patients with pulmonary tuberculosis (Sunita and Mahendra, 2008). Mithun *et al.* (2011), reviewed in detail about the antimicrobial, antiviral, antiinflammatory, anticancer, antiagressive, antileptospiral, antihypertensive, wound healing and immunomodulatory properties of this plant.

E.alba possesses significant antimicrobial properties and *Wedelia chinesis* is said to possess properties similar to this plant (Meena *et al.*, 2010). Alopecia is a dermatological disorder with psychological implications on patients with hair loss. *E. alba* is a well known ayurvedic herb for hair growth when compared to Minoxidil. The herbal drug trefoil, containing extracts of this plant in combination with others produces excellent results when it is administered to the patients of viral hepatitis (Roy *et al.*, 2008; Rupali *et al.*, 2009).

Antifungal activities of *Eclipta alba*

Antidandruff hair oil is a polyherbal formulation contains the extracts of *Hibiscus rosa-sinensis, Centella asiatica, Eclipta alba, Emblica officinalis and Terminalia bellerica* indicated for dandruff. The pilot study evaluated the clinical efficacy and safety of antidandruff hair oil in the management of dandruff and observed a significant reduction in itching and white scales might have been due to the synergistic action with no clinically significant adverse reactions and concluded that antidandruff hair oil is effective and safe in the management of dandruff (Vyjayanthi *et al.,* 2004). Root extracts of *Eclipta alba* was tested against many microbial pathogens and the extract showed no inhibition against all including fungal pathogens like *Candida albicans* and *Aspergillus niger* (Kumar *et al.*, 2006). Rosemary oil, *Coleus* oil, *Cassia*

alata oil, *Centella asiatica, Eclipta alba, Emblica officinalis, Terminalia bellerica*, pepper extract, neem extract and basil extract recorded significant antidandruff activity by various workers in India (Prabhamanju *et al.*, 2009; Vijayakumar *et al.*, 2006). Khanna and Kannabiran (2008) reported that saponin fractions from leaves of *Eclipta prostrata* possess antifungal activity against *Aspergillus fumigatus, Aspergillus niger and Aspergillus flavus*. Vanessa *et al.* (2009) screened ethanol extract and fractions from aerial parts of *Eclipta alba* for the antimicrobial activities against human pathogenic organisms with fluconazole as positive control. The ethanol extract was more effective than the purified fractions against both the *Trichophyton rubrum* strains and suggested that antifungal activity is not only related to demethyl-wedelolactone and wedelolactone, but also due to synergistic action between coumestrans and other compounds found in that extract.

Antifungal activity of *E. alba* crude extract against the fungal species *Aspergillus niger, Aspergillus ustus and Aspergillus ochraceus* obtained using poisoned food antifungal assay technique and reported that it is highly active for the last when compared with the standard fluconazole. Also, suggested that the organic solvent extraction is suitable to verify the antimicrobial properties of the plant (Nazim *et al.*, 2010). The ethanolic crude extracts of three plants including *E. alba* were evaluated for therapeutic potential as antimicrobial agent against eight selective standard bacteria and three fungi (*Aspergillus niger, Aspergillus flavus* and *Fusarium oxysporium*) by using filter paper disc method. Antifungal activity was found highest in *E. alba* against *A. flavus* (Priyanka and Rekha, 2010).

Ten herbs (including *Eclipta alba)* which are widely used in Ayurvedic system of medicine and are collectively known as Dashapushpam in Kerala, (India), were screened for their antimicrobial properties against nine species. Two sets of pathogenic fungi Set 1 and Set 2 were used with Nystatin and Amphotericin as standards, respectively. Results indicate that the herbal extracts involved are more effective against pathogenic fungi than pathogenic bacteria and the extract of *E. alba* was effective against *Aspergillus niger, Candida neoformans, Fusarium* and *Nocardia* sp. from set II indicates as source of potent antibiotics (Vijayan *et al.*, 2010).

This study was conducted to evaluate the antimicrobial potentials of methanol, petroleum ether, dichloromethane, ethyl acetate, butanol and water extracted samples from the aerial parts of *Eclipta alba* against nine microbial species. The antimicrobial (antibacterial and antifungal) susceptibility was screened by disc diffusion assay. Analysis of the data indicated that petroleum ether, dichloromethane and water extracted samples did not inhibit the growth of *Candida albicans* and were ineffective in controlling the growth of *C. albicans* at any concentration. The data further revealed that butanol, ethyl acetate and methanol extracted samples were more effective in controlling the growth of *C. albicans* when compared with the positive (clotrimazole) and negative (DMSO) controls (Jehan *et al.,* 2011).

The susceptibility of nine microbial species to an antimicrobial extract from *Eclipta alba* was screened using the well diffusion assay. Three different volumes (24, 30 and 36 µl/well) were tested. Analysis of the data revealed that all extracts from *Eclipta alba* showed antimicrobial activities. The data showed that dichloromethane, ethyl acetate, butanol and methanol extracts were active against *Candida albicans* at all volumes. Three fractions, such as dichloromethane, ethyl acetate and butanol, exhibited increased antifungal activities against *Candida albicans* at higher concentrations. The highest inhibition of *Candida albicans* growth was recorded for butanol (92%) at 36 µl/well followed by butanol (86%) at 30 µl/well and ethyl acetate (86%) at 36 µl/well. The antimicrobial activity of methanol and petroleum ether extracts exhibited varying degrees of inhibition of *Candida albicans* at different volumes. Petroleum ether extract did not inhibit the growth of *Candida albicans* at 24, 30 and 36 µl/well, however, growth reduction of 53% occurred at 36 µl/well concentration. The data further suggested that the petroleum ether fraction was effective only at higher volumes. Methanol extracts, on the other hand, showed the highest antifungal activity (72%) at 30 µl/well, compared with 42% and 44% inhibition at 24 or 36 µl/well, respectively (Jehan *et al.,* 2011).

Antifungal effect of methanolic extract of *Eclipta alba* was determined against four different fungal pathogens *Aspergillus niger*, *Aspergillus flavus*, *Candida albicans*, *Penicillium citrinung* using disc diffusion techniques. Significant antifungal activity was found with the methanolic extract at a concentration of 250 µg/ml (Prabu *et al.,* 2011). Solvents like methanol, acetone, petroleum ether and aqueous extract of leaves from five different plants including *Eclipta prostrata* were tested against soil borne pathogenic fungus *Bipolaris oryzae* and found that the methanolic extract showed better antifungal activity (Manimegalai *et al.*, 2011).

In vitro antimicrobial activity of crude extracts of ten medicinal plants including *Eclipta alba* tested against the isolates from immunocompromised oral cancer cases affected by the secondary infections by *Candida albicans* and *Aspergillus fumigatus* respectively. The extract of ten medicinal plants including the whole plant extracts of *Eclipta alba* in different solvents like petroleum ether, benzene, chloroform, acetone, methanol, aqueous compared with the standard ketocanozole against the clinical pathogens and found that eight medicinal plants including *E. alba* possess antimicrobial activity but less than the standard Ketoconazole (Manju *et al.*, 2011)

Antimicrobial activity of different extract of the leaves of *Eclipta alba* against the microbial cultures was checked in this study and ten fungal cultures used were *Aspergillus flavus, Fusarium dimerium, Rhizopus orizae, Mucco circinelloides, Pencillium chrysogenum, Aeromonium furcatum, Humicolo insulans, Aspergillus niger, Trichoderma ressei and Basidiomycetes* species. Antimicrobial activity was high in 15 microgram concentration of all extracts. *Eclipta alba* showed better activity in methanol extract and the second best activity was identified as chloroform and then in petroleum ether extract. The study was also supported by the similar study against dermatophytes and filamentous fungi carried out by Thenmozhi and

Rajeshwari, (2011). *In vitro* antifungal activity of extracts of this plant in various organic solvents like petroleum ether, chloroform, acetone and ethanol 95% and the standard amphotericin B and nystatin were tested against *Candida tropicalis, Rhodotorula glutinis* and *Candida albicans.* Extracts showed significant zone of inhibition with all the tested fungi and petroleum ether, chloroform, acetone extracts of *E. alba* were found to have wider antifungal activity. The phytochemical analysis revealed the presence of cardiac glycosides, sterols and flavonoids (Venkatesan *et al.,* 2004).

Eclipta alba was analyzed quantitatively and qualitatively for its phytochemicals and when tested against four different strains including *Aspergillus niger, Aspergillus fumigatus, Fusarium solani, Aspergillus flavus* showed very promising result. Crude saponins extract of *E. alba* showed good antifungal activity against *Fusarium solani, Aspergillus flavus* and *Aspergillus niger* and inactive against *Aspergillus fumigatus.* Alkaloids crude extract of *E. alba* was active against *F. solani* and *A. flavus* and inactive against *A. niger* and *A. fumigaus.* Flavonoids crude extract was active against *F. solani* and *A. flavus* and inactive against *A.niger* and *A. fumigatus* (Iqbal *et al.,* 2011). The aqueous and ethanolic extracts of the leaves of *Eclipta alba* were evaluated for their antiinflammatory and antimicrobial activity against *Staphylococcus aureus, Escherichia coli, Proteus vulgaris* and *Pseudomonas aeruginosa* as well as the fungi *Candida albicans and Aspergillus niger* by agar plate disc diffusion method. The antimicrobial screening revealed the moderate antibacterial activity and significant antifungal activity which was comparable to the activity of standard clotrimazole (Muthu *et al.,* 2011).

The polyherbal antidandruff powder which includes *Eclipta alba,* as it strengthens the hair and other nine plants was analyzed for its antifungal potential against *Candida albicans* and the results revealed that the polyherbal shampoo powder produced zone of inhibition against G (+)ve, G (-)ve and fungal organisms. This confirms that the shampoo extract has good antimicrobial activity (Suryaprabha *et al.,* 2014).

CONCLUSION

Screening of antifungal properties has been studied for some fungal strains but only few studies have been focused on the antimicrobial activity of this plant against clinical isolates. Since it has more number of uses, it is important to identify and prove its biological activity using organic solvent extracts as the active principles are either polar or non polar can be extracted only through the organic solvent extraction. There is a continuous urgent need to discover new antimicrobial compounds with diverse chemical structures and novel mechanisms of action for new and re-emerging infectious diseases. As antimicrobial products of plant origin are not associated with any side effects and have an enormous therapeutic potential to treat many infectious disease.

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A study on rainwater harvesting practices

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ABSTRACT

The term rainwater harvesting is being frequently used these days; however, the concept of water harvesting is not new for India. It is the process of augmenting the natural filtration of rainwater into the underground by artificial methods. Water harvesting techniques had been evolved and developed centuries ago. Ground water resource gets naturally recharged through percolation. But due to indiscriminate development and rapid urbanization, exposed surface of soil has been reduced drastically with resultant reduction in percolation of rainwater, thereby depleting ground water resource. Conscious collection and storage of rainwater is essential to cater the demands of water for drinking, domestic purpose and irrigation.

Key words: Rain water, Harvesting and Ground water.

INTRODUCTION

Water is one of the most important element and no creature can survive without it. Human beings could not save and conserve water, probably because of its availability in abundance. But this irresponsible attitude resulted in deterioration of water bodies with respect to quantity and quality. Now, situation has arrived when even a single drop of water matters. System of collection rainwater and conserving for future needs has traditionally been practiced in India. The traditional systems were time-tested wisdom of not only appropriate technology of rainwater harvesting, but also water management systems, where conservation of water was the prime concern. Traditional water harvesting systems were bawaries, step wells, jhiries, lakes, tanks, etc. These were the water storage bodies to domestic and irrigation demands. People were themselves responsible for maintenance to water sources and optimal use of water that could fulfill their needs.

Ground water resource gets naturally recharged through percolation. But due to indiscriminate development and rapid urbanization, exposed surface for soil has been reduced drastically with resultant reduction in percolation of rainwater, thereby depleting ground water resource. Rainwater harvesting is the process of augmenting the natural filtration of rainwater in to the underground by artificial methods. Conscious collection and storage of rainwater is therefore essential to cater the demands of water, for drinking, domestic purpose and irrigation.

Statement of problem

In the present scenario management and distribution of water has become centralized. People depend on government system, which has resulted in disruption of community participation in water management and collapse of traditional water harvesting system. As the water crisis continues to become severe, there is a dire need of reform in water management system and revival of traditional systems. A scientific and technological study needs to be carried out to assess present status so as to suggest suitable mitigate measures for the revival to traditional system/wisdom. Revival process should necessarily be backed by people's initiative and active public participation. Therefore, an analysis has been made to study the opinions of peoples towards rainwater harvesting. The objectives of the present study were to assess the impact of rainwater harvesting, to analyze the respondent's knowledge, availability and Government initiatives about rainwater harvesting and to offer suitable suggestions on the basis of findings.

METHODOLOGY

The researcher was concerned with the study on the opinion of the respondents about rainwater harvesting.Sivakasi is one of the well known cities in India was selected for the present study. Since the population of Sivakasi is large the judgment sampling method was applied in a systematic way to collect data from 70 respondents. The primary data was collected using a structured questionnaire and the opinion of the respondents about rainwater harvesting was recorded. The secondary data was obtained from the records of municipal corporation, journals, magazines and websites. For data analysis percentage was used as statistical tool for the present study.

Period of study

The researcher has collected the data relating during the period of 6 months from April 2014 to October 2014.

RESULTS AND DISCUSSION

The educational level of the respondents this investigation was studied and tabulated in Table 1.

Table 1: Educational status of the respondents

S.No	Educational level	No. of respondents	Percentage (%)
1	Up to 12th	25	35.71
2	Degree	30	42.86
3	PG	8	11.43
4	Illiterate	7	10.00
	Total	70	100

Source: Primary Data

Table 1 shows that out of 70 respondents, 42.86 per cent of the respondents were degree holders, 35.71 per cent of the respondents were coming under the category of up to school level, 11.43 per cent of the respondents were post graduates and the remaining 10.00 per cent of the respondents were illiterates.

Employment status of the respondents, is depicted in table 2.

Table 2: Employment status of the respondents

S.No	Occupation wise classification	No. of respondents	Percentage (%)
1	Business	13	18.57
2	Government employee	17	24.28
3	Private employee	14	20.00
4	Coolie	17	24.28
5	Agriculture	9	12.87
	Total	70	100

Source: Primary Data

It is clear from the Table 2 that 24.28 per cent of the respondents were coolies and another 24.28 per cent of the respondents were government employees, 20.00 per cent of the respondents were private employees, 18.57 per cent of the respondents were businessman and the remaining 12.87 per cent of the respondents were agriculturist.

The monthly income level of the respondents were shown in Table 3.

Table 3 :Monthly income level of the respondents

S.No	Monthly income (in Rupees)	No. of respondents	Percentage (%)
1	Up to Rs 10,000	20	28.57
2	Rs 10,000 to Rs 15,000	16	22.86
3	Rs 15,000 to Rs 20,000	22	31.42
4	Above Rs 20,000	12	17.15
	Total	70	100

Source: Primary Data

The table indicates that the 31.42 per cent of the respondents earn monthly income group of Rs 15,000 to Rs 20,000, 28.57 per cent of the respondent's monthly income was up to Rs 10,000, 22.86 per cent of the respondent's monthly income was Rs 10,000 to Rs 15,000 and the remaining 17.15 per cent of the respondent's monthly income group of above Rs 20,000. It is understood that most (31.42%) of the respondents monthly income was Rs 15,000 to Rs 20,000.

Table 4 shows the data regarding ownership of house.

Table 4: Ownership of the house

S.No	House wise classifications	No. of respondents	Percentage (%)
1	Owned house	51	72.85
2	Rented house	19	21.15
	Total	70	100

Source: Primary Data

Table 4 shows that, out of 70 respondents, 72.85 per cent of the respondents were having owned house and the remaining 21.15 per cent of the respondents were in rented house. The knowledge of respondents about the rainwater harvesting, was analysed and the results was presented in Table 5.

Table 5: Knowledge about the rainwater harvesting

S.No	Knowledge about rainwater harvesting	No. of respondents	Percentage (%)
1	Yes	46	65.71
2	No	24	34.29
	Total	70	100

Source: Primary Data

Table 5 shows that, out of 70 respondents, 65.71 per cent of the respondents had the knowledge on rainwater harvesting and the remaining 34.29 per cent of the respondents had no knowledge about rainwater harvesting.

Table 6 shows the awareness of respondents on advertisement about rainwater harvesting.

Table 6: Awareness of respondents on advertisement about rainwater harvesting

S.No	Particulars	No. of respondents	Percentage (%)
1	Aware	38	54.28
2	Unaware	32	45.72
	Total	70	100

Source: Primary Data

Table 6 depicts that out of 70 respondents, 54.28 per cent of the respondents were aware of the advertisement of rainwater harvesting and the remaining 45.72 per cent of the respondents were unaware about the advertisement of rainwater harvesting.

The availability of the facilities for rainwater harvesting in their houses was studied and tabulated below.

Table 7: Facility of rainwater harvesting in house

S.No	Particulars	No. of respondents	Percentage (%)
1	Available	46	65.71
2	Not-available	24	34.29
	Total	70	100

Source: Primary Data

Table 7 indicates that out of 70 respondents, majority (65.71%) of the respondent's house were facilitated with rainwater harvesting and the remaining 34.29 % of the respondents house were not facilitated with rainwater harvesting.

The study was conducted to analyse the reasons for rainwater harvesting in house.

Table 8: Purpose of rainwater harvesting

S. No	Particulars	No. of respondents	Percentage (%)
1	To increase ground water level	22	47.82
2	To get government facilities	5	10.87
3	Compulsion of local bodies	4	8.70
4	To face water scarcity	10	21.73
5	Any other	5	10.88
	Total	46	100

Source: Primary Data

Table 8 express that, 47.82 per cent of the responden's house were facilitated with rainwater harvesting to increase ground water level, 21.73 per cent of the respondents house were facilitated with rainwater harvesting to face water scarcity, 10.87 per cent of the respondents were having house facilitated with rainwater harvesting to get Government facilities, 10.88 per cent of the respondents house were facilitated with rainwater harvesting for some other purposes and the remaining 8.70 per cent of the respondents house are facilitated with rainwater harvesting for the compulsion of local bodies.

It is clear from the Table 8 that most (47.82%) of the respondents house are facilitated with rainwater harvesting to increase ground water level.

Table 9 shows the person who initiated to the fix rainwater harvesting system in the house.

Table 9: Initialization of rainwater harvesting

S. No	Initiators	No. of respondents	Percentage (%)
1	Initialization	16	34.79
2	Government/Local bodies	15	32.60
3	Friends and neighbour	8	17.40
4	Advertisement	7	15.21
	Total	46	100

Source: Primary Data

Table 9 clearly exhibits that out of 46 respondents, 34.79 per cent were self initiators, 32.60 per cent of them were initiated by Government and local bodies, 17.40 per cent were initiated by friends and neighbours and the remaining 15.21 per cent were initiated by advertisement. It is clear that majority (34.79%) of the respondents were self initiators.

The present research work has analyzed the benefits of rainwater harvesting. Table 10 depicts the opinion of respondents about rainwater harvesting.

Table 10: Benefits of rainwater harvesting

S. No	Particulars	No. of respondents	Percentage (%)
1	Known	57	81.42
2	Not known	13	18.58
	Total	70	100

Source: Primary Data

From Table 10, it is evident that out of 70 respondents, 81.42 per cent of the respondents know the benefits of rainwater harvesting and the rest (18.58 per cent) of the respondents were not known the benefits of the rainwater harvesting.

It is inferred that majority (81.42%) of the respondents have known the benefits of rainwater harvesting.

The study was also conducted to know whether the respondents need advice with regard to rainwater harvesting and the data obtained is shown in table 11.

Table 11: Advice for rainwater harvesting

S. No	Particulars	No. of respondents	Percentage (%)
1	Need	46	65.71
2	No need	24	34.29
	Total	70	100

Source: Primary Data

Table 11 reveals that out of 70 respondents, 65.71 per cent of the respondents felt that they are in need of advise regarding rain water harvesting and remaining 34.29 per cent of the respondents expressed that the advice is not necessary.

Further, the investigation was done to identify the need of financial support for rainwater harvesting. Table 12 shows whether the respondents expect the financial support or not.

Table 12: Financial support for rainwater harvesting

S. No	Particulars	No. of respondents	Percentage (%)
1	Expect	21	30
2	Not expect	49	70
	Total	70	100

Source: Primary Data

It is vivid that, majority (70.00 per cent) of the respondents do not need any financial support and the remaining 30 per cent of the respondents need financial support.

Table 13 shows the opinion of respondents about the importance of rainwater harvesting.

Table 13: Importance of rainwater harvesting

S. No	Particulars	No. of respondents	Percentage (%)
1	Favourable	58	82.83
2	Unfavourable	12	17.17
	Total	70	100

Source: Primary Data

A vast majority of the respondents (82.83 per cent) felt that the rainwater harvesting is more important and the remaining 17.17 per cent of the respondents feel that it is not important one.

The information regarding the involvement of Government in rainwater harvesting was collected and tabulated. Table 14 shows the opinion of respondents about Government involvement in rainwater harvesting.

Table 14: Government involvement in rainwater harvesting

S. No	Particulars	No. of respondents	Percentage (%)
1	Satisfied	45	64.29
2	Dissatisfied	25	35.71
	Total	70	100

Source: Primary Data

From Table 14, it is understood that 64.29 per cent of the respondents were satisfied with the Government involvement in rainwater harvesting and 35.71 per cent of the respondents were not satisfied with Government involvement.

It is inferred that the majority (64.29%) of the respondents were satisfied with Government involvement.

FINDINGS OF THE STUDY

The researcher has summarized major findings of the study

- It is found that most (42.86%) of the respondents were degree holders.
- Most (24.28%) of the respondents were coolies and another (24.28%) of the respondents were government employees.
- Most (31.42%) of the respondents monthly income level was between 15,000 to 20,000.
- Majority (72.85%) of the respondents were having owned house.
- Majority (65.71%) of the respondents were aware of rainwater harvesting.·

- Majority (54.28%) of the respondents were seen the advertisement of rainwater harvesting.

- Majority (65.71%) of the respondent's house were facilitated with rainwater harvesting.

- Most (47.82%) of the respondents were having house facilitated with rainwater harvesting to increase ground water level.

- Most (34.79%) of the respondents were self initiators.

- Majority (81.42%) of the respondents knew the benefits of rainwater harvesting.

- Majority (70.00%) of the respondents do not need any financial support.

- Majority (82.83%) of the respondents were felt that rainwater harvesting is not of much importance.

- Majority (64.23%) of the respondents were satisfied with the Government involvement in rain water harvesting.

SUGGESTIONS

After having a thorough analysis, the following suggestions were made to improve the awareness of rainwater harvesting.

- The Government of India could provide sufficient channel of advertisement about rainwater harvesting and also conduct the awareness campaign.

- The Government may provide sufficient financial initiatives to the public for rainwater harvesting, especially who are under poverty.

- The people are advised to grow tree as most of the respondent's study area had no sufficient rain.

- The city club and association are advised to make arrangements and offer suggestions to the public, who are not having the rainwater harvesting in their home.

CONCLUSION

The present study reveals that the respondents from Sivakasi city Tamil Nadu were aware of rainwater harvesting system and its benefits. The rainwater harvesting is most essential to cater the needs of the people and society. The Government has insisted the public to make arrangements in their homes to save the rainwater. At the same time, the Government may provide sufficient financial initiatives and offer suggestions to public regarding rainwater harvesting.

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Molecular diagnosis of mupirocin resistant *Staphylococcus aureus* from different wound samples

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ABSTRACT

Mupirocin resistance in *Staphylococcus aureus* is increasingly being reported in many parts of the world. This study describes laboratory characterization and mupirocin resistant activity of *Staphylococcus aureus* strains. Different types of wound swab samples were collected. All the samples were analyzed for the isolation of *Staphylococcus aureus* using the selective media Mannitol Salt agar (MSA) and biochemical tests. All isolates of *Staphylococcus aureus* were characterized by coagulase test with human plasma. PCR was done to detect the presence of the mupA gene. For strains with mupA, plasmid DNA was extracted to detect high-level mupirocin resistant gene. A total of 18 isolates were identified. These results indicate that the incidence of low-level Mup^r is present among strains of *Staphylococcus aureus* and that low-level Mup^r is recovered from patients with distinct clinical and molecular characteristics.

Key words: *Staphylococcus aureus*, Mupirocin resistance and Coagulase test.

INTRODUCTION

A wound is the area where the skin has been opened by a surgery, a cut, development of a sore, or a burn. Even with sterile techniques for surgery and wound treatment, infection can still develop. Once infection sets in, bacteria populate and rapidly multiply in the wound (Adekunle *et al.*, 2011). Mupirocin (pseudomonic acid A) is an analogue of isoleucine, which competitively binds to isoleucyl-tRNA synthetase (IRS) inhibiting protein synthesis. Inhibition of isoleucyl-tRNAsynthetase (IRS) is irreversible and time dependent, suggesting that the mupirocin–isoleucyl-tRNAsynthetase (IRS), complex is highly stable (Finlay *et al.*, 1997). The objective of the present work was to isolate and characterise mupirocin resistant the molecular diagnosis of mupirocin resistant *Staphylococcus aureus* from different wound samples were studied. Low level mupirocin resistance gene can be observed from chromosomal DNA and high level mupirocin resistance gene can be observed from plasmid DNA.

MATERIALS AND METHODS

Collection of samples

Purulent materials were collected aseptically with the aid of sterile swab sticks from

patients with different wound infection at Nagercoil area . The samples were properly labeled indicating the source, date, time of collection, sex, age of patients and the samples were transported in cooler boxes to the microbiology laboratory for bacteriological investigations within 4 – 6 hours of collection.

Bacterial isolation and identification

Culture plates of nutrient agar and mannitol salt agar were used. The swab sticks used for sample collection and the samples were streaked directly on the labeled agar plates and incubated at 37^0C for 24 hours. After incubation, cultures were examined for significant growth. Subcultures were then made into plates of nutrient agar and incubated for another 24 hours. Strains that produced yellow colonies on mannitol salt agar were confirmed as *S. aureus.* The primary identification of the bacterial isolates was made based on colonial appearance and pigmentation.

Gram staining and selected biochemical tests were performed to identify microbes.

Slide coagulase test

Slide coagulase is used to demonstrate bound coagulase, is otherwise known as clumping factor. Two circles were drawn on the slide using the marking pen. The circles were drawn as far apart as possible so as to keep the suspensions separate and to mix each of the suspensions. With a sterile dropper, a drop of saline is placed into one circle on the appropriate end of the slide. The saline served as control to verify that the strain does not auto agglutinated and clumped with itself instead of being easily emulsified. Using a sterile dropper, a small drop of reconstituted plasma is placed into another circle on the opposite end of the slide. With a sterile inoculation loop, cells from one colony was collected and emulsified in the saline and then in the drop of plasma. The slide was observed for clumping within 10 seconds of adding the bacterial cells to the plasma.

Coagulase tube test

The test tube with the organism to be tested was labeled.   Using a pipette, 0.5 ml of diluted rabbit plasma (1:10) was aseptically transferred into the test tube. To the tube 0.1ml of overnight broth culture of test bacteria was added and were emulsified and placed in the incubator. All the tubes were incubated at 37 ^{0}C and observed up to 4 h. Clot formation within 4 h is interpreted as a positive result and is indicated by gelling of the plasma, which remains in place even after inverting the tube.   If no clot is observed by the end of 4 h, the test may be continued with an overnight incubation at room temperature and a final observation at 24 h. The positive control organism should exhibit clotting by the end of 24 h, while the negative control organism should not.

Determination of low-level mupirocin resistant *S. aureus*

Isolation of genomic DNA

Precisely 1.5 ml of overnight broth culture *(S. aureus)* was taken in 2 ml micro centrifuge tubes and centrifuged at 8000 rpm for 5 minutes. After centrifugation, the supernatant was discarded and the pellet was suspended in 200μl of 1X TE buffer + 100μl of 10% SDS and mixed by vortexing. The tubes were kept in water bath at 60°C for 20 min. Then the tubes were added with 300μl of phenol: chloroform: isoamyl alcohol mixture (24:25:1) to extract the DNA and mixed completely by vortexing. The tubes were then centrifuged at 10000 rpm for 10 min to separate the phases. The aqueous phase containing the DNA was carefully removed and transferred to new tubes. Then equal volume of 100% isopropanol was added to the tubes containing aqueous phase and mixed by inverting the tubes. Then the tubes were centrifuged at 10000 rpm for 10 min, the supernatant was discarded and the pellet was collected. 200μl of 70% ethanol was added to the pellet, and centrifuged at 10000 rpm for 10 min. Ethanol was decanted completely and the pellet was air-dried. The dried DNA pellet was re-suspended in 20μl of TE buffer and dissolved by tapping. DNA was confirmed by agarose gel electrophoresis.

Polymerase chain reaction (PCR)

All isolates of *S. aureus* were subjected to PCR assay (Strommenger, 2003).

Each PCR reaction mixture (20 μl) contained 1 μl of template DNA (genomic DNA), 2 μl of 10 X PCR buffer, 0.5 μl of 2.0 mM of each primer, F MupA (5′ ___3′), R Mup B (5′ ___3′), 1 μl of 25 mM of each deoxynucleotide triphosphate and 0.5 μl of Taq DNA polymerase (5U/ μl) and 15.5 μl of molecular grade water. The amplification condition adopted is given in table 1.

Table1: Amplification condition

Steps	Temperature (^{0}C)	Time
Initial denaturation	94^{0}C	30s
Annealing	64^{0}C	30s
Extension	72^{0}C	1min
Denaturation	94^{0}C	30s
25 cycles were repeated		
Final extension	72^{0}C	10min

This yields 456 base pair products.

Analysis of amplified products

At the end of the reaction, 5 μL of the final PCR product was analysed by electrophoresis on 2% agarose gel stained with ethidium bromide at 100 V (45 mA) for 1 h and visualized on UV trans illuminator. To estimate the molecular weights of fragments, a 100-bp molecular weight ladder was run on each gel. The size of the diagnostic fragment amplified with these primers was detected.

RESULTS AND DISCUSSION

Experiments were conducted on the prevalence of mupirocin resistant wound isolates of *S. aureus*. In the present study patients with different types of wound swab samples were collected and the isolated *S. aureus* were screened from the different types of wound infection.

Identification of low level mupirocin resistance gene from genomic DNA

Among 18 isolates, 14 isolates were known to possess mupirocin resistant gene (Plate 1 and Table 2).The skin infection isolates showed highest resistant activity (83.3%) followed by accident wound infection (77.7%). Iisolates from burn sample showed 66.6% resistant activity.

Table 2: Mupirocin resistance activity of *S. aureus*

S.No	Isolate Name	Mupirocin LLR	Mupirocin HLR
1	AS1M	+	-
2	AS2F	+	-
3	AS3F	+	-
4	AS4M	-	+
5	AS5M	+	-
6	AS6M	+	-
7	AS7M	-	+
8	AS11M	+	-
9	AS16F	+	-
10	SS17F	+	-
11	SS18F	+	-
12	SS21M	+	-
13	SS22M	-	+
14	SS27M	+	-
15	SS29M	+	-
16	BS33M	-	+
17	BS35F	+	-
18	BS44F	+	-

Note: Mupirocin LLR -low level resistance, Mupirocin HLR-high level resistance.

Plate 1: Amplification of low-level gene from genomic DNA
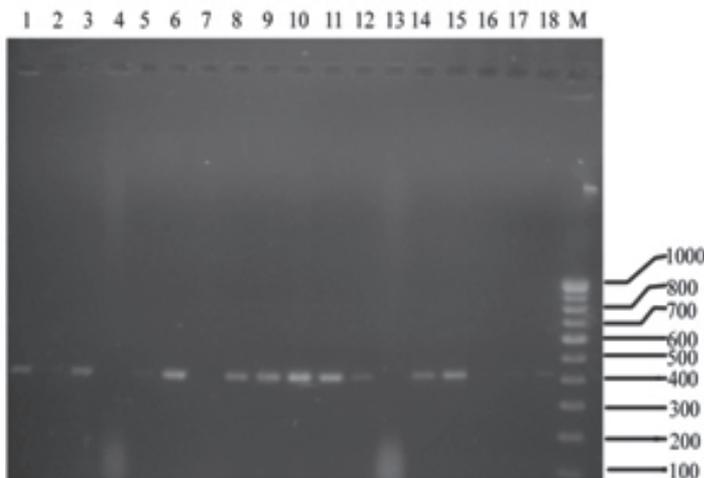
Lane: 1-AS1M, Lane: 2-AS2F, Lane:3-AS3F,Lane: 4-AS4M,Lane: 5-AS5M,Lane: 6-AS6M,

Lane: 7-AS7M, Lane: 8 AS11M, Lane: 9-AS16F, Lane: 10-SS17F, Lane: 11-SS18F, Lane: 12-SS21M,

Lane: 13-SS22M, Lane: 14-SS27M, Lane: 15-SS29M, Lane: 16-BS33M,Lane: 17-BS35F,

Lane: 18-BS44F, Lane: M- 100 bp DNA lader

Mupirocin is an antimicrobial agent, which is used for the treatment of skin and postoperative wound infections. Low and high level mupirocin-resistant *S. aureus* isolates obtained from Nagercoil area were characterised. Mupirocin-resistant strains are divided into two groups: low and high level resistance. Low level mupirocin resistance appears to be more prevalent in clinical isolates than high level resistance. In the present study, out of 18 isolates, 14 isolates were found to be mupirocin resistant. These results were observed from chromosomal DNA that indicates as low-level resistance. High-level mupirocin resistance also observed in the study with low incidence. The result coincides with the findings of Franz *et al.* (1998), Deshpande (2000) and Adebayo (2009).

The use of mupirocin is limited and it is only used for controlling the spread of methicllin resistant *S. aureus* (MRSA). The low incidence of mupirocin-resistant *S. aureus* is due to the limited methicillin resistance *S. aureus* (MRSA) exposure to mupirocin and any subsequent development of resistance. In the present study all the isolates of *S. aureus* were subjected to PCR assay. Among the 18 isolates, 14 isolates showed low-level mupirocin resistance which is clearly indicated in the PCR analysis of genomic DNA. The four isolates which failed to show positive

result in PCR for low level mupirosin resistance gene was subjected to plamid analysis which clearly indicated the presence of high level mupirosin resistant gene.

CONCLUSION

S. aureus is a Gram positive cocci in clusters. They cause a variety of superficial and deep seated infection in human. In the present study molecular diagnosis of mupirocin resistant *S. aureus* obtained from different wound samples from Nagercoil area were evaluated. Among 18 isolates, 14 isolates possessed low level mupirocin resistant gene and 4 high level resistant gene.

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Consumer satisfaction and effectiveness of online advertisement study with reference to Sivakasi Taluk

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ABSTRACT

The evolution of the internet has provided a new communication tool for people all over the world to access a vast amount of data and resources from any geographical location. The internet has experienced widespread adoption of new technology and has introduced new and interactive opportunities for integrated marketing communication into the company-customer relationship. Traditional advertising agencies are being forced to adopt interactive marketing strategies in order to fulfill their clients in online marketing. This study investigates internet-based advertising and explores the potential of the internet as a promotional tool. The data were collected from the 140 respondents, who are using the online. The judgment sampling method was applied to select the respondents. The desire and attractiveness of the online advertisement makes the consumer satisfaction. The data were statistically analyzed through SPSS and suggestions enlightens on the basis of findings of the study.

Key words: Internet, Consumer satisfaction, Advertisement and Online marketing

INTRODUCTION

Advertising is an important aspect of the brand communication to connect with the consumers. There are several modes to communicate wit the consumers, and digital advertising is one among them. It is a relatively new mode to promote brands by using the Internet, mobile and other channels. It is a practice of promoting products and services using digital distribution channels to reach consumers in a timely, relevant, personal and cost-effective manner. Digital advertisement includes many of the techniques and practices contained within the category of internet marketing. With the internet becoming accessible by mobile phones now, the internet is becoming all pervasive to the consuming class. Previously seen as a stand-alone service in its own right, it is frequently being seen as a domain that can and does cover most, if not all, of the more traditional marketing areas such as direct marketing by providing the same method of communication with an audience, but in a digital fashion. Some companies created success

stories through the usage of the internet marketing, that it has made a large number of organizations motivated to harness the potential of internet marketing. Advertising on the internet is distinctive because of its ability to be interactive and enables potential and existing customers to customize their viewing behavior. In some product categories, which are digital in nature, the usage of the internet is well documented.

PROBLEM OF THE STUDY

Online advertising is the means of promoting a product on the internet while using various internet features. With the arrival of the internet, the business world has become digitalized and people prefer to buy stuff on online, which is easier and faster. Online advertising, otherwise known as e-advertising, gives a new dimension and unique charm to the product, which is an added advantage. The primary benefit of the online advertising over traditional form of advertising is that it surpasses all geographical boundaries, which cannot be gained locally. This leads to great progress in business, which is the ultimate aim of any businessman. Online advertising has no time limitations and can be viewed day and night throughout the globe. It also reduces the transaction cost and contributes to the profit of the company and is secure in completion against international marketing. The owner is much more satisfied because a secure business is more beneficial and reliable. Certainly, online advertising is one step ahead over others and helps to keep pace with the fast-changing world.

Internet is one of the important media that own all kinds of features, which implies a great potential and a powerful advertising medium for the future. Internet has a better impact than traditional media in the features like format variety, attraction and preserve ability. Furthermore, Internet is the only medium so far which owns the feature of interactivity that creates lots of new communication opportunities and possibilities that were unable to be achieved in the past because of the limitation of media technologies. In spite of these, the online advertisement is effective in influencing the potential buyers in modern era. Therefore, the researcher has made an attempt to analyze the effectiveness of online advertisement on purchase behavior of consumers. With that aim, the present study was carried out to assess the effectiveness of online advertising on purchasing behavior, to study the satisfaction of respondents towards online advertising and to offer suitable suggestions to improve the effectiveness of online advertising.

METHODOLOGY

Hypotheses

The researcher has framed the following hypotheses to fulfill the above mentioned objectives.

H_0: Consumer satisfaction is not positively related to attractiveness of the online

advertisement.

H_0: Consumer satisfaction is not positively related to interest of the online advertisement.

H_0: Consumer satisfaction is not positively related to desire of the product through online advertisement.

H_0: Consumer satisfaction is not positively related to action taken by the respondents towards online advertisement.

Sources of data

The primary data were collected by preparing an interview schedule and were collected directly from the internet user of various browsing centers in Sivakasi. The secondary data needed for the study was collected from various books, journals, magazines, related research report and search engines.

Sampling design

The scope of the study was limited to Sivakasi area. The populations of online users were infinite in numbers. The researcher has adopted judgment sampling method for selecting the internet users in Sivakasi. The sample size for the study was 140.

Analytical framework

The researcher analysed the opinions of user towards online advertising. Many variables were observed. To know the opinions of the respondents about online advertising effectiveness and satisfaction the Likert's five point scaling techniques applied (the scaling options like strongly agreed to strongly disagree each parameter score allotted for 5 to 1). To know the reliability of the statement Cronbach's alpha test was applied. The value of Cronbach's alpha is more than 0.7, it may be more reliable. The alpha values for two statements such as level of satisfaction of internet advertisement and effectiveness of the online advertisement are to be 0.898 and 0.851. To know the consumer perception towards online advertising and its effectiveness, regression analysis was adopted to find which independent variable almost identifies the dependent variable. In regression analysis those factors that were related to online advertising were treated as independent variable and satisfaction was considered to be dependent variable.

RESULTS AND DISCUSSION

Level of satisfaction on internet advertisement

The level of satisfaction on various elements was broadly analyzed on the basis of highly satisfied, satisfied, no opinion and not satisfied. The result is expressed based on the opinion of

the internet users in the following table.

Table 1: Satisfaction on internet advertisement

S.No	Particulars	SA	A	NO	DA	SDA	TOT	Cronbach's alpha
1	Getting information about various products and services	35	69	7	21	8	140	
2	Attractive and creativity	47	57	18	8	10	140	0.89
3	Advertisements of reputed companies and websites while browsing internet	51	83	1	3	2	140	
4	Advertisements on internet are intrusive and distract the attention of the internet users	55	23	17	21	24	140	
5	Trust the advertisements on internet as they provide correct information	19	63	29	12	17	140	
	Total	207	295	72	65	61	700	
	Percentage (%)	29.57	42.14	10.28	9.29	8.72	100	

Source: Primary Data

SA = Strongly Agree A = Agree NO = Neither Agree or Disagree DA = Disagree SDA = Strongly Disagree

From Table 1 it is found that, 42.14 percent of the internet users strongly agree with the various elements on effectiveness of internet advertisement, followed by 29.57 per cent of the internet users who agree with the various elements on internet advertisement, 10.28 percent of the internet users have expressed no opinion on it, 9.29 per cent of the internet users have expressed disagree on it and the remaining 8.72 percent strongly disagree about the various elements found in their job.

Effectiveness of the online advertisement and consumer satisfaction

In addition to fueling the impulse to purchase, consumers rely increasingly on the internet as a source of information and a medium for preferred their purchase. Internet users believe that online advertising play a key role in the purchasing process. Online advertising is proving to be an effective means for create the brand advertisement makes the consumers to purchase the product. Therefore, the five point scaling technique is used to measure the consumer perception towards online advertising and its effectiveness. Hence the researcher applied the regression analysis to find which independent variable almost identifies the dependent variable.

Table 2: Effectiveness of the online advertisement

Statement	SDA	DA	A or DA	A	SA	Total	Cronbach's alpha
Online advertisement attracts me	11	55	15	28	31	140	
Online advertisement arouse interest in the product/ service	33	27	18	45	17	140	
Online advertisement tune the mindset to purchase a particular product	23	15	14	60	28	140	0.851
Online advertisement initiates necessary action to purchase the product	37	56	9	15	23	140	
Satisfied with purchasing of a product/consumption of service through online	7	13	35	57	28	140	

Source: Primary Data

SA = Strongly Agree A = Agree DA = Disagree SDA = Strongly Disagree

Table 2 shows respondents opinion about effectiveness of the online advertisement and perceived satisfaction towards purchasing of a product/service through online. In addition, the researcher has applied the regression analysis to identify which factor is latent for consumer satisfaction. For that purpose first four statements were assigned as independent variable and the fifth variable was treated as dependent variable. The following table discloses the summary of regression analysis.

Table 3: Model summary[b]

Model	R	R^2	Adjusted R^2	Std. error of the estimate
1	0.671[a]	0.450	0.441	0.90869

a = Predictors (Constant), Factor 4,2,1,3

b = Dependent Variable: Satisfaction

The above table gives the R value for assessing the overall fit of the model. The adjusted R^2 values in this case was 0. 441. This indicates that the four instrumental variable in the model account for 44.1% variance in dependent variable - Satisfaction of the respondents.

Table 4: Coefficients[a]

Model	Unstandardized Coefficients B Std.Error		Standardized Coefficient Beta	t	Significance	H_0 or H_1
Satisfaction (constant)	0.655	0.189	-	3.458	0.001	

Factor 1	0.264	0.068	0.251	3.882	0.000	H_1
Factor 2	-0.004	0.069	-0.004	-0.058	0.954	H_0
Factor 3	0.482	0.073	0.454	6.629	0.000	H_1
Factor 4	0.066	0.063	0.064	1.045	0.297	H_0

a.Dependent variable: Satisfaction

From table 4 the independent variable such as factor 3 were highly influenced followed by   factor 1 and also that these factors were statistically significant ($p<0.05$), where as other factors were not significant ($p>0.05$). These regression coefficients can be used to construct an Ordinary Least Squares (OLS) equation.

The OLS equation for consumer satisfaction is as follows:

Satisfaction $=0.655 + 0.264*$ Factor 1 $- 0.004*$ Factor 2 $+ 0.482*$ Factor 3 $+0.066*$Factor 4.

The consumers' satisfaction is highly influenced by the factors desire and attraction; at the same time the other factor such as factor 2 and factor 3 were found to be -0.004 and 0.482, but not statistically significant. Hence, the consumer satisfaction is positively associated with desire and attractiveness of the online advertising. Therefore the framed two null hypotheses were alone accepted. It makes the consumer satisfaction towards online purchasing. The above details are presented with the following figure.

Figure1: Regression analysis
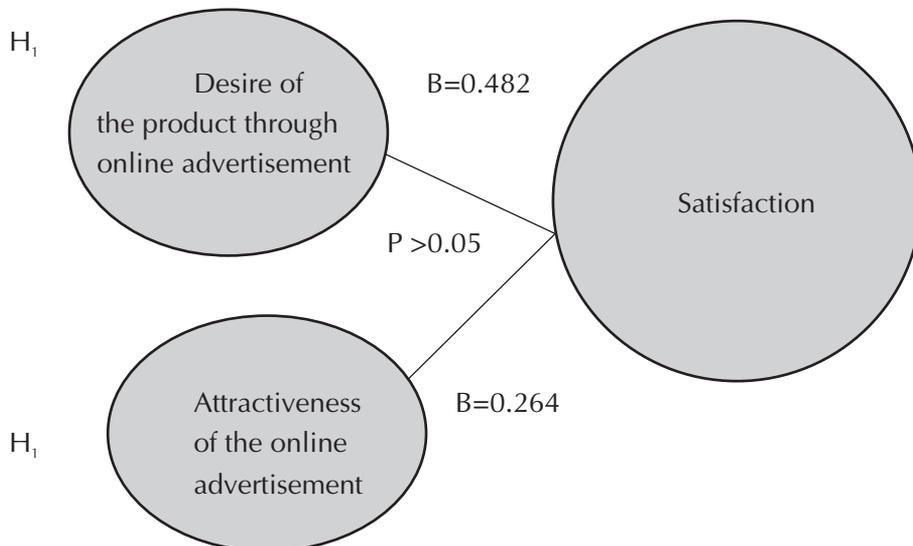
SUGGESTIONS

- During the course of investigation, the influencing factors regarding to the purchase of the product was analysed and the majority of the respondents were influenced by attractive and animation effect, it is suggested that the advertising agency can provide the advertisement with the effect of both attractive and animation oriented.

- The advertiser should avoid misleading advertisement about the product or service.

- The advertiser may give interactive advertising facility for providing enough details regarding the product details, company details, online shopping and so on.

CONCLUSION

The introduction of both online and offline advertising as the penetration of internet is growing day by day. This study provides an insight into the effectiveness of internet advertisement and satisfaction of the users towards online purchasing system. From the findings of the study it can be concluded that presently internet users have a positive attitude towards internet advertising. On the other hand the online user satisfaction is dependent on the effectiveness of the online advertisement, especially desire of the product and attractiveness of the online advertisement.

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A study on the financial performance of cotton textile industries in Tamil Nadu

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ABSTRACT

The cotton textile industry occupies a very important position in the Indian economy next to agriculture sector in India. The textile industry has generated huge employment for both skilled and unskilled labour and continues to be the second largest employment generating sector in India. It offers direct employment to over 35 million people in the country. The present study aims to analyse the financial position in terms of liquidity and solvency, to trace out the profitability and efficiency position and to study the leverage position of the selected industry.

Key words: Textile industry, Indian economy and Employment.

INTRODUCTION

Financial statement analysis is a preliminary step towards the final evaluation of the results drawn by the analyst or management accountant. Management makes analysis or evaluation of such results thereafter. Evidently financial analysis is the end of a continuous accounting cycle, which starts with the classification, recording, summarizing presentations and analysis of data and ends with the interpretation of results obtained from ratio analysis thereof. Much can be learned about business performance and financial position through the analysis of financial statements. The analysis of financial statement spot lights the significant facts and realizations concerning managerial performance, corporate efficiency, financial strength, weakness and credit worthiness. The techniques of financial analysis is frequently applied to the study of accounting data with a view to determining continuity or discontinuity of the operating policies, investment values of the business, credit rating and testing the efficiency of operations. The objectives of the study were to analyze the financial position of the selected industry measured in terms of liquidity and solvency, to trace out the profitability and efficiency position and to study the leverage position of the selected industry.

METHODOLOGY

The present study aims to analyse the financial performance of cotton textile industry in Tamil Nadu with the help of financial ratios. In order to analyze the performance of cotton spinning and weaving industry, the period of 2006-2010 has been redrafted to suit the requirements of the study. The following industries were selected on the basis of turnover more

than Rs.50 crores. The industries selected were Patspin India Ltd, K G Denim Ltd, Rajapalayam Mills, Sambandam Spinning Mills, Super Sales India Ltd, Kandagiri Spinning Mills, Tamilnadu Jai Bharath Mills, VTM Ltd, Srinachammai Cotton Mills, Sri Lakshmi Saraswathi Textiles, Sri Ramakrishna Mills and Lambodhara Textiles.

The research design adopted for the present study was descriptive in nature as the study aims at narration of facts regarding the financial position of the unit concerned. The secondary data was obtained from financial reports, old records (balance sheet, profit and loss account), internet and auditor reports for the period of 5 years from 2006-2010.The financial year starts from 1st April and extends up to 31st March. The statistical tools used for the present study was ratio analysis and one-way ANOVA.

RESULTS AND DISCUSSION

The Current ratio, Debt - equity ratio and Net profit ratio analysis from the year 2006 to 2010 for the selected cotton textile industries are shown in table 1 to determine their improvement or deterioration or no change over the period.

Table 1: Current ratio, Debt-equity ratio and Net profit ratio of the selected industries from the year 2006 to 2010

	Year	Current Ratio	Debt to equity Ratio	Net Profit Ratio		Year	Current Ratio	Debt to equity Ratio	Net Profit Ratio
Patspin India Ltd	2006	1.17	0.99	125.70	**KG Denim Ltd**	2006	0.53	0.35	0
	2007	1.48	1.58	125.17		2007	0.58	0.43	0
	2008	1.56	4.87	97.00		2008	0.59	0.39	0
	2009	1.04	11.35	101.02		2009	0.63	0.04	0
	2010	1.35	11.52	116.83		2010	0.71	1.01	0
	Mean	1.32	6.06	113.14		Mean	0.61	1.244	0
	SD	0.22	5.12	13.45		SD	0.066	1.770	0
	Year	Current Ratio	Debt to equity Ratio	Net Profit Ratio		Year	Current Ratio	Debt to equity Ratio	Net Profit Ratio
Rajapalayam Mills Ltd	2006	1.83	2.14	234.57	**Sambandam Spinning Mills Ltd**	2006	1.23	4.24	214.83
	2007	1.80	2.19	294.60		2007	1.04	4.66	158.28
	2008	1.70	2.68	291.49		2008	1.46	4.90	391.54
	2009	1.01	3.36	221.27		2009	1.02	5.32	156.85
	2010	1.25	2.81	308.77		2010	1.18	4.74	195.17
	Mean	1.52	2.64	270.14		Mean	1.19	4.77	223.33
	SD	0.37	0.50	39.37		SD	0.18	0.39	97.22

A study on the financial performance of cotton textile industries in Tamil Nadu

	Year	Current ratio	Debt to equity ratio	Net Profit Ratio		Year	Current Ratio	Debt to equity ratio	Net Profit Ratio
Super sales India Ltd	2006	1.55	1.56	140.44	**Kandagiri Spinning Mills Ltd**	2006	1.23	4.24	110.75
	2007	1.57	2.02	200.00		2007	1.04	4.66	145.29
	2008	1.57	1.95	146.43		2008	1.46	4.90	183.59
	2009	1.76	1.55	192.45		2009	1.02	5.32	134.62
	2010	1.91	1.21	192.44		2010	1.18	4.74	150.67
	Mean	1.67	1.66	174.35		Mean	1.19	4.77	144.98
	SD	0.16	0.33	28.47		SD	0.18	0.39	26.47
	Year	Current ratio	Debt to equity ratio	Net Profit ratio		Year	Current ratio	Debt to equity ratio	Net Profit Ratio
Tamilnadu Jai Bharath	2006	1.34	3.44	145.64	**VTM Ltd**	2006	5.14	0.26	636.84
	2007	1.36	3.13	169.65		2007	10.72	0.18	110.04
	2008	1.49	6.50	-14.33		2008	5.26	0.18	-259.89
	2009	1.01	74.50	0.0		2009	14.85	0.07	158.14
	2010	1.23	45.05	823.94		2010	9.33	0.03	94.78
	Mean	1.29	26.52	224.98		Mean	9.06	0.14	147.98
	SD	0.18	32.12	344.96		SD	4.07	0.09	320.04
	Year	Current ratio	Debt to equity ratio	Net Profit ratio		Year	Current ratio	Debt to equity ratio	Net Profit ratio
Sri Nachammai Cotton Mills Ltd	2006	1.56	1.50	175.00	**Sri Lakshmi Saraswathi Textiles (ARNI) Ltd.**	2006	1.30	1.77	125.70
	2007	1.81	2.86	325.37		2007	1.42	1.50	125.17
	2008	1.77	3.42	67.19		2008	1.12	1.86	97.00
	2009	1.49	5.10	151.12		2009	1.31	2.03	101.02
	2010	1.71	7.32	126.46		2010	1.13	1.76	116.83
	Mean	1.67	4.04	169.03		Mean	1.26	1.78	113.14
	SD	0.14	2.24	96.15		SD	0.13	0.19	13.45
Sri Ramakrishna Mills (Coimbatore) Ltd	Year	Current ratio	Debt to equity ratio	Net Profit ratio	**Lambhodhara Textiles Ltd**	Year	Current ratio	Debt to equity ratio	Net Profit ratio
	2006	0.64	0.00	443.48		2006	1.78	0.97	45.49
	2007	1.58	6.38	85.89		2007	1.50	1.52	-2575
	2008	0.89	4.26	51.25		2008	1.48	2.31	33.94

	2009	0.82	5.83	52.19		2009	1.54	2.13	55.13
	2010	0.69	1.38	-190.86		2010	3.04	3.06	74.71
	Mean	0.92	3.57	88.39		Mean	1.87	2.00	-473.15
	SD	0.38	2.78	227.36		SD	0.67	0.79	1175.07

The table 2 shows the current ratio of the selected industries.

Table 2: Current ratio of selected Industries

Industry (I)	Industry (J)	Mean difference (I - J)	Std. Error	Significance	95% Confidence interval	
					Lower bound	Upper bound
Patspin India . Ltd	KG Denim Ltd.	155.36600	55.52058	0.213	-35.2768	346.0088
	Rajapalayam Mills Ltd.	141.14800	55.52058	0.340	-49.4948	331.7908
	Sambandam Spinning Mills Ltd.	152.69000	55.52058	0.234	-37.9528	343.3328
	Super Sales India Ltd.	155.46000	55.52058	0.213	-35.1828	346.1028
	Kandagiri Spinning Mills Ltd.	153.59068	55.52058	0.227	-37.0521	344.2334
	Tamilnadu Jai Bharath Mills Ltd.	151.73600	55.52058	0.242	-38.9068	342.3788
	VTM Ltd.	147.21200	55.52058	0.281	-43.4308	337.8548
	Sri Nachammai Cotton Mills Ltd.	153.46200	55.52058	0.228	-37.1808	344.1048
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	151.66200	55.52058	0.243	-38.9808	342.3048
	Sri Ramakrishna Mills (Coimbatore) Ltd.	151.66200	55.52058	0.243	-38.9808	342.3048
	Lambodhara Textiles Ltd.	148.49000	55.52058	0.270	-42.15283	39.1328
KG Denim Ltd.	Patspin India Ltd.	-155.36600	55.52058	0.213	-346.0088	35.2768
	Rajapalayam Mills Ltd.	-14.21800	55.52058	1.000	-204.8608	176.4248
	Sambandam Spinning Mills Ltd.	-2.67600	55.52058	1.000	-193.3188	187.9668
	Super Sales India Ltd.	0.09400	55.52058	1.000	-190.5488	190.7368
	Kandagiri Spinning Mills Ltd.	-1.77532	55.52058	1.000	-192.4181	188.8674

	Tamilnadu Jai Bharath Mills Ltd.	-3.63000	55.52058	1.000	-194.2728	187.0128
	VTM Ltd.	-8.15400	55.52058	1.000	-198.7968	182.4888
	Sri Nachammai Cotton Mills Ltd.	-1.90400	55.52058	1.000	-192.5468	188.7388
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-3.70400	55.52058	1.000	-194.3468	186.9388
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-3.70400	55.52058	1.000	-194.3468	186.9388
	Lambodhara Textiles Ltd.	-6.87600	55.52058	1.000	-197.5188	183.7668
Rajapalayam Mills Ltd.	Patspin India Ltd.	-141.14800	55.52058	0.340	-331.7908	49.4948
	KG Denim Ltd.	14.21800	55.52058	1.000	-176.4248	204.8608
	Sambandam Spinning Mills Ltd.	11.54200	55.52058	1.000	-179.1008	202.1848
	Super Sales India Ltd.	14.31200	55.52058	1.000	-176.3308	204.9548
	Kandagiri Spinning Mills Ltd.	12.44268	55.52058	1.000	-178.2001	203.0854
	Tamilnadu Jai Bharath Mills Ltd.	10.58800	55.52058	1.000	-180.0548	201.2308
	VTM Ltd.	6.06400	55.52058	1.000	-184.5788	196.7068
	Sri Nachammai Cotton Mills Ltd.	12.31400	55.52058	1.000	-178.3288	202.9568
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	10.51400	55.52058	1.000	-180.1288	201.1568
	Sri Ramakrishna Mills (Coimbatore) Ltd.	10.51400	55.52058	1.000	-180.1288	201.1568
	Lambodhara Textiles Ltd.	7.34200	55.52058	1.000	-183.3008	197.9848
Sambandam Spinning Mills Ltd	Patspin India Ltd.	-152.69000	55.52058	0.234	-343.3328	37.9528
	KG Denim Ltd.	2.67600	55.52058	1.000	-187.9668	193.3188
	Rajapalayam Mills Ltd.	-11.54200	55.52058	1.000	-202.1848	179.1008
	Super Sales India Ltd.	2.77000	55.52058	1.000	-187.8728	193.4128
	Kandagiri Spinning Mills Ltd.	0.90068	55.52058	1.000	-189.7421	191.5434
	Tamilnadu Jai Bharath Mills Ltd.	-0.95400	55.52058	1.000	-191.5968	189.6888
	VTM Ltd.	-5.47800	55.52058	1.000	-196.1208	185.1648

	Sri Nachammai Cotton Mills Ltd.	0.77200	55.52058	1.000	-189.8708	191.4148
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-1.02800	55.52058	1.000	-191.6708	189.6148
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-1.02800	55.52058	1.000	-191.6708	189.6148
	Lambodhara Textiles Ltd.	-4.20000	55.52058	1.000	-194.8428	186.4428
	Patspin India Ltd.	-155.46000	55.52058	.213	-346.1028	35.1828
	KG Denim Ltd.	-0.09400	55.52058	1.000	-190.7368	190.5488
	Rajapalayam Mills Ltd.	-14.31200	55.52058	1.000	-204.9548	176.3308
	Sambandam Spinning Mills Ltd.	-2.77000	55.52058	1.000	-193.4128	187.8728
	Kandagiri Spinning Mills Ltd.	-1.86932	55.52058	1.000	-192.5121	188.7734
Super Sales India Ltd.	Tamilnadu Jai Bharath Mills Ltd.	-3.72400	55.52058	1.000	-194.3668	186.9188
	VTM Ltd.	-8.24800	55.52058	1.000	-198.8908	182.3948
	Sri Nachammai Cotton Mills Ltd.	-1.99800	55.52058	1.000	-192.6408	188.6448
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-3.79800	55.52058	1.000	-194.4408	186.8448
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-3.79800	55.52058	1.000	-194.4408	186.8448
	Lambodhara Textiles Ltd.	-6.97000	55.52058	1.000	-197.6128	183.6728
Kandagiri Spinning Mills Ltd.	Patspin India Ltd.	-153.59068	55.52058	0.227	-344.2334	37.0521
	KG Denim Ltd.	1.77532	55.52058	1.000	-188.8674	192.4181
	Rajapalayam Mills Ltd.	-12.44268	55.52058	1.000	-203.0854	178.2001
	Sambandam Spinning Mills Ltd.	-0.90068	55.52058	1.000	-191.5434	189.7421
	Super Sales India Ltd.	1.86932	55.52058	1.000	-188.7734	192.5121
	Tamilnadu Jai Bharath Mills Ltd.	-1.85468	55.52058	1.000	-192.4974	188.7881
	VTM Ltd.	-6.37868	55.52058	1.000	-197.0214	184.2641
	Sri Nachammai Cotton Mills Ltd.	-0.12868	55.52058	1.000	-190.7714	190.5141

	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-1.92868	55.52058	1.000	-192.5714	188.7141
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-1.92868	55.52058	1.000	-192.5714	188.7141
	Lambodhara Textiles Ltd.	-5.10068	55.52058	1.000	-195.7434	185.5421
	Patspin India Ltd.	-151.73600	55.52058	0.242	-342.3788	38.9068
	KG Denim Ltd.	3.63000	55.52058	1.000	-187.0128	194.2728
	Rajapalayam Mills Ltd.	-10.58800	55.52058	1.000	-201.2308	180.0548
	Sambandam Spinning Mills Ltd.	0.95400	55.52058	1.000	-189.6888	191.5968
	Super Sales India Ltd.	3.72400	55.52058	1.000	-186.9188	194.3668
Tamilnadu Jai Bharath Mills Ltd.	Kandagiri Spinning Mills Ltd.	1.85468	55.52058	1.000	-188.7881	192.4974
	VTM Ltd.	-4.52400	55.52058	1.000	-195.1668	186.1188
	Sri Nachammai Cotton Mills Ltd.	1.72600	55.52058	1.000	-188.9168	192.3688
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-0.07400	55.52058	1.000	-190.7168	190.5688
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-0.07400	55.52058	1.000	-190.7168	190.5688
	Lambodhara Textiles Ltd.	-3.24600	55.52058	1.000	-193.8888	187.3968
	Patspin India Ltd.	-147.21200	55.52058	0.281	-337.8548	43.4308
	KG Denim Ltd.	8.15400	55.52058	1.000	-182.4888	198.7968
V T M Ltd.	Rajapalayam Mills Ltd.	-6.06400	55.52058	1.000	-196.7068	184.5788
	Sambandam Spinning Mills Ltd.	5.47800	55.52058	1.000	-185.1648	196.1208
	Super Sales India Ltd.	8.24800	55.52058	1.000	-182.3948	198.8908
	Kandagiri Spinning Mills Ltd.	6.37868	55.52058	1.000	-184.2641	197.0214
	Tamilnadu Jai Bharath Mills Ltd.	4.52400	55.52058	1.000	-186.1188	195.1668
	Sri Nachammai Cotton Mills Ltd.	6.25000	55.52058	1.000	-184.3928	196.8928
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	4.45000	55.52058	1.000	-186.1928	195.0928

	Sri Ramakrishna Mills (Coimbatore) Ltd.	4.45000	55.52058	1.000	-186.1928	195.0928
	Lambodhara Textiles Ltd.	1.27800	55.52058	1.000	-189.3648	191.9208
	Patspin India Ltd.	-153.46200	55.52058	0.228	-344.1048	37.1808
	KG Denim Ltd.	1.90400	55.52058	1.000	-188.7388	192.5468
	Rajapalayam Mills Ltd.	-12.31400	55.52058	1.000	-202.9568	178.3288
Sri Nachammai Cotton Mills Ltd.	Sambandam Spinning Mills Ltd.	-0.77200	55.52058	1.000	-191.4148	189.8708
	Super Sales India Ltd.	1.99800	55.52058	1.000	-188.6448	192.6408
	Kandagiri Spinning Mills Ltd.	0.12868	55.52058	1.000	-190.5141	190.7714
	Tamilnadu Jai Bharath Mills Ltd.	-1.72600	55.52058	1.000	-192.3688	188.9168
	V T M Ltd.	-6.25000	55.52058	1.000	-196.8928	184.3928
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-1.80000	55.52058	1.000	-192.4428	188.8428
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-1.80000	55.52058	1.000	-192.4428	188.8428
	Lambodhara Textiles Ltd.	-4.97200	55.52058	1.000	-195.6148	185.6708
	Patspin India Ltd.	-151.66200	55.52058	0.243	-342.3048	38.9808
Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	KG Denim Ltd.	3.70400	55.52058	1.000	-186.9388	194.3468
	Rajapalayam Mills Ltd.	-10.51400	55.52058	1.000	-201.1568	180.1288
	Sambandam Spinning Mills Ltd.	1.02800	55.52058	1.000	-189.6148	191.6708
	Super Sales India Ltd.	3.79800	55.52058	1.000	-186.8448	194.4408
	Kandagiri Spinning Mills Ltd.	1.92868	55.52058	1.000	-188.7141	192.5714
	Tamilnadu Jai Bharath Mills Ltd.	0.07400	55.52058	1.000	-190.5688	190.7168
	VTM Ltd.	-4.45000	55.52058	1.000	-195.0928	186.1928
	Sri Nachammai Cotton Mills Ltd.	1.80000	55.52058	1.000	-188.8428	192.4428
	Sri Ramakrishna Mills (Coimbatore) Ltd.	0.0	55.52058	1.000	-190.6428	190.6428
	Lambodhara Textiles Ltd.	-3.17200	55.52058	1.000	-193.8148	187.4708

Sri Ramakrishna Mills (Coimbatore) Ltd.	Patspin India Ltd.	-151.66200	55.52058	0.243	-342.3048	38.9808
	KG Denim Ltd.	3.70400	55.52058	1.000	-186.9388	194.3468
	Rajapalayam Mills Ltd.	-10.51400	55.52058	1.000	-201.1568	180.1288
	Sambandam Spinning Mills Ltd.	1.02800	55.52058	1.000	-189.6148	191.6708
	Super Sales India Ltd.	3.79800	55.52058	1.000	-186.8448	194.4408
	Kandagiri Spinning Mills Ltd.	1.92868	55.52058	1.000	-188.7141	192.5714
	Tamilnadu Jai Bharath Mills Ltd.	0.07400	55.52058	1.000	-190.5688	190.7168
	VTM Ltd.	-4.45000	55.52058	1.000	-195.0928	186.1928
	Sri Nachammai Cotton Mills Ltd.	1.80000	55.52058	1.000	-188.8428	192.4428
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	0.00000	55.52058	1.000	-190.6428	190.6428
	Lambodhara Textiles Ltd.	-3.17200	55.52058	1.000	-193.8148	187.4708
Lambodhara Textiles Ltd.	Patspin India Ltd.	-148.49000	55.52058	.270	-339.1328	42.1528
	KG Denim Ltd.	6.87600	55.52058	1.000	-183.7668	197.5188
	Rajapalayam Mills Ltd.	-7.34200	55.52058	1.000	-197.9848	183.3008
	Sambandam Spinning Mills Ltd.	4.20000	55.52058	1.000	-186.4428	194.8428
	Super Sales India Ltd.	6.97000	55.52058	1.000	-183.6728	197.6128
	Kandagiri Spinning Mills Ltd.	5.10068	55.52058	1.000	-185.5421	195.7434
	Tamilnadu Jai Bharath Mills Ltd.	3.24600	55.52058	1.000	-187.3968	193.8888
	VTM Ltd.	-1.27800	55.52058	1.000	-191.9208	189.3648
	Sri Nachammai Cotton Mills Ltd.	4.97200	55.52058	1.000	-185.6708	195.6148
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	3.17200	55.52058	1.000	-187.4708	193.8148
	Sri Ramakrishna Mills (Coimbatore) Ltd.	3.17200	55.52058	1.000	-187.4708	193.8148

Descriptive Statistics: The mean difference was significant at 5% level

H_0: There is no significant relationship between current ratios of 12 textiles industries

ANOVA

	Sum of squares	df	Mean square	F	Significance
Between groups	105558.298	11	9596.209	1.245	0.285
Within groups	369904.241	48	7706.338	-	-
Total	475462.540	59	-	-	-

Source: Computed from the annual report of the respective textile industries

The above multiple comparison (table 2) for current ratio of selected industries reveals that Patspin India Ltd, KG Denim Ltd, Rajapalayam Mills, Sambandam Spinning Mills, Super Sales India Ltd, Kandagiri Spinning Mills, Tamilnadu Jai Bharath Mills, VTM Ltd, Sri Nachammai Cotton Mills, Sri Lakshmi Saraswathi Textiles, Sri Ramakrishna Mills and Lambodhara Textiles were not significant because the p-value was greater than the level of significance. Therefore null hypothesis was rejected and there is significant relationship between current ratio of textiles industries.

The figure 1 depicts that the mean plot of net profit ratio of selected textile industries.

Figure 1: Means plot of net profit ratio
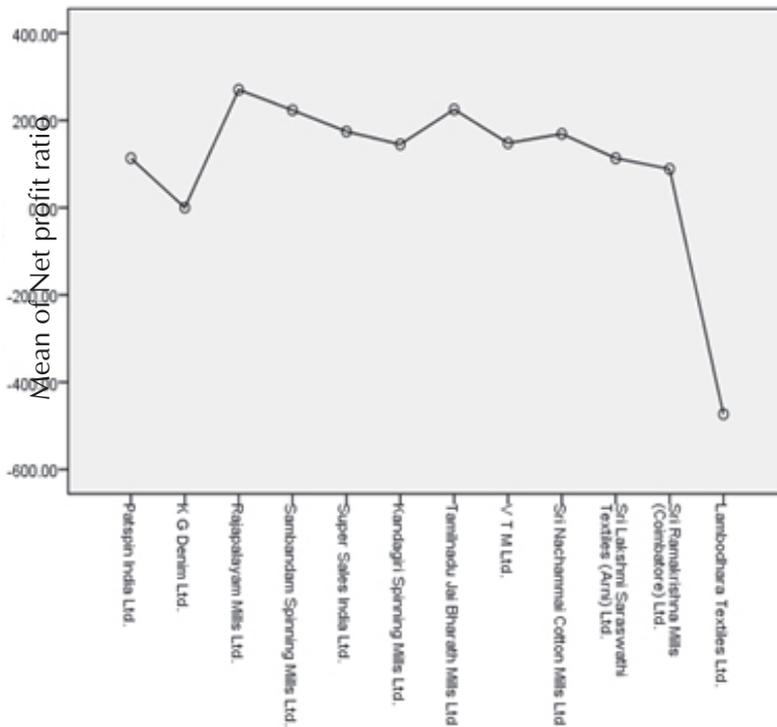
Table 3: Debt-equity ratio of selected companies

Industry (I)	Industry (J)	Mean Difference (I - J)	Std. Error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Patspin India Ltd.	KG Denim Ltd.	4.81800	6.18644	1.000	-16.4246	26.0606
	Rajapalayam Mills Ltd.	3.42600	6.18644	1.000	-17.8166	24.6686
	Sambandam Spinning Mills Ltd.	1.29000	6.18644	1.000	-19.9526	22.5326
	Super Sales India Ltd.	4.40400	6.18644	1.000	-16.8386	25.6466
	Kandagiri Spinning Mills Ltd.	1.29000	6.18644	1.000	-19.9526	22.5326
	Tamilnadu Jai Bharath Mills Ltd.	-20.46200	6.18644	0.069	-41.7046	0.7806
	VTM Ltd.	5.91800	6.18644	0.998	-15.3246	27.1606
	Sri Nachammai Cotton Mills Ltd.	2.02200	6.18644	1.000	-19.2206	23.2646
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	4.27800	6.18644	1.000	-16.9646	25.5206
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-7.49200	6.18644	0.985	-28.7346	13.7506
	Lambodhara Textiles Ltd.	4.06400	6.18644	1.000	-17.1786	25.3066
KG Denim Ltd.	Patspin India Ltd.	-4.81800	6.18644	1.000	-26.0606	16.4246
	Rajapalayam Mills Ltd.	-1.39200	6.18644	1.000	-22.6346	19.8506
	Sambandam Spinning Mills Ltd.	-3.52800	6.18644	1.000	-24.7706	17.7146
	Super Sales India Ltd.	-0.41400	6.18644	1.000	-21.6566	20.8286
	Kandagiri Spinning Mills Ltd.	-3.52800	6.18644	1.000	-24.7706	17.7146
	Tamilnadu Jai Bharath Mills Ltd.	-25.28000[*]	6.18644	0.008	-46.5226	-4.0374
	VTM Ltd.	1.10000	6.18644	1.000	-20.1426	22.3426
	Sri Nachammai Cotton Mills Ltd.	-2.79600	6.18644	1.000	-24.0386	18.4466
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-0.54000	6.18644	1.000	-21.7826	20.7026
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-12.31000	6.18644	0.698	-33.5526	8.9326

	Lambodhara Textiles Ltd.	-0.75400	6.18644	1.000	-21.9966	20.4886
Rajapalayam Mills Ltd.	Patspin India Ltd.	-3.42600	6.18644	1.000	-24.6686	17.8166
	KG Denim Ltd.	1.39200	6.18644	1.000	-19.8506	22.6346
	Sambandam Spinning Mills Ltd.	-2.13600	6.18644	1.000	-23.3786	19.1066
	Super Sales India Ltd.	0.97800	6.18644	1.000	-20.2646	22.2206
	Kandagiri Spinning Mills Ltd.	-2.13600	6.18644	1.000	-23.3786	19.1066
	Tamilnadu Jai Bharath Mills Ltd.	-23.88800[*]	6.18644	0.016	-45.1306	-2.6454
	VTM Ltd.	2.49200	6.18644	1.000	-18.7506	23.7346
	Sri Nachammai Cotton Mills Ltd.	-1.40400	6.18644	1.000	-22.6466	19.8386
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	0.85200	6.18644	1.000	-20.3906	22.0946
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-10.91800	6.18644	0.828	-32.1606	10.3246
	Lambodhara Textiles Ltd.	0.63800	6.18644	1.000	-20.6046	21.8806
Sambandam Spinning Mills Ltd.	Patspin India Ltd.	-1.29000	6.18644	1.000	-22.5326	19.9526
	KG Denim Ltd.	3.52800	6.18644	1.000	-17.7146	24.7706
	Rajapalayam Mills Ltd.	2.13600	6.18644	1.000	-19.1066	23.3786
	Super Sales India Ltd.	3.11400	6.18644	1.000	-18.1286	24.3566
	Kandagiri Spinning Mills Ltd.	0.00000	6.18644	1.000	-21.2426	21.2426
	Tamilnadu Jai Bharath Mills Ltd.	-21.75200[*]	6.18644	0.040	-42.9946	-0.5094
	VTM Ltd.	4.62800	6.18644	1.000	-16.6146	25.8706
	Sri Nachammai Cotton Mills Ltd.	0.73200	6.18644	1.000	-20.5106	21.9746
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	2.98800	6.18644	1.000	-18.2546	24.2306
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-8.78200	6.18644	.954	-30.0246	12.4606
	Lambodhara Textiles Ltd.	2.77400	6.18644	1.000	-18.4686	24.0166
Super Sales India Ltd.	Patspin India Ltd.	-4.40400	6.18644	1.000	-25.6466	16.8386
	KG Denim Ltd.	0.41400	6.18644	1.000	-20.8286	21.6566
	Rajapalayam Mills Ltd.	-0.97800	6.18644	1.000	-22.2206	20.2646
	Sambandam Spinning Mills Ltd.	-3.11400	6.18644	1.000	-24.3566	18.1286

	Kandagiri Spinning Mills Ltd.	-03.11400	6.18644	1.000	-24.3566	18.1286
	Tamilnadu Jai Bharath Mills Ltd.	-24.86600[*]	6.18644	0.010	-46.1086	-3.6234
	VTM Ltd.	1.51400	6.18644	1.000	-19.7286	22.7566
	Sri Nachammai Cotton Mills Ltd.	-2.38200	6.18644	1.000	-23.6246	18.8606
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-0.12600	6.18644	1.000	-21.3686	21.1166
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-11.89600	6.18644	0.739	-33.1386	9.3466
	Lambodhara Textiles Ltd.	-0.34000	6.18644	1.000	-21.5826	20.9026
Kandagiri Spinning Mills Ltd.	Patspin India Ltd.	-1.29000	6.18644	1.000	-22.5326	19.9526
	KG Denim Ltd.	3.52800	6.18644	1.000	-17.7146	24.7706
	Rajapalayam Mills Ltd.	2.13600	6.18644	1.000	-19.1066	23.3786
	Sambandam Spinning Mills Ltd.	0.00000	6.18644	1.000	-21.2426	21.2426
	Super Sales India Ltd.	3.11400	6.18644	1.000	-18.1286	24.3566
	Tamilnadu Jai Bharath Mills Ltd.	-21.75200[*]	6.18644	0.040	-42.9946	-0.5094
	VTM Ltd.	4.62800	6.18644	1.000	-16.6146	25.8706
	Sri Nachammai Cotton Mills Ltd.	0.73200	6.18644	1.000	-20.5106	21.9746
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	2.98800	6.18644	1.000	-18.2546	24.2306
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-8.78200	6.18644	0.954	-30.0246	12.4606
	Lambodhara Textiles Ltd.	2.77400	6.18644	1.000	-18.4686	24.0166
Tamilnadu Jai Bharath	Patspin India Ltd.	20.46200	6.18644	0.069	-0.7806	41.7046
	KG Denim Ltd.	25.28000[*]	6.18644	0.008	4.0374	46.5226
	Rajapalayam Mills Ltd.	23.88800[*]	6.18644	0.016	2.6454	45.1306
	Sambandam Spinning Mills Ltd.	21.75200[*]	6.18644	0.040	0.5094	42.9946
	Super Sales India Ltd.	24.86600[*]	6.18644	0.010	3.6234	46.1086
	Kandagiri Spinning Mills Ltd.	21.75200[*]	6.18644	0.040	0.5094	42.9946
	VTM Ltd.	26.38000[*]	6.18644	0.005	5.1374	47.6226
	Sri Nachammai Cotton Mills Ltd.	22.48400[*]	6.18644	0.029	1.2414	43.7266

	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	24.74000[*]	6.18644	0.011	3.4974	45.9826
	Sri Ramakrishna Mills (Coimbatore) Ltd.	12.97000	6.18644	0.627	-8.2726	34.2126
	Lambodhara Textiles Ltd.	24.52600[*]	6.18644	0.012	3.2834	45.7686
VTM Ltd.	Patspin India Ltd.	-5.91800	6.18644	0.998	-27.1606	15.3246
	KG Denim Ltd.	-1.10000	6.18644	1.000	-22.3426	20.1426
	Rajapalayam Mills Ltd.	-2.49200	6.18644	1.000	-23.7346	18.7506
	Sambandam Spinning Mills Ltd.	-4.62800	6.18644	1.000	-25.8706	16.6146
	Super Sales India Ltd.	-1.51400	6.18644	1.000	-22.7566	19.7286
	Kandagiri Spinning Mills Ltd.	-4.62800	6.18644	1.000	-25.8706	16.6146
	Tamilnadu Jai Bharath Mills Ltd.	-26.38000[*]	6.18644	0.005	-47.6226	-5.1374
	Sri Nachammai Cotton Mills Ltd.	-3.89600	6.18644	1.000	-25.1386	17.3466
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	-1.64000	6.18644	1.000	-22.8826	19.6026
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-13.41000	6.18644	.580	-34.6526	7.8326
	Lambodhara Textiles Ltd.	-1.85400	6.18644	1.000	-23.0966	19.3886
Sri Nachammai Cotton Mills Ltd.	Patspin India Ltd.	-2.02200	6.18644	1.000	-23.2646	19.2206
	KG Denim Ltd.	2.79600	6.18644	1.000	-18.4466	24.0386
	Rajapalayam Mills Ltd.	1.40400	6.18644	1.000	-19.8386	22.6466
	Sambandam Spinning Mills Ltd.	-0.73200	6.18644	1.000	-21.9746	20.5106
	Super Sales India Ltd.	2.38200	6.18644	1.000	-18.8606	23.6246
	Kandagiri Spinning Mills Ltd.	-0.73200	6.18644	1.000	-21.97462	0.5106
	Tamilnadu Jai Bharath Mills Ltd.	-22.48400[*]	6.18644	0.029	-43.7266	-1.2414
	VTM Ltd.	3.89600	6.18644	1.000	-17.3466	25.1386
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	2.25600	6.18644	1.000	-18.9866	23.4986
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-9.51400	6.18644	0.922	-30.7566	11.7286
	Lambodhara Textiles Ltd.	2.04200	6.18644	1.000	-19.2006	23.2846

Sri Lakshmi Saraswathi T extiles (Arni) Ltd.	Patspin India Ltd.	-4.27800	6.18644	1.000	-25.5206	16.9646
	KG Denim Ltd.	0.54000	6.18644	1.000	-20.7026	21.7826
	Rajapalayam Mills Ltd.	-0.85200	6.18644	1.000	-22.0946	20.3906
	Sambandam Spinning Mills Ltd.	-2.98800	6.18644	1.000	-24.2306	18.2546
	Super Sales India Ltd.	0.12600	6.18644	1.000	-21.1166	21.3686
	Kandagiri Spinning Mills Ltd.	-2.98800	6.18644	1.000	-24.2306	18.2546
	Tamilnadu Jai Bharath Mills Ltd.	-24.74000*	6.18644	0.011	-45.9826	-3.4974
	VTM Ltd.	1.64000	6.18644	1.000	-19.6026	22.8826
	Sri Nachammai Cotton Mills Ltd.	-2.25600	6.18644	1.000	-23.4986	18.9866
	Sri Ramakrishna Mills (Coimbatore) Ltd.	-11.77000	6.18644	0.752	-33.0126	9.4726
	Lambodhara Textiles Ltd.	-0.21400	6.18644	1.000	-21.4566	21.0286
Sri Ramakrishna Mills (Coimbatore) Ltd.	Patspin India Ltd.	7.49200	6.18644	0.985	-13.7506	28.7346
	K G Denim Ltd.	12.31000	6.18644	0.698	-8.9326	33.5526
	Rajapalayam Mills Ltd.	10.91800	6.18644	0.828	-10.3246	32.1606
	Sambandam Spinning Mills Ltd.	8.78200	6.18644	0.954	-12.4606	30.0246
	Super Sales India Ltd.	11.89600	6.18644	0.739	-9.3466	33.1386
	Kandagiri Spinning Mills Ltd.	8.78200	6.18644	0.954	-12.4606	30.0246
	Tamilnadu Jai Bharath Mills Ltd.	-12.97000	6.18644	0.627	-34.2126	8.2726
	V T M Ltd.	13.41000	6.18644	0.580	-7.8326	34.6526
	Sri Nachammai Cotton Mills Ltd.	9.51400	6.18644	0.922	-11.7286	30.7566
	Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	11.77000	6.18644	0.752	-9.4726	33.0126
	Lambodhara Textiles Ltd.	11.55600	6.18644	0.772	-9.6866	32.7986
Lambodhara Textiles Ltd.	Patspin India Ltd.	-4.06400	6.18644	1.000	-25.3066	17.1786
	K G Denim Ltd.	0.75400	6.18644	1.000	-20.4886	21.9966
	Rajapalayam Mills Ltd.	-0.63800	6.18644	1.000	-21.8806	20.6046
	Sambandam Spinning Mills Ltd.	-2.77400	6.18644	1.000	-24.0166	18.4686
	Super Sales India Ltd.	0.34000	6.18644	1.000	-20.9026	21.5826

Kandagiri Spinning Mills Ltd.	-2.77400	6.18644	1.000	-24.0166	18.4686
Tamilnadu Jai Bharath Mills Ltd.	-24.52600[*]	6.18644	0.012	-45.7686	-3.2834
VTM Ltd.	1.85400	6.18644	1.000	-19.3886	23.0966
Sri Nachammai Cotton Mills Ltd.	-2.04200	6.18644	1.000	-23.2846	19.2006
Sri Lakshmi Saraswathi Textiles (Arni) Ltd.	0.21400	6.18644	1.000	-21.0286	21.4566
Sri Ramakrishna Mills (Coimbatore) Ltd.	-11.55600	6.18644	0.772	-32.7986	9.6866

Descriptive Statistics: *The mean difference was significant at $p < 0.005$.

H_0: There is no significant difference between the 12 Textiles industries in debt equity ratio

ANOVA

	Sum of squares	df	Mean square	F	Significance
Between groups	3026.862	11	275.169	2.876	0.006
Within groups	4592.645	48	95.680	-	-
Total	7619.507	59	-	-	-

Source: Computed from the annual report of the respective textile industries.

Tables 3 shows that the Debt-equity ratio of selected industries such as Patspin India Ltd, KG Denim Ltd, Rajapalayam Mills, Sambandam Spinning Mills, Super Sales India Ltd, Kandagiri Spinning Mills, Tamilnadu JaiBharath Mills, VTM Ltd, Sri Nachammai Cotton Mills, Sri Lakshmi Saraswathi Textiles, Sri Ramakrishna Mills, Lambodhara Textileswere not significant because the p-value was greater than the level of significance. Therefore null hypothesis was rejected and there is significant relationship between current ratio of textiles industries except Tamilnadu JaiBharath Mills.

FINDINGS

- The current ratio of VTM Ltd was higher than the other textile industries.
- The equity ratio of the textile industries was low except Sambandan Spinning Mills Ltd and Kandagiri Spinning Mills Ltd. It indicates that the percentage of owner's capital of the Industries were not good. Higher the ratios better the long term solvency position of the Industries.
- The percentage of net profit ratio of all textile industries except KG Denim Ltd and Lambodhara Textiles Ltd were better.

SUGGESTIONS

- The current ratio of the textiles companies like KG Denim and Sri Ramakrishna Mills (Coimbatore) Ltd are very low. So these companies must take sufficient steps to increase their current asset to meet their current liabilities.

- The profitability of KG Denim Ltd and Lambodhara textile companies and Sri Ramakrishna Mills (Coimbatore) Ltd were very low compared to other textile companies. The companies did not have any control over their expenses, so the net profit of the industries have gone down during 2006-2010. They should take necessary steps to reduce the cost of goods sold to increase the sales.

- The textile industries should improve the long term solvency position to meet their long term obligations.

- The textile industry should follow a study credit policy to increase the sales.

CONCLUSION

The present study highlighted the overall financial performance of cotton textile tndustries. The financial performance plays a significant role in the successful functioning of the industries. Poor financial performance threatens survival and leads to business failure. Most of the textile Industries has been caught in a vicious down cycle facing a threat to their viability. The cotton textile industries could improve the performance of identifying and concentrating in the relevant areas where the attention is much needed and possibility for improvement. The industry could help the stock holders, management, employee's investors and public to take relevant decisions in their respective areas of operation resulting in growth of the country. In this study an attempt has been made to determine the combined effect of various financial ratios. The estimated discriminate function could be of great use for the management in ascertaining the financial performance. This study would also be useful to all companies, policy markers and researchers for appraising financial performance of cotton textile industry.

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Finding best route for minimizing traffic congestion level in road networks through mobile agents

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ABSTRACT

Present study focuses the functioning of mobile agents for traffic system and proposes an architecture work on agent technology that has been developed using Java and JADE agent platform under dynamic changing environment by implementing Fixed Monitor Stationary Agent (FMSA) and Interactive Mobile Agent for Client (IMAC).The developed Mobile Agents FMSA and IMAC agents make decisions based on Traffic Congestion Level (TCL) algorithm in road traffic networks for finding best routes in order to minimize congestion level by considering the parameters, mainly the velocity, acceleration of vehicles and estimated threshold value in the existing lane along with RMI and SOAP interfaces. We study also compares the experimental results obtained by the architecture before and after implementation of FMSA and IMAC agents and the result shows the significant performance for the optimization of traffic system by finding the best path and confirms the better efficiency, scalability improvement of the proposed architecture.

Key words: Mobile Agents, FMSA, IMAC, LTCDM, GPS and GPRS.

INTRODUCTION

Traffic congestion prevention has shown great potential for solving problems in intelligent traffic and transportation system. The increase in modernization and urbanization creates an effective need to operate the existing traffic systems with maximum throughput and utilization. One of the most effective methods is to find best path for a road network to its destination from its current position for congestion avoidance and it can be prevented by considering the velocity of vehicles as an important optimization parameter in the existing lane. The agents FMSA and IMAC have been implemented to many aspects of optimizing the traffic and transportation systems that includes minimization, prevention and avoidance of congestion effectively by providing the best route for a vehicle. In the present study, the main parameter that consider for the Intelligent Traffic and Transportation Systems (ITTS) optimization is velocity of vehicles in the existing road network along with the RMI and SOAP interfaces.

The agents FMSA and IMAC signed the techniques and approaches resulting from the field of agent technology that has been applied to many aspects of traffic and transportation systems including monitoring the traffic, dynamic routing for finding best route, handling traffic congestion, modeling and simulation. Present study examines a mobile agent based approach for monitoring the current traffic congestion scenario and optimizes the best path for the client vehicles on the road network by implementing agents along with Traffic Congestion Level (TCL) algorithm. The techniques for monitoring traffic congestion level using agent technology were introduced to record the real time status of the entities (vehicles) in road networks (Sujatha, 2010).

New applications need to manage the functions of ITTS. One of the most important functions of ITTS applications is to support vehicle to infrastructure system (Wiroon *et al.,* 2010). Wiroon *et al.* (2010) proposed specific service oriented middleware for handling co-operative vehicle infrastructure systems. In the concept of agent technology, agents are the building blocks and may act as stationary or mobile in road networks. The traffic emulator was developed for the representation of traffic conditions at an isolated intersection, with the features Graphical User Interface developed in JAVA (Singh *et al.*, 2000). The proposed genetic algorithm mainly focuses on optimizing the traffic signal time by considering optimization parameters as weights and cycle timings.

Concepts of FMSA and IMAC agents

The concept of FMSA and IMAC agents includes receiving geographical information from a Global positioning System (GPS) through Global System for Mobile communication (GSM) services (Short Message Service (SMS), or General Packet Radio Service (GPRS). The coordination among GIS, GPS and either SMS or GPRS technologies is monitored by FMSA and IMAC agents and based on threshold value and TCL algorithm, these agents make decisions in road traffic networks for finding best on-line routes in order to avoid congestion.

The input for these agents are handled by the interfaces of RMI, SOAP and GPS Tracker. The GPS Tracker is installed into the vehicle which is responsible for capturing the geographical information such as date, time, latitude, longitude, and speed for the vehicle. This device is also responsible for tracking server located in road networks and sends vehicle's movement data (Geo-info) to the control room wirelessly through either SMS or GPRS.

Proposed architecture using FMSA and IMAC agents

Figure 1: Components of proposed architecture
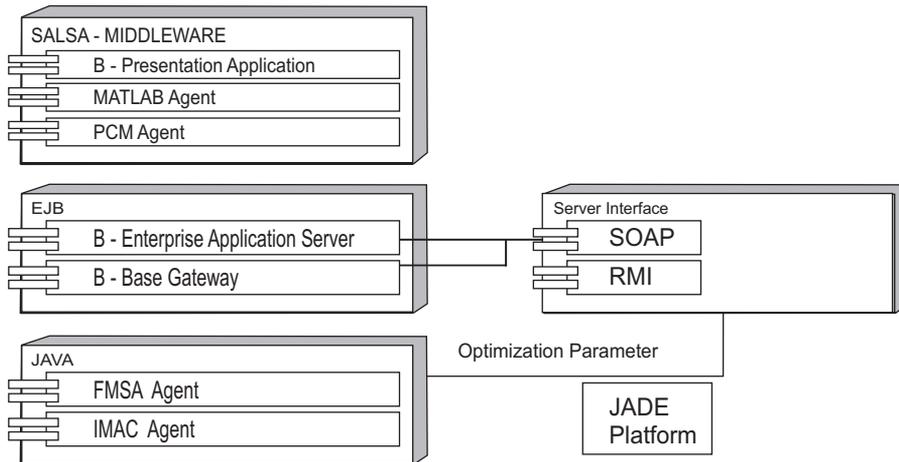
The components of proposed architecture as shown in Figure 1 was developed in JADE agent platform under dynamic changing external environments and it comprises of three layers. To demonstrate the mobile agents in ITTS, the mobile agent technology was integrated with MASs to enhance the flexibility and adaptability of large scale traffic control and management system (Chen *et al,* 2010). The first layer of the framework consists of B-Presentation application along with MATLB and PCM mobile agents that are supported by SALSA middleware for calculating the threshold value and also for identifying the emergency vehicles in the existing lane. The second layer deals with the B-Enterprise Application Server and B-Base Gateway that are developed in EJB by implementing the server interfaces like RMI and SOAP for receiving and delivering information from and to the Information provider (IP). The third layer of the framework focuses on actual optimization techniques through the fixed stationary agent FMSA and the interactive mobile agent IMAC by considering the optimization parameter, which is the velocity of vehicles in the current scenario that gives the better solution for the effective traffic congestion prevention as well as finding the best route for the vehicles in the existing lane using TCL algorithm. The code for implementing the RMI Service Interface, RMI Client Interface and SOAP message for receiving and delivering information, from and to the information provider are given below.

Code for RMI service interface

```
import java.rmi.Remote;
import java.rmi.RemoteException;
...
public interface GatewayServiceInterface extends Remote {
```

```
....
public String getTimeStamp(String tagNo)throws RemoteException;
public String getPassingTime(String tagNo)throws RemoteException;
....
}
```

Code for RMI Client

```
// RMI Client
import java.rmi.Naming;
import java.rmi.RMISecurityManager;
import ballabs.rmi.gateway.common.GatewayServiceInterface;
public class ApplicationClient {
public static void main(String[] args) {
try {
System.setSecurityManager(new RMISecurityManager());
GatewayServiceInterface inventory =(GatewayServiceInterface)
Naming.lookup("rmi://www.its-thailand.org/BVIS_Service");
RecordTimeStamp(gateway.getTimeStamp("MO4"));
AverageSpeed(gateway.getPassingTime("M04"));
....
} catch (Exception e)
{
e.printStackTrace();
}
}
```

Code for SOAP Message

```
POST /url HTTP/1.1
Host: HostServerName
Content-type: text/xml; charset=utf-8
Content-length: 350
SoapAction: http://www.its-thailand.org/GetBusArrivalTime
...
<?xml version="1.0" encoding="utf-8" ?>
<soap:Envelope
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
```

```
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
<soap:Body>
<GetBusArrivalTime xmlns="http://www.its-thailand.org/">
<BusID>0454</BusID>
<OutputParam />
</GetBusArrivalTime>
</soap:Body>
</soap:Envelope>
```

The working principle of RFID in the proposed architecture for receiving and delivering information from and to the information provider, telephone organization provider and control room is shown in the Figure 2.

Figure 2: Working principle of RFID for the proposed architecture
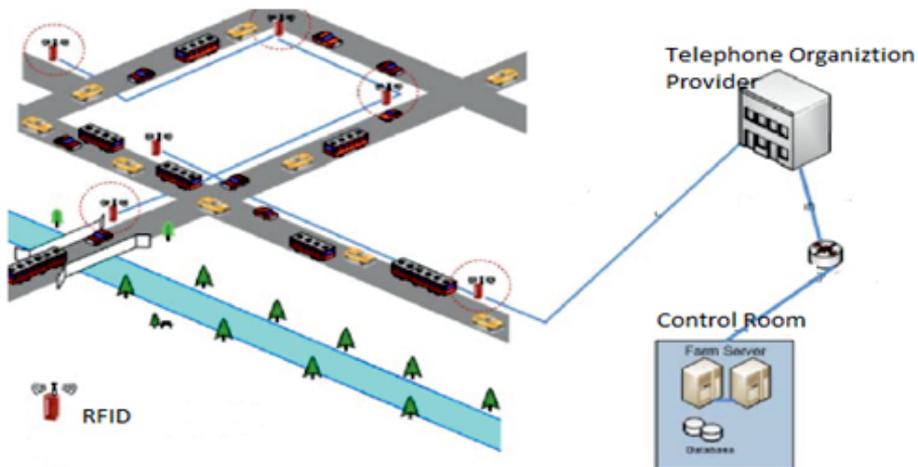
The RFID has privileges to access data/application server in control room that retrieves and sends information of vehicles through information provider. Radio Frequency Identification (RFID) technology has been used to obtain vehicles' IDs (Tag ID) from RFID readers and to collect traffic information in real-time. The RFID reader will read the vehicle tags and transfer the necessary information to a database server in control room. The FMSA and IMAC agents utilize these data to determine the traffic congestion status of the road network by defining a specific TCL algorithm.

The working principles of RFID were employed by the British during world war II to identify their aircraft using the IFF system (Identity: Friend or Foe) (Want, 2006). Today RFID is a generic term for technologies that use radio waves to automatically identify people or objects (Roberts, 2006). A typical RFID system comprise RFID tags, RFID reader and middleware. Each

RFID tag has a unique serial code or ID, and placed in or attached to the object to be identified. It contains information on the basic properties of the object (Tao *et al.*, 2010). An RFID tag responds to a reader query with its fixed unique ID. This fixed ID enables tracking of tags and the bearers. Some tags carry information about the objects they are attached to (Li, 2009). A reader detects the tags that is attached to or embedded in the selected items. It varies in size, weight and may be stationary or mobile. The reader communicates with the tag through the reader antenna, which broadcasts radio waves and receives the tag's response signals within its reading area. After the signals from the tag are detected, the reader decodes them and passes the information to middleware (Yu *et al.*, 2011). Typically, an RFID middleware platform performs aggregation of data across different readers and forwarding of relevant data to subscriber servers or application-level systems in control room and persistent storage for received data from the information provider.

Structure and functioning of FMSA, IMAC agents in road networks

Karthikeyan *et al.* (2012), discussed the proposed architecture initiates with activation of MATLB and PCM agents. The FMSA agent was fixed on polls and IMAC agent was fixed in client vehicles on the road. The FMSA received the details like initial velocity, final velocity, departure time, arrival time of vehicles from RFID Station. RFID station maintains the database for routes of highways. Even though the PCM agent is responsible for controlling the speed and handling high priority and emergency vehicles, the better optimization of real time traffic is handled by FMSA and IMAC agents to make the effective traffic congestion prevention.

GPS tracker produces the Geo-info data, sends the data through either SMS or GPRS to the tracking server and FMSA agent, which interpret the geo-info data and sends it to the database server. A GPS tracker is installed in the experimental vehicle and IMAC agent is used for collecting geo-info (spatial data and GPS satellites data), which are collected through different time intervals in week duration. The hardware network used for this proposed model consists of communication server, database server, information and application server, and GIS server.

The FMSA agent functions based on proposed TCL algorithm.The TCL Algorithm is constrained with the threshold velocity loop counter (TV) depending upon road lane. The TV and Objective Function (OF) are calculated by,

Threshold Velocity Loop Counter (TV) = V_{min} + pre-estimated total velocity of vehicles on the road lane.

Objective Function (OF) = $\sum \triangle v / \triangle t = \sum (v_f - v_i) / (t_f - t_i)$,

where $\triangle v$ = change in velocity, v_i = initial velocity of vehicle at departure time, v_f = final velocity of vehicle at arrival time, $\triangle t$ = change in time, t_i = departure time of a vehicle, t_f = predicted arrival time of a vehicle.

TCL Algorithm

The TCL Algorithm is executed in order to obtain best alternative route along with FMSA and IMAC agents.

// generate threshold velocity loop counter depending upon the road lane.

//Evaluate objective function by calculating the traffic density in the existing road lane
 which determines the optimal vehicle routing with real – time traffic information?

//Check, if objective function is greater than the threshold velocity loop counter or not

//If the objective function is greater than the TV, and then FMSA sends communication to IMAC agent to find the best alternate route (shortest route based on Dijkstra Algorithm) depending on the departure time that is maintained in RFID stations in coordination with database server. If not then the IMAC agent takes real time decision based on existing scenario.

Input: Road network G, object trajectory data T, Eps, MinTraffic.

Output: Best routes R

Step 1: Initialize R to{}

Step 2: Let B be the set of best route starts in G according to T

Step 3: for every hot route start h in B do

Step 4: r = new Best Route initialized to (b)

Step 5: Add Extend Best Routes(r) to R

Step 6: end for

Step 7: Return R

Procedure Extend Best Routes (best router)

Step 1: Let p be the last edge in r

Step 2:Let Q be the set of directly traffic density - reachable neighbors of p\

Step 3: if Q is non-empty then

Step 4: for every split in Q do

Step 5: if route traffic density - reachable condition is satisfied with the Objective Function (OF)then

Step 6: Let r1 be a copy of r

Step 7: Append split's edges to r1

Step 8: Extend Best Routes (r1)

Step 9: end if

Step 10: end for

Step 11: else

Step 12: Return r

Step 13: end if

The checking procedure of the algorithm is implemented by counting the number of intersection of the horizontal line starting from the node to the right with the restricted area. If the number of intersection is odd, the node is within this area, otherwise it is not in the area. Time Complexity of TCL Algorithm

// suppose the nodes in the road networks are distributed evenly.
/ /Let traffic density be C,
// V*: the number of vertices examined by using existing algorithm.
// V: the number of vertices examined by using proposed algorithm.
// Sdij: searched area by using existing algorithm.
// Soptimal: searched area by using proposed algorithm.
// TV1, TV2: the factors of threshold.

Then, the ratio IE can be used to describe the improvement of efficiency,

$$
\begin{aligned}
\text{IE} \quad &= V/V^* \\
&= C^* \text{Sdij} / C^* \text{Soptimal} \\
&\leq 2 * TV1 \, (R + TV2 * \sqrt{2}) / \pi R2 \\
&= 2 * TV1^* R(R + TV2^* R^* \sqrt{2}) / \pi R2 \\
&= 2 * TV1(1 + \sqrt{2} * TV2) / \pi
\end{aligned}
$$

To achieve a better solution, this architecture uses relative thresholds instead of the fixed ones, called factor TV1 and TV2. To simplify the problem, they have same value in the implementation. The threshold proportionally increases with the distance from start point to the destination in a selected factor.

The TCL Algorithm calculates a route dynamically depending on threshold value and objective function. So a route from origin to destination is varies on real time situation .The system is simulated in Coimbatore. Initially, reader's IP and port number is loaded. If the connection is established between reader's IP and RFID, then the tag list is sent and received. The objective function is the function which determines the optimal vehicle routing with real – time traffic information and it is evaluated by calculating the traffic density in the existing road lane. The threshold velocity is generated depending upon speed and velocity of vehicles in the lane. Check, if objective function is greater than the threshold velocity or not. If the objective function is greater than the TV, and then FMSA sends communication to IMAC agent to find the best alternate route (shortest route based on Dijkstra Algorithm) depending on the departure time that is maintained in stations in coordination with database server. If not then the IMAC agent takes real time decision based on existing scenario in coordination with spatial database through Geo-Info receiver and Interpreter. Thus the TCL algorithm calculates and finds the best route in ordination with FMSA and IMAC agents that control and minimizes the traffic by reducing the time of congestion clearance and save travel time.

EXPERIMENTAL RESULTS

The experimental results showed a significant performance improvement with the comparison of before and after implementation of agents to minimize and avoid traffic congestion in great way by considering the velocity of vehicles in the road lane. The model developed was based on TCL algorithm, which optimizes the traffic transportation system in real time providing the best route from RFID station and consuming time to reach the destination, so that the congestion can be greatly avoided in any situation. Microscopic simulator was used to evaluate the behavior of the model using FMSA and IMAC agents with simulated computer traffic and actual signal phasing. Java and JADE were used in the system side of the model and the simulations have done for one-hour duration for two cases using TCL algorithm.

- Objective Function (OF)>Threshold velocity Loop counter (TV)
- Objective Function (OF) <Threshold velocity Loop counter (TV)

Table1: Simulated results of proposed architecture before implementing FMSA and IMAC agents

Date and Time	Road status	Location	Speed control (Y/N)	Duration (min)	Action
19/12/2014, 08:00:01 a.m.	Normal	AR	N		n/a
19/12/2014, 08:15:02 a.m.	Normal (termination area)	LM	Y		Msg to HEBS
19/12/2014, 08:20:10 a.m.	Normal (activity area)	PR	Y		Msg to HEBS
19/12/2014, 08:30:17 a.m.	Congested	OP	Y		Msg to HEBS
19/12/2014, 08:32:19 a.m.	Normal	OP	N	8	Traffic cleared
19/12/2014, 08:45:45 a.m.	Normal (transition area)	LT	Y		Msg to HEBS
19/12/2014, 08:55:19 a.m.	Normal	SL	N		n/a
19/12/2014, 09:25:18 a.m.	Congested (with Emergency Vehicle)	PD	Y(other vehicles), N(emergency vehicle		Msg to HEBS & RFID tag for lane clearance
19/12/2014, 09:27:28 a.m.	Congested	PD	Y		Lane cleared for emergency vehicle

19/12/2014, 09:29:54 a.m.	Normal	PD	N	10	Traffic Cleared

Table 2: Simulated results of proposed architecture after implementing FMSA and IMAC agents

Date and Time	Road status	Location	Speed control (Y/N)	TV m/s	OF m/s	Duration (min)	Action
19/12/2014, 08:00:01 a.m.	Normal	AR	N	60	43		n/a, real-time decision by IMAC
19/12/2014, 08:15:02 a.m.	Normal (termination area)	LM	N	60	54		n/a, real-time decision by IMAC
19/12/2014, 08:20:10 a.m.	Normal (activity area)	PR	Y	50	62		IMAC receive message from RFID for best route
19/12/2014, 08:30:17 a.m.	Congested	OP	N	50	45		n/a, real-time decision by IMAC
19/12/2014, 08:32:19 a.m.	Normal	OP	N	50	42	4	Traffic cleared.
19/12/2014, 08:45:45 a.m.	Normal (transition area)	LT	Y	70	79		IMAC receive message from RFID for best route
19/12/2014, 08:55:19 a.m.	Normal	SL	N	70	63		Traffic cleared
19/12/2014, 09:25:18 a.m.	Congested (with Emergency	PD	Y	60	69		IMAC receive Vehicle message from RFID for best route
19/12/2014, 09:27:28 a.m.	Congested	PD	N	60	54		n/a, real-time decision byIMAC
19/12/2014, 09:29:54 a.m.	Normal	PD	Y	60	52	6	Traffic cleared

The measure of effectiveness used for comparison of two cases included data and time, location, road status, TV, objective function and action taken. The performance of the architecture with MATLB agent and PCM agent and MATLB agent in co-ordination with PCM, FMSA, IMAC agents were simulated on a particular day during the peak hours from 8.00 a.m to 10.00 a.m covering locations from Avinashi Road to Palladam in Coimbatore linking areas like

AR (Avinashi Road), LM (Lakshmi Mills), PR (Puliakulam Road, OP (Ondipudur), LT (L&T Bye Pass Road), SL (Sulur) and PD (Palladam).

The simulation results in table 1 and 2 explains that, on 19/12/2014, 8: 32:19 a.m, before implementing FMSA and IMAC agents, the duration of clearing traffic to avoid congestion was taken as 8 minutes. But by implementing these agents on the same day at same time the duration of congestion clearance was noted as 4 minutes. Similarly on 19/12/2014, 9:26:28 a.m, the duration of congestion clearance was taken as 10 minutes and by the implementation of these agents at the same time, it was noted as 6 minutes. This shows that the duration of congested clearance was reduced by FMSA and IMAC agents along with TCL algorithm that provides the best or alternate routes and save travel time.

Figure 3: Performance measures of MATLB, PCM, FMSA IMAC agents
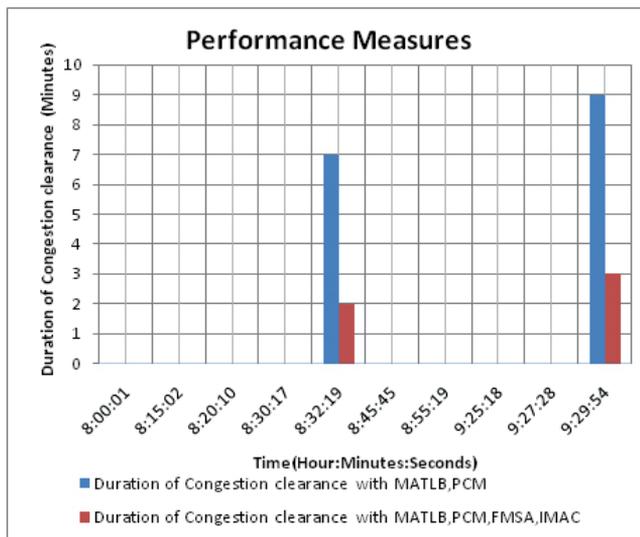
From figure 3 it was found that the proposed architecture showed considerable reduction in travel time of a vehicle in the existing lane using MATLB, PCM in co-ordination with FMSA and IMAC agents and was able to reduce the delay by 61% in traffic congestion scenario. However, it should be noted that the proposed method reduces the average delay of all the vehicles in the simulation in order to prevent traffic congestion in an effective way.

CONCLUSION

Present study aims at optimizing real-time traffic which would lead to major improvement in terms of the performance of road networks using agent technology. The TCL algorithm was proposed which uses the density of traffic in sequences of road segments to discover best alternate routes. The proposed optimization architecture using FMSA, IMAC gave better results compared to the existing models using other agents and thus showed a significant

performance increase after the implementation of agents to find best alternate for the optimization of intelligent traffic system.

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