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From The Editor's Desk

I take this opportunity to thank all contributors and readers for making ***Tecnia Journal of Management Studies*** an astounding success. The interest of authors in sending their research-based articles for publication and overwhelming response received from the readers is duly acknowledged. I owe my heartfelt gratitude to all the management institutes for sending us their journals on mutual exchange basis, and their support to serve you better.

We are happy to launch the Thirty Two issue of our academic journal. The present issue incorporates the following articles:

- A Study of Work-Life Balance- Challenges, Solutions and Role for Improving the Organisational Performance
- McKinsey 7S Model and its Application in Business Function - Marketing
- On the Features and Challenges of Security and Privacy in Distributed Internet of Things
- Innovation of Business Model: Managing the Challenges
- A Study of Effectiveness of Digital Marketing
- Brand Management and Mckensey's 7 S Model: A Case of Perfect Correlation!
- McKinsey 7-S Framework: An Integrated Approach for Organizational Excellence
- A Study of McKinsey 7s Model & Total Quality Management
- Digital Watermarking: A Solution to e-Property Rights
- Knowledge Organization Tools in the Digital Era: A Study
- A Study of Cyber Crime and its Deterrence

My thanks to the authors, Nitu Rana, M.Sindhuja, Indu Sharma, V.K. Panchal, Vijay Kr. Khurana, Pallavi Khurana, Sweta Bakshi, Kanika Gupta, Ajay Kumar, Sandeep Kumar, Ksh. Krishna B Singha, Vakeel Ahmad, Dilkash Naaz and Dr. R.K. Gupta , who have sent their manuscripts in time and extended their co-operation particularly in following the American Psychological Association (APA) Style Manual in the references.

I extend my sincere thanks to our Chairman Dr. R. K. Gupta, who has always been a guiding light and prime inspiration to publish this journal. I am grateful for his continuous support and encouragement to bring out the Journal in a proper form. I also appreciate Editorial Committee Members for their assistance, advice and suggestion in shaping up the Journal. My sincere thanks to our distinguished reviewers and all team members of Tecnia family for their untiring efforts and support in bringing out this bi-annual Journal.

I am sure the issue will generate immense interest among corporate members, policy-makers, academicians and students.

Editor

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General Information

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- The received articles for publication are screened by the Evaluation Board for approval and only the selected articles are published. Further information on the same is available in the "Guidelines for Contributors".

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A Study of Work-Life Balance- Challenges, Solutions and Role for Improving the Organisational Performance

Nitu Rana*

Abstract: *Work-life balance can be defined as attaining that level of equilibrium where equal priority is given to the demands of the job and to the demands of the personal life of the employees. Work-life balance is the balance between the professional and personal life of any individual. To explain the ideal work-life balance is a very difficult task. Because of the technological advancement the work-life balance has become a very debatable issue as the importance of physical location of any individual is immaterial now. In this paper an attempt has been made to study the perception related to the work life balance and its impact on job satisfaction and to find out the various initiatives taken by the organisations for the work life balance of its employees. For conducting this study, the required data was collected through a questionnaire. In the study the exploratory research design was chosen and under exploratory research design convenience sampling method was used which is a non-probability sampling method. The survey results were analysed with the help of simple percentages, frequency analysis and graphs. The study concluded that the concept of work-life balance is known to everyone these days which shows that in the present work environment the working population is very much aware about the importance of maintaining a balance between their work-related life and their personal life. It was also observed that the organisations are taking various steps for improving the work life balance of their employees which indicates that the importance of the work life balance have been realised by the employers also and various steps are taken for resolving the issues related to maintaining work-life balance like providing flexible working hours and various kinds of leaves.*

Key Words: *Work-Life Balance, Job Satisfaction, Work Stress, Employers, Performance.*

Introduction

In today's unpredictable and fast-paced world it is very difficult to achieve work-life balance. To separate work from our personal lives is becoming more and more difficult due to the growing connection through information and communication technology. It has become very common to take work calls during dinner time, to check the mails all the time and doing office work on weekends or holidays. The employers always expect more from their employees which in turn put pressure on the employees to get better results. This results in more working hours and sacrifice of family and personal time resulting in work life imbalance. Hence, it becomes the responsibility of the employer to help their employees in maintaining the work life balance.

Having a balance in between work life and personal life is not only good for health and personal life but it can also improve the productivity and efficiency of

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the individuals which will further lead to improve the performance of the whole organisation. By giving importance to the work-life balance the organisations can have the best talent from the industry and the retention rate will also increase.

Work-life balance is the balance between the professional and personal work in the life of any individual and refers to the work related to the job which is present at the home of any individual. The ideal work-life balance is very difficult to explain. Due to the technological advancement the work-life balance has become a very debatable issue as the importance of physical location of any individual is immaterial now. Earlier it was very difficult to do work from home and because of that there was a clear demarcation between professional and personal life of any individual. The poor work-life balance results in stress. Hence the responsibility of the employer is to ensure good work-life balance for the employees as the stressed employees will be less productive and will make errors.

Work-life balance can be defined as attaining that level of equilibrium where equal priority is given to the demands of the job and to the demands of the personal life of the employees. Work-life balance is to check how the time is managed by the working people at and outside of their work. The time outside of work includes family work, responsibilities, and pursuing interests and hobbies. The working people should have good time management skills for spending time with their families and for pursuing their personal hobbies and interests. One very important point here is that the work-life balance is gender neutral in the present time. The work-life balance should be designed in such a manner that it can be attained, and it should not be gender biased. Due to the technological advancement the employees found themselves often digitally connected to the work. The line of division between the work life and personal life is required to be drawn. Since the technology will keep on advancing, the measures are required to be taken for maintaining the work-life balance. Creating a balance between professional and the personal life may be a challenge, but it is the need of the hour. Having good work-life balance will result in less stress, and will benefit not only employees but the employers, too. The employers who are trying to provide environment which supports work-life balance for their employees are able to save their costs, have lower rate of absenteeism, and have productive and efficient workforce.

Review of Literature

Job satisfaction was found to be higher among the male employees in comparison to the female employees in the study carried out by Kanwar et al. (2009), to find out the relation between the work life balance and job satisfaction in the Information Technology (IT) and IT Enabled Services (ITES) industries. It was also observed that the IT industry had lower work-life balance and job satisfaction in comparison to the ITES group. Their study also concluded that the work-life balance and job satisfaction were positively related to each other.

For large organisations, developing an organizational culture supporting work-life balance is a long-term process. It requires a change in the way people think and discuss about their work-life balance. Only then the various work-life balance initiatives will be accepted by all irrespective of their gender, seniority in the organisation and many other personal commitments (Ioan Lazar, Codruta Osoian and Patricia Ratiu (2010)).

A negative relation was observed in between work life balance and workload and work family by Chawla and Sondhi, (2011) in the survey of teachers and BPO women professionals. It was proved in this study that the schools and the companies which give preference to the contribution of a committed and hardworking employee are required to give more freedom to their employees to maintain the work-life balance in their organisation.

A significant relationship was observed in between demographic variables and the work life balance of women employees by Kumari K. Thriveni and Devi V. Rama, (2012) in their study. For addressing the work life balance issues of the employees and for designing appropriate policies for the same, the relationship observed between the demographic variables and the work life balance of the employees is a very important input. The employers are required to understand that the work life balance initiatives to help employees balance their work and personal lives should not be optional rather these have become necessity today.

V. Varatharaj and S. Vasantha (2012) concluded that the companies are required to establish a special bond with its employees and motivate them to put more efforts into their jobs. The concept of work life balance for the employees of the company is a very encouraging and progressive step.

The various factors required for maintaining work-life balance were identified by V. G. Madhusudhan and

K. Nagaraju (2013) in their study and they concluded flexibility of time, role clarity, support from the co-workers, family culture, working hours and support from the seniors are the measures required for work-life balance. Hence, the management should think about these measures and take steps to introduce these in their organisation for maintaining work-life balance of their employees.

Rajesh K. Yadav and Nishant Dabhade, (2014) observed in their study that by implementing organizational strategies for controlling or minimising some of the major causes of stress, the working women can be helped. It was also observed that by changing the satisfaction determinants, the level of job satisfaction will also change. The employers should design the appropriate policies to handle the work-life balance and job satisfaction issues of their employees.

The employee centric solutions for creating work-life balance will help the organization in designing and implementing the work-life balance policies (I. Gautam and S. Jain, (2018)). The challenge of work life balance is required to be taken seriously by the organizations as it affects the professional success, well-being, and efficiency of the employees. The topmost priority of any organization should be the welfare of the employees and their job satisfaction.

In the study of A. Aruna Shantha, (2019) most of the employees were found to be not satisfied with their job and due to that they were not able to have good work life balance. The employees were stressed in such kind of work atmosphere and the efficiency and productivity of the workers declined.

Based on the review of above studies, it was found that the work-life balance, its measurement and identifying the various steps or measures required for maintaining work-life balance in the present fast-moving world is the need of the hour.

Objectives of the Study

The objectives of the study are as following:

1. To study the perception related to the work life balance and its impact on job satisfaction.
2. To find out the various initiatives taken by the organisations for the work life balance of its employees.

Research Methodology

For the present study the exploratory research design was chosen and under exploratory research design convenience sampling method was used which is a non-probability sampling method. The required information and data for the present study was gathered both from the primary sources and secondary sources. The required secondary data was gathered from various journals, magazines, reference books, daily and weekly reports, newspapers, and various websites. For the collection of primary data an online survey was conducted and for that a structured questionnaire (through google form) was made to check the perception about the work life balance of the samples chosen for the study. The purpose for using the questionnaire was to get the opinion of the individuals about the various aspects of the work-life balance. The questions in the google form were in the closed form to improve the response rate. The google form was sent to 150 individuals. The questionnaires were mailed to the individuals from March 2022 to June 2022. About four weeks after the first post of questionnaires, reminder mails were also sent. In this study one hundred thirty-six responses were received. It means the response rate was 90.67 per cent. The survey results were analysed with the help of simple percentages, frequency analysis and graphs.

Limitations of the Study

The main limitation of the study is that the convenience sample method of data collection involves only those persons who are easily accessible. Although being a simple, easy and inexpensive method to collect the required data, but it can't be concluded that the sample is giving representation to the population. Hence, the results can't be generalized. The size of the sample and time period for the study was also small.

Results and Analysis

The table -1 is portraying the profile of the respondents. 51.47 per cent of the respondents are from the age group 40-50 years and only 9.55 per cent from the 20-30 age group. More than sixty per cent of the respondents are females.

Table-1 Profile of the Respondents

Age	**Frequency**	**Percentage**
20-30	13	9.55
30-40	35	25.74
40-50	70	51.47
Above 50	18	13.24
Total	136	100
Gender	**Frequency**	**Percentage**
Male	54	39.71

Female	82	60.29
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

From the Table-2, it can be observed that more than seventy-two per cent of the respondents are from the Government sector and twenty-seven per cent (approx.) are from private sector.

Table-2 Nature of the Job and Experience

Type of the Organisation	**Frequency**	**Percentage**
Private Sector	37	27.21
Government	98	72.06
Others	1	0.73
Total	**136**	**100**
Experience	**Frequency**	**Percentage**
0-5	34	25.00
5-10	18	13.24
10-15	34	25.00
More than 15 years	50	36.76
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

The information about the work experience can also be viewed from the table 2. More than sixty-one percent of the respondents are working for more than ten years. Hence, they must be familiar with the importance of maintaining the balance between their work life and the personal life.

Table-3 Hours of Work

Hours of Work	**Frequency**	**Percentage**
7-9	94	69.12
10-12	36	26.47
More than 12	6	4.41
Total	**136**	**100**
Work on Weekends	**Frequency**	**Percentage**
Yes	44	32.35
No	38	27.94
Sometimes	54	39.71
Total	**136**	**100**
Working Hours Satisfaction	**Frequency**	**Percentage**
Yes	102	75
No	34	25
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

The information about the time spent by the respondents on their job and whether they work on weekends is provided in the table 3. About sixty-nine per cent of the respondents work for 7-9 hours. The reason could be that most of the respondents are from the government sector and the timings generally are from 10 am to 5 pm. More than thirty per cent of the respondents are working for more than 10 hours. Thirty-two per cent of the respondents work on weekends also. Seventy-five per cent of the respondents are satisfied with their working hours. Twenty five percent of the respondents are not satisfied, the reason could be that they are not able to maintain the balance between their work-life and personal life because of long working hours or week-ends work.

Table-4 Quality of Work-Life

Balanced Work-Life	**Frequency**	**Percentage**
Yes	94	69.12
No	42	30.88
Total	**136**	**100**
Enough Family-Time	**Frequency**	**Percentage**
Yes	93	68.38
No	43	31.62
Total	**136**	**100**
Personal Time	**Frequency**	**Percentage**
Yes	86	63.24
No	50	36.76
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

The quality of work life of the respondents is depicted in table 4. Around sixty-nine per cent of the respondents considered their work-life balanced. The reason could be that they are getting sufficient

time for their family and also for their health, hobbies etc. Thirty-one per cent of the respondents are not happy with their work-life because of not being able to spend quality time with their family and for themselves.

The percentage of familiarity with the concept of work-life balance is high (88.24) (Table-5) which shows that in the present work environment the working population is very much aware about the importance of maintaining a balance between their work-related life and their personal life.

Table-5 Work-Life Balance (WLB)

Concept of WLB	Frequency	Percentage
Yes	120	88.24
No	16	11.76
Total	**136**	**100**
WLB Satisfaction	**Frequency**	**Percentage**
Extremely Satisfied	10	7.35
Very Satisfied	42	30.88
Somewhat Satisfied	60	44.12
Not so Satisfied	19	13.97
Not at all Satisfied	5	3.68
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

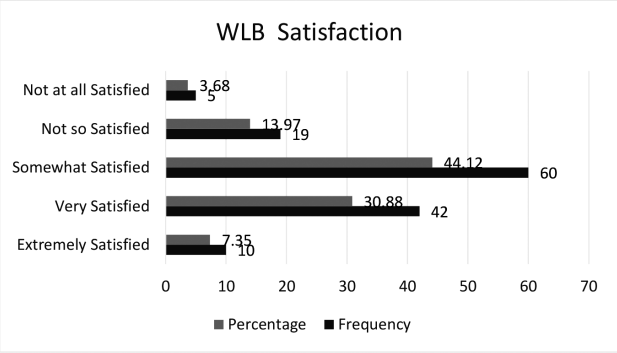

Figure-1 Work-Life Balance (WLB) Satisfaction

The figure-1 is portraying the level of satisfaction of the respondents about their work-life balance. Around seventeen per cent of the respondents are not satisfied with their work-life balance. Forty-four per cent are somewhat satisfied. Thirty-eight per cent (approx.) of the respondents are having good rate of satisfaction. The reason for this high degree of satisfaction can be that most of the respondents are part of the government organisation where the work pressure and working hours are less as compared to the private sector.

Table-6 Work Stress

Work Stress	Frequency	Percentage
Always	16	11.77
Often	46	33.82
Sometimes	62	45.59
Rarely	9	6.61
Never	3	2.21
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

More than forty-five per cent of the respondents have work in their mind even when they are not working (Table-6). This shows how stressed they are and the need to maintain a balance between the work life and personal life. The same degree of stress about work is also depicted in the figure 2.

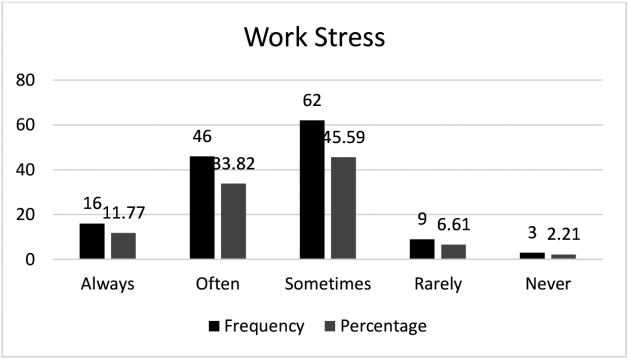

Figure-2 Work Stress

To reduce the work stress of the employees, various measures can be taken by the organisations. The table-7 is showing that approx. fifty-four per cent of the respondents' organisations are taking various steps for improving the work life balance of their employees. But more than forty-five per cent are still not doing anything for the work life balance of their manpower. The importance of the work life balance should be realised, and steps are required to be taken for this.

Table-7 Work Life Balance (WLB) Measures by Organisations

WLB measures by Organisations	**Frequency**	**Percentage**
Yes	74	54.41
No	62	45.59
Total	**136**	**100**
Measures		**Frequency**
Work from home		37
Flexible Working Hours		72
Provide leaves to manage work life		72
Job share option		8
Mandatory leaves (annual or monthly)		52

Source: Questionnaire Survey and Researcher's Calculations.

The various measures taken by the organisations of the respondents are presented in the figure 3. Flexible working hours and providing various kinds of leaves are the measures which seem to be adopted by most of the organisations. Job share option seems to be not very popular measure for work life balance. Work from home option is a very good measure and adopted mostly by the private sector organisations.

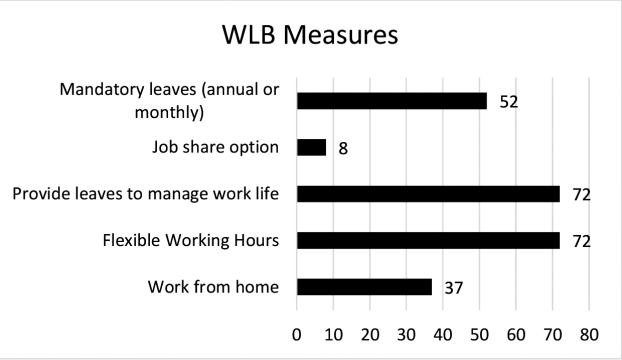

Figure-3 Work Life Balance (WLB) Measures taken by the Organisations

Many organisations are providing the option of work from home to their employees. More than sixty-six per cent of the respondents were making use of this option given by their organisation (Table-8).

Table-8 Work from Home

Work from Home	**Frequency**	**Percentage**
Never	46	33.82
Few times a year	27	19.85
About once a month	7	5.15
Once a week	14	10.29
More than once a week	42	30.89
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

The table-8 is showing that still more than thirty-three per cent of the respondents are not able to avail the work from home option. The reason could be that they belong to the government organisation and work from home option is not given to the employees of government organisation (except at the time of pandemic).

Table-9 Distribution of Work Pressure

Even Distribution of Work Pressure	**Frequency**	**Percentage**
Strongly Disagree	26	19.12
Disagree	22	16.18
Neutral	58	42.65
Agree	28	20.58
Strongly Agree	2	1.47
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

For maintaining the good work life balance the work pressure is required to be uniformly distributed at each level of job. More than thirty-five per cent of the respondents (Table-9) were of the opinion that in their organisation the work pressure is not evenly distributed.

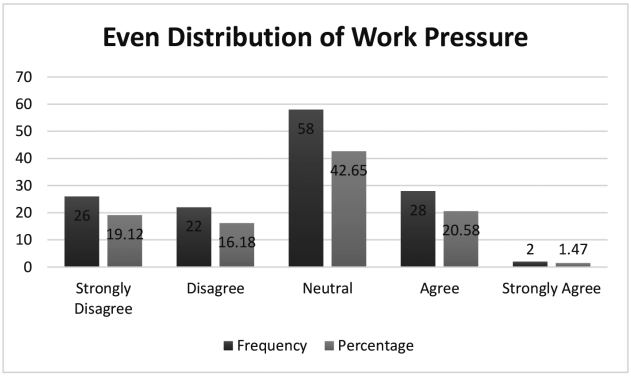

Figure-4 Distribution of Work Pressure

Around twenty-two per cent were found to be satisfied with the distribution of work in their organisation (Figure-4). The reason for dissatisfaction with the uniform distribution of work can be the inability of the employees to maintain the balance

between their work life and personal life.

Table-10 Work Life Balance (WLB) and Productivity

WLB Increases the Productivity	Frequency	Percentage
Yes	115	84.56
No	2	1.47
May be	19	13.97
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

The productivity of the employees will get improved if the work life balance is attained. The same is supported by the eighty-five per cent approx. of the respondents (Table-10). Around fourteen per cent were not very sure about the impact of good work-life balance on the productivity proving that the awareness about the work life balance is required to be created between both the employees and the employers.

Table-11 Work Life Balance (WLB) Policy of the Organisation

WLB and WLB Policy of the Organisation	Frequency	Percentage
Yes	84	61.77
No	52	38.23
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

The work life balance policy of the organisation has a strong influence on the work life balance of the employees. More than sixty-one per cent (Table-11) of the respondents also supported that their work life is balanced due to the work life balance policy of their organisation. Thirty- eight per cent of the respondents seemed to be not very much satisfied with the work life balance policy of their organisation.

Table-12 Good and Efficient Work Life Balance (WLB) Policy

Good and Efficient WLB policy helps in Retaining Employees	Frequency	Percentage
Strongly Disagree	6	4.41
Disagree	2	1.47
Neutral	20	14.71
Agree	73	53.68
Strongly Agree	35	25.73
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

For the retention of employees good and efficient work life balance (WLB) policy is needed. The same can be concluded from the table-12 as around seventy-nine per cent of the respondents were endorsing this. If the employees are given the option of work from home, flexible working hours, job share option and various kinds of leaves, then they will not leave their job so easily. Hence for the retention of good and efficient employees the work life balance policy is also required to be good and competitive. The same results can also be viewed from the figure 5.

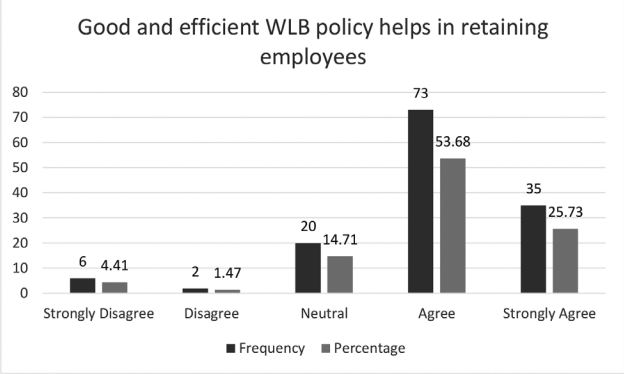

Figure-5 Good and Efficient Work Life Balance (WLB) Policy

The opinion of the respondents about their career prospects in their present organization is presented in table-13. More than eighty per cent of the respondents were of the view that they have good career growth opportunities in their present organization which proves that they are able to maintain a balance between their work life and personal life.

Table-13 Career Prospects

Good Career Prospects in the Organisation	Frequency	Percentage
Yes	110	80.88
No	26	19.12
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

The table-14 is portraying the opinion of the respondents about the work life balance policy of their organisation. With the option of flexible working hours more than ninety per cent of the respondents were happy as they rate this policy as either good or average.

Table-14 Work Life Balance (WLB) Policy of the Organisation-I

Flexible working hours in the existing WLB policy	**Frequency**	**Percentage**
Good	56	41.18
Average	68	50.00
Poor	12	8.82
Total	**136**	**100**
Leave policy of the organisation	**Frequency**	**Percentage**
Satisfactory	109	80.15
Unsatisfactory	27	19.85
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

The leave policy i.e., providing various kind of leaves like paid leaves, medical leaves, compulsory leaves by the organisation also seems to be good as more than eighty per cent (Table-14) of the respondents were satisfied with the leave policy of their organisation.

Table-15 Work Life Balance (WLB) Policy of the Organisation-II

Outdoor camps and picnics to manage WLB	**Frequency**	**Percentage**
Yes	14	10.30
No	80	58.82
Sometimes	42	30.88
Total	**136**	**100**
Discussion of work life issues with superiors	**Frequency**	**Percentage**
Yes	74	54.41
No	30	22.06
Sometimes	32	23.53
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

Many organisations believe in organising picnics, trips, outdoor camps etc. to make their employees feel stress free and for their recreation. More than forty per cent (Table-15) of the respondents informed that their organisations organise outdoor camps and picnics for managing the work life balance. More than seventy-seven per cent of the respondents were also discussing the issues related with the work life with their superiors. The reason can be that by doing so the solutions for the problem can be found and the suggestions given by the employees for managing the work life balance issues can be taken into consideration by the superiors to design a better work life balance policy in the organisation.

Table-16 Effective and Successful Organisation

Good WLB will make effective and successful organisation	**Frequency**	**Percentage**
Yes	120	88.24
No	16	11.76
Total	**136**	**100**

Source: Questionnaire Survey and Researcher's Calculations.

For making any organisation effective and successful the work life balance (WLB) policy should be good and appropriate. More than eighty-eight per cent (Table-16) of the respondents also endorsed this statement. The retention rate of the employees will be more. The employees will feel satiated, stress free and happy. The sense of belongingness will also develop in the employees. Their productivity will increase which in return will increase the productivity of the organisation.

Conclusions and Suggestions

The present study observed that the concept of work-life balance is known to everyone these days which shows that in the present work environment the working population is very much aware about the importance of maintaining a balance between their work-related life and their personal life. Most of the respondents were able to maintain the balance between their work-life and personal life, the reason could be that they are getting sufficient time for their family and for their health, hobbies etc. It was also observed that the organisations are taking various steps for improving the work life balance of their employees which indicates that the importance of the work life balance have been realised by the employers also and various steps are taken for resolving the issues related to maintaining work-life balance like providing flexible working hours and

various kinds of leaves. Work from home option is a very good measure and adopted mostly by the private sector organisations but the government organisations are not providing this option (except at the time of pandemic). The good and efficient work life balance policy of the organisation plays a very significant role on the work life balance of the employees which in turn results in increasing the productivity of the employees. The organisations can retain their good and efficient employees for a longer period by having good and competitive work life balance (WLB) policy. The employees should also discuss the issues related with the work life with their superiors to find the solutions for the problems that they are facing and by giving their suggestions for managing the work life balance issues. The same can be taken into consideration by the superiors to design a better work life balance policy in the organisation. For making any organisation effective and successful the work life balance policy should be good and appropriate. The employees will feel satiated, stress free and happy. The sense of belongingness will also develop in the employees. Their productivity will increase which in return will increase the productivity of the organisation.

There is no perfect or ideal work-life balance as such. The balance can be achieved over a period of time not in a day. For attaining work-life balance deliberate actions are required to be taken both by the employees as well as the employers. One should always set the boundaries for work to ensure that beyond a specific limit the concerned person is not available as he/ she is engaged in personal activities. The time-management strategies should be adopted to achieve the organisational as well as personal goals. The proper structuring of the day is required to increase the productivity at the workplace and to get the free time for the personal life. The employers are also required to find different ways to provide flexible options for the work for attracting and retaining the competitive and best talent. For making strategies for work-life balance the employers should collaborate with their employees to get their opinions and suggestions for this important issue. The organisations should realise that giving respect to the balance and the personal life of the employees is very important issue. The organisations can make a productive and competitive team of employees by bringing some flexibility for their employee's work-life balance.

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McKinsey 7S Model and its Application in Business Function - Marketing

M. Sindhuja*

Abstract: *Business functions are the activities carried out by an enterprise and it can be divided into Core functions and support functions. Core business functions are activities of an enterprise yielding income through production of final goods or services which are intended for the market or for third parties. Marketing is of vital importance to any business. It is the key process of researching, promoting and selling products or services to your target market. McKinsey's 7S Model was developed by former McKinsey employees that was created by the consulting company McKinsey and Company in the early 1980s. They used the model to analyse over 70 large organisations. The paper explains each of the seven components of the model and the links between them. It also includes practical guidance and advice how to analyse organisations using this model. The McKinsey 7S Framework was created as a recognisable and easily remembered model in business. It is a tool that analyzes firm's organizational design by looking at 7 key internal elements: strategy, structure, systems, shared values, style, staff and skills, in order to identify if they are effectively aligned and allow organization to achieve its objectives. This model has been widely used by academics and practitioners. It is one of the most popular strategic planning tools. It sought to present an emphasis on human resources (soft S), rather than the traditional mass production tangibles of capital, infrastructure and equipment, as a key to higher organizational performance. The key point of the model is that all the seven areas are interconnected and a change in one area requires change in the rest of a firm for it to function effectively.*

Introduction

Business functions are the activities carried out by an enterprise and it can be divided into Core functions and support functions. Core business functions are activities of an enterprise yielding income through production of final goods or services which are intended for the market or for third parties. Marketing is important because it helps you sell your products or services. It not only builds brand awareness but it can also increase sales, grow businesses and engage customers. There are so many core business functions that stem from a good marketing plan. So this paper discusses to assess how the capabilities of an organisation can be improved by application of McKinsey's 7S Model to marketing function of organisation. McKinsey's 7S Model was created by McKinsey and Company started in the early 1980s. The McKinsey 7S Framework was designed by former employees like Tom Peters, Robert Waterman and Julien Philips with a help from Richard Pascale and Anthony G. Athos formers consultants of McKinsey, the American consulting firm and is applied in organizations all over the world. They used the model to analyse over 70 large organisations. Since then it has been widely used by practitioners and academics alike in analysing hundreds of organisations. McKinsey and

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Company, which has conducted applied research in business and industry. The paper explains each of the seven components of the model and the links between them. It also includes practical guidance and advice how to analyse organisations using this model. The McKinsey 7S Framework was created as a recognisable and easily remembered model in business. It is a tool that analyzes firm's organizational design by looking at 7 key internal elements: strategy, structure, systems, shared values, style, staff and skills, in order to identify if they are effectively aligned and allow organization to achieve its objectives. This model has been widely used by academics and practitioners. It is one of the most popular strategic planning tools. It sought to present an emphasis on human resources (soft S), rather than the traditional mass production tangibles of capital, infrastructure and equipment, as a key to higher organizational performance. The key point of the model is that all the seven areas are interconnected and a change in one area requires change in the rest of a firm for it to function effectively.

McKinsey 7s models a tool that analyzes firm's organizational design by looking at 7 key internal elements: strategy, structure, systems, shared values, style, staff and skills, in order to identify if they are effectively aligned and allow organization to achieve its objectives.

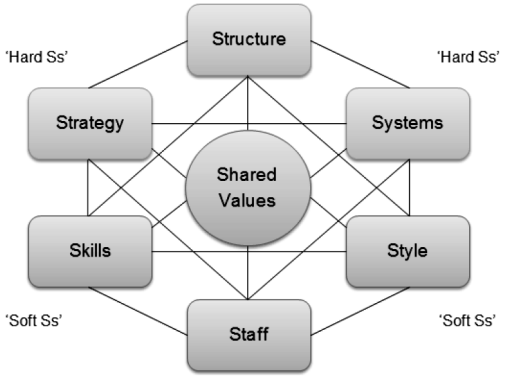
Objectives of the study:

- To Study about McKinsey 7s Models and its tools
- To understand the steps in application of the tools.
- To know how to apply McKinsey 7s Models and its tools in Marketing Function.

Framework of McKinsey 7s Model

The goal of the model was to show how 7 elements of the company: Structure, Strategy, Skills, Staff, Style, Systems, and Shared values, can be aligned together to achieve effectiveness in a company. The key point of the model is that all the seven areas are interconnected and a change in one area requires change in the rest of a firm for it to function effectively.

Below you can find the McKinsey model, which represents the connections between seven areas and divides them into 'Soft Ss' and 'Hard Ss'. The shape of the model emphasizes interconnectedness of the elements.



The model can be applied to many situations and is a valuable tool when organizational design is at question. The most common uses of the framework are:

- To facilitate organizational change.
- To help implement new strategy.
- To identify how each area may change in a future.
- To facilitate the merger of organizations.

Elements of McKinsey model

In McKinsey model, the seven areas of organization are divided into the 'soft' and 'hard' areas. Strategy, structure and systems are hard elements that are much easier to identify and manage when compared to soft elements. On the other hand, soft areas, although harder to manage, are the foundation of the organization and are more likely to create the sustained competitive advantage.

Hard S

Strategy

Strategy is a plan developed by a firm to achieve sustained competitive advantage and successfully compete in the market. What does a well-aligned strategy mean in 7s McKinsey model? In general, a sound strategy is the one that's clearly articulated, is long-term, helps to achieve competitive advantage and is reinforced by strong vision, mission and values. But it's hard to tell if such strategy is well-aligned with other elements when analyzed alone. So the key in 7s model is not to look at your company to find the great strategy, structure, systems and etc. but to look if its aligned with other elements. For example, short-term strategy is usually a poor choice for a company but if its aligned with other 6 elements, then it may provide strong results.

Structure

It represents the way business divisions and units are organized and includes the information of who is accountable to whom. In other words, structure is the organizational chart of the firm. It is also one of the most visible and easy to change elements of the framework. Structure work in partnership with the four "soft" elements – Staff, Skills, Style and Shared Values – for an organisation to be successful.

As an organisation grows and develops, its Structure can often become too complex. This can lead to uncertainty among staff about responsibilities and reporting lines, and reduce accountability. Most organisations tend to have a hierarchical Structure, in which each department has specific responsibilities and a section head, and each team leader answers to a higher level of management. However, another model is to have a flat Structure, with specialist teams set up for specific projects and fewer middle managers.

To establish an effective Structure, an organisation should:

- Study the current Structure, including hierarchy, organisation of teams, lines of communication and how decisions are made.
- Establish how well the current Structure is working.
- Analyse how the existing Structure relates to the other six factors in McKinsey's 7S Framework.
- Make any changes required to ensure the 7 elements are in alignment.
- Establish a plan looking at the longer term aims of the company.

Systems

Systems are the processes and procedures of the company, which reveal business' daily activities and how decisions are made. Systems are the area of the firm that determines how business is done and it should be the main focus for managers during organizational change.

Soft S

Skills

Skills are the abilities that firm's employees perform very well. They also include capabilities and competences. During organizational change, the question often arises of what skills the company will really need to reinforce its new strategy or new structure.

Staff

This element is concerned with what type and how many employees an organization will need and how they will be recruited, trained, motivated and rewarded.

Style

Style represents the way the company is managed by top-level managers, how they interact, what actions do they take and their symbolic value. In other words, it is the management style of company's leaders.

Shared Values

Shared values are at the core of McKinsey 7s model. They are the norms and standards that guide employee behaviour and company actions and thus, are the foundation of every organization.

Benefits of 7s model

- Diagnostic tool for understanding organizations that are effective
- Guides organizational change
- Combine rational and hard elements with emotional and soft elements
- Managers must act on all Ss in parallel and Ss are interrelated.

Steps in Application of the tool:

It is easy to understand the model but much harder to apply it for your organization due to a common misunderstanding of what should a well-aligned elements be like. We provide the following steps that should help you to apply this tool:

Step 1. Identify the areas that are not effectively aligned

During the first step, your aim is to look at the 7S elements and identify if they are effectively aligned with each other. Normally, you should already be aware of how 7 elements are aligned in your company. You have to find out whether there is any gaps, inconsistencies and weaknesses between the relationships of the elements. For example, you designed the strategy that relies on quick product introduction but the matrix structure with conflicting relationships hinders that so there's a conflict that requires the change in strategy or structure.

Step 2. Determine the optimal organization design

With the help from top management, your second step

is to find out what effective organizational design you want to achieve. By knowing the desired alignment you can set your goals and make the action plans much easier. This step is not as straightforward as identifying how seven areas are currently aligned in your organization for a few reasons. First, you need to find the best optimal alignment, which is not known to you at the moment, so it requires more than answering the questions or collecting data. Second, there are no templates or predetermined organizational designs that you could use and you'll have to do a lot of research or benchmarking to find out how other similar organizations coped with organizational change or what organizational designs they are using.

Step 3. Decide where and what changes should be made

This is basically your action plan, which will detail the areas you want to realign and how would you like to do that. If you find that your firm's structure and management style are not aligned with company's values, you should decide how to reorganize the reporting relationships and which top managers should the company let go or how to influence them to change their management style so the company could work more effectively.

Step 4. Make the necessary changes

The implementation is the most important stage in any process, change or analysis and only the well-implemented changes have positive effects. Therefore, you should find the people in your company or hire consultants that are the best suited to implement the changes.

Step 5. Continuously review the 7s

The seven elements: strategy, structure, systems, skills, staff, style and values are dynamic and change constantly. A change in one element always has effects on the other elements and requires implementing new organizational design. Thus, continuous review of each area is very important.

Application of 7 S model in Marketing Function

Mckinsey model help to improve capabilities of an organisation by applying 7s model in Marketing. Digital Marketing is basically promotion of brands using all available forms of digital advertising media to reach the target segment. In current marketing media, the popular media includes Radio, mobile, Internet, Television, social media marketing and other less popular forms of digital media like Digital Signage, Digital bill boards, etc.

1. Strategy

The contribution of digital business in influencing and supporting organisations' strategy. Digital Marketing typically is the way a Digital marketing strategy is systematically utilized.

The key issues are:

- Gaining appropriate budgets and demonstrating, delivering value and ROI from budgets.
- Annual planning approach.
- Techniques for using digital business to impact organization strategy.
- Techniques for aligning digital business strategy with organisational and marketing strategy.

2. Structure

The modification of organisational structure to support digital business. The key issues are:

- Integration of digital marketing or e-commerce teams with other management, marketing (corporate communications, brand marketing, direct marketing) and IT staff.
- Use of cross-functional teams and steering groups.
- Insourcing vs outsourcing.

3. Systems

The development of specific processes, procedures or information systems to support digital business. The key issues are:

- Campaign planning approach-integration.
- Managing or sharing customer information.
- Managing customer experience, service and content quality.
- Unified reporting of digital marketing effectiveness and
- In-house vs external best-of-breed vs external integrated technology solutions.

4. Staff

The breakdown of staff in terms of their background, age and sex and characteristics such as IT vs marketing, use of contractors/ consultants. The key issues are:

- Insourcing vs outsourcing.
- Achieving senior management buy-in/

involvement with digital marketing.

- Staff recruitment and retention, and virtual working.
- Staff development and training.

5. Style

Includes both the way in which key managers behave in achieving the organisation's goals and the cultural style of the organisation as a whole. The key issues are:

- Defining a long-term vision for transformation.
- Relates to role of the digital marketing or e-commerce teams in influencing strategy – is it dynamic and influential or a service which is conservative and looking for a voice?

6. Skills

Distinctive capabilities of key staff, but can be interpreted as specific skill-sets of team members. The key issues are: staff skills in specific areas such as supplier selection, project management, content management and specific e-marketing media channels.

7. Shared values

The guiding concepts of the digital business or e-commerce organization which are also part of shared values and culture. The key issues are: improving the perception of the importance and effectiveness of digital business amongst senior managers and staff it works with (marketing generalists and IT).

Conclusion

In McKinsey's 7S model applied organizations achieve an effective fit between these seven elements. In change processes, many organizations focus their efforts on the hard S's, Strategy, Structure and Systems. They care less for the soft S's, Skills, Staff, Style and Shared Values. The most successful companies work hard at these soft S's. The soft factors can make or break a successful change process, since new structures and strategies are difficult to build upon inappropriate cultures and values. These problems often come up in the dissatisfying results of spectacular mega-mergers. The lack of success and synergies in such mergers is often based in a clash of completely different cultures, values, and styles, which make it difficult to establish effective common systems and structures. The 7 S Model is a valuable tool to initiate change processes and to give them direction. The model is based on the theory that, for an organization to perform well, these seven elements need to be aligned and mutually reinforcing. So, the model can be used to help identify what needs to be realigned to improve performance, or to maintain alignment (and performance) during other types of change. Whatever the type of change – restructuring, new processes, organizational merger, new systems, change of leadership, and so on – the model can be used to understand how the organizational elements are interrelated, and so ensure that the wider impact of changes made in one area is taken into consideration. Having the correct Structure in place will help an organisation achieve its goals. As a business grows and develops, its Structure may need to evolve to better suit its size and activities, and to better align with the other six elements of McKinsey's 7S Framework. Perhaps the most surprising element about the 7-S model is that it supports and is similar in nature of the managerial functions such as planning, organizing, staffing, leading and controlling.

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On the Features and Challenges of Security and Privacy in Distributed Internet of Things

Indu Sharma*
V.K. Panchal**

Abstract: *In the Internet of Things, services can be provisioned using centralized architectures, where central entities acquire, process and provide information. Alternatively, distributed architectures, where entities at the edge of the network exchange information and collaborate with each other in a dynamic way, can be used. In order to understand the applicability and viability of this distributed approach, it is necessary to know its advantages- not only in terms of features but also in terms of security and privacy challenges. The purpose of this paper to show that the distributed approach has various challenges that need to be solved but has various interesting properties and strengths.*

Keywords: *Internet of Things Distributed Architectures Security*

Introduction

The concept of the Internet of Things (IoT) has evolved over time [1-3]. Nevertheless, its core idea can be summarized in a sentence: 'A worldwide network of interconnected entities'. In most cases, these heterogeneous entities, 'things' (e.g. Human beings and computers, books and cars, appliances and food) have a locatable, addressable, and readable counterpart on the Internet. They can open a communication channel with any other entity, providing and receiving services at any time, any place, and in any way. Many technologies serve as the building blocks of this new paradigm, such as wireless sensor networks (WSNs), RFID, cloud services, machine-to-machine interfaces (M2M), and so on. Also, this paradigm has a multitude of application domains, such as automotive, healthcare, logistics, environmental monitoring and many others. There is no single strategy for realizing the vision of the IoT, as services can be provisioned in various ways. In a centralized approach, application platforms located in the Internet (e.g. cloud services) acquire information from entities located in data acquisition networks, and provide raw data and services to other entities. These application platforms control the whole information In fact, there are multiple industrial solutions that make use of this approach [4,5]. multiple industrial solutions that make use of this approach [4,5]. On the other hand, in a distributed approach, not only the intelligence and the provisioning of services is located at the edge of the network, but also various application platforms can collaborate with each other dynamically. In the context of the IoT, the importance of the distributed approach as an element of the Future Internet of Things has been previously mentioned in the literature (cf. [1]). However, there have been no explicit analyses of its features and its challenges. In order to understand the viability and applicability of this distributed approach, it is necessary to explicitly know its actual features and major principles, including the benefits and disadvantages. Also, as security and privacy are important factors that will influence the adoption of the IoT paradigm, it is essential to know what are the security and privacy challenges – and benefits – of the distributed approach, and what are the most promising approaches in this field. If the challenges are too complex and the benefits

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too small, it might make sense to focus mainly on the centralized approach forIoT deployments. The purpose of this paper is to assess and answer these questions. The structure of this paper is as follows. Section 2 will focus on the analysis of the centralized and distributed approaches. In this section we will summarize the state of the art, introduce taxonomy of the different approaches, and provide an analysis of the features of these approaches. Section 3 will focus on the analysis of the different security challenges. In this section we will overview the existing IoT security challenges (3.1), introduce an attacker model that can be applied to both centralized and distributed IoT architectures (3.2), and study the main challenges and promising solutions in the design and deployment of the security mechanisms (3.3). Finally, conclusions are presented in Section 4.

1.2. A DISTRIBUTED INTERNET OF THINGS

1.2.1 Related Work: Government, Academia and Industry

The concept of a distributed IoT is not novel. In fact, various official documents consider it as one of the possible strategies that can push the dream of the IoT into the real world, and it has been explicitly mentioned that the development of decentralized autonomic architectures and the location of intelligence at the very edge of the networks are issues that need to be addressed [2]. Still, some key questions have to be answered to make the most of this strategy in the real world, such as the specific situations on which the network intelligence should be distributed [1]. In order to answer these questions, it is necessary to study the specific requirements of applications. For example, whether an application needs support for distributed ownership of data [3]. This and other issues that have been raised by these governmental studies are being carefully considered by the research community.

There are various research articles that study different instances of distributed IoT architectures. For example, Gomez-Goiri and López-de-Ipiña [6] combine the concept of the web of things (using web protocols to implement the IoT) with the concept of triple spaces (using semantic web techniques to exchange knowledge in a distributed local shared space) to create a distributed environment where devices located in two or more spaces can collaborate with each other through Internet services. In another example, which follows a more holistic point of view, Ning and Liu [7] describe a heterogeneous system known as U2IoT that comprises two subsystems: Unit IoTs, which are basic local cells that provide solutions for special applications, and Ubiquitous IoT, which comprises the different Unit IoTs plus other managers and controls the collaboration between all entities.

There are also many research projects funded by various government bodies that, directly or indirectly, are studying as of 2012 the needs of a distributed IoT architecture. Precisely, one of these projects, IoT-A [8], is aiming to provide an architectural reference model for the interoperability of Internet of Things systems. Note that such a reference architecture does not mandate how all entities should collaborate, or who should analyze the data and provide the different services. Still, the communication model provides the foundations for the creation of distributed applications, allowing digital entities to directly connect and interact with other digital entities. Moreover, the location of intelligence at the edge of the network is implicitly considered, as digital entities range from simple devices to abstract entities made up of various distributed devices. Therefore, its building blocks [9] could be used in the future to create fully distributed IoT applications.

Some concrete building blocks, which can help to build a distributed IoT, have been indirectly studied in other research projects. For example, the HYDRA project [10] developed an open source middleware that allows legacy devices to provide web services over the Internet – directly or indirectly. HYDRA also provides some tools that can be used to enable collaboration, such as a device and service discovery interface. This interface can make use of an ontology to describe the available services, achieving semantic consistency. Another project, SENSEI [11], was more focused on providing a consistent interface to access the services of Wireless Sensor Networks (WSN) islands. But it produced other relevant results, such as semantically-enabled resource directories, and local management systems that benefit of the existence of such directories. Finally, other projects, like CUBIQ [12] and SMARTPRODUCTS [13], studied and developed various P2P-based distributed mechanisms, such as a distributed publish/subscribe system and a distributed storage system.

1.2.2 A Taxonomy of the Vision

In the previous section, we have seen that there

are two principles that have been applied to most distributed IoT architectures: (i) the location of the intelligence and the provisioning of services at the edge of the network (edge intelligence), and (ii) the collaboration between diverse entities in order to achieve a common goal (collaboration). In fact, these two principles are core elements in the construction of 'decentralized systems' and 'distributed systems', respectively. In organizational theory, decentralized systems delegate the decision-making authority to entities located in the lower levels. Such delegation can also allow the implementation of any decisions without relying on the approval of high-level entities [15]. On the other hand, a distributed system consists of multiple entities that collaborate with each other and appear to users as a single coherent system [16].

These two principles, edge intelligence and collaboration, can be used to define a taxonomy of possible Distributed Internet of Things approaches, which is presented below. Two of these approaches (collaborative IoT and connected intranet of things) comply with only one of the principles, while a ''full'' distributed IoT complies with both principles. We will also include the definition of a centralized IoT for the sake of completeness.

(A) Centralized IoT. A Centralized Internet of Things (cf. Fig. 1A) does not provide any of the previously mentioned principles. In this scenario, the data acquisition networks (i.e. networks of things such as mobile phones, radiation sensors [17], and cars) are passive: their only task is to provide data. All this data will be retrieved by a single central entity, which will process it into information, combine it, and provide it to its customers. Consequently, if users want to make use of IoT services, they must connect through the Internet to the interfaces provided by this central entity. Note that there are various strategies to implement this approach. For example, the central entity can be instantiated using a simple server or a cluster of devices forming a cloud (or even located in the cloud itself, cf. solutions such as [4]). Also, its interfaces can provide both raw and preprocessed data, enabling the creation of more complex 3rd party services.

(B) Collaborative IoT. While in this approach the 'intelligence' of the network is still located within the central entities (data acquisition networks still behave as passive entities, users access the information through the central entity interfaces), the main difference with a centralized IoT is its compliance with the collaboration principle. As a result, there are various central entities that can exchange data and/or information with each other, generating new services or enriching existing ones (cf. Fig. 1B). For example, IoT service providers that analyze the radiation in the atmosphere of different cities can collaborate in order to provide a snapshot of the radiation levels in the whole country.

(C) Connected Intranets of Things. In this approach, data acquisition networks (Intranets of Things) can actually process local information, and also provide it not only to central entities but also to local and remote users (cf. Fig. 1C). However, there are no underlying mechanisms (e.g. discovery services, ontologies) that facilitate the collaboration between entities. As a result, the information mainly flows from the intranets to a central entity, which will be able to provide a holistic point of view of the whole system. For example, IoT-enabled hospitals need to access the services of a central IoT entity to obtain global information (e.g. (e.g. overall bed occupancy). Note, however, that if the central entities fail, the local services (e.g. the vital signs records of local patients) can still be accessed.

(D) Distributed IoT. In this vision, all entities can have the ability to retrieve, process, combine, and provide information and services to other entities (cf. Fig. 1D). Intranet of things (ranging from personal other entities (cf. Fig. 1D). Intranet of things (ranging from personal Intranet of things (ranging from personal area networks (PANs) [18] to smart city infrastructures [19]) evolve from isolated entities to fully interconnected systems, not only providing services at a local level but also collaborating with each other and with other IoT architectures towards common goals. Observe that it is also possible to integrate higher-level cloud-based services or other centralized entities (e.g. data repositories) within this architecture, but they are not required. Following the e-health example highlighted above, the IoT of a hospital can interact with the IoT located in the household of a patient, or even with the PANs of the personnel located inside the premises. Moreover, all hospitals can easily collaborate so as to obtain the overall bed occupancy.

1.3 ANALYSIS OF DISTRIBUTED IOT FEATURES

After presenting the taxonomy of the different

distributed IoT approaches, this section analyzes their features, pointing out their benefits and disadvantages. This is especially important because, as shown in Section 2.1, centralized IoT architectures (mostly based on cloud technologies) are not only gaining momentum but also satisfying the requirements of users as of 2012. Therefore, it is necessary to review and understand the benefits of all these approaches in order to measure their viability, even if the notion of a distributed IoT has been explicitly mentioned as one of the elements of the Future Internet infrastructure [3,2,8]. For this analysis, we will use various requirements and properties of IoT deployments that have been gathered from existing reports and research documents. They are enumerated below:

- **Openness.** Beyond presenting raw data and other specialized services, an IoT platform can also be flexible enough to allow 3rd parties to develop complex applications through the provision of an API.
- **Viability.** This property encompasses two concepts: business model (whether it is viable to market this technology) and vendor lock-in (whether a company can take the long-term risk of depending on a particular provider).
- **Reliability.** Not only the IoT architecture must be resilient enough to assure a certain level of availability, but also needs to provide a performance that is tailored to the specific needs of the applications.
- **Scalability.** Within this paradigm, it is expected that the number of devices and the amount of data generated and processed by those devices will grow exponentially (i.e. the concept of ''data deluge''). Thus, we have to take scalability and extensibility into account.
- **Interoperability.** Even if the Internet of Things is inherently heterogeneous, all its components must be able to interact with each other. Therefore, it is necessary to achieve service and semantic interoperability, amongst other things.
- **Data Management.** As the different elements of the Internet of Things produce data, either by sensing or by processing, we must take certain design decisions: where the data should be stored how the data is accessed?
- **Security Issues.** There are various security issues that must be considered in order to achieve a trusted and fault-tolerant IoT: how to protect the communications? how to manage authentication and access control in a world of billions of things? what about the privacy of the users, and the security of the data generated by the things?

1.4 SECURITY ISSUES IN DISTRIBUTED IOT SYSTEMS

Although academic research on the topic of security in the Internet of Things is still in its infancy, there is a substantial body of work that analyzes the existing challenges and possible protection mechanisms (cf. Section 3.1).

1.4.1 IoT Security: an Overview

One of the major challenges that must be overcome in order to push the Internet of Things into the real world is security. IoT architectures are supposed to deal with an estimated population of billions of objects, which will interact with each other and with other entities, such as human beings or virtual entities. And all these interactions must be secured somehow, protecting the information and service provisioning of all relevant actors and limiting the number of incidents that will affect the entire IoT.

However, protecting the Internet of Things is a complex and difficult task. The number of attack vectors available to malicious attackers might become staggering, as global connectivity (''access anyone'') and accessibility (''access anyhow, anytime'') are key tenets of the IoT. The threats that can affect the IoT entities are numerous, such as attacks that target diverse communication channels, physical threats, denial of service, identity fabrication, and others [21]. Finally, the inherent complexity of the IoT, where multiple heterogeneous entities located in different contexts can exchange information with each other, further complicates the design and deployment of efficient, interoperable and scalable security mechanisms.

1.4.2. Analysis of Attacker Models and Threats

As aforementioned, in order to understand how the different approaches presented in Section 2.2 should be secured in the future, it is firstly necessary to enumerate and analyze the attacker models. These models have been defined in a way that they can be applied to both centralized and distributed IoT approaches. Note, however, that the concept of 'perimeter' in the Internet of Things is a bit fuzzy: an attacker can control part of the network, but due to the inherent distributed nature of the IoT, it is nearly impossible for an attacker to fully control the whole System. As a result, an attacker can

be both 'internal' and 'external' at the same time. These attacker models, categorized by threats, are introduced in the following paragraph.

Eavesdropping. Passive attackers can target various communication channels (e.g. wireless networks, local wired networks, Internet) in order to extract data from the information flow. Obviously, an internal attacker that gains access to a particular infrastructure will be able to extract the information that circulates within that infrastructure.

Denial of service (DoS). There are awide number of DoS attacks that can be launched against the IoT. Beyond traditional Internet DoS attacks that exhaust service provider resources and network bandwidth, the actual wireless communication infrastructure of most data acquisition networks can also be targeted (e.g. jamming the channels). Malicious internal attackers that take control of part of the infrastructure can create even more mayhem.

Node Capture. As aforementioned, things (e.g. household appliances, street lights) are physically located in a certain environment. Instead of destroying them, an active attacker can try to extract the information they contain. Note also that, instead of things, active attackers can also target other infrastructures that store information, such as data processing or data storage entities.

Physical damage. This threat can be seen as a subset of the DoS threat. In this attacker model, active attackers usually lack technical knowledge, and can only hinder the provisioning of IoT services by destroying the actual 'things'. This is a realistic attack in the IoT context, because things might be easily accessible to anyone (e.g. a street light). If that is not possible, the attacker can simply target the hardware module in charge of creating the 'virtual persona' of the thing.

Controlling. As long as there is an attack path, active attackers can try to gain partial or full control over an IoT entity. The scope of the damage caused by these attackers depends mainly on (a) the importance of the data managed by that particular entity, (b) the services that are provided by that particular entity.

While both centralized and distributed approaches share the same attacker models, there are subtle differences caused by the distributed IoT features and principles. They change various aspects of the underlying infrastructures, such as the deployment strategies of the different IoT entities, the actual information flow, and the availability of certain interfaces and services. Such changes can create new threats and facilitate the work of attackers, but also can reduce the effectiveness of certain attack vectors. In the following paragraphs we will discuss the different aspects that are influenced by the distributed IoT features and principles, and how they impact the threats and attacker models.

One aspect is the centralization of resources. Most adversaries will aim to target systems that provide the biggest payoff, and central entities fall under this category – they store, manage, and process a huge amount of information. Theoretically, these central entities will have better protection mechanisms, but any vulnerability can make the whole system fall apart. On the other hand, if the actual intelligence of the Internet of Things is distributed, the information will be created and processed in different entities, thus adversaries need to redouble their efforts in order to control the same amount of resources. However, the distribution of resources is a double-edged sword. If the adversary is only interested in a specific piece of information, it can target the system that manages that

1.5 SPECIFIC CHALLENGES AND PROMISING SOLUTIONS

Once the analysis of the threats and attacker models is finished, we can study what are the main challenges in the design and deployment of the security mechanisms. Such study, which will be performed in the next sections, will help to point out specific problems that must be considered if we want to bring the distributed IoT architectures to the real world. Moreover, within this study, we will explore not only existing IoT security mechanisms, but also promising approaches that could be used to provide security in a distributed IoT environment.

1.5.1. Identity and Authentication

It is essential to consider how to manage identity and authentication in the Internet of Things, as multiple entities (e.g. data sources, service providers, information processing systems) need to authenticate each other in order to create trustable services [25]. When defining these security mechanisms, we also have to consider some of the inherent features of the Internet of Things. As interactions can be quite dynamic, the entities of the network might not even know in advance which partners can be used to create a certain service. Vehicular networks (VANETs [26]) are an example of this: cars are expected to provide data not only to devices located on the roadside but also to other cars. Besides, if billions of things are going to be

interconnected, it is necessary to manage their identities in a scalable way.

In a centralized IoT architecture, some of these challenges are inherently more simple. In this particular approach, the application logic is mainly located in one central entity (e.g. a cloud-based IoT application platform) that provides a limited set of well-known entry points (e.g. APIs). Both data providers, such as sensors, and information consumers, such as user applications and other customers, connect to this central entity. As a consequence, all the authentication logic can be centralized in this entity or in an identity provider associated with it. In case there are data providers that have their own identity provider, there are no scalability problems, as such identity providers can establish a relationship of trust with the central entity (a N-to-1 scenario).

Note that if an IoT complies with the collaboration principle (Collaborative IoT), it might be possible to make use of a federated identity management system, where all the service providers belong to the same circle of trust.

This simplification cannot be found in purely distributed IoT architectures, which fulfill both the collaboration and edge intelligence principles. In this context we find a dynamic N-to-N scenario, where data providers are no longer passive and are able to acquire and process information from other sources. Moreover, due to the edge intelligence principle, local users can query local information providers directly, without intervention from external entities. As a result, some kind of authentication logic must be present in every service provider – including the tiniest of objects. Note, however, that things do not exist in a vacuum: they usually belong to a specific group, are located in a particular context, and are owned by certain entities. These aspects must be taken into account.

1.5.2. Promising Approaches

As aforementioned, it is essential to manage the identities of the things in a scalable way. However, as of 2012, there are various mechanisms that can be used to identify things uniquely, such as the tag code standards EPC and ucode [27]. Therefore, it is expected that in the future various systems will coexist – not only at the universal level but also at a local scale [28]. Note, however, that in many scenarios the 'who' is less important than the 'where' and the 'what'. As a consequence, things should be able to identify themselves using their attributes and their context (e.g. radiation sensor #2044A can simply state that is a radiation sensor located in Shibuya, Tokyo).

Regarding things authentication, we have to consider that in many scenarios things belong to a certain group (e.g. intranets of things, personal area networks) located in the same spatial area (e.g. IoT-enabled hospitals). In such environments, local identity providers canmanage the identities of those things, and also can create a circle of trust with relevant external resource providers (e.g. the household of a chronic patient, other hospitals). Consequently, local entities are not only able to authenticate to each other within the group, but also can provide a proof of identity when interacting with external entities. Also, external entities can receive a temporary persona (e.g. long-term patient) from the local identity provider if necessary. This group-based strategy has been, in fact, partially considered in the interactions between WSN islands, where inter domain collaboration is possible through federated identity management and access tokens translation [29]. Traditional Web 2.0 SSO such as OpenID and Shibboleth could also be used in this situation, although it should be noted that they were not designed to fulfill certain IoT requirements such as identity disclosure (i.e. support for privacy) [30], thus more analyses are needed.

1.5.3 Access Control

In the Internet of Things, the challenges related to Access Control are closely related to those found in any distributed system. A particular service is constructed by aggregating several services and data sources from different locations and contexts (e.g. a hospital retrieving information from home patients and ambulances). All these information providers will have their own access control policies and permissions whose life cycle (creation, enforcement, maintenance, translation) needs to be managed.

There are also some specific issues that must be taken into account in the context of the IoT. Granularity (i.e. providing more information to people with the right credentials) and location (i.e. checking whether users are accessing the services of a thing locally or remotely) become important elements of the access control policies in certain scenarios. For example, in case of an accident, everyone at the crash site can access my blood group, but only certified doctors and nurses can access my vital signs. Also, whenever access control mechanisms are implemented at the thing level, it is necessary to consider the amount of computational

resources that are available, as constrained devices might not have enough space to implement a complex access control mechanism. Finally, as many things are owned by their users (either permanently or temporarily) and may belong to a group (e.g. personal area network), it is necessary to consider the design of delegation mechanisms as these things may act in the name of the user/group.

As with authentication, access control policies are easier to manage in centralized IoT architectures: all access control policies are stored and managed within a single central entity. Therefore, data providers do not need to implement any kind of access control logic: they will send all their data to those whom they trust (i.e. the central entity). As a side effect of this configuration, both data providers and information consumers must completely trust the central entity, as it will store the information generated by all network entities. On the other hand, purely distributed IoT architectures have to deal with all previously mentioned challenges: management of heterogeneous policies, multiple enforcement points, etc.

1.5.4. Promising Approaches

There have been very few advances in the management of access control policies for distributed IoTs. In fact, it is not trivial to apply existing access control approaches to completely distributed environments. For example, there are scalability and consistency issues when storing the list of users and their associated access rights in access control lists (ACLs). Role-based access control (RBAC) mechanisms need to define the different roles that users can take, which might be different in various contexts even if they refer to the same type of entity (e.g. custodian vs. janitor). Finally, RBAC policies that use attribute certificates [34] need of an infrastructure that allows validating such certificates in a cross-domain environment. Note, however, that due to the specific features of the Internet of Things, it is possible to consider certain factors such as context as part of the access control model [35]. As a consequence, with adequate technological support, certain policies (e.g. only authenticated users located within my vicinity during working hours can access today's reports) can be easily implemented.

1.5.5 Protocol and Network Security

A secure communications channel is, in most cases, a byproduct of a successful authentication (e.g. server authentication or mutual authentication using protocols such as TLS/DTLS). This process will make use of certain user credentials, such as shared keys or X.509 certificates.

If there is a limited set of well-known centralized application providers (i.e. central entities), the distribution and management of these credentials becomes easier, as it is possible to preload information in the devices. However, in distributed IoT architectures, extra challenges arise: any entity can connect with any other entity at any time, these entities might not know each other in advance, and also limited devices can exchange information with other limited devices. Therefore, in this scenario key management becomes a significant problem.

There are some additional challenges related to the computational resources available to things. Whenopening a secure channel, devices should be able to negotiate the actual parameters of that channel, such as algorithms (e.g. RSA vs. ECC), strength (AES-128 vs. AES-256), and protection mechanisms (only integrity vs. confidentiality and integrity). The first reason is obvious: constrained devices might not be able to implement certain configurations. There is another reason, though: adaptability. Depending on various factors such as the level of criticality of the data, it might not be necessary to apply strong protection mechanisms to a particular information flow (e.g. confidentiality and the on/off status of a street light). Another challenge is the need to analyze the number of security protocols that can be implemented within a constrained device. In fact, it is necessary to carefully study whether existing Internet protocols should be adapted to this context or not. Finally, things that can be accessed directly (e.g. in the distributed IoT approach) need to be careful about the overhead caused by incoming connections (e.g. multiple incoming connections that require the use of public key cryptography).

1.5.6 Promising Approaches

As the Internet of Things inhabits the Internet ecosystem, it is important to provide support for existing security protocols. In fact, the security of IoT-designed web transfer protocols, such as CoAP (Constrained Application Protocol), is largely dependant on the implementation of these security protocols [36]. Some protocols can be implemented without any major changes. For example, there are commercial implementations available of DTLS for constrained devices [37]. However, other protocols need to be adapted due to the complexity of their design. Such protocols must achieve a tradeoff

between simplicity and compatibility. For example, one approach seeks to apply IPsec to constrained environments by balancing link-layer security and IPsec security (cf. Raza et al. [38]).

As for the distribution of the credentials, there are various strategies that could be used to tackle this problem. As aforementioned (cf. Sections 3.3.1 and 3.3.2), whenever things belong to a particular local group, it is possible to have one or various entities in charge of managing and distributing the credentials. Also, in scenarios where clients and servers know each other in advance, it is also possible to use certain symmetric key-based protocols, which can provide good properties such as high resilience to attacks [39]. Finally, beyond the optimization of these security protocols, there are various researchers that are pursuing the implementation of fast and compact cryptographic algorithms. There are various research areas, which are not mutually exclusive: from the design of novel hash functions and symmetric algorithms [40] to the optimization of existing primitives [41].

1.5.6 Privacy

Up to this pointwe have seen that a distributed IoT architecture requires more complex security mechanisms. There is, however, one area where distributed IoTs provide immediate benefits: Data management and privacy. The core idea is that, due to the edge intelligence principle, every entity has more control over the data it generates and processes. There are several consequences of this approach. Firstly, entities can control the granularity of the data they produce. For example, a portable radiation sensor can announce that it is located in a certain area without providing its exact coordinates. Secondly, entities can define their own access policies. The previously mentioned object can provide the city where it is located (Tokyo) to anonymous entities, the area where it is deployed (Shibuya, Tokyo) to entities with adequate permissions, or even detailed GPS location information to local entities in case of emergencies. Thirdly, entities do not need to provide all the data they produce, only the data that is needed by the external entities for a particular service. This is closely related to privacy, as it will be more difficult to create a profile of a certain entity if not all information is available.

As for centralized IoT architectures (including those who comply with the collaboration principle), a data provider can also decide whether to share or not a particular data stream. Still, as the intelligence is located on the central entity, the type of services it provides will be limited to the amount of data it receives. Another approach can be used if the centralized architecture complies with the edge intelligence principle: as data providers and information consumers are able to communicate directly, they might negotiate a set of secret keys in order to protect their information. However, in this case the central entity cannot process the data, thus it becomes a simple storage system unless it implements advanced cryptographic mechanisms that can manipulate encrypted data, such as homomorphic encryption.

1.5.8 Promising Approaches

The distributed IoT approach facilitates the implementation of the privacy-by-design principles [24], as all entities can directly manage their own data. However, it is necessary to go beyond the implementation of user-centric access policies and mechanisms to control the granularity of the provided data. Whenever human beings are involved, aspects such as the usability of the user interface (e.g. what can be accessed and to what extent [42]) should be taken into account. As data will be distributed amongst various entities, it also is necessary to study the applicability of existing privacy-preserving distributed data mining algorithms [43]. For example, certain privacy enhancing technologies (PETs) [44] such as multiparty computations [45] can be used to provide protection to some cooperative protocols (e.g. cooperative benchmarking and forecasting). For especially sensitive data, advanced concepts such as active bundles (i.e. a container with a payload of sensitive data, metadata, and a virtual machine (VM) [46]) might be used. Finally, the legal privacy regulations should be revised to fully consider the intricacies of an always connected Internet of Things [47].

Regarding the problem of user tracking and profiling, there are some ongoing efforts in the research community that aim to provide solutions for this particular threat. For example, there is an interesting perspective that considers a local environment as an operative system [48]. In short, incoming and outgoing items need to be scanned for rogue devices and malicious software that can threaten the privacy of the user. This can be achieved by using mechanisms such as the privacy coach [49]. However, as users could be tracked anywhere and anytime, these concepts should be extended in order to help users to become more aware of how their surroundings capture and use their information. Frameworks like uTRUSTit

(cf. Section 3.3.5) might help in this area. Besides, existing studies on surveillance systems such as CCTVs [50] might also provide a clue on the specific legal challenges that our society will face once the Internet of Things becomes a reality.

1.5.9 Trust and Governance

There are other areas where both centralized and distributed IoT approaches have their own specific advantages and disadvantages. One of those areas is Trust Management. As aforementioned, in the IoT we can consider two dimensions of trust: trust in the interactions between entities, and trust in the system from the users' perspective. In a centralized IoT, uncertainty comes from the interactions with the data providers ('Which data is more reliable and fresh?'). The holistic point of view of a central entity can help in calculating the reputation of other entities (e.g. a radiation sensor cannot give a warning if all sensors in the vicinity provide a low value). However, if different central entities collaborate with each other, they must be able to exchange trust information in order to fix inconsistencies in the reputation values. In a distributed IoT, there is uncertainty in both the interactions with the data providers and the interactions with the service providers ('Who can give me a robust and timely service?'). The distributed infrastructure makes the management of trust more complicated: how can reputation and trust be is given a low reputation, this reputation can be propagated to other entities that might interact with such an outlier in the future.

As for the trust in the system, it is largely dependant on knowing the internal state of the Internet of Things that surround us. In a centralized IoT not all information will be available: in order to provide services, a central entity is more interested in retrieving physical and entity data instead of status and network data. Still, if a centralized system provides an additional 'internal status' service, it can be able to supply this kind of information very quickly, as (a) it stores internally most of the information from the data providers and (b) if fresh data is not available, it can send immediate queries to the specific data providers. As for a distributed IoT, this kind of service is more complex and needs more time to be completed, as relevant data providers must be discovered and queried. Nevertheless, the more intelligence at the edge of the network, the more relevant information (e.g. network status, existing connections between entities) that can be retrieved. This way, it can be possible to have a more accurate picture of the status of the whole system.

1.5.10 Promising Approaches

There are some theoretical studies that analyze the suitability of trust management systems for the IoT. For example, Køien [52] points out those subjective logic systems such as TNA-SL [53] can capture dynamic environments where beliefs and uncertainties change over time. There are other open issues that the state of the art needs to address, such as the management of trust without central authorities. Still, it might be possible to develop preliminary solutions for such problems by analyzing how they are solved in the building blocks of the Internet of Things (e.g. sensor networks, ad hoc networks). The reason is simple: these building blocks have several features in common with the distributed IoT approach. For example, ad hoc networks are dynamic environments where the network is created, operated and managed by the nodes themselves. In such networks, the decentralization of trust, which is essential in a distributed IoT context, has been extensively studied [54]. Moreover, there are other holistic paradigms closely related to the Internet of Things, such as ambient intelligence and pervasive computing, whose existing works in the area might also provide additional information on how to deal with multidisciplinary challenges [55]. The Internet of Things, but also enables users to know their status, allowing the creation of a mental model of the virtual world.

1.5.11 Fault Tolerance

Regardless of the approach, centralized or distributed, there is an expected population of billions of things that will act as data and information providers. Such things can become faulty and stop working, but they also can send bogus or even manipulated data. As mentioned in Section 3.2, it is unrealistic to assume that a data processing entity will never have to deal with such problematic data. Therefore, in the IoT context, it is essential to consider fault tolerance. We must not only aim to provide a 'best-effort' service in case parts of the network are not accessible, but also assume that every entity can receive bogus information from other entities.

In case one of the things fails and stops sending data, it is necessary to discover another thing that can provide a similar set of data. In centralized IoT architectures this task is more simple, as the central entity will have access to all data flows. As for distributed IoT architectures, they need to develop a discovery mechanism that is able to pinpoint

related data flows. Note that additional mechanisms need to tobe implemented in order to assure the survivability of the network in case of a failure of part of the infrastructure: not only data providers need to be located, but also service providers and data processing entities as well.

As for the existence of bogus data, it is possible to develop holistic (centralized) and detailed (distributed) mechanisms that deal with this problem. A centralized system can analyze the consistency of the data, pinpointing data providers who seem to behave erratically. A distributed system can make use of the additional information (e.g. network information) retrieved at a local level or in the interactions with other entities to apply advanced intrusion detection systems. Both approaches have their own challenges, but they are not mutually exclusive (e.g. in a distributed environment there can be certain entities that provide high-level services and behave like cloud-based IoT infrastructures), thus it is advisable to take full advantage of both of them if possible.

1.5.12 Promising Approaches

As of 2012, there are almost no explicit analyses on the mechanisms that could be used to provide service survivability in the IoT. Still, there are various research approaches that can be used as a foundation to enable such fault tolerance. For example, the tools that allow human users to create a mental model of their surroundings (highlighted in Section 3.3.5) can also be used by the network entities to discover devices that are faulty. There are also various theoretical platforms whose aim is to provide service look-up, discovery and composition mechanisms for the Internet of Things [58]. However, it is necessary to study their applicability in an heterogeneous distributed environment. The use of local clusters can help with this task: if entities are clustered in local groups, that cluster can incorporate mechanisms that not only provide up-to-date information about local things, but also enable the interaction of different service discovery protocols through specialized middleware [58]. Besides, all these services can make use of the functionality provided by existing security mechanisms such as trust management (e.g. only reports from trusted entities will be considered, zones with high reputation will take care of the extra workload).

Regarding the detection of bogus data and malicious entities, most existing intrusion detection mechanisms and rules focus on internal adversaries that try to attack the specific protocols of data acquisition networks (e.g. sensor networks) [59], but do not consider attacks that target the interactions between different IoT domains (e.g. a DoS attack or a malformed packet attack targeting a smart door service [60]). In fact, the state of the art on this specific area is very limited and only few works are available [61,62].Itis then necessary to implement new detection mechanisms that take into account the distributed IoT specific attacker models. Note that it is also possible, in certain scenarios, to adapt existing mechanisms. For example, centralized entities can make use of clustering-based mechanisms and other data mining techniques to detect outliers and intrusions [63]. Moreover, lessons might be taken from existing distributed intrusion detection systems implemented in similar environments such as smart grids [64].

1.6 SUMMARY

A summary of the challenges studied in the previous sections is shown in Table 2. We can conclude that the decentralized and heterogeneous nature of the distributed approach increases the complexity of most security mechanisms (Identity and Authentication, Access Control, Protocol and Network Security, Trust management and Fault Tolerance). Still, there are some security mechanisms (Privacy, Trust management and Governance, Fault Tolerance) where i) the distributed approach provides interesting features, ii) both approaches (centralized and distributed) can complement each other.

In the previous sections we have also highlighted various strategies that could be used in the near future to design and deploy IoT-specific security mechanisms. One such strategy assumes that things belong to a certain group (intranet of things, personal area network) located in a certain spatial area (IoT-enabled hospital, household). These groups comply with the edge intelligence and collaboration principles, thus they are part of the distributed IoT. Once the things are grouped, the implementation of certain security mechanisms becomes easier: local identity providers can be defined, the access control logic can be pushed onto specific entities, a mental model of the virtual world can be created, and so on. Note that this strategy might be partially applicable to highly dynamic environments such as VANETs [26] if we consider the existence of logical groups (''all cars that have been registered in Singapore''), although more research is needed to validate this point of view.

Other strategies focus on the interactions of humanusers with the Internet of Things. For example, as digital social infrastructures have been already deployed, they can be used in the implementation of specific security mechanisms such as user-defined access control and circles of trust. Finally, another strategy consists of adapting the security mechanisms that have been developed in i) the building blocks of the Internet of Things (e.g. sensor networks, ad hoc networks) and ii) other paradigms closely related to the Internet of Things (ambient intelligence, pervasive computing). Note that while the building blocks lack the complexity of the distributed IoT approach, they share certain similarities such as the decentralization of resources. In fact, some security mechanisms, such as Key Management, have been successfully adaptedand fault tolerance mechanisms can be specifically created for this approach. These and other benefits show that this approach is actually useful and applicable to the real world. As a final note, we would like to stress that both centralized and distributed approaches can coexist with each other, providing the foundations of a full-fledged Internet of Things.

1.7 CONCLUSIONS

The main goal of this paper was to provide an explicit analysis of the features and security challenges of the distributed approach of the Internet of Things, in order to understand what is its place in the Future Internet. There are numerous challenges that must be solved, such as assuring interoperability, reaching a business model, and managing the authentication and authorization of entities. Still, there are multiple benefits as well. Since intelligence is not concentrated on a limited set of centralized application platforms – although these platforms can also exist in order to provide additional support – scalability is improved. Data is managed by the distributed entities, thus it is possible not only to push/pull data only when needed, but also to implement specific privacy policies. Besides, additional trust and fault tolerance mechanisms can be specifically created for this approach. These and other benefits show that this approach is actually useful and applicable to the real world. As a final note, we would like to stress that both centralized and distributed approaches can coexist with each other, providing the foundations of a full-fledged Internet of Things.

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Innovation of Business Model: Managing the Cha

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Abstract: *The present digital era is marked by high degree of ongoing ICT led technological change and ever-increasing competition. While existing businesses/ early entrants are worried about increasing competition and declining profit margins; new/ late entrants are worried about their fate in the face of cut throat competition. Digital disruption has shortened business model lifecycles and made business model innovation key to long-term success.*

This papers examines the drivers and challenges of business model innovation in digital era. The paper also examines the ways and strategies through which business model innovation can be successfully implemented. The study is qualitative in nature and is based on analysis of existing articles, papers and case studies.

Key Words: *Business Model, BM, Business Model Innovation, BMI, Value Proposition, Operating Model, ICT, Digital Era.*

Introduction

In today's highly competitive and globalized marketplace, it is always challenging for the existing firms to stay competitive, expand and grow. It is even more challenging for a new firm to enter any existing market. For survival and growth, firms need to discover the opportunities which are presently not being served properly. The firms are continuously struggling to recognize such under-served needs of the customers, and are pursuing innovations to meet such needs.

Most of the time, firm's focus and efforts are confined to innovations in existing products, processes and services, which provide it some advantage in the face of cut-throat competition. While pursuing innovations in the existing are as, the firm should also explore other areas for innovation. One such key area of innovation is Business Model (BM),which can change the game in favour of innovating firm. Business model innovation (BMI) refers to the creation, or reinvention, of a business itself.

In the last few decades, business model innovation has assumed increasing significance. It can be said to foster innovation in two ways: (a) allows managers and entrepreneurs to connect innovative products and technologies to a realized output in a market; (b) it may be also a source of innovation and of itself. History has proven time and again that successful innovations often stem from excellent business models as much as they do from excellent technologies (Shelton and Davila, 2005). Business model innovations have re-shaped many industries and re-distributed billions of value. One secret of maintaining a thriving business is recognizing when it needs a fundamental change; BMI is the driver which delivers such fundamental change. According to Chesbrough (2010), a mediocre technology pursued within a great business model may be more valuable than a great technology exploited via a mediocre business model.

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A recent American Management Association study emphasizes that almost 10% of innovation investment at global companies is focused on developing new business models. A global survey of more than 4,000 senior managers and leaders by the Economist Intelligence Unit found that the majority (54%) of respondents favoured new business models over new products and services as a source of future competitive advantage. In a similar global study conducted by IBM (2010) covering over 750 organizational leaders, it was found that competitive pressures have pushed business model innovation much higher than expected on CEOs' priority lists. According to GE Global Innovation Barometer Study (2013), 52% respondents said that business model innovation is also one of the main pursuits by the organization. The message is clear that how companies do business is often more important than what they do.

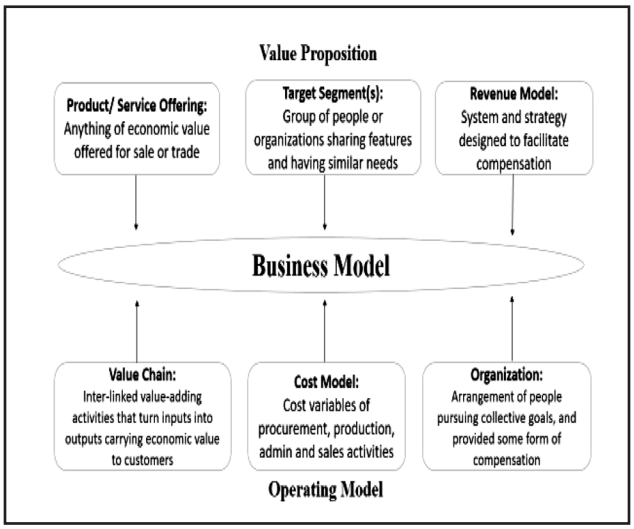
The ongoing ICT revolution has thrown up new vistas and new challenges in the path of BMI process. On the one hand, designing and implementation of BMI has become relatively easier and faster; and on the other hand the business-model life cycles are getting shorter. This paper examines the drivers and challenges of business model innovation in digital era. The paper also examines the ways and strategies through which business model innovation can be successfully implemented.

Understanding Business Model Innovation

Every company has at least one business model (BM). A company can operate several business models at the same time. Similarly, two or more business models can be successfully used simultaneously in one industry. BM describes the rationale of how an entity creates, delivers, and captures value, in economic, social, cultural or other contexts. Companies can change parts of their business model and thus maintain an advantage over their competitors.

Boston Consulting Group (2009) states that a business model consists of two essential elements- the value proposition and the operating model. Within the value proposition, the firm needs to be explicit on its target segments, product or service offering and revenue model. In the operating model part, it needs to address three critical parts - the value chain, cost model and organization. The figure 1 presents elements/ components of business model, as proposed by BCG.

Figure 1: Elements of a Business Model



Source: Boston Counsulting Group (2009). Business model innovation: When the game gets tough, change the game.

According to Osterwalder, Piqneur and others (2010), a business model canvas/ framework can be constructed through nine building blocks i.e. by exploring and deciding - key partners, key activities, key resources, customer relationships, channels (to market), customer segments and the value proposition, with cost structure and revenue streams. Thus a business model helps as to: (i) articulate the value proposition, (ii) identify a market segment, (iii) define the structure of the value chain, (iv) specify the revenue generation mechanism(s), (v) describe the position of the firm within the value network/ ecosystem, and (vi) formulate the competitive strategy.

The business model of a company needs to be changed from time to time in order to ensure firm's continuing survival, growth and success. Osterwalder et al.(2010)explain BMI as creating value, for companies, customers and society, by replacing outdated models with new models that respond to emerging user needs and pressing environmental concerns.

Johnson (2010) defines BMI as 'seizing the white space (un/under-served market)' by undertaking a range of potential activities not defined or addressed by the current business model, beyond its core and adjacencies that require a different business model to exploit. BMI has four parts –first: a clear & strong customer value proposition, second: a profit formula that defines how and where the company will capture value from a given set of customers at

a given price. Its third and fourth elements are - the key resources and key processes as the means by which the company delivers the value to the customer and itself.

According to Girotra and Netessine (2014), in simpler terms, business model innovation demands neither new technologies nor the creation of brand-new markets; it is about delivering existing products that are produced by existing technologies for existing markets. A business model innovation is thus the conscious change of an existing business model or the creation of a new business model that better satisfies the needs of the customer than existing business models.

BMI Examples

A prominent example in global context is Apple's introduction of products and services such as the iPod, iPhone and iTunes which expanded the company's offerings beyond the desktop computer market. The iPod and iTunes created ways to generate profit from downloadable music, while the iPhone was a breakthrough in the smart phone market.

In Indian context, Patanjali Ayurveda Ltd can be regarded to have made business model innovation by providing a large variety of FMCG products with natural ingredients. Its strategy of targeting those consumers who carved for swadeshi/ natural/ ayurvedic products, selling at prices lower than those charged by MNCs, and setting up separate distribution network, helped it to capture a large market share despite high competition and challenges in distribution. This different business model helped the company to earn a revenue of around Rs. 10,500 crore for the financial year ending March 2018.

Reliance Jio can be taken as another example of BMI. Jio introduced free lifetime call services, and data services at cheaper prices (almost one-tenth). It introduced a significant change in business model from voice based revenue system to data based revenue system. For the quarter ending March 2018, Jio's revenue from operations was around Rs 8,404 crores and its subscriber base stood at 186.6 million. Despite late entry into markets, both Patanjali and Jio have been able to capture significant market share due to business model innovation through better value proposition and different operating model.

Objectives of the Study

Key objectives of the study are as follows:

- To gain an insight into key drivers of business model innovation
- To study the challenges in the business model innovation process
- To examine ways &strategies for successful implementation of business model innovation

Research Methodology

The study is qualitative in nature and is based on analysis of existing articles, papers and case studies. The secondary data has been collected from various websites and sources like Boston Consulting Group, Harvard Business Review etc.

Drivers of Business Model Innovation

There are many drivers of business model innovation. The digital age has become an impetus for business model innovation, as technology has dramatically changed how companies operate and deliver services to customers. This digital disruption has shortened business model lifecycles and made business model innovation key to financial success. In the past few decades, the average business model lifespan has fallen from about 15 years to less than 5years. Business model innovation is thus no longer one of key ways to gain a competitive edge, but it is a necessary core capability to respond to - and make progress in - a changing world.

Business model innovation is critical to transformation. According to BCG (2009), whenever seeking to drive breakout growth, reinvigorate a lagging core, or defend against industry disruption or decline, leaders need to continuously ask themselves: - Can their existing business model continue winning? What type of business model shift will help it achieve breakout performance? How they can avoid jeopardizing the core business? How can they build the capability to develop, rapidly test, and scale new models? Future success of business often hinges on re-thinking the current model by defining a compelling new customer value proposition and supporting it with a sharp, and efficient operating model.

Business model innovation may not always be in connection with a new technology or a new product. However it is often necessary to install BMI to generate value from a radical product innovation. BMIs are significantly more profitable. Changes in customer behavior, globalization and technological innovations keep on creating a 'window of opportunity' for new business models. The global marketplace has further driven the need for business model innovations, as companies must react to rising

international competition and increasing systemic risk.

According to Johnson, Christensen and Kagermann (2008), BMI can provide companies a way to break out of intense competition. It can help address disruptions that demand new competitive approaches. It can help address downturn-specific opportunities.

Slywotzky (1996) has highlighted the importance of adjusting the business-design in order to drive/adjust value migration within an industry. Christensen (2006) has cited the need for business model innovation as one of the core elements of a successful market disruption. Thus there are many drivers of business model innovation.

Designing New Business Model (BMI)

Business model innovations do not necessarily require the development of completely new concepts. Some business model innovations are new combinations from parts of 'old' or 'other' business models. Thus BMI is sometimes a combination of already existing ideas.

Business model innovation is about fundamentally rethinking of the business around a clear customer need, then realigning its resources, processes and profit formula with this new value proposition. Analogies are an important catalyst for generating new business model ideas.

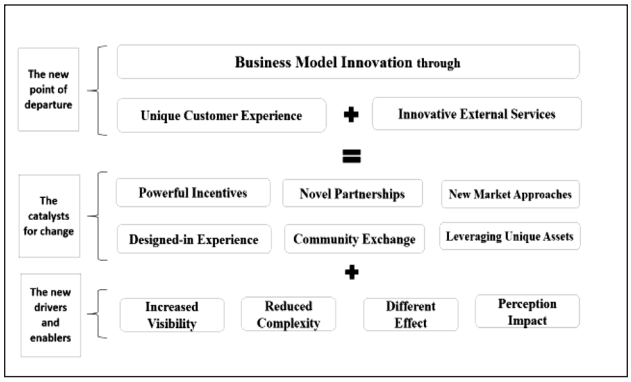
Business model innovation involves making simultaneous, coordinated, and internally consistent changes to multiple aspects of the business model to reignite growth, combat disruptions, or access new markets.

According to Innosights, successful business model innovation requires identification of 'white space (un/under-served market)' growth opportunities - tapping into an entirely new customer opportunity with a completely new business model that changes the competitive landscape. For this purpose, it needs to create new systems, rules, and metrics that enable companies to organize and implement new models successfully.

While implementing business model innovation, the companies need to - focus appropriately neither narrow nor wide, create hedged and balanced portfolio of products or services, ensure proper timing of decisions, proper phasing and sequencing of decisions, sub-divide key decisions, nurture creativity, utilise experienced and talented leadership team, and encourage wide-spread external and internal collaboration.

According to Hobcraft (2010), the starting point of a new business model is to know what the customer is trying to do that they cannot do as effectively as they would wish today. These customers' needs can be recognized through deeper observations to discover new opportunities. If firm can correctly identify these gaps/opportunities, then there is a scope for potential innovation match that might need a new business model. Figure 2 presents the framework for BMI proposed by Hobcraft.

Figure 2: Framework for BMI



Source: Hobcraft, Paul (2010). The case for a more systematic understanding of business model innovation design.

The four 'drivers and enablers' that can galvanise BMI process are - increased visibility, reduced complexity, providing a different effect than the present, and altering the perception with significant impact on today's understanding. BMI process can be further sped up by using the 'catalysts of change' namely – new approaches to the market, providing powerful incentives and designed-in-experience with a focus placed on the quality of the user experience, leveraging unique assets of the firm, developing novel partnerships, and fostering community exchange. The combined effect of drivers and catalysts can lead to unique customer experience which coupled with innovative external services, can lead to sustainable business model innovation.

Challenges in BMI Process

There are many challenges in the pursuit of business model innovation as discussed below:

- ICT led technological change has dramatically changed how companies operate and deliver to customers. Thus useful life span of existing business model is always under threat.
- Digital disruption has shortened business model lifecycles from about 15 years to less than 5 years.

- BMI is sometimes found to fail to capture opportunity if it is implemented late and delayed.
- Leveraging ICT and other technologies properly for business model innovation is a major challenge.
- BMI processes are very costly and uncertain.
- Sometimes leaders think that their business model is the best or perhaps the only way to earn profit in their respective industries; however, there could be many business models.
- Some business leaders may not be fully knowing what it is within their existing business model that combines to make the profit engine of their existing business.
- Without a framework for identifying opportunities, it is hard to be systematic about the BMI process. Hence its successful outcome is challenging.
- Planned BMI may often conflict with the old/ traditional configurations of firm's assets, whose managers are likely to resist experiments/ change programs that might threaten their ongoing value to the company.
- There may always be some conflict between the old business model established for the existing technology, and the new business model required to exploit the emerging, disruptive technology.
- There is a strong bias in effectuation for action over analysis. Whenever there is insufficient data, firms do not explore the market thoroughly, they go ahead with the BMI project/ proposal without in-depth analysis and planning.
- Increasing the pressure on the new business model by wrongly applying existing key performance indicators (KPIs) based on existing businesses units can be harmful, and it is likely to derail/ kill the new business model project.
- The search for a new business model may mean extended co-existence between current and new models. Knowing when to shift resources towards the latter is a delicate balancing act.
- A company may get bogged down in too many uncoordinated, bottom-up innovations through bloated, unbalanced, and overlapping portfolio of experiments.
- Some organizations are able to churn out ideas endlessly, but rarely move on to piloting and scaling them up.
- Every industry has zombies - projects that do not go anywhere but refuse to die; as some managers refuse to give up their pet ideas.
- A company may sometimes focus too much on the internal needs of the organization and fail to address the evolving needs of customers. BMI that takes an inside-out approach frequently results in too little change too late and fails to capture the opportunity.
- Business model innovation in itself is shaping up to be one of the most challenging aspects for leadership of existing business and future aspiring leaders.

Thus there are many obstacles and challenges in the path of BMI process.

Managing Challenges in BMI Process

Some ways in which these challenges can be managed are as follows:

- The business leaders should be open to many business models instead of analysing only two or three models.
- The business leaders should accept that the new model can remain unprofitable for some time.
- It is vital to understand external forces of change in order to anticipate relevant impacts in the business model design.
- Maps of business models can be constructed, which can help to clarify the processes underlying them, and which can allow them to become source of experiments by considering alternate combinations of the processes.
- There should be proper focus (neither too narrow nor too wide), proper planning, proper scheduling/ sequencing of activities, matched by adequate resources, with continuous feedback, and by managing internal resistance to change.
- The business model development should follow the 'Trial and Error Principle: Design Prototype & Test'.
- Visualization tools such as the 4-Dimension Concept, Business Model Canvas or BMI Pattern Cards can be used to support BMI process.
- Once a company properly understands it current choices, it is better positioned to brainstorm new opportunities. The existing model should be properly diagnosed and its limitations should be found, thereafter a new model which overcomes these limitations should be made.
- Successful business model innovation in the

digital age requires an alignment of business objectives and ICT objectives.

- BMI requires a distinct set of processes, skills and capabilities to overcome an organization's short-term focus & resistance to change, and also sustain a BMI advantage on a continuous basis.
- Top management involvement and support are prerequisites for success of a business model.
- Widespread external and internal collaboration can play an important role in successful implementation of BMI.
- Organization must resist the temptation to overvalue past models and undervalue forward-looking, disruptive ideas.
- The focus must lie on organizational learning based on an iterative approach for finding a successful business model design than on efficiency. An experimental instead of a purely analytical logic is required.
- Constant adjustments to the business model are required in order to account for diverse customer needs and changing business environments.
- Learning to speak the language of the (new) market is key to the success.

Thus by taking above steps and strategies, business model innovation can be implemented successfully.

Conclusion

Modern era is characterized by high degree of volatility, uncertainty, ambiguity and complexity (VUCA). Due to the ongoing ICT revolution led technological change, socio-economic environment is changing fast. ICT led technological progress has changed and continues to change the way business is done and operations are carried out. The competition continues to rise with every passing day. While existing businesses/ early entrants are worried about increasing competition and declining profit margins; new/ late entrants are worried about their fate in the face of cut throat competition. Business model innovation (BMI) has become the need of the hour. Business model innovations have re-shaped many industries and re-distributed billions of value. Reliance Jio and Patanjali Products can be taken as recent examples of attempts towards business model innovation in Indian context. However there are many problems and challenges in the path of business model innovation process, like, lack of understanding of business model and available choices, insufficient data, associated uncertainty, coordination problems, narrow fixation on idea generation only, lack of resources, lack of top management support etc. These challenges can be met by taking a variety of steps and strategies, like, construction of maps, simulation of models, internal and external collaboration etc. ICT tools can play a major role as a facilitator of business model innovation.

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A Study of Effectiveness of Digital Marketing

Sweta Bakshi*

Abstract: *With the world continuously revolving on the axis of technological advancement man has got many things to add to his comfort list. With the rising interest in the internet and its beneficial usage the man has evolved many options to make his life simpler. Digital is a new way of engaging with customers. And for others still, it represents an entirely new way of doing business. None of these statements are incorrect. But such diverse perspectives often trip up leadership teams because they reflect a lack of alignment and common vision about where the business needs to go. This often results in piecemeal initiatives or misguided efforts that lead to missed opportunities, sluggish performance, or, false starts. If we talk about digital marketing, it's an umbrella term for all of your online marketing efforts. Businesses leverage digital channels such as Google search, social media, email, and their websites to connect with their current and prospective customers.*

Introduction

With the world continuously revolving on the axis of technological advancement man has got many things to add to his comfort list. With the rising interest in the internet and its beneficial usage the man has evolved many options to make his life simpler. Now, rather than going to your local shop for groceries you opt for going online and buying all your errands with a few simple clicks. You name it and the World Wide Web has it to deliver.

Considering the higher interest of customers in online buying and exploring, the companies have now taken the route of e-marketing. Also known as digital marketing; it is the most easy way to market your product to your target audience. As per the studies 89%of the customers choose e-buying over physical buying. Various companies are encashing this opportunity by making themselves available online. Digital marketing is playing a vital role in business productivity

Digital describes electronic technology that generates, stores, and processes data in terms of two states: positive and non-positive. Positive is expressed or represented by the number 1 and non-positive by the number 0. Thus, data transmitted or stored with digital technology is expressed as a string of 0's and 1's. Each of these state digits is referred to as a bit (and a string of bits that a computer can address individually as a group is a byte). Prior to digital technology, electronic transmission was limited to analog technology, which conveys data as electronic signals of varying frequency or amplitude that are added to carrier waves of a given frequency. Broadcast and phone transmission has conventionally used analog technology. Digital technology is primarily used with new physical communications media, such as satellite and fiber optic transmission. A modem is used to convert the digital information in computer to analog signals for phone line and to convert analog phone signals to digital information of computer.

Digital marketing in other words is marketing that exists online. Digital marketing refers to advertising delivered through digital channels such as search engines, websites, social media, email, and mobile apps. Digital marketing is a broad term that refers to various promotional techniques deployed to reach customers via digital technologies. Digital marketing embodies an extensive selection of service, product

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and brand marketing tactics which mainly use Internet as a core promotional medium in addition to mobile and traditional TV and radio. Canon iMage Gateway helps consumers share their digital photos with friends online. L'Oréal's brand Lancôme uses email newsletters to keep in touch with customers and hence tries to strengthen customer brand loyalty (Merisavo et al., 2004). Magazine publishers can activate and drive their customers into Internet with e-mails and SMS messages to improve re-subscription rate (Merisavo et al., 2004).

Marketers increasingly bring brands closer to consumers' everyday life. The changing role of customers as coproducers of value is becoming increasingly important (Prahalad and Ramaswamy, 2004). Khan and Mahapatra (2009) remarked that technology plays a vital role in improving the quality of services provided by the business units. According to Hoge (1993), electronic marketing (EM) is a transfer of goods or services from seller to buyer involving one or more electronic methods or media. E-Marketing began with the use of telegraphs in the nineteenth century. With the invention and mass acceptance of the telephone, radio, television, and then cable television, electronic media has become the dominant marketing force. McDonald's uses online channel to reinforce brand messages and relationships. They have built online communities for children, such as the Happy Meal website with educative and entertaining games to keep customers always close to themselves (Rowley 2004). Reinartz and Kumar (2003) found that the number of mailing efforts by the company is positively linked with company profitability over time. The primary advantages of social media marketing is reducing costs andenhancing the reach. The cost of a social media platform is typically lower than other marketing platforms such as face-to-face sales or sales with a help of middlemen or distributors. In addition, social media marketing allows firms to reach customers that may not be accessible due to temporal and locational limitations of existing distribution channels. Generally, main advantage of social media is that it can enable companies to increase reach and reduce costs (Watson et al. 2002; Sheth & Sharma 2005).

According to Chaffey (2011), social media marketing involves "encouraging customer communications on company's own website or through its social presence". Social media marketing is one important technique in digital marketing as companies can use social media form to distribute their messages to their target audience without paying for the publishers or distributor that is characteristic for traditional marketing. Digital marketing, electronic marketing, e-marketing and Internet marketing are all similar terms which, simply put, refer to "marketing online whether via websites, online ads, opt- in emails, interactive kiosks, interactive TV or mobiles" (Chaffey & Smith, 2008). Giese and Gote (2000) finds that customer information satisfaction (CIS) for digital marketing can be conceptualized as a sum of affective response of varying intensity that follows consumption and is stimulated by focal aspects of sales activities, information systems (websites), digital products/services, customer support, after-sales service and company culture.

Waghmare (2012) pointed out that many countries in Asia are taking advantage of e-commerce through opening up, which is essential for promoting competition and diffusion of Internet technologies. Zia and Manish (2012) found that currently, shoppers in metropolitan India are being driven by e- commerce: theseconsumers are booking travels, buying consumer electronics and books online. Although spending per online buyer remains low, some 59% of online consumers in metropolitan India already make purchases online at least once in a month. Dave Chaffey (2002) defines e-marketing as "application of digital technologies - online channels (web, e-mail, databases, plus mobile/wireless & digital TV) to contribute to marketing activities aimed at achieving profit acquisition and customers retention (within a multi-channel buying process and customer lifecycle) by improving customer knowledge (of their profiles, behavior, value and loyalty drivers) and further delivering integrated communications and online services that match customers' individual needs. Chaffey's definition reflects the relationship marketing concept; it emphasizes that it should not be technology that drives e-marketing, but the business model. All types of social media provide an opportunity to present company itself or its products to dynamic communities and individuals that may show interest (Roberts & Kraynak, 2008). According to Gurau (2008), online marketing environment raises a series of opportunities and also challenges for social media marketing practitioners.

The main objective of this paper is to identify the effectiveness of digital marketing and marketing innovations in the competitive market. The supportive objectives are following:

- To show the various elements of digital marketing;
- To focus on the basic comparison between

traditional and digital marketing;

- To discuss the principles of marketing strategy in the digital age;
- To discuss types of innovations

Various Elements of Digital Markeitng

Digital marketing refers to advertising delivered through digital channels such as search engines, websites, social media, email, and mobile apps. While this term covers a wide range of marketing activities, all of which are not universally agreed upon, we'll focus on the most common types below.

Paid Search

Paid search, or pay-per-click (PPC) advertising, typically refers to the "sponsored result" on the top or side of a search engine results page (SERP). You only pay when your ad is clicked. You can tailor your PPC ads to appear when specific search terms are entered, creating ads that are targeted to a particular audience.

PPC ads are flexible, visible, and most importantly, effective for many different types of organizations. They are also contextual advertisements—ads that appear when a person is searching for a particular keyword or term

Search Engine Optimization

Simply put, search engine optimization (SEO) is the process of optimizing the content, technical set-up, and reach of your website so that your pages appear at the top of a search engine result for a specific set of keyword terms. Ultimately, the goal is to attract visitors to your website when they search for products, services, or information related to your business.

SEO can almost be viewed as a set of best practices for good digital marketing. It enforces the need for a well-constructed and easy-to-use website, valuable and engaging content, and the credibility for other websites and individuals to recommend you by linking to your site or mentioning it in social media posts.

Content Marketing

Great content is the fuel that drives your digital marketing activities: It is a key pillar of modern SEO

It helps you get noticed on social media

It gives you something of value to offer customers in emails and paid search ads Creating clever content that is not promotional in nature, but instead educates and inspires, is tough but well worth the effort. Offering content that is relevant to your audience helps them see you as a valuable source of information. On top of that, resourceful content makes it less likely that they will tune you out.

Social Media Marketing

People aren't just watching cat videos and posting selfies on social media these days. Many rely on social networks to discover, research, and educate themselves about a brand before engaging with that organization. For marketers, it's not enough to just post on your Facebook and Twitter accounts. You must also weave social elements into every aspect of your marketing and create more peer-to-peer sharing opportunities. The more your audience wants to engage with your content, the more likely it is that they will want to share it. This ultimately leads to them becoming a customer. And as an added bonus, they will hopefully influence their friends to become customers, too.

Email Marketing

Email has been around for more than two decades, and it's not going anywhere anytime soon. It's still the quickest and most direct way to reach customers with critical information. The reason is simple: Consumers are very attached to their emails.

But great marketers know that not just any email will do. Successful email campaigns must be engaging, relevant, informative, and entertaining. To succeed, your marketing emails should satisfy these five core attributes:

- Trustworthy
- Relevant
- Conversational
- Be coordinated across channels
- Strategic

Mobile Marketing

As mobile devices become an increasingly integral part of our lives, it's vital that marketers understand how to effectively communicate on this unique and extremely personal channel. Mobile devices are kept in our pockets, sit next to our beds, and are checked constantly throughout the day. This makes marketing on mobile incredibly important but also very nuanced.

From SMS and MMS to in-app marketing, there are many ways to market on mobile devices, so finding the right method for your particular business is key. Beyond the mechanisms to deliver your message,

you also need to think about coordination of your marketing across digital channels and make sure mobile is a part of that mix.

Marketing Automation

Marketing automation is an integral platform that ties all of your digital marketing together. Without it, campaigns will look like an unfinished puzzle with a crucial missing piece. Marketing automation software streamlines and automates marketing tasks and workflows. Most importantly, it measures the results and ROI of your digital campaigns, helping you to grow revenue faster.

When used effectively, marketing automation will help you gain much-needed insight into which programs are working and which aren't.

The importance of digital marketing

While the older generation is still not much able to come out of the web of paper based information stuff the younger generation has evolved themselves to be the most tech savvy and based on e-marketing.

This is mainly because the digital marketing offers a lot of comfort, ease, versatility and most importantly is faster than anything else. It's not only a boon to the consumers, but a very effective tool for the marketers to reach their target audience. Here are some key points that explain its importance:

Affordable

The first to be considered point is that digital marketing is very cheaper when compared to the other modes and means of marketing. Information going online regarding your company or product may not cost the company more than a fractional cost of sending the same information via newspaper or a digital advertisement.

Effective targeting of the audience

When compared the digital marketing again stands out to the print marketing as there is always the chance of people being attracted to the digital media more. As the technology probe more and more into our daily life, it has made a significant effect on our sense that can be convinced. Moreover, there are always higher chances of more people watching an online ad than a print media advertisement.

The traceable results

Thanks to the technology it has made it very easy for the marketers to track and monitor their results online. The data can always be collected and the analyst may help in data assessing and provide the valuable data for various decision making.

The effectiveness of digital marketing

Digital marketing is the most widely used marketing aid in the current era as it is considered to be more effective than any other tool. This is true to the core as there is a considerable shift in the preferences of the common man. Here are a few facts that clearly state the effectiveness of digital marketing.

The comparative analysis: customers want to have a comparative analysis of the prices and benefits of all the products available in the market. The digital market offers them a platform to review all the aspects associated with a product.

The acceptability- In thistech savvy era the information available online is widely accepted by the customers in comparison to the physically available information.

Wider audience:The coverage of digital marketing is much more than that of the physical media as the internet is now the new tool of every type of communication. It is a lot much easier to sit back and communicate over a technology driven device.

Impact: how many times did you let your favourite show forgotowatchan advertisement of a companyselling some random product? But while surfing the internet it is always very easy to restart what you left from the same point. Any advertisement pop up window attracts you as soon as it flashes on the screen.

Apart from all these things the rising technology regime has given birth to many career opportunities to the aspiring youth. Digital marketing has made our lives simpler and offered us everything right in front of us virtually. Companies have got a very effective tool to market their product and services directly to the customers and track the change in the consumer behaviour.

It has enabled the companies to assess all the attributes of the customers and let them make their best strategic move. Digital marketing holds a significant role for both customers as well as for the companies selling their products and services. So whether you are an individual looking for an opportunity to make your career or a company expanding their business digital market is one vital element for you.

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Brand Management and Mckensey's 7 S Model: A Case of Perfect Correlation!

Kanika Gupta*

Abstract: *From hospitals to high-tech firms, innovation drives sustained success. Whether building a new business, transforming an established one, or leading a product R&D team, one find ways to create and nurture a culture of experimentation and innovation—and evolve a more agile business. Brands must distinguish themselves in the market to make their products viable. The top brands don't necessarily spend tons of money on branding; they utilize strategic brand management to enhance their brand in a sustainable way. And brand value is a decisive factor for purchasing decisions in the current digital market. A wide range of products and services are accessible to everyone, and that's why brand management is a top growth field. "Brand innovation" is perhaps the most important capability in business today. If your brand is your core asset, then innovation is about how you evolve and leverage this asset in changing markets. Products, manufacturing, and the majority of business activities can be achieved in partnership with others. Innovating a brand has a number of dimensions – some around how you innovate the brand concept itself (why it exists, who it's for, how it's manifest, and articulated), but also around how you innovate the branded business (what it brands, how it's delivered, how it can extend, and what difference it makes). This research paper explore each of these aspects, and how they can be achieved in smarter, more innovative ways in collaboration with Mckensey's 7 S model.*

Introduction

Brand management is the development of brand perception in the market. Constructing a positive relationship with the target market is vital for brand management. But it also encompasses all aspects of the customer's brand association and relationship with the purchasing process. This includes tangible elements of a brand as well as brand experience.

Brand management is an important aspect of marketing, which utilizes sophisticated techniques to boost the value of a product. Depending on the marketing strategy implemented, brand management can increase the price products and build devoted customers utilizing brand affirmations with images or key messaging.

Brands are a reflection of customers, uniquely shared value, and potentially your most valuable business asset. Brands capture an irresistible idea, compelling and intuitive, engaging and inspiring people in ways that companies and products cannot. They build platforms and connections through which customers and business can achieve more. A great brand captivates people emotionally and irrationally, about them and what they want to achieve, and ultimately to make life better. Brands are also your bridge to new products, categories and markets, to sustaining and growing your business in a world of relentless change.

We live in the most incredible time. These are days of exponential change. We are now in the middle

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of a decade when the global population is growing faster than it ever has or will, when technology fuels unimaginable possibilities from 3D printed organs to driverless cars. We see power shifting from west to east, north to south, business to customer, and few to many.

Literature Review:

In the past, brands spent most of their budgets seeking to build awareness, measuring success by ad recall. Now it is much more about influencing at the time of considering and making purchase, the time of usage, and the time when they tell others, or decide to repurchase themselves. Advocacy is far more powerful than advertising. People believe a recommendation from their friends far more than they believe anything a brand says. Brand resonance is focusing around influencing customers at key moments.

- IBM's "Smarter Planet" brand concept is a great example of a broad and enduring brand platform that allows the brand to build a rich story. It can be accessed in different ways by different audiences, making it relevant to many segments. It can support a diverse range of products and services, because it is not about them, but the higher purpose which they support. It inspires and accelerates ongoing innovation, creating a context in which to add new themes, and helps new ideas enter the market quickly.
- Narrower brand platforms like Vaio for Sony's range of laptop computers again creates a platform about smart and stylish hardware which comes and goes in its models and specifications. People engage in the idea of a Vaio rather than a specific product.
- Similarly car brands like BMW's Mini can have a diversity of models for different audiences, but promoted together with a bigger idea.

As business grows, its range of products and services become more diverse and complex. Brand portfolios need focus, and brand architectures based around customers.

Objective:

To correlate Mckensey's 7 S model with the Brand Management and Innovation.

Analysis:

- Between 2010 and 2020, the world's population will grow from 6.9 to 7.7 billion people, mostly in megacities of the fast-developing world. Most significant for marketers will be the rise of a huge "new middle" consumer class, neither rich nor poor, driving global GDP. But this growth is not a linear extrapolation of the old world. It is a fantastic "kaleidoscope" of changing markets, new customers and priorities, new capabilities and aspirations.
- The turmoil of financial markets, collapsing banks and defaulting nations, was the dying pains of an old world order. Amidst the shake-up there are new winners and losers.
- In 2014 China's real GDP growth will be 7.1% compared to 0.9% in Europe. However some markets, including Ghana and Nigeria, Brazil and Colombia, Indonesia and Vietnam will grow even faster.
- As Samsung launches its smart watch and Beijing is recognised as the world's leading city for renewable energies, we realise that the best ideas in business are shifting rapidly.
- The big investors are in Schenzen, the most sustainable innovators in Nairobi, the best fashion designers are in Buenos Aires, the best digital engineers in Hyderabad. No longer are these emerging markets the source of low-cost supplies, and low-budget consumers. They have youth, education, disposable income, fast growth and ambition on their side too.
- More than half the world live inside a circle based 106.6° E, 26.6° N, and within 4100km of Guiyang, Guizhou Province, in southwest China. 55% of all products are now made in more than one country, and around 20% of services too. 24% of the world's adults have a smartphone, typically checking it 150 times per day, spending 141 minutes on it.
- 70% of people think small companies understand them better than large, 55% trust businesses to do the right thing, but only 15% trust business leaders to tell the truth.
- The majority of the world's business value is now privately owned. Over 40% of companies in the Fortune 500 in 2000 were not there in 2010, and by 2020 over 50% will be from emerging markets. And on.
- It is a period of awesomeness, of opportunities limited only by our imagination. A world where impossible dreams can now come true. The power to change the world From Alibaba to ZaoZao, Ashmei to Zidisha, Azuri and Zipcars, a new generation of brands are rising out of

the maelstrom of economic and technological change.

- Social networks drive reach and richness, whilst new business models make the possible profitable. They collaborate with customers, and partner with other business, fusing ideas and utilising their capabilities. They look beyond the sale to enable customers to achieve more, they care about their impact on people and the world. People trust the best brands more than any traditional institution – more than governments, lawyers, sometimes even more than religion.
- Brands connect with them, shape their attitudes and aspirations, connect them with people like them, to give them a platform to achieve more together. Ultimately, brands have the power to change the world – not just to sell products and make profits, but to make life better.

McKensey's 7 s model:

Mckensey Indiahelp clients achieve sustainable performance gains by optimizing corporate strategy, category strategies, and financial productivity. To create sustainable value in today's environment, consumer goods companies need disciplined strategic planning and focused execution, mid-term as well as long-term. The company support leading players in their efforts to gain sustainable supremacy and enforce the use of its 7 s model.

The teams support clients in their efforts to create value now and in the future. Specifically, it work with consumer goods companies to define, review, and optimize strategies at all organizational levels, from the corporate center to individual business units and specific categories. Their global team also provides independent, strategic advice on finance and value creation. They work with clients on topics such as valuation, transaction support, capital markets, treasury, financial analysis and modeling, and strengthening the finance function.

The Seven Interdependent Elements:

The basic premise of the model is that there are seven internal aspects of an organization that need to be aligned if it is to be successful.

Hard Elements

- Strategy - Purpose of the business and the way the organization seeks to enhance its competitive advantage.
- Structure - Division of activities; integration and coordination mechanisms.
- Systems - Formal procedures for measurement, reward and resource allocation.

Soft Elements

- Shared Values
- Skills - The organization's core competencies and distinctive capabilities.
- Staff - Organization's human resources, demographic, educational and attitudinal characteristics.
- Style - Typical behavior patterns of key groups, such as managers, and other professionals.

Findings:

Brand Management and Mckensey's 7 S Model: Perfectly Correlated!

There are typically 5 phases in innovating your brand, deploying the diamond at each stage, combining analytics and intuition, creativity and discipline, to develop the right strategic approach:

1. **Intent:** The starting point is commercial, understanding the best market opportunities in the medium to long-term, where the business can most effectively create and sustain profitable growth over time. This should align and shape the business strategy.
2. **Insight:** Deep understanding of potential customers in the identified markets, maybe through collaboration, enables the development of brand purpose and concept, opportunities to innovate the solutions, communication, experiences and portfolio.
3. **Ideation:** Creatively articulating the brand concept, from which flows appropriate solutions by bringing together new and existing products and services, partners and resources to design an engaging brand experience. Ideas are visualised and evaluated.
4. **Innovation:** Making the strategic choices in each of the 9 dimensions, from brand story to brand solutions, brand experience to brand portfolio. Underpinning this with a smarter allocation of resources, aligned culture and organisation.
5. **Implementation:** Planning and executing the agreed strategy over a sequence of horizons over which the brand evolves and grows in the

market and commercially. Supporting this with effective leadership, appropriate metrics,staying agile to change.

Conclusion:

Brands can become "anchors" around which customers live their lives, representing something familiar and important, whilst everything else is changing. Yet brands must also evolve as markets and customers evolve, with the portability to move easily into new markets, and glue to connect diverse activities. A great brand is not designed for everyone, but for their target customers. In reflecting these people, they seek to build affinity and preference, encourage purchase behaviour, and sustain a price premium. They seek to retain the best customers, building their loyalty, introducing new services, and encouraging advocacy.

Brands are about more than words and slogans, images and colours, more than businesses and their cultures, products and their functional benefits. Brands are about people, their hopes and dreams, and enabling them to achieve more. For consumer brands, the people and emotions are obvious, but for business brands the same applies, helping people to succeed individually and together, driving growth, innovation and success. Brands are ultimately, in one way or another, about making life better.

Thus, this research paper shows that employing Mckensey's 7 S model is really helpful in innovative brand management.

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McKinsey 7-S Framework: An Integrated Approach for Organizational Excellence

Ajay Kumar*

Abstract: *The McKinsey 7-S Framework was developed in 1980 by Tom Peters and Robert Waterman for understanding the importance of three hard elements named as Strategy, Structure and Systems as well as four soft elements named as Shared Values, Skills, Style and Staff for any organization and its integration for evaluating the strengths and weaknesses for sustaining in this global competitive business market.*

The application of The McKinsey 7-S Framework is being used in a wide variety of situations and has persisted as a best model of an organizational effectiveness as the model provides

- *What and where to change for future growth of a company*
- *How to face challenges to determine the best implementation of proposed strategy*
- *Why to identify and create a high potential performer/talent pool*

In this 21st century of competitiveness and consciousness of modernization of systems, adaptation of latest/new technology and improvement of organizational culture and environment, every organization is striving hard to have uniqueness in its business and to achieve the best performance in respect of Leadership, Strategy Planning, Customer and Market Focus, Information and Analysis, HR Focus & Development, Process Management and Business Result so that to get appreciation and award for discharging all the responsibilities for full satisfaction to all stakeholders.

The main purpose of this paper is to understand all seven elements in simple and descriptive manner and how they are to be aligned and mutually reinforced so that it will help to analyze the current situation and to propose the future improvement and development as strengths by identifying the gaps and inconsistencies as weaknesses between them and accordingly suggest new simple models for achieving organizational excellence.

Keywords: *Competitiveness and consciousness, organizational culture and environment, Shared values, Skills and Strategy.*

Introduction

In the year 1991, when India has been forced/ compelled to adapt New Economic Policy of Liberalization, Privatization and Globalization (LPG) for availing the loan from IBRD and IMF to meet the financial crisis in the country, a competitiveness and consciousness of modernization of system, adaptation of latest and new technology, improvement of

**Dr. Ajay Kumar, Director, TIAS*

organizational culture and environment, creation of talented pool and beliefs on values and ethics in business have become essential ingredients of strategy along with others for each and every company. Therefore the work of practitioners, consultants and academic researchers has been dominated by concerns related to the strategic impact of downsizing, restructuring, re-engineering, out-sourcing, and empowerment on operational performance of both service and manufacturing firms.

Several academic authors in strategic management adopted McKinsey's 7S Framework as a useful way of visualizing the key components managers must consider when disseminating a strategy throughout their organizations.

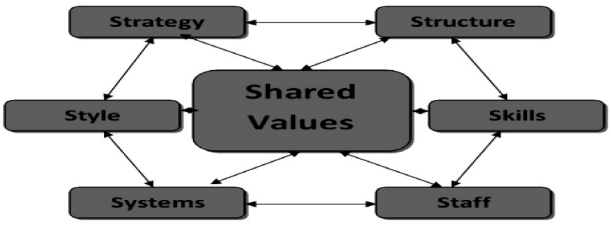
The McKinsey 7-S Framework was developed in 1980 by Tom Peters and Robert Waterman for understanding the importance of Three hard elements named as Strategy, Structure and Systems as well as Four soft elements named as Shared Values, Skills, Style and Staff for any organization and its integration for evaluating the strengths and weaknesses for sustaining in this global competitive business market.

The hard elements are those that can physically be seen when in place, whereas the soft are more intangible and cannot readily be seen.

Hard Elements	Soft Elements
Strategy	Shared Values
Structure	Skills
Systems	Staff
	Style

The relationships among all of the variables in McKinsey 7S Framework are depicted in the Exhibit 1 as a tool of strategy formulation and implementation and several important ideas were generated. First is the idea of a multiplicity of factors that influence and organizations' ability to change and its proper mode of change. Second, it is intended to convey the notion of interconnectedness of the variables. Third, strategy alone is not sufficient. Fourth, the shape of the framework is significant in that there is no starting point or implied hierarchy.

Exhibit 1



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LITERATURE REVIEW

The McKinsey 7-S Framework was developed in 1980 by Tom Peters and Robert Waterman for understanding the importance of Three hard elements named as Strategy, Structure and Systems as well as Four soft elements named as Shared Values, Skills, Style and Staff for any organization and its integration for evaluating the strengths and weaknesses for sustaining in this global competitive business market.

To understand McKinsey 7S Model of organization change better let's take a brief look at each of its elements, beginning with Strategy. The basic theory underlying of each and every elements is as under:

Strategy is defined as those actions that an

organization plans in response to or anticipation of changes in its external environment, its customers and competitors. Strategy is the way a firm aims to improve its position vis-à-vis competition, perhaps through low-cost production or delivery, perhaps by providing better value to the customer, perhaps by achieving sales and service dominance. Finally, as we will attempt to illustrate in this research, a strategy reflects an organization's awareness of how, when, and where it should compete; against whom it should compete; and for what purposes it should compete from.

In general, a sound strategy is one that's clearly articulated, is long-term, helps to achieve competitive advantage and is reinforced by strong vision, mission and values.

Structure represents the way the organization is structured, the way business divisions and units are organized and who is accountable to whom or who reports to whom. In other words, structure is the organizational chart of the firm. It divides tasks and then provides coordination. It trades off specialization and integration. It decentralizes and then re-centralizes. The five basic primary structures are:

- Function organizations,
- Geographic organizations;
- Divisional organizations,
- Strategic business units, and
- Matrix organizations.

Each of these structures has advantages and disadvantages that strategists must consider when choosing an organization form.

Systems are defined as all the procedures, formal and informal, that make the organization go, day by day and year by year: compensation and reward systems, capital budgeting, systems, training systems, cost accounting procedures, ad budgeting systems to name a few. To many business managers the word "systems" has a dull, plodding, and middle-management sound. Yet, powerful systems changes can enhance organizational effectiveness without the disruptive side effects that so often ensue from tinkering with structure.

Staff is the demographic description of important personnel categories within the organization. Considering people as a pool of resources to be nurtured, developed, guarded, and allocated is one of the many ways to turn the "staff" dimension of the model into something not only amenable to, but is worthy of practical control by management (Pearce and Robinson, 1997; Waterman, Peters, and Phillips, 1980). In this paper, staff is defined as the critical human resources managed by the head coach in his efforts to maximize the team's overall effectiveness and efficiency.

Style is the characterization of how key managers behave in achieving the organization's goals within the cultural context of the firm. Style, a seemingly vague and esoteric concept, is an essential element of effective strategy implementation. There are two style issues that are of fundamental importance:

- The role of the chief executive officer (CEO) and
- The assignment of key managers form.

Skills represent dominating attributes, competencies, or capabilities that the organization as a whole does best. Possibly the most difficult problem in trying to organize effectively is that of weeding out old skills – and their supporting systems, structures, etc.-to ensure that important new skills can take root and grow.

Finally, the word "superordinate" literally means "higher order." Superordinate (shared values) goals, we mean guiding concepts – a set of values and aspirations, often unwritten that goes beyond the conventional formal statement of corporate objectives. Shared values are fundamental ideas around which a business is built. They are in main values. But they are more as well.

They are the broad notions of future direction that the top management team wants to infuse throughout the organization. Every organization has its own set of shared values. An organization's shared values are similar to an individual personality – an intangible yet ever-present theme that provides meaning, direction, and the basis for action form.

The notion that structure follows strategy (get the strategy right and the structure follows) was an important addition to the organizational tool kit; yet strategy rarely seemed to dictate unique structural solutions. As a result, productive change is not simply a matter of structure, although structure is important.

It is not as simple as the interaction between strategy

and structure, although strategy is critical too. While, there are many other organizational models in existence, but McKinsey's 7S model is by far one of the most popular.

All the definitions we found in any research on 7S are almost identical to this one. My research has been conceptualized and contextualized by its own way. Once the strategy has been designed, McKinsey 7S Model suggests that managers may focus on six organizational variables to ensure effective execution: structure, systems, shared values, skills, style, and staff.

This research focuses on examining the impact on performance of the strategy, skills, and staff variables of the McKinsey 7S Model. The resulting strategy-staff-skills model intends us to focus shared values as a central to the development of all other six elements.

This research focuses on examining the impact on performance of a subset of these variables, due to experimental constraints. In addition, we believe that in service firms a significant portion of the performance can be explained by examining the strategy, staff and systems. It is found that human resource practices are a crucial factor in creating unique capabilities, which can help the firm differentiate its products and services and thus build competitive advantage. These unique capabilities arise because managers create and implement a strategic plan designed to achieve these capabilities. Creating distinctive capabilities is not simply a matter of assembling a set of resources. Rather, managers must create complex patterns of coordination between structure, strategy, systems, style, skills, structure, staff, and share values.

As a result, it is difficult to measure how effectively managers are able to implement their strategic choices. There have been attempts to measure strategic implementation in manufacturing companies, but they have not been applied to services. The service industry is a difficult environment to actually quantify and measure the degree of success of a strategic implementation, since many of the key organizational dimensions that drive performance have traditionally been unanalyzed. Therefore, to improve our understanding of service strategy we need to utilize a more comprehensive definition of organization. A barrier to studying the relationships between the environment, organization and strategy in the service industries is that most service firms do not understand all the organizational variables well enough to develop meaningful measures.

The strengths of the McKinsey 7S Model are:

- Its description of organizational variables that convey obvious importance,
- Its recognition of the importance of the interrelationships among all of these seven variables, or dimensions and
- Its generic form makes its applicable to either manufacturing or service firms.

The limitations of this taxonomy are its lack of variables that deal with external environment and performance related issues. The principal reason for this lack of "completeness" of McKinsey 7S Model is its origin, which was from practice as opposed to theory. In other words, McKinsey 7S Model represents an attempt to explain McKinsey's beliefs about manufacturing and service firm's operations ex post facto.

Keeping in view the literature of the study and also the survey of various high performer companies' based on the application of The McKinsey 7-S Framework in a wide variety of situations it has been persisted as a best model of an organizational effectiveness as the model provides:

- What and where to change for future growth of a company
- How to face challenges to determine the best implementation of proposed strategy
- Why to identify and create a high potential performer/talent pool

Using the 7S model, the change agent's task is to start with the end in mind.

- That is to understand the change needed, working backwards, asking questions as to how the organisation can best be aligned across all the seven elements of the model, to achieve that objective.
- Remember, this model is based around the theory that for an organisation to perform well and achieve its objectives, all seven elements must be aligned, mutually enforcing progress towards the objectives of the firm.
- It comes as no surprise, therefore, that, if we understand the goal of the organisation, then the next step is to look at each element and work to realign them to create synergy.
- We can use the 7S model to help analyze

the current situation, a proposed future goal and then identify gaps and inconsistencies between them. It's then a question of adjusting and tuning the elements to ensure that the organization works effectively and well towards achieving that end goal.

However, there are some criticism about the model due to its limitations "the model tends to focus on internal aspects of the organization only, the organizational sustainability issues are not addressed" and therefore sustainability development as activities that maximize the net benefits of economic development while maintaining the services and quality of products without exploiting the natural resources, efforts have been made by researchers to explore the interface between business excellence and sustainability. Edgeman and Hensler proposed a BEST business excellence model for sustainability which is built on four pillars:

- Biophysical/environmental sustainability;
- Economic sustainability;
- Social sustainability; and
- Technical sustainability.

Based upon the above, we define for this study as a balance of economic, social and environmental sustainability which is consistent with the notion of Triple Bottom Line Philosophy i.e. 3Ps: People, Planet and Profit.

FINDINGS AND CONCLUSION

The findings are based on the literature and the answers gathered by using the following 7S Checklist Questions as illustrated in Exhibit II of various successful companies, the following STEPS have been suggested to apply such tool to achieve excellence business performance:

STEPS:

- Identify the areas that are not effectively aligned.
- Determine the Optimal organization design.
- Decide where and what changes should be

Exhibit II

Strategy • What is our strategy? • What are the objectives and how do we intend to achieve them? • What makes us competitive and how do you deal with competition? • What environmental factors affect the businass and how do you keep track on the factors?	**Shared Values** • What are the main systems that support and drive the business? E.G. Resource planning, information management, HR systems, Comminications, etc. • What controls are there in the organisation and how is status fedback?
Structure • What hierarchical structuree does the firm have? • What are the reporting mechanisms? • How is the organisation divided? E.G. Matrix or Bureaucratic? • It decision making centralised or decentralised?	**Skills** • What are the corporate values of the organisation? • Do these values align with competitive pressure and straegy? • What is the 'internal culture' like in the work force? • Is the culture conducive to progressive improvements
Systems • What is the general Leadership style of the organisation? • Is the Leadership participative or largely autocratic? • Are there participative teams or just merely groups of people? • Are people empowered and encouraged to proactiveely take risks, and challenge the norm?	**Staff** • In line with the strategy and vision, are there any skills gaps? • In line with operations at a team level, are there any skills gaps? • How is training and skills monitored and evaluated? • What are the strongest skills? • What are the core competencies of the organisation or team?
Style • What positions are vacant or need to be filled? • What competency gaps are needed to be filled? • What type of people and skills are needed to support the other 7 elements of the firm?	

made.

- Make the necessary changes.
- Continuously review the 7S.

Moreover it is concluded that Shared Values of the McKinsey 7S, if taken into centre and focused for integration with other six elements by believing on Triple Bottom Line Philosophy i.e. 3Ps: PEOPLE. PLANET and PROFIT, it creates 3B Model i.e. BELIEFS-BEHAVE-BUSINESS and such integrated approach will give result in all together the Business Excellence and its Sustainability.

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A Study of McKinsey 7s Model & Total Quality Management

Sandeep Kumar*

Abstract: *Change is inevitable and for sustenance and growth of any organisation, changes to be introduced in systems, processes, technology and strategies are absolutely necessary. For successful implementation of changes, alignment in various functions, attributes and attitudes needs to be ensured at all the times. Towards this need, Mckinsey 7S model provides a framework for organisations to assess their current status and work out required corrections. This model identifies three hard elements viz. Strategy, Structure and Systems and four soft elements i.e. Skills, Staff, Styles and Shared Values. All these elements are interdependent and changes in any one necessitates re-evaluation, corrections and realignment of these attributes. Any laxity in this action can lead the system to instability and failure. Mckinsey model has a limitation that it does not provide any guidance on concrete actions to be taken for corrections. Against this another business management tool i.e. Total Quality Management (TQM), introduced almost sixty years back; offers more comprehensive attributes (both hard and soft) along with an exhaustive list of action points to guide the organisations for successful management of change, which can be helpful in sustenance and growth of business. It is felt that TQM is more relevant even in the present context, as compared to Mckinsey 7S model.*

Introduction

Business is a social process and unless the implicit and explicit approval is accorded by the society, no business can survive. It is absolutely mandatory that businesses are established and managed for the benefit of publics at large. Businesses beneficial for society would have better acceptance and profitability for the organization and interests of the stake holders would be automatically taken care off.

Mckinsey 7S Model

Currently, with ingression of ICT technologies: product technologies are getting refined at a very faster pace and the product life cycles are becoming very short. Consequently, new products are replacing the existing ones in shorter time spans. To stay in business in present day competitive environment, organisations have to continuously look into their processes and strategic planning needs to be revised very frequently. For successful change introduction in internal processes, it is mandatory that all the organizational functions are well aligned towards common goal achievement.

McKinsey 7s model is one such tool, whichenables the organisations to analyze its internal structures to ensure smooth change implementation. The model is

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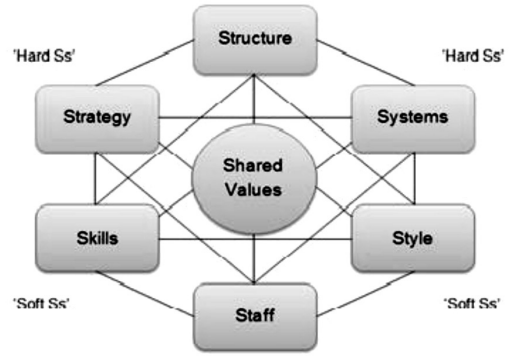
most often used as an organizational analysis tool to assess and monitor changes in the internal situation of an organization. Whatever the type of change i.e. restructuring, new processes, organizational merger, new systems, change of leadership, and so on, the model can be used to understand how the organizational elements are interrelated, and so ensure that the wider impact of changes made in one area is taken into consideration for alignment in other areas too.

McKinsey 7s modelis a tool that analyzes firm's organizational design by looking at 7 key internal elements: strategy, structure, systems, shared values, style, staff and skills, in order to identify if they are effectively aligned and allow organization to achieve its objectives. This model was developed in 1980s by McKinsey consultants Tom Peters, Robert Waterman and Julien Philips and is used by academics and practitioners and remains one of the most popular strategic planning tools. It sought to present an emphasis on human resources (Soft S), rather than the traditional mass production tangibles of capital, infrastructure and equipment, as a key to higher organizational performance. The goal of the model was to show how 7 elements of the company: Structure, Strategy, Skills, Staff, Style, Systems, and Shared values, can be aligned together to achieve effectiveness in a company. The key point of the model is that all the seven areas are interconnected and a change in one area requires change in the rest of a firm for it to function effectively. Tom Peters emphasized throughout his writing, the important distinction between American and Japanese management was not the so-called "hard" technical aspects of organization, but rather the "soft" cultural aspects.



Below you can find the McKinsey model, which represents the connections between seven areas and divides them into 'Soft Ss' and 'Hard Ss'. The shape of the model emphasizes interconnectedness of the elements.

The model can be applied to many situations and the most common uses of the framework are:

- To facilitate organizational change.
- To help implement new strategy.
- To identify how each area may change in a future.
- To facilitate the merger of organizations.

The McKinsey 7s framework is often used when organizational design and effectiveness are at question. Following steps provide a guide, while using this tool:

- Identify the areas that are not effectively aligned
- Determine the optimal organization design
- Decide where and what changes should be made
- Make the necessary changes
- Continuously review the 7S.

It is easy to understand the model but much harder to apply it for your organization due to a common misunderstanding of what should a well-aligned element be like. There are certain limitations, while using this tool:

- Actions to be taken are not defined.
- It does not give real guidelines as to how to proceed further, after the analysis is completed.
- Other techniques are to be used to formulate further steps.
- 7S tool seems to be an abstract list of generic elements in any organization. But to improve each business process, such as Marketing, Finance, Manufacturing etc., steps to be initiated is not spelt out.

Total Quality Management (TQM)

In view of the above listed limitations of McKinsey 7S model, an effort is made to compare its various attributes against Total Quality Management (TQM). Towards initiation of the TQM philosophy, in early 1920s statistical theory was first applied to product quality control. This concept was further developed

in the 40s led by Americans -William Deming, Joseph Juran and Feigenbaum. TQM philosophy was not accepted by developed capitalist economies of Europe and USA. Post-World War II, Western nations were engaged in large scale production to meet the global requirements. As compared to present, population was limited and technologies were not very intricate. Most of the businesses were in Sellers' market without any semblance of competition. Hence the TQM concept, though originated at USA; was rejected by developed countries in Europe and USA.

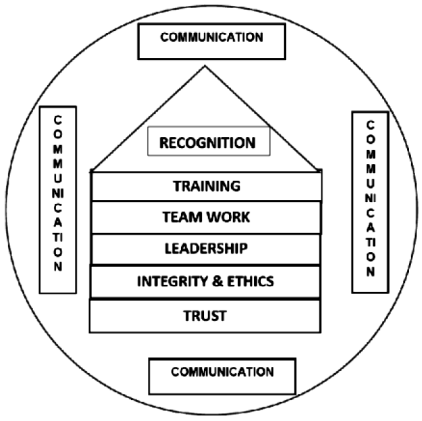
Against this, in Japan, there was huge imbalance in population. There was considerable attrition of male population between 16 and 50 years of age in war. Large number of elderly people with no children were left behind and huge population of children were orphaned due to war. Japanese consolidated themselves and new structures developed in personal lives and also in professional business environments too. Employees worked as family members to the promotors. Under such environment, industrial and business work culture also got aligned to family orientations. Japanese, being highly disciplined and quality conscious people, TQM philosophy found ready acceptability there and got developed there in the present form. This also made Japan as Quality Leader and global number two economy. TQM had great impact on Japanese manufacturing. TQM enjoyed widespread attention during the late 1980s and early 1990s before being over shadowed by ISO 9000, Lean manufacturing, and Six Sigma.

Total Quality Management (TQM) is an approach to long– term success through customer satisfaction. In a TQM effort, all members of an organization participate in improving processes, products, services, and the culture in which they work. TQM hinges on eight principles which are more in line with Hard Parameters of McKinsey 7S model:

- Customer focus
- Leadership
- Involvement of people
- Process approach
- System approach to management
- Continuous improvement
- Factual approach to decision making
- Mutually beneficial supplier relationships

For successful implementation of TQM, an organization must concentrate on the following eight key elements, which are analogue to the Soft Parameters of McKinsey 7S model:

- Ethics.
- Integrity.
- Trust.
- Training.
- Teamwork.
- Leadership.
- Recognition.
- Communication.



TQM philosophy offers the guiding factors to carry out corrections in organizational strategies. William Deming suggested following 14 action points:

- Create constancy of purpose for improving products and services.
- Adopt the new philosophy.
- Cease dependence on inspection to achieve quality.
- End the practice of awarding business on price alone; instead, minimize total cost by working with a single supplier.
- Improve constantly and forever every process for planning, production and service.
- Institute training on the job.
- Adopt and institute leadership.
- Drive out fear.
- Break down barriers between staff areas.
- Eliminate slogans, exhortations and targets for the workforce.

- Eliminate numerical quotas for the workforce and numerical goals for management.
- Remove barriers that rob people of pride of workmanship, and eliminate the annual rating or merit system.
- Institute a vigorous program of education and self- improvement for everyone.
- Put everybody in the company to work accomplishing the transformation.

With above basic inputs available on McKinsey 7S model and TQM, an effort has been made to compare the ease and feasibility to apply these tools to check on alignment of various organizational element towards achievement of its objectives. Against three hard and four soft elements used in McKinsey model, TQM specifies eight each for hard and soft elements.

Over and above TQM model lists down the various options to carry out the corrections in the case of anelement being misaligned. It must be appreciated that TQM was introduced almost 60 years back, when the business environment was more skewed towards the capitalist outlooks and no semblance was visible for the soft parameters. William Deming and Juran were ahead of time, when they introduced soft elements in their TQM philosophy, which are more relevant in the present times.

Aneffort has been made to draw a comparisonbetween varioushard and soft element considered for McKinsey 7S and TQM philosophy. Against each element, probable action points suggested by William Deming have been identified. Details are tabulated below.

Sl. No.	McKinsey (Key elements)	TQM Principles (Hard)	TQM Key Elements (Soft)	Corresponding EDWARD DEMING'S Action Points
1	Structure	Leadership	Leadership	• Adopt and institute leadership • Break down barriers between staff areas
2	Strategy	• Strategic and systematic approach, • Focus on customer, • Continuous improvement		• Create constancy of purpose for improving products and services • End the practice of awarding business on price alone; instead, minimize total cost by working with a single supplier
3	Systems	• Process Approach • System approach to management		
4	Skills		Training	Institute training on the job, Institute a vigorous program of education and self-improvement for everyone
5	Staff	Involvement of people	• Integrity / Ethics • Recognition	Drive out fear
6	Style	Factual approach to decision making	Team Trust/ Work	
7	Shared values		Communication	Put in the work everybody company to accomplishing transformation

Conclusion

From the above comparison and with consideration of various aspects related to both the tools, it is felt that TQM is still relevant even in the present context and it even outlines the suggestive action criterions to overcome the misalignment between various organizational elements / attributes applicable for change management, which is missing in the case of McKinsey 7S model.

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Digital Watermarking: A Solution to e-Property Rights

Ksh. Krishna B Singha*

Abstract: *A watermark is a mechanism for identification that is nearly invisible to human and machine inspection, difficult to remove, and permanently embedded as an integral part of the design scheme. In today's Internet era, an enormous amount of information is available on the global network. Also editing, manipulation, copying of these digital multimedia has become prevalent and is becoming a serious issue in the present scenario to secure and protect this information. Digital watermarking is one of the many solutions to tackle this threat to protect the intellectual property available to the Internet community. Watermarksare pattern of bits embedded into the digital data in such a way that it does not hinder the actual data which can be extracted and retrieve the original information thereby maintaining its reliability. Digital watermarking can be applied in the variety of application areas such as copyright protection, fingerprinting, broadcasting monitoring, copy protection, medical application, etc. The paper presents a general review of the watermarking techniques, their merits and demerits, possible attacks on watermarking schemes, and various challenges for these schemes.*

Keyword: *Water Marking, Steganography, Digital, Spatial Domain.*

Introduction

A watermark is a mark that is (i) embedded into an artifact (text, image, video, audio) or piece of intellectual property (hardware, software, algorithm, data organization), (ii) designed to identify the author, the source, the used tools and techniques and/or recipient of the artifact or the intellectual property, and (iii) difficult to detect and remove[1]. One of the many available ways to protect digital data is digital watermarking. A digital watermark is a kind of marker covertly embedded in a noise-tolerant signal such as an audio, video or image data[2]. Watermarking is one of the techniques employed in Steganography, which is the art and science of communicating in such a way that the presence of a message cannot be detected [3]. This is one such emerging technology which is well utilized in securing data and documents available in soft form either online or any other media. Now-a-days digital data are available in multimedia forms such as text, image, audio, video and animation or anycombination of these. The enormous amount of data and information available online and the convenience and ease of copying/ pasting and using one's scholarly copyrighted material without the owner's permission makes the task of securing such data/information becomes more challenging.Watermarkingtechnology is used in - Proof of Ownership (copyrights and IP protection),Prevention of Copying, Broadcast Monitoring, Date authentication, Data hiding. Digital watermarking involves the ideas and theories of different subject coverage, such as signal processing, cryptography, probability theory and stochastic theory, network technology, algorithm design, and other techniques [4]. The process of digital

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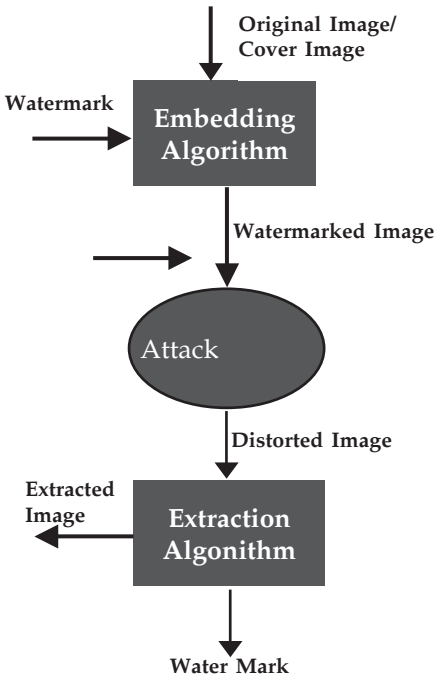
watermarking involves embedding of signal or secret information (i.e. watermark) into the digital media such as text, image, audio and video. Later this embedded information is detected and extracted out to reveal the real owner/identity of the digital media. Generally the watermarking works in two major steps; namely 1) watermark embedding module and 2) watermark detection and extraction module. The following figure shows a sketch of the digital watermarking scheme:

Figure. 1.1: Digital Watermarking System (courtesy-[15])



Security and authentication of the originality of content is a major and fundamental task in any application in the field of information technology, and digital watermarking technology plays a very important role in this problem area in this information age. So, it's become a very important study area for important hiding. This paper studies and explores the key technologies for digital watermarking to safeguard the intellectual property information available over the global networks. The paper is organized as follows- Section 2 gives a survey available in the literature describing the available techniques for the technology and their appropriateness with respect to a particular type of data/information format. Section 3 briefs about the kind of possible attacks on the watermarks. Section 4 elaborates about the challenges and limitations over digital watermarking and section 5 is the concluding remark describing the future area of study in this field.

1.1.1 Applications

Digital watermarking may be used for a wide range of applications, such as:

- Copyright protection
- Source tracking (different recipients get differently watermarked content)
- Broadcast monitoring (television news often contains watermarked video from international agencies)
- Video authentication
- Software crippling on screen casting programs, to encourage users to purchase the full version to remove it.
- Content management on social networks

1.2 RELATED WORKS

Various information hiding techniques and works has been proposed and are available in the literature. However, all these works can be classified into two major domains- Spatial domain and Frequency domain. A watermark can be embedded either in spatial or frequency domain in digital format information. Both the domains are different and have their own pros and cons and are used in different situation and purpose. Based on these two domains a number of algorithms are available. The following sub sections brief the available works in the said domains.

1.3 SPATIAL DOMAIN

In the Spatial domain, digital watermarking algorithms directly load the raw data into the original image [4]. It is to be noted that spatial watermarking can also be applied using color separation where the watermark appears in only one of the color bands. This method renders the watermark visibly subtle such that it is difficult to detect under regular viewing. Fundamentally the

digital watermarking done in Spatial domain is manipulating or changing an image representing an object in space to enhance the image for a given application. Techniques employed here are based on direct manipulation of pixels in an image. Spatial domain has the following algorithms to mention the main ones.

1.3.1 LSB or Least Significant Bit

One of the old and popular algorithm that LSB is, it embeds the watermark in the LSB of pixels. This method is popular because of its simplicity and ease of implementation with less distortion in the output image; however with the drawback in its robustness of standing against the attacks. Embedding the watermark is done on some subset of chosen pixels and substituting the least significant bit of each of the pixels with the watermark. It can be done on selected locations or may be distributed over the image.

1.3.2 Additive Watermarking

Additive watermarking technique adds pseudo random noise pattern to the intensity of image pixels. The noise signal is usually integers like (-1, 0, 1) or sometimes it may be floating point numbers. To ensure that the watermark can be detected, the noise is generated by a key, such that the correlation between the numbers of different keys will be very low.

1.3.3 SSM or Spread-Spectrum Modulation

These algorithms embed information by linearly combining the host image with a small pseudo noise signal that is modulated by the embedded watermark. The Spread-spectrum techniques employ methods in which energy generated at one or more discrete frequencies is deliberately spread or distributed in time.

1.3.4 Patchwork Algorithm

This technique is developed by Bender et al whose work is published in IBM Systems Journal, 1996[7]. Patchwork is a data hiding technique based on a pseudorandom, statistical model. Patchwork imperceptibly inserts a watermark with a particular statistic using a Gaussian distribution. Steps followed are:

- Generate a pseudo-random bit stream to select pairs of pixels from the cover data.
- For each pair, let d be the difference between the two pixels.
- Encode a bit of information into the pair. Let d < 0 represent 0 and d > 0represent 1. Given that the pixels are not ordered correctly, swap them
- In the event that d is greater than a predefined threshold or if is equal to 0, ignore the pair and proceed to the next pair. Patchwork being statistical methods uses redundant pattern encoding to insert message within an image.

1.4 CORRELATION-BASED TECHNIQUE

In this technique, a pseudorandom noise (PN) pattern say W(x, y) is added to cover image I(x, y).

$Iw(x, y) = I(x, y) + k*W(x, y)$

Where K represent the gain factor, Iw represent watermarked image ant position x, y and I represent cover image. Here, if we increase the gain factor then although it increases the robustness of watermark but the quality of the watermarked image will decrease.

1.5 FREQUENCY DOMAIN

In frequency domain, watermarks are embedded in the spectral coefficients of the image. Discrete Cosine Transform (DCT), Discrete Fourier Transform (DFT), and Discrete Wavelet Transform (DWT), are the most commonly used transforms used in the frequency domain. The theory behind watermarking in the frequency domain is that the characteristics of the human visual system (HVS) are better captured by the spectral coefficients [8]. Main algorithms under this domain are:

1.5.1 Discrete Cosine Transforms (DCT)

DCT represents data in terms of frequency space rather than an amplitude space. DCT based watermarking techniques are robust compared to spatial domain techniques. Such algorithms are robust against simple image processing operations like low pass filtering, brightness and contrast adjustment, blurring etc. But the disadvantage of this technique is that it is difficult to implement and are computationally more expensive in comparison to the algorithms based on spatial domain. They are also weak against geometric attacks like rotation, scaling, cropping etc.

1.5.2 Discrete Wavelet Transforms (DWT)

Another watermarking technique under frequency domain is the DWT. Wavelet Transform is a modern technique frequently and popularly used in digital image processing, compression, watermarking etc. Wavelets are small waves, called wavelet, of varying frequency and limited duration. This technique uses wavelet filters to transform the image[9]. The wavelet transform decomposes the image into three spatial directions, i.e. horizontal, vertical and diagonal. The magnitude of DWT coefficients are larger in the lowest bands (LL) at each level of decomposition and are smaller for other bands (HH, LH, and HL). Also the Watermark detection at lower resolution is

more effective because there is few frequency bands involved at every successive resolution level. Here the wavelet coefficient will be more efficient if its magnitude is larger[10].

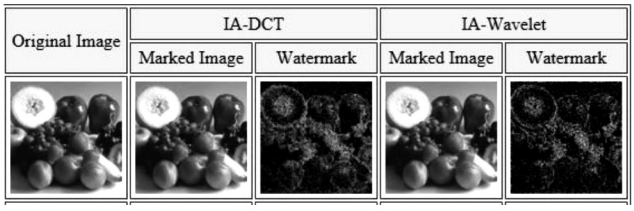
1.5.3 Discrete Fourier Transforms (DFT)

DFT has robustness against geometric attacks like scaling, rotation, cropping, translation etc. It transforms a continuous function into its frequency components[11].

DFT shows translation invariance. Spatial shifts in the image affects the phase representation of the image but not the magnitude representation. DFT of a real image is usually complex valued which results in magnitude and phase representation of an image. Central component of DFT is the strongest component which contains low frequencies [12]. Scaling in image results in amplification of extracted signal and detected by correlation coefficient. Rotation of image results in cyclic shift of extracted signal and it can be detected by exhaustive search. Translation of image has no result on extracted signal.

Figure 2.1: Original & Watermarked image with the watermark as per DCT & DFT scheme(Courtesy: Multimedia Security Research at Purdue University - Professor Edward J. Delp)

1. Possible Attacks



An attack on a watermarking scheme is any processing that may impair detection of the watermark or communication of the information conveyed by the watermark[13]. Attacks on a watermarking scheme come in different forms; some of the typical attacks are: finding ghosts, tampering & forging, etc.[1]. Depending upon the nature of the attacks, they can be: Basic attacks, Removal attack, legal attacks, Geometric attack, Protocol attacks,Cryptographic attacks, etc.

Basic attacks take advantage of limitations in the design of the embedding techniques. For instance, Simple spread spectrum techniques are able to survive amplitude distortion and noise addition but are vulnerable to timing errors. Synchronisation of the chip signal is required in order for the technique to work so adjusting the synchronization can cause the embedded data to be lost.

Legal attack is the ability of an attacker to cast doubt on the watermarking scheme in the courts. These attacks rely on existing and future legislation on copyright laws and digital information ownership, the credibility of the owner and of the attacker, the financial strength of the owner versus that of the attacker, the expert witnesses, and the competence of the lawyers.

Removal attacks aim at the complete removal of the watermark information from the watermarked data without cracking the security of the watermarking algorithm (e.g., without the key used for watermark embedding) i.e. no processing, even prohibitively complex, can recover the watermark information from the attacked data. This category includes de-noising, quantization (e.g., for compression), re-modulation, and collusion attacks. Not all of these methods always come close to their goal of complete watermark removal, but they may nevertheless damage the watermark information significantly.

Geometric attacks do not actually remove the embedded watermark itself, but intend to distort the watermark detector synchronization with the embedded information. The detector could recover the embedded watermark information when perfect synchronization is regained. However, the complexity of the required synchronization process might be too great to be practical.

Cryptographic attacks aim at cracking the security methods in watermarking schemes and thus finding a way to remove the embedded watermark information or to embed misleading watermarks.

Protocol attacks aim at attacking the entire concept of the watermarking application. One type of protocol attack is based on the concept of invertible watermarks. The idea behind inversion is that the attacker subtracts his own watermark from the watermarked data and claims to be the owner of the watermarked data. This can create ambiguity with respect to the true ownership of the data. Another protocol attack is the copy attack. In this case, the goal is not to destroy the watermark or impair its detection, but to estimate a watermark from watermarked data and copy it to some other data, called target data. Copy attack is applicable when a valid watermark in the target data can be produced with neither algorithmic knowledge of the watermarking technology nor knowledge of the watermarking key. But signal-dependent watermarks might be resistant to the copy attack.

2. Challenges and Limitations

The ultimate challenges in a watermarking scheme include design considerations, requirements analysis, and choice of watermarking techniques, speed, robustness, and the tradeoffs involved.Main issues/ challenges while implementing a watermarking algorithm can be briefed as:

a) To maintain balance between imperceptibility, robustness and capacity as increasing one factor adversely effect on other and a good digital watermarking system possess above feature. To achieve good imperceptibility, watermark should be embedded in high frequency component whereas robustness occurs in low frequency component [14].

b) In RGB color images, only blue color is less sensitive to hiding watermark. So, basically why only blue color not others. Others are fragile watermarking, content recovery against cropping, robustness in spatial domain, computational cost, etc.

1.6 CONCLUSION & FUTURE AREA OF RESEARCH

In this paper we have presented an overview of watermarking, its uses, and the techniques employed for the purpose. We have also explored the possible attacks on a watermarked scheme along with the main issues and challenges while implementing technology in a watermarking scheme has also been discussed briefly. However, there is lot more to be done in this area to empower the watermarking scheme to be robust in all senses keeping in mind all the possible attacks.

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KNOWLEDGE ORGANIZATION TOOLS IN THE DIGITAL ERA: A STUDY

Vakeel Ahmad*

Abstract: *Knowledge Organization became the centre of attraction for the knowledge community during last few decades. The steps to understand the knowledge organization process are the part of the study. Knowledge organization systems are also enlightened. Knowledge organization tools and techniques in the digital era are the focused area of the study.*

Keywords: *Knowledge, KM, KOS, Ontology, Taxonomy*

Introduction

Knowledge is the set of facts, information or data acquired through the experience of work as well as theoretical and practical study of the subject. "Knowledge isn't something that we find "out there", but something that is created by observing the world and by comparing world observations over time and among different observers, bearing in mind, of course, that the observer is part of the observed world" (cf. Von Foerster 1984)[1]. Knowledge Organization is the skill of systematically structuring and arrangement of knowledge stuff according to their characteristics in the logical order. "Knowledge Organization (KO) was first referred by H.E.Bliss in 1929. KO is to give order to knowledge, i.e. to show the knowledge element and knowledge relation in knowledge object orderly, which is convenient to recognize and understand knowledge" (Xiaoyue and Xinjin, 2009) [2].

1.2 KNOWLEDGE ORGANIZATION PROCESS

Knowledge organization was a concern already for many ancient thinkers, both Eastern and Western, the latter including Aristotle, Francis Bacon, Konrad Gesner, G.W. Leibniz, John Wilkins, Karl von Linné, the French encyclopedists, Auguste Comte, Peter Mark Roget, etc. However, it was only towards the end of the 19th century that knowledge organization began to develop as a set of special techniques, aimed at managing knowledge contained in documents through bibliographical references. This produced detailed general systems of knowledge like the Dewey Decimal Classification or the Universal Decimal Classification.[9] Compiling, sorting, filtering, organizing, sense making and prioritizing gradually is there, in the process of knowledge organization. Compiling is the process of collecting into a list, or putting together, gathering and amassing large amounts of information (The Oxford Dictionary and Thesaurus, 1996)[3]…The next process is sorting, described as a way to display data in some preferred manner of display, either by relevance, time sequence, author or source…Filtering is another concept….Shneiderman (1998, 538) defines it as a process of discarding non-meaningful or uninteresting data, with the aim of assisting the user to focus more on relevant items…This step is then followed by the organizing phase. Soergel (1985) identifies two approaches to organizing, namely, putting like entities into groupings, and developing a list of descriptive characteristics for each entity. It involves grouping data that are alike, similar, or related. The final step in the analysis phase is sense-making… attempts to find some meaning out of the organized data….and prioritizing these in the order of implementation. (Pajarillo, 2006). [4]

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1.3 KNOWLEDGE ORGANIZATION SYSTEMS (KOS)

The term knowledge organization systems are anticipated to cover all kinds of schemes for organizing information and supporting knowledge management. KOS includes term lists, metadata-like models, classification and categorization and relationship models. Term lists includes glossaries, dictionaries, pick lists, synonym rings etc. In metadata like models, there are authority files, directories, gazetteers grouped together. Subject heading, categorization, taxonomies and classification schemes falls under classification and categorization. Thesauri, semantic networks and ontologies grouped into relationship models. Knowledge organization systems are mechanisms for organizing information, they are at the heart of every library, museum, and archive.(Hodge, 2000).

VARIOUS TYPES OF KOS

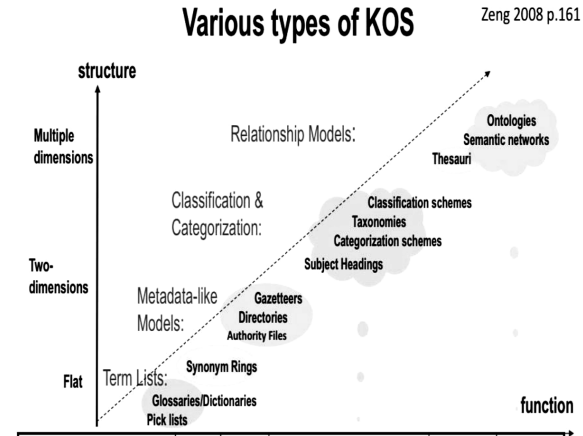

Fig. 1: Source: Zeng, Marcia Lei. "Knowledge Organization Systems (KOS)". Knowledge Organization, 35(2008) No.2/No.3

VARIOUS TYPES OF KOS

Various different typologies are there in advanced level. Among them one is Gil Hodge's (2000) typology of KOSs. He grouped KOS according to the three categories which are mentioned in the following table.

Table 1: Hodge's (2000) Classification of KOSs

Categories of KOSs	General Features of the Categories	Specific Types of KOSs
Lists	Linear and less structured systems; emphasis on the lists of terms (frequently provided with definitions)	Authority files Glossaries Dictionaries Gazetteers
Classifications and Categories	Hierarchically structured systems; emphasis on the creation of subject sets	Subject headings Classification schemes Taxonomies Categorization schemes (the last three terms are frequently used interchangeably)
Relationship Lists	Complex and highly structured systems; emphasis on the connections between terms and concepts	Thesauri Semantic networks Ontologies

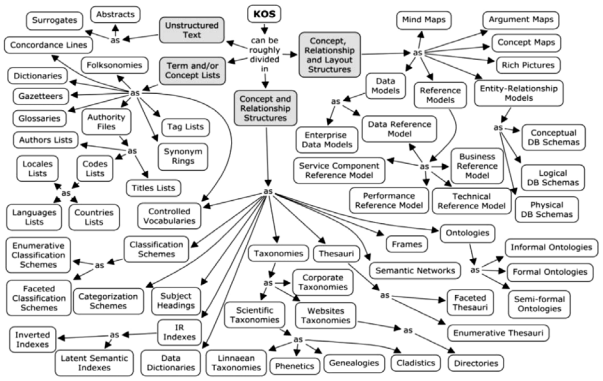

Fig. 2: Categories of KOSs

1.4 KNOWLEDGE ORGANIZATION SYSTEMS

According to Hodge 2000 knowledge organization systems divided into 3 categories and these are:

- Term Lists
- Classification & Categories
- Relationship lists

These three categories further divided into sub categories as:

Term Lists

- Authority files
- Glossaries

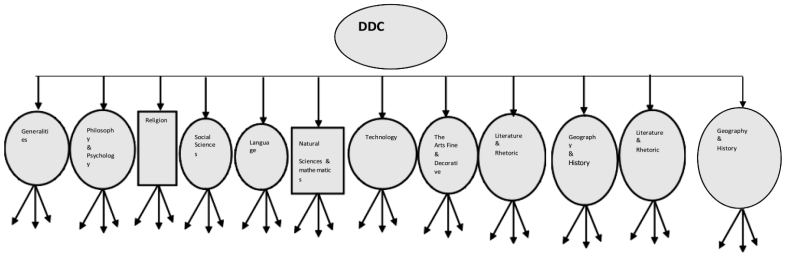

Fig.3: Source: Souza, Tudhope, and Almeida (2010). The KOS spectra. ISKO 2010

- Dictionaries
- Gazetteers

Classification and Categories

- Subject Headings
- Classification Schemes
- Taxonomies
- Categorization

Relationship Lists

- Thesauri
- Semantic Networks
- Ontologies
- Folksonomy

Classification Scheme is an arrangement that organizes concepts into a hierarchy, possibly in a scheme of facets. Gazetteers, Authority Files, Biographical Sources are those in which there are the names of the places and geographical concepts Subject Heading Lists is the list in which the name of the category that a record is included under. Thesaurus manages the multifaceted relationships between terms and concepts and offers conceptual relationships, ideally through an embedded classification. A thesaurus may be monolingual or multilingual. Dictionaries/Vocabularies are the collection of words in a specific language. (Subject Dictionaries) often listed alphabetically, with definitions, etymologies, phonetics, pronunciations, and other information. Glossaries/ Vocabularies (Terminologies) a glossary is an alphabetical list

++ of terms in a particular domain of knowledge with the definitions for those terms. Concept map is a diagram showing the relationships among concepts.

Taxonomies classification plays an important role in database organization, searching, and analysis.

Ontologies and semantic networks In AI-related contexts, ontology is a classification with a rich set of semantic relationships that support reasoning (Soergel).[5] Folksonomies are user-generated classification or a type of distributed classification system which is generally created by group of individuals. It is a novel way of indexing documents and locating information by user generated keywords. Nomos means management. Folk is the people.

Some websites examples are given below to understand the concepts of various terms as Taxonomy, Thesauri, ontology etc. in the case of knowledge organization.

Classification is good for placement of documents in a library (because documents on many related subjects can be kept together) Classification is not well suited for computer searching (too complicated) .Thesaurus is not suited for placement of documents in a library (because documents with related subjects would NOT be kept together) .Thesaurus is well suited for computer searching (relatively simple alphabetic listing of keyword.[6]

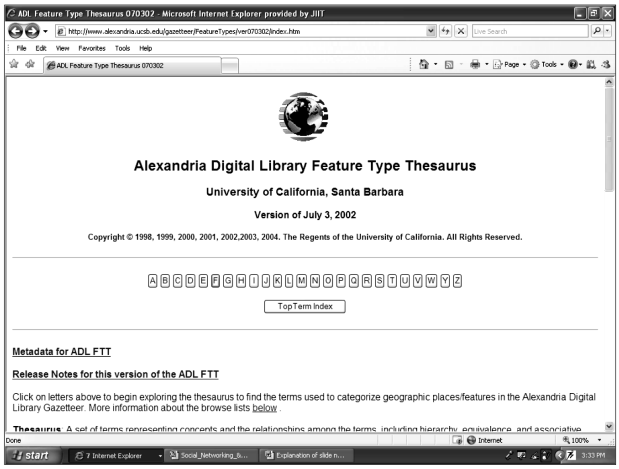

Fig. 4: Example of Thesauri Tool (Implementation examples)

MultiTes thesaurus software (version 7.2) has been used to create this thesaurus

Taxonomy is the science of classification according to a pre-determined system, with the resulting catalog used to provide a conceptual framework for

discussion, analysis, or information retrieval (Ravid Y. 2002)

(http://www.authorstream.com/Presentation/Prudenza-50319-taxonomy- Science-Classification-Why-Oracle-Issues-Backgrounds-Blended-Approach- Workshop-as-Entertainment-ppt-powerpoint/

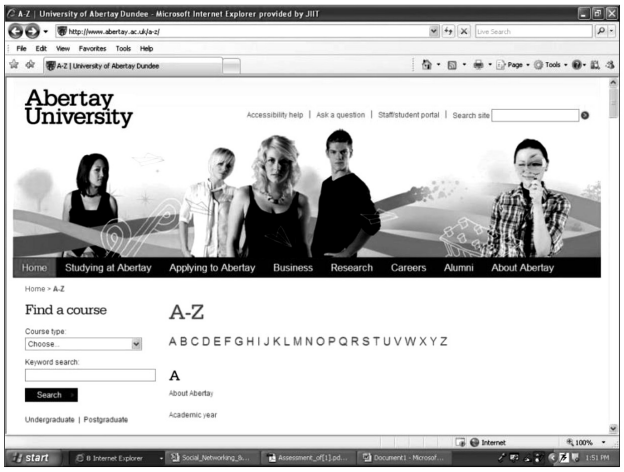

Fig. 5: Example of Abertay University Website Using Taxonomy

1.6 SEMANTICS AND KNOWLEDGE ORGANIZATION

A semantic network or net is a graph structure for representing knowledge in patterns of interconnected nodes and arcs. Computer implementations of semantic networks were first developed for artificial intelligence and machine translation, but earlier versions have long been used in philosophy, psychology, and linguistics. The Giant Global Graph of the Semantic Web is a large semantic network (Berners-Lee et al. 2001; Hendler & van Harmelen 2008).[7].

What is common to all semantic networks is a declarative graphic representation that can be used to represent knowledge and support automated systems for reasoning about the knowledge. Some versions are highly informal, but others are formally defined systems of logic. Following are six of the most common kinds of semantic networks [7].

1.7 ONTOLOGY AND KNOWLEDGE ORGANIZATION

Ontology is an autonomous discipline in which we discover and establish the necessary connections between pure ideal qualities by intuitive analysis of the contents of ideas. This is an indispensable preparation for metaphysics, which aims to elucidate the necessary truths of factual existence. Each section of philosophy - theory of knowledge, philosophy of man, philosophy of nature and so on - has ontological and metaphysical aspects."[10] Contemporary ontologies share many structural similarities, regardless of the language in which they are expressed. Most ontology describes instances, concepts, properties, relations and rules. Major components of the ontology are: Concepts, Instances, Properties, Relations, and Rules to understand the components of the ontology.

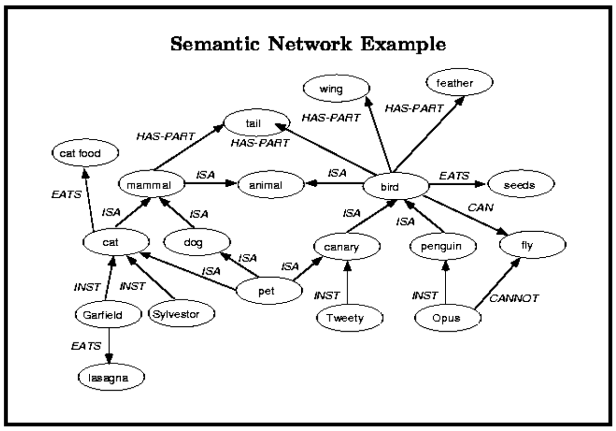

Fig. 6: Semantic Network Example

http://zeus.csci.unt.edu/swigger/csci3210/semantic.ppt#274,3, Slide 3 Some examples are here to understand the components of the ontology:

Concepts: e.g. Man, Bird, Chair, Food, Picture etc. Instances: e.g. Shin chen is an instance of concept 'cartoon'.

Properties: e.g. Animals has properties of gender, mammal, amphibian, height, etc.

Relations: e.g. Bal Bharti Public School is located in Ghaziabad. Rules: e.g. If someone is graduate, then he/she should have a degree.

Types of Ontology:

- Representational ontologies
- Top level, up per, generic, general, core, and common-sense ontologies
- Metadata ontologies
- Domain ontologies
- Application, Method and task-specific ontologies

Example of Taxonomy Merged with Ontology

For example we are taking the case of DDC

Dewey Decimal Classification which is worldwide

using in library classification. DDC is library classification system developed by Melwil Dewey in 1876. This system organizes books on library shelves in a specific and repeatable order that makes it easy to find any book and return it to its proper place. The system is used in 200,000 libraries in at least 135 countries.

There are 10 main classes in Dewey decimal classification systems. The ten main classes are each further subdivided into ten divisions, and each division into ten sections, giving ten main classes, 100 divisions and 1000 sections. DDC's advantage in using decimals for its categories allows it to be both purely numerical and infinitely hierarchical. It also uses some aspects of a faceted classification scheme, combining elements from different parts of the structure to construct a number representing the subject content (often combining two subject elements with linking numbers and geographical and temporal elements) and form of an item rather than drawing upon a list containing each class and its meaning Knowledge organization systems are used to organize materials for the purpose of retrieval and to manage a collection. A KOS serves as a bridge between the user's information need and the material in the collection… All digital libraries use one or more KOS. Just as in a physical library, the KOS in a digital library provides an overview of the content of the collection and supports retrieval. The scheme may be a traditional KOS relevant to the scope of the material and the expected audience for the digital library…The primary users of Knowledge Organization Systems was librarians and other professional searchers. However, the proliferation of electronic data, the explosion of electronic publishing, and increasing concerns about the difficulty of locating information have led to a renewed interest in these KOSs for use not only by professionals but also by end users.[8]

This is the fact that in the field of knowledge organization, ontology does well. It is not only deciding the relationship between the subjects but represent it also for the universe of knowledge. Its logical accuracy helps in the knowledge organization and in the knowledge representation. In this knowledge explosion era, ontology plays a vital role in knowledge organization.

1.8 CONCLUSION

We have now presented an overview on the KO tools. It is obvious that these, as well as other tools need careful deliberations. KO tools in digital era may be understood in narrow senses, as well as in broad senses. The future of the arena of knowledge organisation is reliant on the researches on the same field. The teaching and the practice on the same field, provide helpful systems and services for given user groups. It has to be check that whether existing systems like Google already provides adequate results. An essential concern is, therefore, to evaluate the relative fortes and the faintness of different knowledge organisation tools in this digital era. It is still needed that KO tools needs to be further developed to make searches more effectual.

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A Study of Cyber Crime and its Deterrence

Dilkash Naaz*
R.K. Gupta**

Abstract: *We all know that, cyber crime is any illegal act committed using a computer network especially in the field of internet. In a history, JOSEPH MARIE JACQUARD was the first recorded cyber crime took place in the year 1820. In this paper, I have mentioned some survey of cyber crime, impact of the cyber crime and also mentioned some prevention. There are various fields of cyber crime like cyber pornography, sale of illegal articles, online gambling, intellectual property crime, email spoofing, forgery, cyber defamation and cyber staking. And finally, I will discuss that in today's world which type cyber crime is most important and also brief explanation about the new cyber crime occur and their prevention also.*

Keywords: *Cyber Crime, Technology, Internet, Cyber Security, Software.*

Introduction

In today's world, most of the people use computer and internet for study, business, online transaction, online shopping, social networking, use of Gmail and soon. These are very useful for our today's generation but also some problem occurs i.e. Cybercrime. Cybercrime is also known as Internet crimes. Cybercrime is any illegal act which occurs on internet using computer network. The internet in India is growing rapidly. What is the cybercrime? We can read it in newspaper, television, radio and etc. "It is a criminal activity committed on the internet it describes everything from electronic cracking to denial of service attacks that cause electronic commerce sites to lose money". Cyber crime can be basically divided into three major categories:

- Cybercrimes against persons.
- Cybercrimes against property.
- Cybercrimes against government.

HISTORY

The first cybercrime occur in 1820, Joseph Marie Jacquard, a textile manufacturer in France, produced the loom. This device allowed the repetition of a series of steps in the weaving of special fabrics. This result in a fear amongst jacquard's employee and livelihood were being threatened. Then Jacquard use of the new technology and this is the first recorded cyber crime.

Types of cybercrime:-

1. Hacking
2. Denial of service attack
3. Virus dissemination
4. Computer forgery
5. Credit card fraud
6. Phishing
7. Spoofing
8. Threatening
9. Salami attack

Modification of a conventional crime by using computers:-

- Financial crimes

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- Cyber pornography
- Sale of illegal articles
- Online gambling
- Intellectual property crime
- Email spoofing
- Cyber defamation
- Cyber staking

LAW OF CYBER CRIME

In this section of this paper we'll discuss laws and legislative that governs cybercrime in the India. India is the 12th nation in the world to adopt cyber laws which was introduced on 17th may, 2000. We are facing this problem not only in India but in the whole world. Cyber law is providing an answer to these problems or dealing with the information technology termed as "computer's laws" or "cyber laws"[1]. The rules of the laws can be conduct in following ways:-

- Approval by the government.
- Which are in force over a certain territory, and.
- It must be acquiesce by all persons on that territory. Cyber law includes:
- Copy write law: It is related with computer software, websites, source code of computers, components of cell phones,
- License of the software and source code.
- Trademark law is related to domain name, framing, linking, etc.
- Semiconductor law: keep save the semiconductor integrated circuit design.
- Patient law: is related to computer hardware and software.

The Indian penal code condemns several cyber crimes, which are forgery of cyber fraud, electronic records and evidence etc. As per the Indian Evidence Act- Digital Evidence is to be collected and proven in court. The Banker's Book Evidence Act is relevant with the bank records Code of Criminal Procedure and the IT Act is the provisions of investigation and adjudication of cyber crimes. The Reserve Bank of India was also modified by IT Act.

LITERATURE SURVEY

Cyber law and cyber crimes of India: A survey, Neha kuila, Swati kumari, Shazia Sheikh, Department of computer science, discuss in this paper to describe the cyber crime cases of India and also discuss the India Act, 2000[1].

Cyber crime survey report, KPMG.com/in, Dec 2017[2]. In this report present how the cybercrime attacker attacks. 79 percent of the institution illustrates that cyber security was amongst the top five business risk. Only 3 percent of the organisations reported a cyber attack to the local law enforcement agency. This report provides a whole context on cyber security and identifies crime with a view on how organisations are gearing against this threat. According to the study, there has been significant increase (79 percent) in attention provided by audit committees to cyber security risks with specific focus on:

1) Incident prevention 2) Detection and 3) Response.

A Comparative study on probation terms for cyber crime and other, Dr. Malek Harbawi and Dr. Asaf Varoli, Firat University [3]. In this paper, they have do the best level to access the issue of probation in cyber crime and elaborated about its details on both local and international aspects.

What you need to know about cyber crimes, Elene Paryag and Ashre Griffin, IT capstone- research paper [4]. In this paper discuss the problem on cyber crimes in the U.S and internationally, causes and methods of cyber crimes and also discuss the prevention and procedure.

Cyberlawindia.net, IT Act, 2000[5]. Discuss the advantages of cyber law, that we need some law that people can purchase any thing by online transaction over the net through Debit/Credit card without fear of misuse. Some advantages of this act are in the view of the increasing in transaction and communications carries out through electronic records, the act seeks to empower government departments to accept filling any official documents in the digital format. This Act also allow the government to notify the issue on the web thus heralding e-governance.

www.slideshare.net/whitney bolton1/cybercrime-research-paper[6], they discuss on paper of growing issues of cyber crime one is identity theft, identity theft is the act of "stealing a real person's identification information". White collar crime, this is a type of crime that achieve only goal is the criminal's economic gain.

www.enotes.com[8]/ increasing threat via email i.e. internet scams have increased to the point that some user can received much of scam emails every week, then the use filter and email block can decrease the occurrence of this type of cyber crime and also describe the child exploitation.

Cyber crimes and some prevention:-

1. Internet blackmail via email has increased to the point that some users received many fraud emails in the workplace and at the home every week but the use of filter and email block can decrease the receiving the fraud email.
2. The occurrence of cyber crime through credit and debit card. In the United States, hacked nine major retailers and stole 40 million credit and debit card numbers. There are various types of antivirus that solve this problem.
3. Child soliciting and abuse is also a cyber crime via chat rooms for the purpose of child pornography. The FBI has been spending a lot of time monitoring chat rooms frequented by children with the hopes of reducing and preventing child abuse and soliciting.
4. There is some problem facing in online shopping. When you enter your payment information in any online shopping site, investigate this site that you have never site are safe.
5. To solve cyber crime, user must install and keep-up-to-date antivirus programs, firewall and spyware checkers.
6. In cryptography, there are various type of encryption that encrypt information that you do not want anyone to have unauthorised access to is a good way to avoid some cyber crimes, information about password and credit/debit card information.
7. Recently, Malware and ransom ware attacks methods are occur at the regular basis. Malwares are programmed to attack a specific obligation in the systems to target industries which help attackers spread malware and cause disturbance operation. Ransom ware is criminal attack occur small and medium sized business. NORTON security premium coupled with education about their threats are very good plan to protect for today's cyber landscape. In May 12th 2017, the biggest ever cyber attack in internet history. A Ransom ware with the damage epicentre being in Europe.

CONCLUSION

Increasing the cyber crime attacks in today's world, our study has illustrated that organisations are taking cyber security seriously and making it a board driven agenda. Also some agenda to aware all people for cyber crime attacks and learn how to solve this type of problems. Some traditional measures to manage cyber risks will be in inadequate.

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