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*Consultant at Leadership, Policy & HR training Center
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Editorial Note

The South Asian Journal of Management Research (SAJMR) is an open-access, peer-reviewed international journal dedicated to publishing quality research articles, reviews, and perspectives that shed light on the role of business, technology, social work and environmental sustainability in the current era. The current issue of SAJMR showcases research studies on effect of workplace environment on employee performance, customers' perspective on green marketing, e-participation in municipal governance process, saving practice among small enterprise operators, artificial intelligence in hospital industry, customer behavior towards corporate social responsibility, continuous quality improvement factors in public hospitals, legal framework on money laundering and terrorism financing, content analysis of BYJU's app reviews, computerized generic model for selection of manufacturing method, technology's impacts on tourism management and a case study on utilization of boiler fly ash to reduce the parameters of effluent generated.

The journal will be a valuable resource for researchers, academics, and policymakers interested in understanding the dynamics of the globalized world. This editorial note acknowledges and appreciates the invaluable contributions of researchers who have submitted their work to SAJMR since its inception in 2009. The loyal readers of SAJMR are also thanked for their support. The journal will continue to publish quality research and contribute to the dissemination of knowledge so that we can all benefit from it.

Dr. R. S. Kamath

Editor

Effects of Workplace Environment on employee Performance In The Ministry of Revenue

Zewdie Zakie Koyira

Consultant at Leadership, Policy & HR training Center

Ethiopian Civil Service University, Addis Ababa, Africa

E-mail: zakiezawude@gmail.com

ABSTRACT: The purpose of this study was examining the relationship between workplace environment and employee performance on Ministry of revenue. To this end, both descriptive and explanatory design was employed and 315 employees were selected representing one head office, and four branches for collecting quantitative data. For qualitative data collection 50 middle level managers were selected purposively. Standard questioner was used for the collection of quantitative data which assesses the relationship between workplace work place environment and employee performance on role based dimension. Quantitative data analysis was done using descriptive statistics, Pearson product moment correlation, simple and multiple linear regressions. On the other hand, Qualitative data were analyzed using narrative method and triangulation of findings from both sources was done at the interpretation phase. Using Pearson Product Moment Correlation the study shows that there was a substantial positive correlation between workplace environment and employees' performance in the study area ($r=0.647$, $p<0.01$). The survey result also indicated that the explanatory variables (performance feedback ($B=0.591$, $p=0.000$), work incentive ($B=0.553$, $p=0.000$), job aids ($B=0.222$, $P=0.000$), supervisor support ($B=0.075$, $p=0.027$)) which are in the regression equation have positive and significant influence on the performance of employees. However, this study hasn't found out the significant relationship between physical work environment and employee performance in the organization under the study settings. Also the qualitative result confirmed the quantitative findings. The study recommends that Ministry of Revenue should ensure that the workplace environment is comfortable enough by conducting periodic assessment of employees perception towards their workplace environment, give due attention to job aids, work incentives, supervisor support, performance feedback factors.

Key words: Employees, Workplace, Environment, Ministry, Performance

Introduction

An organization articulates a vision and goals to have a better, improved and successful future. In order to achieve the intended goals an organization has to create a supportive work environment Caetano (1999). The study result of Samuel (2010) pointed out the necessity of establishing conducive work environment to enable productive workforce to promote the retention of the employees and the company's ability to sustain a competitive advantage. Foldspang *et al.* (2014) defined work environment as the place that one works, which means the milieu around a person. It is the social and professional environment in which a person is supposed to interact with a number of people and includes a friendly, well-designed, safe physical space, good equipment and effective communication, which will improve productivity.

On the other hand, scholars such as Armstrong (2009), Sultana et al. (2012); Platt and Sobotka (2010) asserted that employee performance is the combined result of effort, ability and perception of tasks and organizations need highly performing employees in order to meet their goals and to deliver the products and services they are specialized in and finally to achieve a competitive advantage. In this regard, Stup (2003) described several factors towards the success of employees' performance. These factors include physical environment, equipment, meaningful work, performance expectation, feedback on performance, bad system among others. In support to this, a survey study result of Hughes (2007) indicated that, nine out of ten employees believed

that the work space quality affects the attitude of employees while the study result of Samuel, et al. (2010) confirmed that about 86% of productivity problems reside in the work environment of organizations. The study of Tiow (2014) found that work environment significantly determines job satisfaction and this result corroborates findings of previous research that investigated the connection between variables in workplace environment and workforce or work process (Akinyele, 2010). Many organizations in developing countries, especially in Africa, have little concern for an improved and conducive workplace environment. For instance, the study conducted in Tiago, Nigeria found that the nature of the work environment and the experience of the work environment have a great influence on low productivity (Taiwo, 2010). Similarly, a studies result of Samson, Waiganjo and Koima (2015) indicated the critical effect of workplace environment on the performance of commercial Banks in Nakuru Town, Kenya. In Ethiopia, following the current political reform, the Ministry of Revenue has changed organizational systems, structures and mainly reorganized human resource placement on the basis of Job Evaluation and Grading system. Just a few months after the reform (HPR MM June 5, 2019) some existing employees raised the concerns about sharing of work spaces, resources and office facilities; and majority of employees expressed displeasure due to change in working conditions. In fact, it would take time to adapt the changes and get along with the new systems. But some the employees started to appreciate the previous workplace environment while majority of the employees blame the current workplace environment for their low performance. As far as the researcher's knowledge is concerned, there is lack of recent research work whether the emerging work environment of the Ministry has effect on employees' performance or not. Therefore, the purpose of this study was examining the perceptions of employees in Ministry of Revenue about the workplace environment of their job performance. To this end, the current study adopted three attributes (job aids, supervisor support and physical work place) used Lankeshwara (2016) which are expected to be in line with this study though it only focused on three attributes. In addition this study used the work incentive attributes of Tamessek (2009) as forth variable and then the study added performance feedback as the fifth variable of the study. Overall, this study is rooted on five attributes such as job aids, supervisor support, physical work place, work incentives and performance feedback. In an attempt to reach an empirical conclusion, some of the questions to be considered as guide in this research work are as follows:

- What does the current workplace environment in Ministry of Revenue look like?
- What relationships exist between workplace environment and employee performance?
- To what extent the workplace environment factors affecting the employee performance?

Literature Review Concepts of Working Environment

Working environment is the sum of the interrelationship that exists within the employees and the environment in which the employees work. Opperman (2002) defines working environment is a composite of three major sub-environments:- the technical environment, the human environment and the organizational environment. Technical environment refers to tools, equipment, technological infrastructure and other physical or technical elements. The technical environment creates elements that enable employees perform their respective responsibilities and activities. The human environment refers to peers, others with whom employees relates, team and work groups, interaction, the leadership and management. This environment is designed in such a way that encourages informal interaction in the work place so that the opportunity to share knowledge and exchange ideas could be enhanced. This is a basis to attain maximum productivity. Organizational environment include systems, procedures, practices, values and philosophies. Management has control over organizational environment. Measurement system where people are rewarded on quantity, hence workers will have little interest in helping those workers who are trying to improve quality. Thus, issues of organizational environment influence employee's productivity.

Employee Performance

Sinha (2001) stated that employees' performance is depending on the willingness and also the openness of the employees itself on doing their job. He also stated that by having this willingness and openness of the employees in doing their job, it could increase the employees' productivity which also leads to the performance. By having the work or job done on track, employers could be able to monitor their employees and help them to improve their performance. Furthermore, a reward system should be implemented based on the performance of the employees. This is to assert that the type of workplace environment in which employees operate determines whether or not organizations will prosper. A better work environment boosts employees' performance. Franco et al. (2002), defined performance that relies on internal motivation but presence of internal factors such as necessary skills, intellectual capacity and resources to do the job clearly have an impact. As a consequence employers are supposed to provide appropriate working conditions in order to make sure the performance of employees meet the required standards. Modern employees' motivation management methods have evolved over time. All employees that have job satisfaction are high performers in their respective workplaces. He said that if employees receive the same wage irrespective of their individual contribution to the goal, they will work less and that employees think working at a higher rate means fewer employees may be needed which discourages employees to work more (Gardner and Lambert 2003). Based on those explanations, this study indicates that the success of any organization largely depends on the motivation of its employees.

Empirical study on Working Environment Factors

An attractive and supportive working environment provide conditions that enable employees to perform effectively, making best use of their knowledge, skills and competences and the available resources in order to provide high-quality of organization service. Globally, a surge of recent studies have been carried out on workplace environment as a factor that determines employee performance.

A study result of Hameed and Amjad (2009) on 31 branch banks indicated that the importance of comfortable and ergonomic office design in motivating employees and their substantive contribution in boosting employee performance. Likewise, a study result of Khan et al (2011) on the impact of workplace environment and infrastructure on employee performance in education sector in Pakistan, found out that the positive relationship between incentives and performance.

Niemela et al. (2002) found out that there are decrements in work performance when temperatures are high, and low temperature has relation to performance of manual tasks. Office design encourages employees to work in a certain way by the way their work stations are built. Spatial layouts contribute a lot towards how the employees perform their tasks (Al- Anzi, 2009). Closed office floor plan, which may consist of each employee having a separate office of their own or a few people in each office, allows employees a greater amount of privacy than open plan office layout. It allows employees to work in peace and quiet, keeping them focused on their tasks without a lot of distraction. It also offers employees a thinking frame and creativity without much distraction. According to McCoy and Evans (2005) the elements of physical work environment need to be proper so that the employees would not be stressed while doing their job. Physical elements play an important role in developing the network and relationships at work. All in all, the physical work environment should support the desired performance. Vischer (2008) stressed that conducive workplace environment should be prioritized as it provides support to the employees in carrying out their jobs. It should be conducive enough to enable performance of tasks by employees. In his study, Tamessek (2009) analyzed the extent to which employees perceive their workplace environment as fulfilling their intrinsic, extrinsic, and social needs and their need to stay in the organization. He also analyzed the impact of perception of workplace environments on employee commitment and turnover in the organization, he concluded that if the employees are provided with enabling workplace environmental support, they will be highly

satisfied and show high level of commitment towards their organization and hence low turnover rate.

Lankeshwara (2016) also conducted on the impact of workplace environment on employees' performance in Awissawella. The study used primary data and covered 85 sample size including managerial and non-managerial employees from Brand-ix Intimate Apparel-Awissella. This study revealed that job aids, supervisor support and physical work environment have positive effect on employee performance. This finding particularly highlighted the significance influence of job aids and concluded it as the most critical predictor. Using a descriptive survey research design Daniel Cross Ogohi (2019) analyzed the Ministry of works and infrastructure at Bayesal state and found out that physical work environment and work reward have positive significant impact on employees' commitment to work. Aisha, et al. (2013) in a study on the effects of working on conditions employees' multidimensional performance in Indonesia University attempted to establish the relationship of determinant factors of work conditions and the way in which they act up on employee performance. This study found out that the significant effect of incentives, motivations and working conditions up on employee performance. The study further highlighted the significance effect of workplace environment and its predictive ability.

A research by Roelofsen (2002) indicates that improving the working environment reduces complains and absenteeism while increasing productivity. Better physical workplace environment will boost the employee and ultimately their performance. A study done by Chevalier (2004) revealed that when environmental supports are sound, employees are better equipped to do what is expected of them. Chandrasekhar (2003) in her study found out that workplace environment plays a big role in increasing employees' performance. Findings by Ajala (2012) indicated that workplace environmental elements such as sufficient light, absence of noise, proper ventilation and layout arrangement substantially increase employees' performance.

In Ethiopian context, some attempts have been done to assess the impact of workplace environment on employee's performance in Ethiopian Airlines (Muluken, L. 2015) and asserted the relationship of workplace environment, motivation and compensation on employees' performance in Ethiopian Airlines. Likewise, Mesert, A. (2017) indicated the effect of organizational culture on employees' performance in Ethiopian construction works while Belete, T. (2017) tried to show the effect of workload on employees' performance in Commercial Bank of Ethiopia. It is evident from the above literature that the studies done by Chandrasekhar, (2011), Roelofsen (2002) and Chevalier (2004) focused on physical work environment basing on different aspects; Ajala (2012) based his study physical factors such as sufficient light, absence of noise, proper ventilation and layout arrangement as attribute. In this regard, a study result done by Aishal (2013) focused on incentives, motivation and work conditions as attributes whereas the study area of Tamessek (2009) focused on intrinsic, extrinsic and social needs as attributes. The other study of Lankeshwara (2016) used job aids, supervisor support and physical work place as attribute.

Research Design and Methods

The research designs for this study were both descriptive and explanatory methods. The descriptive design was to describe the current situation of work environment and assess the relationship between work environment and employee's job performance in Ministry of Revenue. As Chandra, (2004), indicated descriptive design is useful in exploring how workplace environment affects performance in the study areas. It is also considered as the efficient approach of collecting data regarding characteristic of sample of a population, current practices, conditions or needs. In explanatory method, independent and dependent variables are measured at the same point in time using a single questionnaire (Bhattacharjee, 2012). The purpose of this design is to identify if there is a relation between the predictor variable and the response variable. The predictor variable was work environment, and the response variable was employee job performance. The researcher used mixed type of research approach. The reason why the

researcher prefers mixed approach was:- to develop a more complete understanding of the phenomenon under study settings; to cross-validate or corroborate findings and to provide a well-validated and substantiated findings.

Target Population, Sampling and Sample size

Target population is said to be a specified group of people or object for which questions can be asked or observed to develop required data structures and information (Hair et al. 2006). For this study, employees of Ministry of Revenue head office and four branches working at Addis Ababa were selected as target population and they are 6095 in number (HR report 2018). Due to time and financial limitations and the nature of the population sample determination method developed by Carvalho (1984), was applied to determine a sample size.

Table 3.1: sample size determination

Population size	Small	Medium	Large
51-90	5	13	20
91-150	8	20	32
151-280	13	32	50
281-500	20	50	80
501-1200	32	80	125
1201-3200	50	125	200
3201-10000	80	200	315
10001-35000	125	315	500
35001-150000	200	500	800

Source: Adapted from Carvalho (1984)

Based on Carvalho (1984) sample size determination method, out of (6095) population of Ministry of Revenue 315 employees were selected for survey questionnaire. After determining the above sample size, the researcher used simple random sampling method to get the appropriate respondents for questionnaire. For qualitative data (interview), the researcher considered directors and team coordinators as eligible respondents. The reason why they are purposefully selected was that, they were expected to have first-hand experiences in confronting with the challenges of work environment and may have adequate knowledge about it. In addition a focus group discussion was employed with supportive staffs selected purposefully from the institution under study setting.

Types and Sources of Data

Both qualitative and quantitative data were collected from primary sources. The primary data sources of this study were employees, directors and team leaders of Ministry of Revenue. The primary and secondary data were collected using various tools such as questionnaire, interview, and focus group discussion, observation, and document review.

Measurement for Questionnaire

Employee performance measure for this study was role based performance scale questionnaire adapted from 20 items of self-rating instrument of Welbourne, Johnson & Erez (1998) and was used with modification in the context of the public sector in Ethiopia. It includes five items designed to assess the performance of employees on job (e.g. "The quantity of work I do on my job"), career (e.g. "Developing of skills needed for my future career"), innovator (e.g. "Work to implement new ideas by me on my job"), team (e.g. "Work of me as a part of team"), and organization (e.g. "Doing things by me to promote the organization"). Each item is rated using five-point Likert scale ranging from 1 (Need much improvement) to 5 (Excellent). All the constructs under workplace environment were measured on a five point Likert scale of 1-5

where, (1) “needs much improvement”, (2) “needs some improvement”, (3) “satisfactory”, (4) “good” and (5) “excellent”. In addition employee performance was measured by standardized tools developed by Sakha I, (2003).

Descriptive analysis Method

For descriptive analysis using mean values computed from the 5-likert scale, the study followed the approach recommended by Zaidatol and Bagheri (2009). The following indexes’ ranges and interpretations were applied for analysis and discussion purposes in this study.

Table No. 2. Comparison bases of mean score of five point Likert scale instrument

Mean Score	Description
< 3.39	low
3.4.-3.79	Moderate
>3.80	High

Source: Zaidatol and Bagheri (2009)

Correlation Analysis Method

For correlation analysis purpose the descriptors developed by Davis (1971) and cited by Alwadael (2010) was used as indicated in the table below.

Value of coefficient	Relation between variables
0.70-1.00	Very strong association
0.5-0.69	Substantial association
0.30-0.49	Moderate association
0.10-0.29	Low association
0.01-0.09	Negligible association

Source: Alwadael (2010)

Validity and Reliability

The researcher used the most common internal consistency measure known as Cronbach’s Alpha (α) which was generated by SPSS. In this regard, 0.638 was generated from the questionnaires of this study.

Item Statistics				Reliability Statistics	
Items	Mean	SD	N	Cronbach’s Alph	N of Items
Organization	1.3516	.65356	315	.733	6
Job	3.0349	.61591	315		
Employee Performance	2.3341	.28565	315		
Career	3.5246	.81535	315		
Innovator	2.5048	.46619	315		
Team	1.2548	.41849	315		

Source: SPSS Analysis

ANALYSIS AND DISCUSSION

Introduction

The main objective of the study was to determine the effect of workplace environment on employee performance in Ministry of Revenue. The first step towards achieving the objective

was measuring workplace environment and later on determining its effect on employee performance. Workplace environment was categorized into five categories. These are:-job aids, performance feedback, physical environment, work incentives and supervisor support. To this end, 315 questionnaires were distributed to the respondents and all the distributed and usable questionnaires were returned giving a response rate of 100%.

RESULTS OF THE STUDY

Level of Employee performance

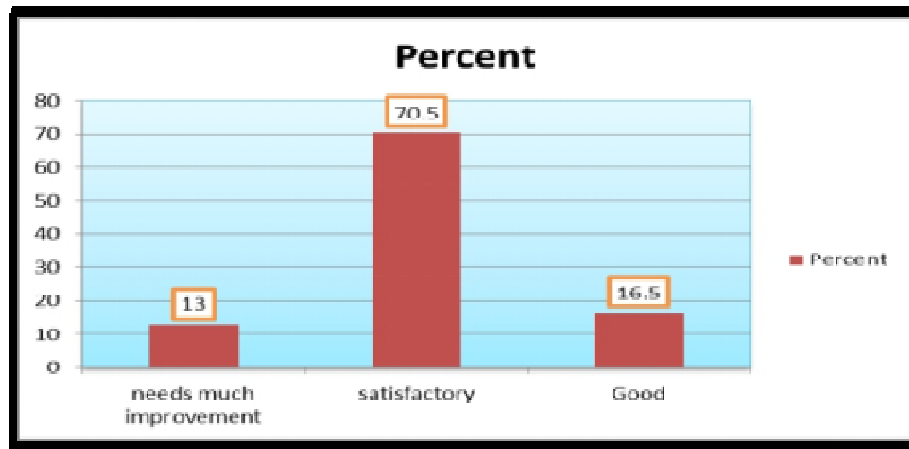
In order to understand the current working capacity of working employees of the study organizations 20 items concerning with overall work performance of employees were included in the questionnaire. As can be seen in table 4.1 below, out of 20 items the respondents level of performance on four items. These are:- making progress in my career (4.22), obtaining personal career goals (3.47), seeking out career opportunities (3.46), services provided to customers(both internal and external) when doing my job (3.36). However, the respondents' levels of work performance on 16 items were satisfactory and below level (needs improvement).

Table 4.1 Descriptive statistics of employees' performance level

S/N	Items	Mean	Std. Deviation
1	Quantity of work delivered	2.47	1.112
2	Quality of work delivered	2.1	1.043
3	Accuracy of doing work	2.34	.824
4	Services provided to customers(both internal and external) when doing my job	3.36	1.014
5	Developing of skills needed for my future career	2.94	.724
6	Obtaining personal career goals	3.47	.928
7	Making progress in my career	4.22	1.259
8	Seeking out career opportunities	3.46	.987
9	Coming up with new ideas	2.94	.817
10	Working to implement new ideas	2.80	.588
11	Finding improved ways to do things	2.07	.476
12	Creating better processes and routines	2.19	.758
13	Working as part of a team or work group	1.30	.620
14	Seeking information from others to in my work group	1.29	.568
15	Making sure my work group succeed	1.21	.487
16	Responding to the needs of others in my work group	1.28	.570
17	Doing things that help others when it's not part of my job	1.35	.643
18	Working for the overall good of the company	1.36	.838
19	Doing things to promote the company	1.29	.520
20	Helping so that the company is a good place to be	1.40	.833
	Total	2.24	0.780

The overall response indicates that employee level of work performance has mean=2.24 and SD=0.780 to the 20 items of work performance. In addition, it is possible to see from the figure below 70.5% of the respondents agreed that the performance workers in the study organization is at "satisfactory" level while 13.0% believe that the need of "much improvement" on employee performance. However, 16.5% responded that the employee performance is at "good" level. This indicates that 83.5% of the respondents perceive that the extent of employee performance at their organization needs improvements.

Fig. 4.1 Employee Performance Level by Category; M=2.24, SD=0.780



Source: SPSS Analysis 2020

Description of workplace environment

The finding in the table below indicates that the extent workplace environment rating by the respondents. According to the respondents response, towards workplace environment 45.7% rated as satisfactory, 27.9% rated as the need of much improvement, 22.2% rated as the need of some improvements. But the remaining 4.1% responded as either good or excellent. In other words 67.9% of the respondents responded either satisfactory or the need of some improvement. The workplace environment at the study institution is at satisfactory and below levels as indicated by a large proportion of the respondents (95.9%). This result is further confirmed by the mean value 2.24 and SD=1.12. This gives a clear indication to the need of some improvements like office lightening, the floor configuration, office layout and the furniture layout though with notable variations in responses shown by a standard deviation of 1.12.

As indicated below majority of the respondents (67%) rated as the need of some improvements regarding performance feedback with mean value 2.35 and standard deviation of 0.824. Regarding work incentive 75% of the respondents rated as either the need of some or much improvements and is supported by the mean value of 2.13 and with notable variation in responses shown by a standard deviation of 1.04 slightly above 1.00. This indicates that the need of some improvements in work incentive factors such as financial and non-financial items.

Table 4.2 Description Of Workplace Environment

Items	Needs much improvement(1)		Needs some improvement(2)		Satisfactory(3)		Good(4)		Excellent(5)		M	SD
	F	%	F	%	F	%	F	%	F	%		
Physical Environment	88	27.9	70	22.2	144	45.7	2	0.6	11	3.5	2.29	0.99
Supervisor Support	104	33.0	62	19.7	23	7.3	125	39.7	01	0.3	2.54	1.31
Performance Feedback	18	5.7	211	67.0	57	18.1	17	5.4	12	3.8	2.34	0.82
Work Incentive	84	26.7	155	49.2	47	14.9	9	2.9	20	6.3	2.13	2.04
Job aids	66	21.0	206	65.4	15	4.8	18	5.7	18	3.2	1.04	0.87

Source: SPSS Analysis 2020

Mean comparison of workplace environment constructs

In terms of job aids, 65.4% of the respondents rated for the need of some improvements in providing job aids with the mean value of 2.05 and standard deviation of 0.88. While talking about the physical environment, comparable results are depicted at both ends. These are the responses rated as satisfactory and above (47.3%) and the need of improvement (52.7%). With respect to supervisor support, 52.7% believe that the need improvements while 40% responded as good and above. These results is further substantiated by mean value of 2.55 and with a notable variation in responses shown by a standard deviation of 1.31. This result further indicates that supervisor support is slightly at satisfactory level (M=2.55).

Table 4.3 Mean comparison of workplace environment constructs

Workplace Environment	Mean	Std. Deviation
Physical Environment	2.2381	1.12179
Supervisor Support	2.5460	1.31392
Performance Feedback	2.3460	.82416
Work Incentive	2.1302	1.04312
Job aids	2.0476	.87841
Overall Mean of Workplace Environment	2.26158	1.03628

Source: SPSS Analysis 2020

The findings in table 1 indicates that the overall mean for workplace environment was rated as (M=2.26; SD=1.04) and imply the need of some improvements. From the constructs of workplace environment, supervisor support rated as (M=2.55; SD=1.31) is at the top as compared to others. Performance feedback emerges the second (M=2.35; SD=0.82) while physical environment (M=2.24; SD=1.12) emerges as the third. The other construct of workplace environment, work incentive (M=2.13; SD=1.04) rated as the fourth while the least rated construct is job aids (M=2.05; SD=0.88). The result implies that workplace environment in the study institutions needs some improvement in relation to providing job aids, establishing work incentives, creating conducive physical work environment, provision of performance feedback and strengthening the support provided by immediate supervisors to their subordinates.

Table 4.4 Pearson product moment correlation of the Items

S/N	Variables	1	2	3	4	5	6
1	Job based performance	1					
2	Physical Environment	.499**	1				
		.000					
3	Supervisor Support	.168**	-.168**	1			
		.003	.003				
4	Performance Feedback	.653**	.190**	.290**	1		
		.000	.001	.000			
5	Work Incentive	.567**	.891**	-.119*	.177**	1	
		.000	.000	.034	.002		
6	Job aids	.160**	-.125*	-.072	-.010	-.108	1
		.005	.027	.201	.865	.056	

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

In order to determine the effect of workplace environment on employee performance, an attempt was made to establish the relationship through Pearson product moment correlation. In this

regard five variables of the workplace environment were correlated with employee performance and the results are presented as shown in table 2 above. The findings in this table indicates that there is a moderately positive and significant correlation between performance feedback and employee performance ($r=0.653$, $p<0.01$). It is also clear from the findings that work incentives positively and moderately correlated with employee performance ($r=0.567$, $p<0.01$). Next to the above constructs, it is also indicated that physical environment is almost moderately and positively correlated employee performance ($r=0.499$, $p<0.01$) while the relationship between job aids and employees performance is weak and positive ($r=0.160$, $p=0.05$). However, supervisor support has weak and negative correlation with employee performance ($r=0.168$, $p<0.01$). Further correlation was carried out between the overall means of employee performance and workplace environment in order to establish the overall strength and magnitude of relationship between a dependent and independent variables.

Table 4.5 Correlation Matrix of Workplace Environment and Employee Performance

Items	Correlation	Workplace Environment	Employee Performance
Workplace Environment	Pearson Correlation	1	.647**
	Sig. (2-tailed)		.000
	N	315	315
Employee Performance	Pearson Correlation	.647**	1
	Sig. (2-tailed)	.000	
	N	315	315
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS 220

The findings in the above table indicates that there is a moderate positive significant correlation between employee performance and workplace environment ($r=0.647$, $p<0.01$). This implies that there is a moderate relationship between employee performance and workplace environment. Therefore employee performance is associated with workplace environment such that the better workplace environment, the better employee performance. In order to determine the effect of workplace environment, further analysis was done using multiple linear regressions. Employee performance was regressed against workplace environment. The model summary results are presented below table 4.

Table 4.6. Regression Result of Workplace Environment and Employees Performance

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.647 ^a	.418	.417	.43928	.418	225.261	1	313	.000

Source: SPSS Analysis 2020

The findings in table 4 indicates that there is a positive significant multiple correlation between the five constructs of workplace environment and employee performance ($r=0.647$). It is also clear from the model that workplace environment accounts for 41.8% variance in employee performance (R square =0.418, $p=0.000$). An adjusted R square value further indicates that workplace environment accounts for 41.7% after controlling for overestimation or underestimation of the estimate values (Adjusted R square value=0.417). These findings are significant, or not by chance ($F(1, 313)=225.261$) but as result of fitting the model. It can thus be deduced from the findings that workplace environment explains much amount of variation on the employee performance in the study organization.

Table 4.7 ANOVA table indicating the fitness of the model

ANOVA						
	Model	Sum of Squares	d.f	Mean Square	F	Sig.
1	Regression	71.653	5	14.331	137.456	.000 ^b
	Residual	32.215	309	.104		
	Total	103.868	314			
a. Dependent Variable: Employee Performance						
b. Predictors: (Constant), Physical Environment, Job aids, Performance Feedback, Supervisor Support, Work Incentive						

Source: SPSS Analysis 2020

Furthermore, the researcher is interested in explaining the effect of each of the constructs of workplace environment on employee performance. The findings are presented in table 5 below as follows:-

Table 4.8 Linear Multiple Regression Result of the effect of workplace on Employees' Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.655	.098		6.658	.000
	Job aids	.145	.021	.222	6.922	.000
	Work Incentive	.305	.039	.553	7.916	.000
	Performance Feedback	.413	.023	.591	17.646	.000
	Supervisor Support	.033	.015	.075	2.226	.027
	Physical Environment	-.034	.036	-.065	-.927	.355
a. Dependent Variable: Employee Performance						

Source: SPSS Analysis 2020

The findings in table 5 above also indicate the effects or contributions of each of the constructs of workplace environments on employee performance. The model coefficients clearly indicate that performance feedback has the highest unique contribution to the employee performance (B=0.591, p=0.000). The second construct that uniquely contributing to the employee performance is work incentive (B=0.553, p=0.000). Job aid becomes the third construct with B value is equal to 0.222 and P value equal to 0 .000. The fourth variable with the least significant unique contribution to employee performance is supervisor support (B=0.075, p 0.027). However physical environment doesn't have a significant contribution to employee performance in this model.

According to coefficients table 5 above, performance feedback, work incentive job aids and supervisor support are significant as the p value of those four variables are less than 0.05 significant level. In contrast, physical work environment has recorded an insignificant explanatory variable with employee performance due to higher p values. Based on the results of the above analysis, the equation of the regression can be depicted as follows:-

$$Y = 0.655 + 0.413X_1 + 0.305X_2 + 0.145X_3 + 0.033X_4$$

Where,

Y= performance of employees

X₁= performance feedback

X₂ = work incentives

X₃= job aids

X₄=supervisor support

As can be seen from the above equation the constant value (0.655) indicates the value of employee performance when all of the independent factors remain constant. The value (0.413) of performance feedback suggests that, if performance feedback component is increased by one unit, employees' performance will increase by 0.413 units when all of the other variables remain constant. Similarly the value of work incentive (0.305) indicates that the value of employee performance will increase by 0.305 units as the value of workplace environment increases by one unit. The same is true in both job aids (0.145) and supervisor support (0.033) cases. In this regard, performance feedback has the highest Beta value as 0.413 and it has become the most influential factor for the employee performance in the institution under study settings. In general, all the explanatory variables which are in the regression equation have positive and significant influence on the performance of employees.

Table 4.9 Simple linear Regression Result of Effects of Workplace environment on Employees' performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.887	.115		7.690	.000	.660	1.114
	Work Place Environment	.748	.050	.647	15.009	.000	.650	.846

a) Dependent Variable: Job based performance

Source: SPSS Analysis 2020

The findings in the above table no. 6 indicates that workplace environment has a unique positive and significant relationship with employee performance ($B=0.647$, $p=0.000$). This implies that workplace environment has moderately strong effect on employee performance. As can be deduced from the above table, the standard beta value of workplace environment ($B=0.647$) indicates the number of SD that the scores in employee performance would change if a one SD unit change occurs in workplace environment. From this finding, it shows that if we could increase workplace environment by one SD (1.03, from descriptive statistics) then the employee performance would be likely to increase by 0.647 SD units. If we multiply this value by 1.03 (the SD of workplace environment), we would get $0.647 \times 1.03 = 0.666$. When this value is multiplied by 100% it implies that putting more effort on workplace environment leads to 66.6% increase in employee performance. Thus, workplace environment could lead to two-third of the increase in employee performance.

Interview and Focus Group Discussion Results

The aim of the Interview and Focus Group Discussion was to understand, determine and provide insights about how employees and leaders perceive the current situation of workplace environment in their institution. As the participants responded, the physical work environment also known as an ergonomic workplace, is favorable to the employees to perform their job more effectively. The institutional office layout, the floor configuration, the furniture layout and lightning are convenient.

Majority of the respondents suggested that employee get support from their immediate supervisor sometimes and it needs much improvement to make the employee more satisfied and performance their works up to the expected standards. Also they mentioned that performance feedback to employees is not common but evaluation at the end of physical year is a mandatory practice. They mentioned that instead of waiting the whole year for evaluation, it would be better providing regular performances feedback.

While talking the office facilities and furniture in the center, all the participants agreed that the office in all branches including head office are equipped with the necessary office facilities, furniture and computers including Internet access. However, they mentioned that, the centers lack waiting place and chair, front line workers (information desk), lack of signs inside the center indicating the work flow and the desk where the customers to go and get the service.

Regarding the job aids, some of the participants mentioned that employees have clear information about the type of services they provide the kind of documents they should process, have clear procedures to follow and understand when the results will be returned to the customers. On the other hand, majority of the participants mentioned that employees are not serving as per the standards because of lack of clear working procedures for new staffs. This has created a challenge for them to deliver the services based on the standards as they said. When we come to the issue of work incentive, it is not based on predetermined conditions outlined on the basis of performance but dominantly based on personal relationships.

Discussion Of Results

Now days the most important organizational asset is the human resource which determines the success of an organization. In other words, it is possible to say that the success of an organization highly depends on its employees' performance. In this regard, any condition affecting employees' performance will affect the organizational performance in the end. Findings from this study shows that employees' performance at the study organization is at satisfactory level and overall workplace environment "needs much improvement". These results are consistent with the study result of McCoy and Evans (2005) who found out that the workplace environment should be conducive for employees so that they would not be stressed while doing their works. Stress affects the performance of employees in that they are not able to perform to the expected standards.

The findings from the results of Pearson Product Moment Correlation indicates that there is a substantial positive correlation between workplace environment and employees' performance ($r=0.647$, $p<0.01$). In addition, this Pearson Product Moment Correlation analysis indicates that there exist moderate relationship between employees performance and some of elements of workplace environment (performance feedback $r=0.653$, $p<0.01$; work incentives $r=0.567$, $p<0.01$ and physical environment $r=0.499$, $p<0.01$). While another variable of workplace environment, job aids has positive and weak correlation ($r=0.160$, $p=0.05$), the remaining variable has weak and negative correlation ($r=0.168$, $p<0.01$) with employees' performance. The findings are in line with Chandrasekhar, K., (2011), Daniel Cross Ogohi (2019) and Aisha et al (2013) who indicated that workplace environment had a positive impact on employees' performance. Therefore it is anticipated that there is a positive significant correlation between workplace environment and employee performance. The findings are also supported by the study of Lankeshwara, P. (2016), Hameed, A. (2009) and Gulali, D. et al (2018) indicating that a significant positive relationship between employee performance and workplace attributes such as feedback performance, physical environment, job aids and work incentives. They therefore concluded that workplace environment had influence on employees' performance.

Regression analysis indicates that performance feedback has the highest unique contribution to the employee performance ($B=0.591$, $p=0.000$) followed by work incentive ($B=0.553$, $p=0.000$). The third variable in this study, job aids has low contribution with beta value ($B=0.222$, $p=0.000$) whereas the fourth variable, supervisor support has the least significant contribution ($B=0.075$, $p=0.000$). However, the other variable of workplace environment (physical environment) doesn't have a significant contribution in this model. When we see the overall value of the workplace environment, it has a unique significant contribution on employees performance ($B=0.647$, $p=0.000$) and accounts for 41.7% of variation in employees performance. An alternative analysis also indicates that the possibility of increasing the employees' performance by 66.6% while improving the workplace environment by one standard deviation

($B=0.647$, $SD=1.03$, $P=0.000$). Mathematically this could be done by multiplying the beta value ($B = 0.647$) with SD (1.03) and we would get $0.647 \times 1.03 = 0.666$; when multiplying the result by 100% it would give us 66.6%. This finding corresponds with Gulali; D. (2018) who found out that putting more efforts on organizational culture could lead to over half the increase in organizational performance.

Major Findings

The Purpose of this study was to determine the effect of workplace environment on employee performance in Ministry of Revenue. Mainly, findings of this study shows that majority of the respondents 83.5% perceive that the extent of employee performance at their organization needs improvements. As confirmed by respondents, the workplace environment in the study institutions needs some improvement in relation to providing job aids, establishing work incentives, creating conducive physical work environment, provision of performance feedback and strengthening the support provided by immediate supervisors to their subordinates.

On the other hand, analysis of inferential statistics indicates that the existence of significant positive relationship between employee performance and workplace attributes such as feedback performance, physical environment, job aids and work incentives. All study variables except physical work environment are significantly contributing to the variation of the dependent variable.

Recommendations

In light of the research findings the researcher made the following recommendations:

Recommendations for practice

- The Ministry of Revenue should ensure that the workplace environment is comfortable enough by conducting periodic assessment of employees' perception towards their workplace environment.
- The Ministry needs to set in place better reward system that motivates employees to work
- The ministry has to establish strong and periodic supervisory support and performance feedback.
- The ministry has to set clear procedures for employees towards their work to guide and facilitate performance.

Suggestions for further research

Based on the findings drawn from this study there should be a sequence after a while to find out if there are any changes that have occurred and a comparison with this data may be done to measure the extent of change or otherwise. A replicate study may be carried out in other areas of contract administration.

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Customer's Perspective on Green Banking In Mauritius

Eric V. BINDAH

University of Technology, Mauritius

LEENSHYA GUNNOO

University of Technology, Mauritius

ABSTRACT : The most essential concerns of the 21st century are environmental protection and sustainable ecological balance, which must be tackled by all functional domains. Due to global warming (GW) and climate change, the entire global economies are moving toward sustainable growth. Banks are the institutions at the heart of any economy, and as such, they are a major source of carbon emissions. However, banking operations do not pollute or dispose of hazardous materials but banks lend to companies and other firms that pollute the environment. So, the ecologically friendly notion of "green banking" (GB) has emerged to reduce banks' carbon emissions and footprints. Banks and the economy can benefit greatly from green practices (GP) and banks may do their part to make the world a better place by adopting them. While the launch of GB products is a positive step, it may not be enough and making sure that customers are aware of GB and its adoption, is crucial. Hence, the purpose of this study is to investigate customers' awareness and their views on adoption for GB by banks. Questionnaires were sent to individuals above 18 years old in order to get more appropriate responses. In total, 141 questionnaires were collected, and analysis was performed on those responses. After compiling the data, it became clear that the vast majority of respondents was unaware of GB. Moreover, the results showed that the GB concept diverged from the other academics' findings. For instance, respondents' awareness levels on GB did not vary significantly across age or educational categories. Nonetheless, the results showed that GB adoption has an unfavorable effect on brand image and financial performance (FP), and an insignificant relation with pressure from customers. Lastly, recommendations were made on three different fronts: for customers, for banks, and for the government.

Keywords : Green products, services and initiatives, online Banking, green mortgages and green loans, pressure from consumers, financial performance, Mauritius.

Introduction

Recent years have seen the financial sector embrace the notion of GB in an effort to slow down the rate of environmental deterioration (Tara et al., 2015). Climate change remains a major issue for developed and developing nations (Ngwenya and Simatele, 2020; Aslam et al., 2021). Located in the Indian Ocean to Africa's east, the Republic of Mauritius is categorized as a Small Island Developing State (SIDS) and the World Risk Report 2021 ranked Mauritius 51st in natural hazard exposure. Since "save the planet" has gained so much attention, businesses have a responsibility to take steps to protect the environment (Aslam et al., 2021). Therefore, it is not surprising that the banking industry has also caught the "green" bug.

GB, also called as ethical banking, environmentally friendly banking, or sustainable banking (SB), is a key strategy to banking and investing that involves addressing environmental, social, and governance issues, and managing bank operations for sustainability (Weber and Feltnate, 2016). Given that the banking industry is one of the main pillars of the Mauritius economy, it is clear that this sector plays a crucial role in preserving price stability and promoting orderly and balanced growth. Also, there are various banks providing green services in Mauritius, such as Mauritius Commercial Bank (MCB) and State Bank of Mauritius (SBM).

A country's banking sector is vital for long-term sustainability because of its unique role as a financial intermediary, which is necessary for getting money to go toward sustainability development (Alexander, 2014; Beck et al., 2010; United Nations, 2015; Yip and Bocken, 2018). Banks want to make money, but they have to do so in a way that benefits society. Hence, GB is the only way out as it reduces carbon dioxide emissions and improves sustainability (Ikram et al., 2019; Rehman et al., 2021) by encouraging eco-friendly behaviors. GB is an initiative by banks to encourage green growth in enterprises and rehabilitate the natural environment as it benefits banks, enterprises, and the economy. Many developed and developing countries have already triggered their activities on GB and why not Mauritius? However, are customers aware of green banks and its adoption in Mauritius? Hence, the purpose of this study is to try to establish a feasible response to the aforementioned question.

In order to slow down global warming (GW) and its effects from occurring, it is really important for individuals to be aware about GB and through this study's primary objective, we will determine whether or not Mauritian are aware of GB and its adoption. In Mauritius, there has not been a sufficient amount of research conducted on GB during the past few years and through this study, customers will have a better understanding of GB and will be able to communicate their thoughts on the matter. Customers need and must have a higher level of environmental awareness in order for them to be able to engage in these programs, help protect the environment and slow down GW. This study has the objectives of provide an explanation on the services and products available in GB by Mauritius's banks, determining the extent to which residents of Mauritius are aware of GB initiatives, investigating the projects of which Mauritian citizens are the most engaged, investigating whether education and age are important factors for awareness and investigating customers' views on why banks adopted GB.

Literature Review

As time passes, organizations' stakeholders have started to pay more attention to environmental issues. This means that all economic sectors need to adopt new business ideas that include environmental concerns in their daily operations (Han et al., 2019). Adoption of GB requires financial institutions (FIs) to implement GB practices across the board, including green operations, green buildings, green finance (GF), green information technology, green human resource management, GP and services, green marketing, green auditing, and green disclosure (Bukhari et al., 2019). A bank can adopt GB by ensuring its core operations and financing portfolio have the fewest environmental impacts and implies creating financial strategies that support environmental and economic growth (Gaikwad, 2020; Malsha et al., 2020; Tu and Dung, 2016).

The main reasons are that more and more people want products and services that are good for the environment and regulations are getting stricter (Risal & Joshi, 2018). Banks are now profiling their company practices and including environmental and social aspects in their business strategy (Weber, 2016). As environmental challenges deteriorated, banks produced creative, eco-friendly products and services.

Green products, services and initiatives

Every one of us may play a part in addressing the GW problem by focusing on eco-friendly activities (Deka, 2020). According to Miah et al., (2018), Shantha (2019), and Khan (2020), banks can provide sustainable services in two ways. First, use energy-efficient technologies like renewable energy to make the branch green. Banks offer paperless, internet, and low-paper services to reduce their environmental impact. Long-term growth comes from saving paper, energy, and banking carbon emissions (Zheng et al., 2021). The second method is non-destructive as this involves investing greenly. Green financing, as outlined by Kohn (2012), can help ecologically friendly investments in economies around the world by providing loans for green projects. The goal is to promote pollution treatment facilities and reduce greenhouse gas emissions. Among the many GP employed by FIs, are eco-friendly marketing, customer service,

and capital allocation. According to Tara, Singh, and Kumar (2018), GB includes a wide range of products and services, such as green mortgages, green loans, green credit cards, green bank deposits, green checking accounts, green money market accounts, internet payments, internet banking (IB), etc. Additionally, GB, marketing, and facilities that use renewable energy (solar energy) are also a few strategies that reduce the internal environmental impact of banking (Meena 2013; Garg 2017; Khan et al., 2016; Herath and Herath, 2020). Furthermore, GB uses cutting-edge technology, changes client habits, and improves bank operations to promote environmentally friendly banking and reduce its carbon footprint (Singh and Singh 2012; Bihari, 2015; Masukujjaman & Aktar, 2013; Thombre, 2011; Jha and Bhoomie, 2013; Mishra, 2013; Biswas, 2011). Moreover, FIs' GP and service development is strategic and commercial. Two GP and services and their environmental benefits are discussed below.

Online Banking

Gupta (2015) said, "Online Banking (OB) is very useful now". IB and MB (Mobile Banking) is a revolutionary and sustainable way to do business. It offers automated payments, electronic statements, and both online and phone banking. While the banking industry is becoming more computerized, networking and the availability of OB are naturally gaining ground. After the first COVID-19 pandemic in March 2020, OB and contactless payments grew popular in Mauritius, and they were ultimately put up in March 2021. In the world after the pandemic, digital payments have taken on a life of their own, and Mauritius is no different. Bills are paid electronically using IB apps like JuicebyMCB or the MB app by ABSA, among others.

Green mortgages and green loans

A green mortgage gives better rates or terms to people who buy homes that use less energy. (Malliga & Rewathi, 2016; Sudhalaksmi et al., 2014; Sharma et al. 2012; Silva, 2015; Kohn, 2012) For instance, with a green mortgage, buyers can add up to 15% more of the price of the house to the loan to pay for improvements like power windows, solar cells, geo-thermal heating, or water heaters.

According to previous studies, the adoption of GB practices is influenced by pressure from consumers (Bukhari, Fathyah, and Azlan 2019), better image (Laari et al., 2015; Lopez Rodriguez, 2009) and Financial Performance (Bag et al., 2020).

Brand Image

A more positive perception of the bank can be achieved through raising environmental consciousness among its target audience (Meena, 2013) and a company's environmental management practices boost its social legitimacy (Das et al., 2020; Dimaggio and Powell, 1983; Hart, 1995; Rizvi and Rana, 2012). According to a number of studies, implementing environmentally friendly policies can assist a company in maintaining its profitability while simultaneously enhancing its reputation. (Zhang and Yang, 2016; Zhang et al., 2022; Chen et al., 2022). For instance, the GB policy, as envisioned by the Central Bank of Bangladesh, is intended to boost the bank's reputation by demonstrating the institution's dedication to environmental preservation (Ahmad et al., 2013). Moreover, adopting GB practices can boost the bank's credibility and reputation in the community, especially its legitimacy in the eyes of its stakeholders (Bhattacharya and Sharma, 2019; Lymperopoulos et al., 2012; Meena, 2013; SBP, 2015; Dimaggio and Powell, 1983) and safeguard the institution's market value (David and Shameem, 2017). Hence, we propose the following hypothesis:

H₁: Adoption of GB will have a favorable effect on the branch's brand image.

Pressure from consumers

Since the organization is dependent on the particular stakeholder, there is an opportunity for the organization to exert coercive pressure. Hence, the demands of consumers have the potential to persuade companies to implement environmentally friendly solutions across a variety of business domains (Chu et al., 2019). Due to expanding customer knowledge of environmental issues and the role firms play in pollution, customer pressure for green management principles has increased (Ahuja, 2015; Bowman, 2010; Zameer et al., 2019). Furthermore, customers directly and indirectly affect a bank's revenue because the bank's survival depends on their business (Choudhury et al., 2013) and this sort of coercive pressure has the potential to positively impact the adoption of GB (Bose et al., 2017; David and Shameem, 2017). Consequently, the following hypothesis is put forward for consideration:

H₂: Pressure from customers will have a favorable effect on the adoption of GB practices.

Financial Performance

Administration has always prioritized financial achievement. Literature that was already available argued about the impact that environmental management initiatives have on FP (Zhang and Yang, 2016). There are other experts who argue that environmental management strategies lead to higher profit margins, thanks to the adoption of environmentally friendly products and practices (Vachon and Klassen, 2006; et al., 2012). Many other studies have found that environmentally friendly business strategies result in improved financial success (Ibe-enwo et al., 2019; Miroshnychenko et al., 2017; Akomea-Frimpong et al., 2021). Hence, **H₃** : The implementation of GB adoption has a favorable effect on FP.

Empirical studies on green banking at international level

Bankers' opinions have been studied (Masukujjama et al., 2016; Mehedi, 2017). Other studies have examined banker and consumer adoption (Bryson et al., 2016; Pillai and Raj, 2019; Deepa and Karpagam, 2018), practices and awareness.

As seen in the literature studies, various countries have established regulations, conventions, and concepts to incorporate GB principles into FIs. GB is vital to banks and requires greater engagement with people, environment, and social values (Lu & Herremans, 2019). Moreover, most banks both in developed and developing countries are still having trouble adopting this approach due to a lack of awareness and knowledge about GB among internal and external stakeholders, high adoption costs for green infrastructure and technology, a lack of green capabilities in banks, and a lack of research on GB adoption (IFC, 2015). Yet, there is a need to adopt GB. Since customers are key stakeholders, this study will assess Mauritius bank customers' awareness and according to them, did banks adopt GB under pressure from customers, to improve image and FP their views on adoption of GB by banks.

Methodology.

This study examines the factors impacting the views of GB customers and their impact on adoption. This quantitative dissertation uses primary data from 141 replies. This study used an online questionnaire which was delivered by Instagram, WhatsApp, and mail. A questionnaire asks respondents about their beliefs, actions, and viewpoints. Having thirty-two questions based on research goals and literature, an online questionnaire was used to determine how much Mauritius customers know about GB and its adoption as they are eco-friendly, faster and more convenient for respondents to answer. Instagram, WhatsApp, and mail were used to deliver the questionnaires.

This study uses non-probability sampling as it is a sampling method that considers characteristics other than randomness, such as availability, geographical closeness, and expert knowledge of the people one wish to investigate to answer a research issue. Moreover, convenience sampling will be

utilized to identify subjects near the researcher. People over 18 would be given questionnaires since they understand the concept of GB better.

To assess GB awareness and uptake, this study randomly selected respondents over 18 years old from various locations. For optimum results, 150 responses will be targeted. However, only 141 people responded to the survey. A number of statistical tests, such as reliability test using Cronbach's Alpha, the crosstabs, the Chi-Square Test, Pearson Correlation Test, and Regression analysis were performed with the help of the Statistical Package for the Social Sciences (SPSS), which was used to analyze the data and produce the results for these tests.

Findings

Demographics Profile

The gender distribution in Mauritius is female-dominated and it was found that 59.57% of responders were female. The majority of responders are 18–25 years old (38.30%), followed by 36–45 years old (23.40%). Above 56-year-olds responded poorly. It should be mentioned that all age groups received the questionnaire online. Also, 41.13% of respondents have degrees. 22.70% have a higher school certificate, 13.48% a postgraduate degree, and 9.93% a professional degree. It was assumed that the population questioned is literate. The vast majority of respondents belong to the working population, which accounts for 61.70% of the total. Several studies have taken the population of the major cities as a representative sample of the whole population (Ahmad and Allen, 2015; Javeed et al., 2020). 63.83% of urban and 36.17% of rural area were registered. Moreover, Vijai and Natarajan (2015) found no correlation between location and GB product awareness. The majority of Mauritian citizens use one of the two largest banks in the country, MCB and SBM to manage their financial affairs.

Also, 66% of respondents are aware of the potential climate change consequences for Mauritius in the absence of intervention to mitigate the effects of GW. As the population surveyed is a literate one, we can see that they are more aware of climatic impacts. Kala et al., (2020) examined the impact of GB Activities on bank's EP in Coimbatore City, Tamil Nadu's second largest city. The study found that environmental awareness, energy-efficient operations, and green initiatives had a significant impact on the environmental banking sector.

We notice that the percentage of Mauritians being unaware of GB is higher by 57.4%. This finding coincides with Paudel et al., (2019) who conducted a study on "Customers Perception on GB Practices," and they discovered that typical banking customers had a poor level of awareness of GB practices. Moreover, according to the research of Rajani et al., (2017), they suggested the bank should raise awareness as most consumers are unaware of GB's benefits.

Furthermore, most customers know their branch has a green building and provides eco-friendly web services. Clients also understand ongoing projects. For instance, respondents are vaguely aware that their branch offers green loans, discounts, environmentally good projects, and attempts to reduce paper use.

Also, the vast majority of respondents (73.57%) believe that banks are not doing enough to promote GB, while a minority (26.43%) believe that efforts are being made. Bhandari et al., (2022) studied "Customer Perception and Awareness of GB Practices" and found that banks and FIs should be able to educate customers about GB practices and their advantages in order to promote environmental sustainability in banks. Moreover, according to research by Sudhalakshmi et al., (2014), Indian banks are lagging behind in the adoption of this green phenomena since they have not made any significant attempts to promote GB.

We can further analyze that 62.41 % of population surveyed are aware that banks adopt GP in Mauritius. However, 37.59% were unaware of it. Moreover, Sahni et al., (2018) found that

adoption of GB services is affected by concerns such lack of awareness of GB services, data security, and other technology factors, inclination for face-to-face interactions, insufficient knowledge about transferring online, inadequate user friendliness, creating value, social and environmental concern, and convenience of use.

The vast majority of people are aware of IB, ATM, and green debit and credit cards, with respective percentages of 73.76%, 66.67%, and 27.66%. On the other hand, with regard to the other remaining GP, we are able to discern that customers are unaware. According to Bhuvaneswari et al., (2016)'s study on Customer Perception Towards GB, only 18% of participants are aware of green mortgages, while the majority are not which correlated the above findings. Moreover, study results from "GP Practices in Bangladesh: A Critical Investigation" by Hoque et al., (2019) show that few FIs have created comprehensive GP.

The majority of Mauritian individuals who were surveyed claimed they were aware of the SBM bill (45.39 %), the SBM Ecolan (34.04 %), JuiceByMCB (76.6 %), and MCB biodegradable cards (31.9 %). Customers, however, did have slight awareness with MCB green loans for photovoltaic and solar water heating systems. Customers will not spend money on something they do not understand, therefore it's vital to keep them engaged and knowledgeable. Moreover, Devkota et al., (2022) studied "Customer Perception and Awareness of GB Practices" and found that customers are favourable about banks' GPs and ready to adopt them.

It is also found that there are 84 females that are aware of the GP provided by MCB and SBM compared to males. This is similar to the study of Vijay (2018) as he also found out that female respondents have a greater knowledge regarding GP. When it comes to GP, IB/MB has the highest level of awareness among Mauritian consumers with 80.14%. OB, rather than physically visiting a bank, is cited as an example of GB in the study by Saravanaselvi & Sangeetha (2016) and as stated by Deepa & Karpagam (2018), it can aid in environmental protection.

Most of the population surveyed make use of IB and this finding correlates with those Ganesan et al., (2016) as they found that 98% of respondents use IB as part of their study on "Customer Perception of GB". Moreover, according to the study by Augusto & Torres (2018), they discovered that individuals are increasingly using the internet and online platforms in their daily lives.

It is observed that the respondents aged 18-25 years use IB the most compared to older people. The findings resemble to those of Torrão et al., (2019), where they found out that even though elderly find the banking apps interesting, they prefer face-to-face care.

bank customers strongly agree that IB enhances efficiency and profitability (58.16%), saves time and reduces pollution (75.89%), is useful (67.38%), lessens paper use (65.96%), and is a GP (51.06%). In general, Mauritians' opinions on IB are favorable, and many see it as a valuable green service. According to Wessel & Drennan (2010) and Gupta (2015), IB is paperless, cheaper, makes customers' lives easier, safer and uses less energy. Moreover, Sahni & Dhamija (2018) found out that IB also saves time and money by minimizing the number of journeys to the bank and the fuel use. However, Mauritians were hesitant to say IB is safe. Martins, Oliveira, and Popovic (2013) found that, despite the trend of using new technology in banking services, many clients are not confident with this new trend and favor to use the old ones due to risk, trust, and security concerns and this could be the reason why Mauritians hesitated to consider that IB safe.

Brand image

H_1 : Adoption of GB will have a favorable effect on the branch's brand image.

Table 1: Correlation of GB adoption*Brand Image

		Banks Adopting GB in Mauritius	Brand Image
Banks Adopting GB in Mauritius	Pearson Correlation	1	-.320**
	Sig. (2-tailed)		.000
	N	141	141
Brand Image	Pearson Correlation	-.320**	1
	Sig. (2-tailed)	.000	
	N	141	141
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS output

Table 1 shows the Pearson correlation between GB adoption and brand image. Though this relationship is being significant, it can be concluded that more GB adoption does not lead to a favourable effect on brand image as the correlation coefficient is weakly negative ($r = -0.320$, $p = 0.000$). Hence, H_1 is not supported. However, this is odd as several other researches have shown positive relationships. For instance, Ali Saleh Alshebami's (2021) research found a positive correlation between GB adoption and the green image of Saudi banks and suggests that the more GB practices are implemented, the better the banks' reputation will become.

Consumer pressure

H_2 : The pressure from customers will have a favorable effect on the adoption of GB practices.

Table 2: Regression analysis of GB adoption* consumer pressure

Hypothesis	Regression Weights	Beta (β)	R^2	F	p-value	Hypotheses supported
H_2	pressure from customers → adoption of GB	-0.100	.030	4.251	.041	No

Dependent Variable: Banks Adopting Green Banking in Mauritius

Source: SPSS output

The hypothesis tests if pressure from customers will have a favorable effect on the adoption of GB practices. The dependent variable banks adoption of GB was regressed on predicting variable pressure from customers to test the hypothesis H_2 as shown in table 4.18. Since the p-value is less than the beta coefficient, then there is sufficient evidence in the sample data to reject the null hypothesis for the full population. ($\beta = -0.100$, $p < 0.05$) Hence, H_2 is rejected. The above finding does not correlate with other studies. For instance, Bukhari et al., (2022) found that customers can push bank branches toward GB adoption in Pakistan.

Financial performance

H_3 : The implementation of GB adoption has a favorable effect on FP.

Table 3: Correlation of GB adoption*FP

		Banks Adopting Green Banking in Mauritius	Financial performance
Banks Adopting Green Banking in Mauritius	Pearson Correlation	1	-.104
	Sig. (2-tailed)		.218
	N	141	141
Financial performance	Pearson Correlation	-.104	1
	Sig. (2-tailed)	.218	
	N	141	141

Source: SPSS output

The Pearson correlation between GB adoption and FP is shown by in table 3. Since the correlation coefficient is weakly negative and not statistically significant ($r = -0.104$, $p = 0.218$), we may conclude that adopting GB does not have a positive effect on FP. H_3 is therefore unsupported. Given the positive associations shown in other studies, this finding is very intriguing. For example, Tria et al., (2021) found that GB daily operation, have a good effect on bank profitability. Since, this conclusion is negative and insignificant, it may be because GB is still poorly understood by Mauritians.

Furthermore, it is found that 109 respondents opted to educate workers and customers of banks so as to increase their knowledge and awareness on GB. Moreover, in their research, Vijai et al., (2015) concluded that there is a need to increase public understanding of GB practices and suggested that this could be accomplished by broadening the reach of GB seminars, workshops, and public meetings.

we can also analyze that most customers of 52.5% agreed that developed countries are implementing GB faster than underdeveloped ones. GB has garnered interest in developed nations, but underdeveloped nations have mainly ignored it (Weber, 2016; Jeucken, 2010; Khan et al., 2015; Roca & Searcy, 2012). According to the study of Amir (2021), his findings claim that developing countries lack GB studies and this could be because this concept has not yet been developed sufficiently. Hence, the concept must be explored and Sharma and Choubey (2022) also worried about GB research. Furthermore, from their study, Chandra and Sathiyabama (2020) noted that developing countries and Indian banks have not adopted GB methods.

Discussion and Conclusion

The results show that the Mauritians are aware of the potential climate change consequences of doing nothing to slow GW. However, just 42.6% of respondents knew what GB meant, and only 37.2% knew that it had been adopted in Mauritius. Furthermore, according to the results, only IB, ATM, and green debit and credit cards were often used by respondents across all six GP. Customers will not be interested in things if they do not know about them. Hence, in order for Mauritians to benefit from GP, it is the responsibility of the banking system and the government to educate the public about them. Nonetheless, according to the results of the surveys and tests performed, surprisingly, compared to other studies, age and education does not play a role in awareness of GB and GP. Since most customers in Mauritius are uninformed of this approach, they will not know if pressure from customers, better brand image, and FP led to the adoption of GB, which had an undesirable effect for this study.

Findings suggest that there is widespread unawareness among responders which led to unrelated hypothesis. Hence, customers' lack of knowledge about GP is a big factor in their reluctance to utilize them. In light of this, it is crucial that FIs organize events for their clients to increase their level of knowledge and empower them to take action to mitigate GW.

As can be seen from the questionnaire, participants were questioned on the most effective means of spreading knowledge. The replies show that the vast majority suggested holding sensitization campaigns as it involves two-way communication. Moreover, since there are three distinct demographic groups among consumers: the young, the working, and the elderly, in order to raise awareness about GB, it is necessary to tailor strategies to various demographics. For instance, educating young people in schools and colleges, and through social medias are the finest ways to raise awareness. Also, awareness programs and leaflets targeted toward the elderly would be useful. Another proposal that can be considered to raise awareness are hosting workshops for both staff and clients to promote GP and services.

Furthermore, in Mauritius, only MCB and SBM have innovated green loans to stay competitive. However, these two and others banks are behind other countries in innovation and the government of Mauritius has not taken the necessary steps to fix this problem or encouraged banks to use GB in Mauritius. Hence, the government and the BOM can take steps like penalize unethical bank green actions, establish a Green Banking Unit with committees to design, evaluate, and administer all GB issues to encourage all banks to start GB in a more innovative way, having a task-reviewing Audit Committee is also advised. Banks can also embrace foreign policies like the Green Coin Rating System,

And subsidize expensive GB products to encourage their use. If these recommendations are being implemented rightly, awareness will be raised and banks will be able to operate efficiently and sustainably as its customers will be making more use of GP when required. Moreover, when customers will be aware of GB, they will know why banks adopted GB in Mauritius.

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Critical Review of The Citizens' Channel Preferences And Level of E-Participation In Municipal Governance Process In Mekelle City Tigray; Ethiopia

Dr. Meresa Ataklt

Ph.D in Urban Planning and Development
from Ethiopian Civil Service University
(ECSU), Addis Ababa, Ethiopia.

Dr. Kanchan Singh

Department of Urban Planning and
Development (UPD), College of Urban
Development & Engineering at Ethiopian
Civil Service University (ECSU),
Addis Ababa, Ethiopia.

ABSTRACT : Nowadays international development agencies and scholars have recognized the need of citizens' participation in the governance process and performance. Inspire of this hard fact having an effective level of citizens' participation determined by a variety of factors; introducing e-participation and implementing of different channels' are among others. Thus, the purpose of the study was to assess the level of e-participation and the factors which determined the citizens' channel preference in municipal governance process in Mekelle city of Tigray, Ethiopia. Questionnaire, interviews and focus group discussions were employed for data collection. 382 Questionnaires were collected from ordinary citizens, 8 FGDs with CBO leaders were conducted and 24 interviews were accompanied with experts, middle, and top municipal managers. Thus, both quantitative and qualitative approaches were employed to triangulate the results. Cross-tabs, the Kruskal Wallis H and the Man Whitney U tests were used to analyze the data. The major findings were citizens' channel preference varies with respondents' age, gender, and income status and the results are statistically significant. But the city has not implemented all the offline and online participation channels to address the diverse needs of the local community. With all the potential for the e-participation, it was not fully explored and utilized.

Keywords: Participation, e-participation, Channel of participation, Channel Preference.

Introduction

Definition and the need for citizens' participation

Citizens' participation in the context of new public management is defined as "an interaction of public administrators and citizens, concerned with public policy decision and public service delivery process" (Callaha, 2007). In this regard, citizen participation is understood as having a direct impact on the public policy decisions and implementation at all levels, and citizens are regarded as an integral part of the governance process, significantly influencing important decisions affecting the community (Roberts, 2004). Countries all over the world are currently exploring collaborative public governance (UNDP 2010) and co-planning, implementing, and delivery of public services to better meet citizen's needs and preferences and leverage nongovernmental resources in the public governance process. This indicates that the government moves from governing for citizens to govern with citizens. Bovair, (2008) conducted a survey of municipal officials focusing on citizens participation and service delivery and they assert that the citizens' engagement in the public governance process leads to better public service which complies with the needs and priorities of citizens, decisions are made with better understanding, more affordable, better quality, more effective collaboration in using public tax money for the local service. Creighton, (2005:14) rule by the people is an accepted definition of participatory governance, it means that the people would have sufficient power to make and influence decisions on the issues that are of concern to them and it also improves public governance and local public service delivery process and performance. Studies from (Madumo, 2011:56) and (Archon Fung

2003) clearly revealed that citizens have better ideas than urban managers and city planners about the kind of services they need, so they can help service providers and planners better understand their requirements and identify solutions. A step ahead, research results from yet another study (Meresu, A. Kanchan. S. 2023), revealed that the effective citizens' participation has a significant positive impact on good municipal governance and service satisfaction. Their findings further revealed that there is a strong positive correlation between the levels of citizens' participation and citizens' perceived service satisfaction with an effect size of about 63.7% ($r=0.637$)

Public Participation Mechanisms

Public participation mechanisms are those approaches that the local government used in the citizens' participation process of consulting, involving, and informing of public concerns that matter citizens' welfare. Besides those mechanisms can also use by local governments, public opinions for the purpose of enhanced local governance and service delivery process and performance, (Raw and Frewer, 2000) and (Wang and Wart, 2007). In the present globalized world, public participation mechanisms can be broadly classified into two categories; which are conventional and technology-driven mechanisms, (Bagui, L., Weimann, P., & Johnston, K. 2016).

Participants' Channel Preferences

Scholars in the field of study agreed that selecting an effective channel of public participation is among the determining factors for the quality of participation process and performance; (Backley et al, 2005); such as, accessibility or availability of the channel to all public interest is among the prominent criteria for choosing an effective participation channel, hence, to come up with an optimal channel is the most challenging efforts of municipal managers and urban planners; indeed, there are some common indicators which municipal officials should consider in choosing the best tools in the participation process (Backley et al, 2005) states the cost of the channel, choice or interest of participants and overall skill and capacity of participants are among others.

Methodology used:

This exercise relates to assessing the level of citizens' e-participation and exploring the factors which determine the citizens' channel preferences in municipal governance process in Mekelle city of Tigray Region in Ethiopia. Determinant factors such as age (younger and older age groups), gender (male and female groups), and income (lower and higher income groups) of households have been used to explain the nature of variation with regard to choices of preferences. Similarly, use of social media, public hearing, and local radio has been used to assess the channel preferences of the respondents. Questionnaires, interviews and focus group discussions were employed for data collection. In all 382 Questionnaires were collected from ordinary citizens; 8 FGDs with CBO leaders were conducted; and 24 interviews were carried out with the experts, middle, and top level municipal managers. Thus, both quantitative as well as qualitative approaches were employed to triangulate the results. Cross-tabs, the Kruskal Wallis H and the Mann Whitney U tests were used to analyze the data.

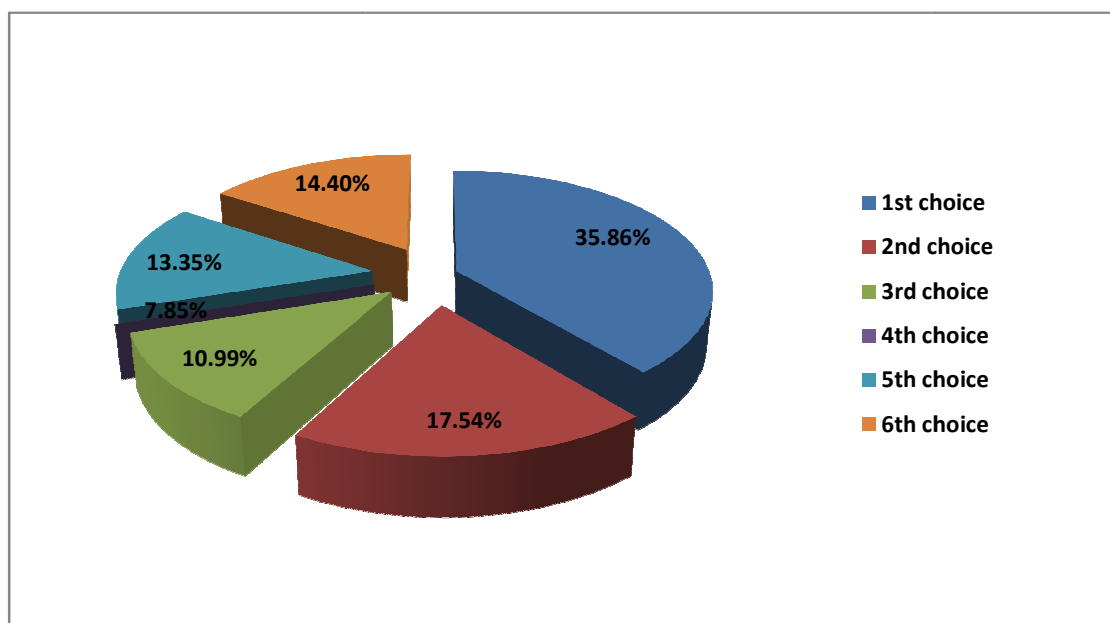
Results and discussions:

By utilizing the methodology explained, present study has identified citizens' choice of channel for participation. Results revealed that participation depends on the socioeconomic variables such as gender, age, and income. These are among the factors which had an impact on the citizens' level of channels choice for participation. It was asked from the respondents to rank their preference of tools for participation among internationally recognized six channels, namely: email, municipal webs, social media, local radio, public hearing (local meetings), and call centers. Accordingly, the participants' level of preference of public hearing, social media and local radio from the above mentioned six channels are as follows.

Social media as a choice of preference for public participation

As depicted in figure-1, of the total respondents, about 35.8% were preferring to social media as their first choice of preference, followed by about 14.40% who preferred social media as their last choice for participation. Respondents who preferred social media revealed that the reason for preferring it over the others was that it covers a large mass of residents at a short time. Additionally, it allows discussions among participants and with the decision makers. As a result, the platform is able to have an open dialogue which is transparent, and responsive to the good municipal governance process and effective performance

Fig- 1: Respondents' preference of social media as a channel of public participation.



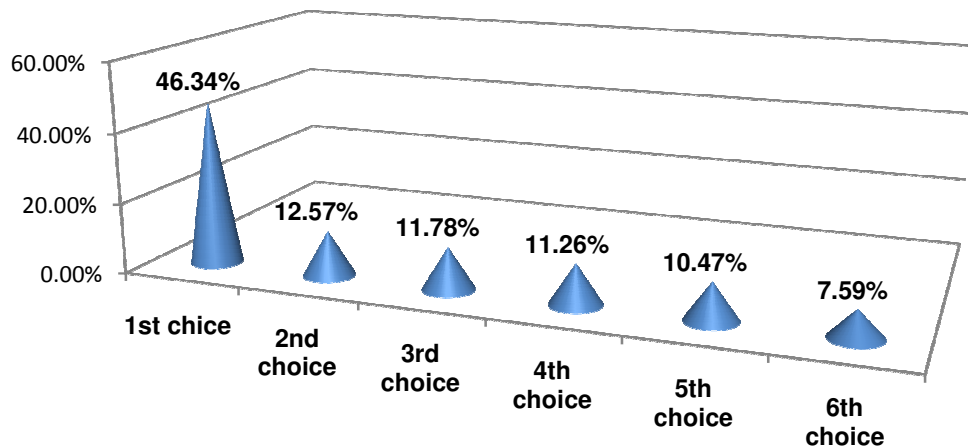
(Source:own: Survey 2021)

Public hearing as a choice of preference for public participation

Similarly, from the given six alternative channels for participation, as shown in fig 2, about 46.34% were preferring public hearing as their first choice and only 7.59% were choosing public hearing as their last preference of channel for participation. Thus, among the available participation platforms of the city, public hearing or local meetings is the most preferable participation tool in the municipal governance process; those participants who prefer public hearing for participation stated that their reason for preferring these from others, is that public hearing and local meetings enabled them to have a two-way communication among the participants. Additionally, it allowed us to reach on the spot consensus compared to the other channels.

These findings are in consistent with the research conducted in case of town Legos in Nigeria by (Ayodel Ibrahim and Ablodun Musbaudeen, 2015) on the issue of selecting public participation mechanisms. Researchers after having an in-depth interaction with five heads of traditional councils in the communities, revealed that face to face participation mechanisms prevails in the communities. This also supports for the (Arnstein, 1969 and Flyubjerg, 1998) clarifications of public hearings. According to those scholars, public hearings are the most ubiquitous form of public participation and serve an important purpose of transparency and accountability in the urban governance process.

Fig- 2: Respondents preference of public hearing as a channel for participation.

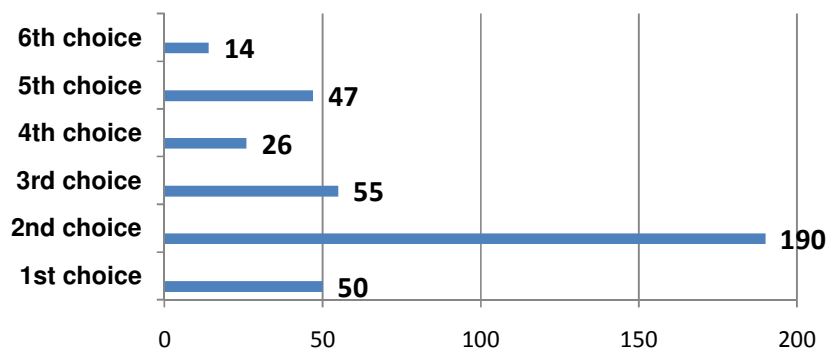


(Source; Own: Survey 2021)

Local radio as a choice of preference for public participation

Finally, local mass media especially the local radio is among the prominent types of channels of participation in most African municipal governance processes. Accordingly, as it is reflected in fig 3, about 13.09% of the respondents were preferring local mass media/ local radio as their first choice of preference and 3.66% were choosing it as of their last preference for participating in the municipal governance process. Respondents who preferred this channel asserted that their reason of preference is based on its relative accessibility to all socio-economic and demographic groups of the society and it also does not take participants time like that in public hearings.

Fig- 3 Respondents preference of local radio as a channel for participation



(Source; Own: Survey 2021)

Factors influencing ‘Citizens’ Channel Preferences’

Age and channel selection.

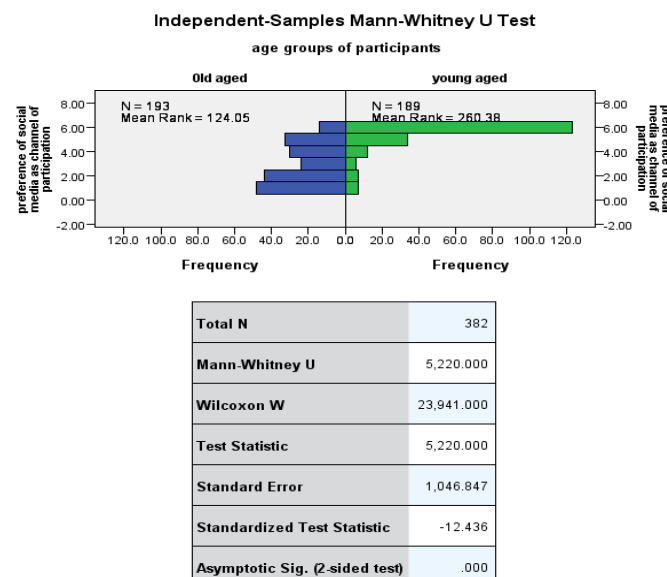
Age and social media as a channel preference

As indicated above the citizens’ preferences of channels for participation in municipal governance and service delivery process is different. In relative terms, public hearing has a higher rate of preference by ordinary citizens compared to others. Based on the survey results, age is among the determinant factors for the preference of channels of participation. For example, respondents from the young age groups, preferred more of the technology driven modes or digitalized participation channels like email, municipal webs, and other social media compared to the older age groups. This is also consistent with the findings of (ShaLae Steadma, 2013) in Provo city, Utah, in United States of America, that the youngest age group respondents were more interested in Social Media (24%), Email (24%), or having Online Discussions (22%) to express their opinions. This was contrasted with the older generations preferences in which only 6% of people were interested in Social Media.

The figure- 4 displays the Man Whitney U statistical test result. The outcome shows that the extent of young and old age group preference of social media for the participation; accordingly the mean rank of the younger age group is 260.38 whereas, the mean rank for the older age group is 124.05. Thus, (N= 382, df =1 test statistic= 5.22, and asymptotic p-value of 0.00, r= 0.63) with relatively higher effect size there is significant evidence to reject the null hypothesis and accept the alternative hypothesis; statistically, this indicates that the distribution of social media preference for participation in municipal governance and service delivery process is different across the age groups.

The interview result with the chairperson of the youth association supports the survey findings, the participants in the interview asserted that the younger age citizens are more familiar with all the ICT applications and as job seekers, they don’t want to spend much time with the offline channel of participation like the public hearing or local meetings.

Fig- 4: Man Whitney U statistical test result age groups and preference of social media as a channel for participation



Hypothesis Test Summary

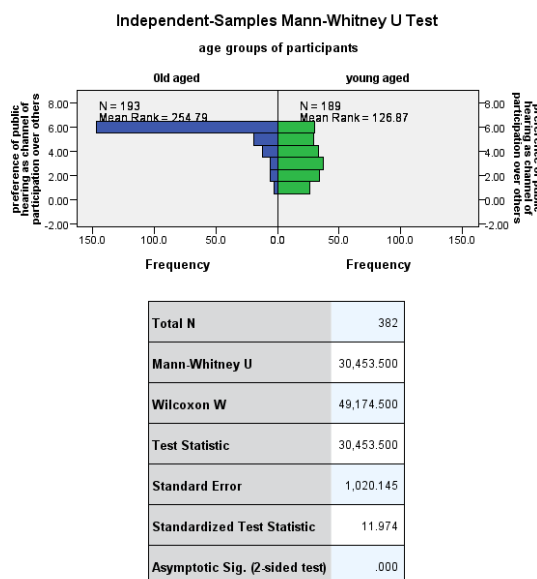
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of preference of social media as channel of participation is the same across categories of age groups of participants.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Age and public hearing as a preference of channel selection

The other internationally recognized public participation tool is public hearing; unlike social media, this type of channel of participation is highly demanded by the older age groups. Based on Fig 5. the Man Whitney U statistical test result has shown that the mean rank of the younger age group is 126.87 whereas, the mean rank of the older age group is 254.79; thus, (N= 382, df =1 test statistic= 30.45, and asymptotic p-value of 0.00, $r = 0.61$) with relatively higher effect size there is significant evidence to reject the null and accept the alternative hypothesis. It is justifiable enough to conclude that the distribution of preferences for public hearing participation in municipal governance and service delivery process is a different across the two age groups. As such, it is possible to generalize that old age group participants have a higher preference for public hearing compared to younger age group participants, as they (old age group) can afford to spend more time for that.

Fig- 5: Man Whitney U test results of age groups and preference of public hearing as a channel of public participation.



Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of preference of public hearing as channel of participation over others is the same across categories of age groups of participants.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

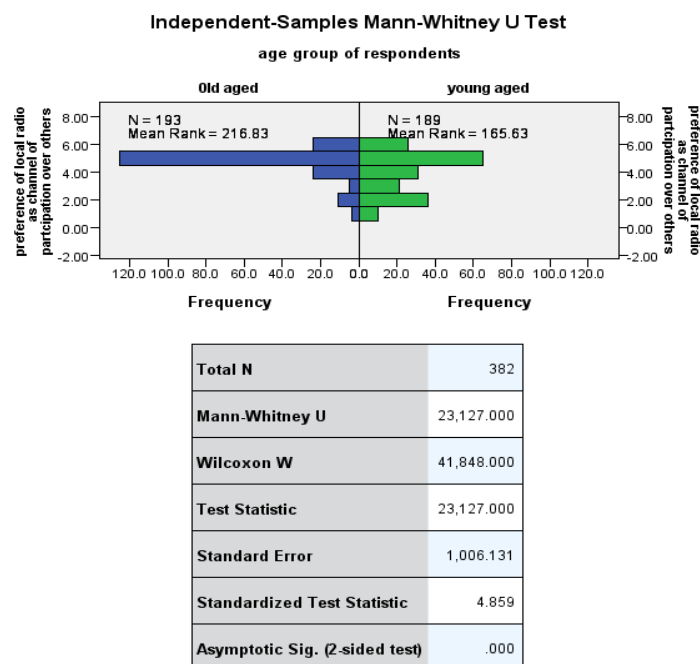
Asymptotic significances are displayed. The significance level is .05.

Age and local radio as a preference for channel selection

From the survey result of 189 younger age groups about 91 or 48% were responding that local radio as their first and second choice for channel of participation. Similarly, of 193 participants from old age groups about 149 or 77% were responding that local radio remains thier first and second choice in the participation process. Thus, it is clear that the older age group preferred local radio as a channel of participation as compared to the young age groups. Therefore, the the Man Whitney U test has been conducted to show how the difference is significant.

Accordingly, as is indicated in figure -6, the mean rank for the old age group was 216.83 and the mean rank for young age was 165.63; thus, (N= 382, df =1 test statistic= 23.12, and asymptotic p-value of 0.00, r= 0.24) hence, with the moderate effect size there is significant evidence to reject the null and accept the alternative hypothesis. It is rational to conclude that the distribution of preference for local radio as a channel for participation in municipal governance and service delivery process is deferent across the two age groups. Further, local radio is relatively more preferred choice of older age group participants as they have been ever since connected to radio since childhood.

Fig- 6: Age groups and preference for local radio as a channel of participation

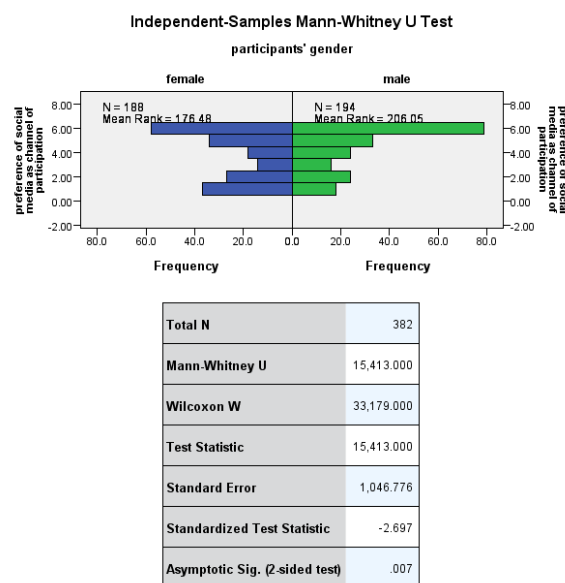


Gender and channel selection

Gender and social media as a preference for channel selection

The other demographic variable, for which assessment has been made regarding its effect on citizens channel selection, is the gender. as indicated in Fig 7 the Man Whitney U statistical test result indicated that the mean rank for males participants was about 206 while, the mean rank for females was 176.48. Thus, (N=382, df=1, analysis result=15.41, and asymptotic pvalue=0.07, r=0.13); this indicated that despite the difference between two groups being small, there is a statistical evidence to reject the null hypothesis.

Fig -7: Gender and social media preference as a channel for participation



Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of preference of social media as channel of participation is the same across categories of participants' gender.	Independent-Samples Mann-Whitney U Test	.007	Reject the null hypothesis.

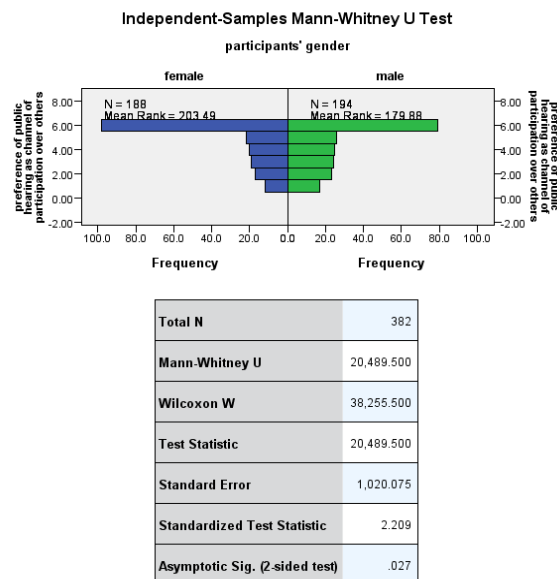
Asymptotic significances are displayed. The significance level is .05.

Gender and public hearing preferences.

As indicated above, public hearing is among the prominent channels of citizens' participation in municipal governance and service delivery process. Unlike social media, which is relatively preferred by all the gender groups, the public hearing was more preferred by females. As shown in figure -8, the Mann Whitney U statistical analysis, results have indicated that the mean rank for the male is 179.88 whereas, the mean rank for female is 203.49. Thus, (N= 382, df =1 test statistic= 20.48, and asymptotic p-value of 0.00, r= 0.11). Though the difference is small, there is significant evidence to reject the null hypothesis and accept the alternative hypothesis. It is justifiable enough

to conclude that the distribution pattern of preference in case of public hearing for participation in municipal governance and service delivery process is different across the two gender groups. Relatively, female participants have a higher preference of participation in case of public hearing compared to their male counterparts.

Fig- 8: Gender groups and preference of public hearing as a channel for participation



Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of preference of public hearing as channel of participation over others is the same across categories of participants' gender.	Independent-Samples Mann-Whitney U Test	.027	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Gender and local radio preference

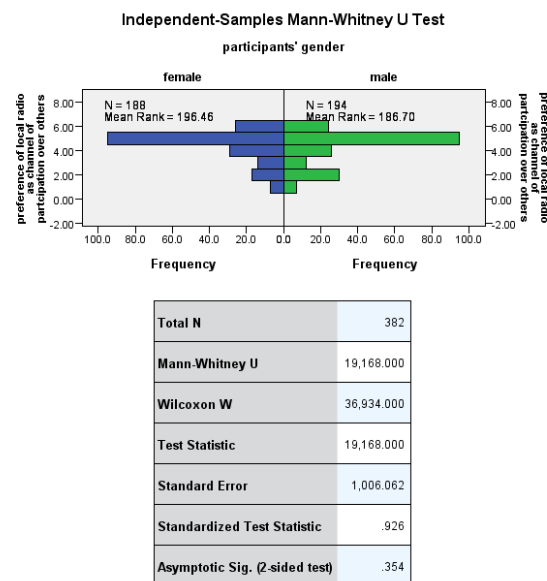
Based on the survey result of 194 male respondents about 119 or 61.13 % were responding that local radio as of their first and second choice of channel of participation; similarly, of 188 female respondents 121 or 64.36% were responding that local radio ranked as of their first and second choice in the participation process. Thus, it is clear that the choice of local radio as a channel of participation between males and females was relatively similar; therefore, the researcher conducted the Man Whitney U test to show how the difference is significant.

Accordingly, as is indicated below the mean rank for the male was 186.70 and the mean rank for the female was 195.45; thus, (N= 382, df=1 test statistic= 19.16, and asymptotic p-value of 0.35, r= 0.04) hence, there is no significant evidence to reject the null and accept the alternative hypothesis; and it is rational to conclude that the distribution of preference local radio as a channel

for participation in municipal governance and service delivery process is not different across the two gender groups.

The FGD result also supports the survey findings; participants in the FGD process agreed that local radio is a prominent channel of participation in the local governance process and which is relatively preferred by all socioeconomic and demographic groups of the society because it is a more accessible, informative and entertain able mode of participation.

Fig- 9: Gender groups and preference of local radio as a channel for participation



Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of preference of local radio as channel of participation over others is the same across categories of participants' gender.	Independent-Samples Mann-Whitney U Test	.354	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Income level and channel selection

Income level and social media as a preference for channel selection

The other important economic variable that the researcher assessed its effect on citizens channel selection is participants' income level, as indicated in table 1 below the Kruskal-Wallis H statistical test result indicates that the mean for the poor is 164.11, for low income is 210.29 and for the middle and high income group is 192.86 thus, (N=382, df=2, analysis result=9.446, and asymptotic pvalue=0.009,); this indicated that there is statistical evidence to reject the null hypothesis and it is justifiable to conclude that the distribution of social media preference for participation is not the same along the three layers of income groups

Table- 1: Citizens' Income level and preference of social media for participation

Ranks			
	colapsed average income	N	Mean Rank
preference of social media as channel for participation	Poor	117	164.11
	low income	176	210.29
	middle and high income	89	192.86
	Total	382	

(Source; Own Survey 2021)

Test Statistics^{a,b}	
	preference of social media as channel of participation
Kruskal-Wallis H	9.446
df	2
Asymp. Sig.	.009
a. Kruskal Wallis Test	
b. Grouping Variable: colapsed average income	

Income level and public hearing as a preference for channel selection

Similarly, the researcher has been assessed the preference of public hearing for participation across the three layers of income; as indicated in table .4 below the Kruskal Walis H stistical test result shwes that that the mean for the poor is **158.34**, for low income is **213.39** and for the middle and high income group is **202.47** thus, (N=382, df=2, analysis result=**17.665**, and asymptotic pvalue=0.00); hence, there is statistical evidence to reject the null haypothesis and to conclude that the distribution of public hearing preferences for participation is not the same along the three layers of income groups

Table-2 : Citizens' Income level and preference of public hearing for participation

Ranks			
	colapsed average income	N	Mean Rank
preference of public hearing as channel of participation over others	Poor	117	158.34
	low income	176	213.39
	middle and high income	89	202.47
	Total	382	

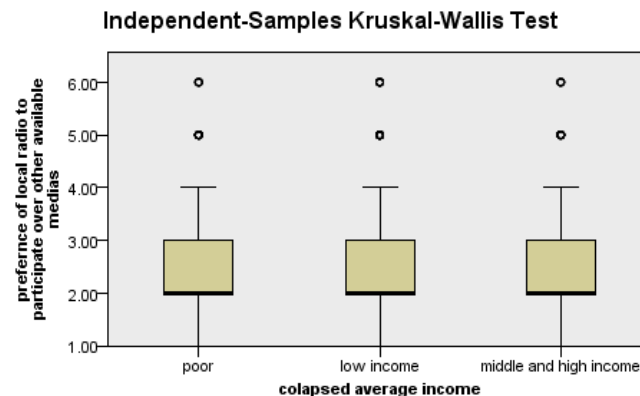
Test Statistics^{a,b}	
	preference of public hearing as channel of participation over others
Kruskal-Wallis H	17.665
Df	2
Asymp. Sig.	.000
a. Kruskal Wallis Test	
b. Grouping Variable: colapsed average income	

Income level and local radio as a preference for channel selection

Similarly as indicated in Fig 10 below the Kruskal Walis stistical test result shwes that (N=382, df=2, analysis result=1.618, and asymptotic pvalue=0.445), this indicated that there is no

significant evidence to reject the null and accept the alternative hypothesis; and it is confident enough to conclude that the distribution of preference local radio as a channel for participation in municipal governance and service delivery process is not different across the three income level groups

Fig- 10: Citizens' Income level and preference of local radio for participation



Total N	382
Test Statistic	1.618
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.445

1. The test statistic is adjusted for ties.
2. Multiple comparisons are not performed because the overall test does not show significant differences across samples.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of preference of local radio to participate over other available medias is the same across categories of colapsed average income.	Independent-Samples Kruskal-Wallis Test	.445	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Level of e-participation in the Urban Governance Process

Linders, D. (2012) defined e-Participation as: “efforts to broaden and deepen public participation by enabling citizens to connect with one another and with their elected representatives and governments, using ICTs”.

Nowadays, online citizen participation is well recognized all over the world. According to the United Nations, 2016 report South Korea is acknowledged as one of the leading countries in the area of online participation. As cited by (Kim, S., Lee, J., & Lee, J., 2018). One of the online programs in the city of Seoul received the service innovation awards from the United Nations in 2009.

Basically, this also greatly supports the e-participation and e-governance theories. Surprisingly implementing this new important theory in the study area has great potential: first as the survey result indicated that about 63% of the respondents were high school and above school level; second as table 1 below shows about 67.5% of the survey respondents are currently using social media, but the municipal institutions have no any online connection with the ordinary citizens.

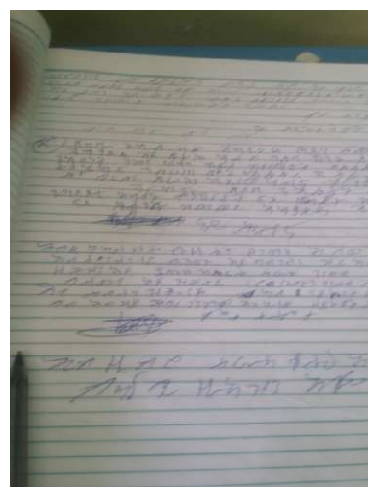
This is also not consistent with the research finding in Korea of (Seol: Jong Youl Lee, 2003) cited from another study that measured Seoul's Internet penetration at 67.1 percent in 2000. In that year, there were 10,566 cases of ordinary citizens using the Internet for interactions with the government in the municipal governance service delivery process. That number increased to 24,620 in 2001. These interactions were carried out on the Web site, [www. cyber.Seoul.kr](http://www.cyber.Seoul.kr). Similarly, the study result of (Goyane Sargsyan, 2016) in Armenia's city of Yerevan indicates 68% of respondents were replying that they got government information online daily.

As shown in the figure -11, the municipal institutions in the study area have been trying to collect citizens' feedback regarding their governance and service delivery process and performance through suggestion boxes and books which are not accessible to most of the residents. The Municipal report of 2020 for the city of Mekelle indicates that there were only four cases or citizens' feedback they could get through this suggestion boxes. The boxes are not only a problem of accessibility, but also the ordinary citizens have no confidence that voices will be heard. Hence, most of them are unwilling to give their feedback using those boxes.

The CBOs and CSOs leaders who participated in the FGD have strongly criticized the process and performance of using the books and boxes for gathering citizens' feedback in the municipal governance and service delivery process; especially the chairperson of the disabled association states that 'how an unsighted citizen' can participate in such a channel of participation. The observation reflected in figure-11 indicate some of the citizens' currently used suggestion boxes and books of the municipal institutions.

Fig- 11: Suggestion boxes and books used by the municipal agencies to collect public feedback.





(Source; Own: Picture 2021)

The table-3 indicates that of the total respondents 258 or 67. 5% were replying that they have any of the social media account, and this indicates that if the municipal government employed the e-participation, as a channel of participation, it has a great potential to upscale the peoples' participation and improve the overall municipal governance for improved service delivery and peoples' satisfaction.

Table 3: Frequency table of participants' social media usage

Respondents extent of usage of social media					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not use	124	32.5	32.5	32.5
	Use	258	67.5	67.5	100.0
	Total	382	100.0	100.0	

(Source Own survey 2021)

As indicated in table-4 that from the total respondents, 204 or around 53% preferred social media as the first and second choice of channel for participating in the municipal governance process. Similarly, from those 204 respondents, who have to prefer social media as a channel of participation, 123 or 60.29 were young-aged respondents.

Whereas the actual performance of using the online/digital channel, as an effective tool in the participatory municipal governance and service delivery process of the city, is viewed as more of problematic nature; it has not just started. Of the total survey respondents, less than 3% are known to have any idea of the municipal online accounts like municipal websites. Hence, this is not aligned with the e-governance and e-participation theories.

This is also not consistent with the study result of the Kisumu county of Kenya by (Kimutai, Gilbert Kiplimo, Aluvi Patrick Amisi 2018) where 22% of the government officials interviewed agreed that the county website plays a key role in facilitating citizens' participation in governance of the city. As the officials asserted, the county has a fully functional website. Besides, disseminating critical information by the county government, the website also provides an interactive platform for the citizens to engage in the overall governance and service delivery processes that affect their daily lives.

Based on the interview and FGD results, the main reasons that the ordinary citizens and officials have reflected for the poor level of performance of e-governance in general and e-participation, in

particular, were the poor utilization of ICT infrastructure, poor skill development and above all the lack of commitment of the government officials. Accordingly, the study results of (Laban Bagui, Peter Weimann, and Kevin Johnston 2016) have asserted that e-participation in Sub-Saharan Africa is still in its infancy, but it is not certain even its birth in the study area. Concerted efforts are needed to up scale the community participation in planning through different channels for governance to achieve the target of urban good governance particularly for service delivery and peoples' satisfaction.

Table -4: Respondents' preferences for social media as a channel of public participation

Preference of social media as a channel of participation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sixth-choice	55	14.4	14.4	14.4
	Fifth-choice	51	13.4	13.4	27.7
	Fourth-choice	30	7.9	7.9	35.6
	Third-choice	42	11.0	11.0	46.6
	Second-choice	67	17.5	17.5	64.1
	First –choice	137	35.9	35.9	100.0
	Total	382	100.0	100.0	

(Source; Own: Survey 2021)

Conclusions & suggestions

The citizens' channel preference varies with respondents' age, gender, and income status and the results are statistically significant. But the city has not implemented all the offline and online participation channels to address the diverse needs of the local community. With all the potential for the e-participation, it was not fully explored and utilized. It is, therefore, suggested that the city authorities need to be more people friendly to encourage them to participate in urban governance through digital and off line modes to avoid delays in communication besides saving time, energy and money for better outcomes.

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Saving Practice Among Micro And Small Enterprise Operators In Addis Ababa: Inter Sector Comparison In Yeka Sub City

Sofoniyas Mekonnen

Consultant

Center for Public Financial Management Training and Consultancy
Ethiopian Civil Service University,
Research and Publication Coordination Office
Addis Ababa, Ethiopia, Africa

ABSTRACT : The purpose of the study was to examine the Saving Practice among Micro and Small Enterprise Operators in Addis Ababa Yeka Sub city. The study was guided by the following specific objectives: to identify the determinates of saving practice of micro and small enterprise operators, to compare the saving practice among micro and small enterprise operators of each operating sectors, to determine the relationship between financial literacy and saving practice of micro and small enterprise operators, and to find out the challenges of micro and small enterprise operators face in saving. A descriptive quantitative research design was used for the study, which focused on the 5048 MSE operators of Yeka Sub-city. A sample of 370 operators from the population was conveniently sampled. The completed questionnaires were keyed in the SPSS statistical software and data analyzed for descriptive statistics. In addition focus group discussion was conducted. The study measure the saving practice of the operators using five measurement factors which are saving behavior, financial literacy, peer influence, self-control and spending habit. Furthermore, the researcher establish the effects of gender, age, level of education, marital status, operating sector's, work experience and income range on the saving practice. The findings conclude that these factors strongly influenced the saving practice of the operator's. Moreover, manufacturing and construction sectors operator's has relatively good personal saving practice compared to other operating sectors and the results indicate that majority of the respondents save less proportion of their income. This can be attributed to the high cost of living and individual's financial discipline. In conclusion low income, inflation and distance between individual and financial institutions are the basic challenges for the saving practice of the operator's. Based on the research findings, the researcher recommends the Yeka sub-city better to organize training programs to their MSE operator's so as to improve their saving practices. From the research findings, the government is advised to initiate subsidy programs that will lessen the cost of living and cultivate a culture of savings and investment among its citizen. The study further recommends that individuals should develop a comprehensive saving and investment plans backed by prudent spending habits.

Key words – saving, saving practice, micro and small enterprise

Introduction

Innovations within the current technological banking has make millions of people in the world now have access to financial services. But, most of these individuals are not ready to cooperate with the growing complexities of financial products and services. From Lusardi & Mitchell (2014), results from both developed and developing countries indicate low financial literacy level, low skills and knowledge on basic individual financial management concepts and banking practices. Research connects financial education to savings outcomes in both advanced and developing nations. Bruhn et al. (2016), look at financial education which has been included in high school curriculum in Brazil and report an impact on financial literacy, attitudes, and change in behavior. Gibson et al. (2022), also looks at the effect of financial education on saving in Indonesia and find no substantial effect on savings behavior.

Savings means different things to different individuals from different economic status. To a group of people, saving is keeping money in a bank. To other it means buying stocks, securities,

jewelries, real properties, pension plan or insurance. People sometime believe that individual with high incomes save more than those with small income but this is not true (Karlan et al., 2013). From Fabiana and Fadul (2019), the three main motives for which individuals demand money are; transaction motive- for current transaction of the people; precautionary motive-for meeting unforeseen or unpredictable contingencies; and speculative motive- for the purpose of financial gain. Precautionary and speculative purposes induce people to save money.

The Ethiopian rate of national saving particularly the individual saving is expected to be very low and this low level of national saving is expected to limit the expected rate of economic growth of the economy (MOFED, 2012). According to Ministry of Finance and Economic Development (2010), one of the major challenges encountered in the past five years of GTP II implementation is low level of domestic savings to support the huge demand of the country's investment for accelerating growth and development in the process of eradicating poverty. The national saving was 9% of GDP at the beginning of the growth and transformation plan in 2010/11. Because of the low level of saving, the national investment of the Ethiopia is dependent on foreign direct investment rather than domestic investment. Though, foreign direct investment has paramount importance on Ethiopian economic growth and development, its importance is less than the domestic investment.

Micro and Small Enterprise operators in Ethiopia participated in five operating sectors which are manufacturing, service, trade, and urban agriculture and construction operators. The sector contribute significantly to the national economy by easing poverty through income generation, contributing to the socio-economic by empowering women, employment creation, contribution to the gross domestic product (GDP), being vanguards of industrialization and core pillars for economic and structural transformation by promoting saving and capital accumulation. Until recently, governments of developing countries, the development communities and development agents have never given the MSE sector apposite recognition and support from the Ethiopian government (Bekele & Worku, 2008). Besides, the MSE sector in Ethiopia faces several constraints that hold back its rapid growth and development and therefore reduce the weight of its potential contribution to the national economy (Dagne, 2017). In recent years, the Ethiopian government has articulated strategic policies to promote and support micro and small enterprises. As it has been an instrumental implementation stage of the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) (2005/06-2009/10). Besides, it is succinctly outlined in the Growth and Transformation Plan (GTP) (2011-2015/16) that this sector shall continue to play a critical role in achieving the GTP's envisaged objectives.

According to the Maps world of finance, saving behavior is defined as an understand on how people save in a country in order to realize the economic condition of that country. It is normal facts that if people are saving more, the levels of their personal disposable income are increasing as well. The study conducted in Kenya by Amponsah (2015), the following factors are likely to influence savings behavior: government monetary and fiscal policy, social security system, and economic growth, development of financial market, terms of trade, macroeconomic stability, demographics and financial literacy. The saving culture of the Ethiopian MSEs operators are low (GFDRE, 2016). MSEs shall be encouraged to make their own savings and contribute to their start-up capital. Assefa (2018), stated as the saving behavior of the operators needs an improvement through providing personal financial management training, creating awareness, and easily access financial services.

Therefore, this study were undertake to address the important aspects of saving practice of Micro and Small Enterprise operators and made comparison the five operating sectors (manufacturing, service, trade, and urban agriculture and construction operators) of Addis Ababa Yeka Sub City.

Statement of the Problem

A well institutionalized savings provide several benefits for the individual (Loayza et al., 2000). These benefits include interest earn on incomes, induce investment purposes, building of credit rating and as collateral security, achieve the feeling of self-reliance, security for the family. Saving plays important role for the MSE operators to overcome shocks and vulnerabilities. This can be substantiated by Steinberg, (2004), concluded that the ability to accumulate or access finance capital helps to smoothen consumption and cushion the poor against shocks(Steinberg, 2004). According Misztal (2018), the growth in savings also stimulates economic growth and development (as a whole) through investment. Even though MSE operators benefit from savings, most operators still do not access proper financial services. This is because most of the financial institutions are inaccessible in terms of proximity, time and procedures needed to complete transactions which are too much for MSE operators. The Ethiopian government has designed and implemented a National MSE Development Strategy in 2016 which facilitates the growth of the sector. However, the sector continues to perform below expectations due to various challenges including limited access to finance, poor saving behavior, lack of appropriate working premises and low quality business development services (BDS). Poor savings behavior be deviling micro and small scale business operators, they are faced with poor access to loan (Lanka, 1985). Recently savings is becoming a priority in the Ethiopian development agenda (MOFED, 2012).

The financial management and saving-related awareness of most MSEs operators in Ethiopia is generally low and they lack favorable attitudes (National MSE Development Strategy 2012). Concerted efforts exerted to ensure that enterprises will promote their saving culture, strengthen their own initiatives, enhance their entrepreneurial skills and create work attitudes that are free from dependency syndrome. A working mechanism implemented to facilitate access to startup capital, for those who have an interest to establish MSEs. As a prerequisite such people shall be encouraged to start their own savings. Those with their own savings shall be given priority to access loans from financial institutions (GFDRE, 2016).

Most of MSE operators in Addis Ababa had only small amount of monthly income that hinders to save money (Assefa, 2018). However, study conducted by Karlan et al. (2013), to find the difference among the high and low income earners in terms of savings shows that, those who have low income, it does not imply that they are unable to save at all. Saving is very essential and there is a lot of evidence to demonstrate its benefits to individuals and households, not excluding low income earners (Chowa et al., 2012).

Therefore, this study were investigate the existing saving practice of MSEs operators, the major possible factors which are expected to influence individuals saving and the role of concerned bodies in mobilizing saving in the case of Addis Ababa Yeka Sub City.

The general objective of study is to examine the saving practice of Micro and Small Enterprise Operators in Addis Ababa Yeka Sub city. The following are the specific objectives of this study:

- To identify the determinates of saving practice of micro and small enterprise operators
- To compare the saving practice among micro and small enterprise operators of each operating sectors.
- To determine the relationship between financial literacy and saving practice of micro and small enterprise operators
- To find out the challenges of micro and small enterprise operators face in saving

Materials and Methods

Research Approach

In this study the researcher have used concurrent triangulation mixed strategy. In concurrent triangulation strategy, both quantitative and qualitative data collected simultaneously and the qualitative data used to triangulate in the quantitative data during the analysis.

Research Design

The study used descriptive and explanatory research designs to determine the saving behavior of micro and small enterprise operators. According to Moronge (2016), descriptive research design determines and reports the way things are. He suggests that, the design describe possible behavior, attitudes, values and characteristics. The explanatory research design also refers to as analytical research design aims at identifying the causal links between the factors or variables (financial literacy and saving behavior) that pertain to the research problem.

Source of Data

Registered operators of micro and small enterprise data are available in the sub-city micro and small enterprise office. The primary data gathered from the sampled Micro and Small enterprise operators. The data relevant to the issues of the study collected using questionnaires. Then the questionnaire translated in to Amharic language for easy understanding of the respondents by the researcher prior of distribution. In addition, the researcher used focus group discussion with the sampled to obtain the necessary information. The secondary data collected from different manual, reports and strategic plan documents of micro and small enterprise office.

Data Collection Instrument

The researcher was use survey to collect information from respondents by asking questions in order to describe the characteristics of the population-sample. There is direct administration of questionnaires to ensure that respondents who need assistance in answering the questionnaires get them. The questionnaire is made up of both open-ended and closed-ended questions. Open-ended questions are to allow the respondents the freedom to express themselves in their own way and in their own words. The closed-end is to give the respondents alternative. Also the researcher conducted focus group discussion (FGD) with 3 groups of MSEs operators and interview conducted with officials of the sub-city.

Population of the Study

Due to the location advantage the researcher select operators of Micro and Small Enterprise of Yeka Sub-city of Addis Ababa are the target population. According to the data of the sub-city micro and small enterprise office (January, 2020) the total population represents 5048 Micro and Small enterprise operators

Sample Size and Sampling Technique

In order to take a sample form this number the researcher will use Yemane (1967) sampling formula using 95% of confidence interval.

$$n = \frac{N}{1 + N(e^2)}$$
$$n = \frac{5048}{1 + 5048(0.05)^2}$$
$$n = \frac{5048}{13.62}$$
$$n = \underline{\underline{370}}$$

Where: n=sample size

N=target population

e=margin of error (5%)

The sample size was systematically distributed for the five operating sector MSE which are manufacturing, service, trade, and urban agriculture and construction operators. The questionnaires will be distributed randomly for each operating sectors. Finally, the researcher was conducted focus group discussion (FGD) with 3 groups of MSEs operators.

Data Analysis

The quantitative data is analyzed through descriptive statistics which comprise of frequency tables, mean and standard deviation. The data is presented using tables for ease of comparison and understanding. Qualitative data is analyzed using content analysis techniques and coded for entering into Statistical Packages for Social Science (SPSS). The study also uses multiple regressions to establish the relationship between financial literacy and saving behavior.

Data Presentation and Analysis

Introduction

The purpose of this study was to examine the Saving Practice among Micro and Small Enterprise Operators in Addis Ababa Yeka Sub city. This chapter presents the study results and findings in the form of figures and tables.

Response Rate

Out of the three hundred seventy (370) questionnaires sent to the target population, three hundred two (302) usable responses were collected representing a 81.6% response rate implying 18.4% of the questionnaires were not returned at all. Despite this, the target population was fairly represented considering that key personnel who are relevant to the study were reached. It is considered that a response rate of anything over 30 percent in a survey is acceptable (Creswell et al., 2007).

In addition, the data were collected from the MSE operators using focus group discussion (FGD).

Data Reliability

Before proceeding to analyze the results found from the questionnaires the reliability are checked using SPSS software. Cronbach's α (alpha) (Cronbach, 1951) is a coefficient of reliability. It is commonly used as a measure of the internal consistency or reliability of a psychometric test score for a sample of examinees.

The five factors were saving behavior, financial literacy, peer influence, self control and spending habit. Each factor was assessed for reliability using Cronbach's α . As cited by Tavakol & Dennick, (2011) the reliability coefficients of the factors, along with the measures of saving practice, exceeded the value of 0.5 recommended by (Peterson, 1994). Therefore, each of the factors and the related items are analyzed and interpreted.

Demographic Profile of the Respondents

The majority (71.9%) of the respondents were male while female represented 28.1% of the respondents who participated in the study. Furthermore, majority (65.4%) of the respondents indicated they were between 26 to 35 years of age, 22.9% were between 36 to 45 years, 6.4% between 25 and below years while only 5.4% of the respondents were 46 and above years of age. From the result, majority (49.5%) of the respondents' level of education is up to grade 12, 25.1% had diploma level of education and 21.4% of the respondents had degree and the remaining 4.0% of the respondents had masters and above level of education. From the result, majority (62.4%) of the respondents are married, and 37.6% of the respondents are unmarried. Out of three hundred

two (302) of respondents 180 (59.7 %), are involved in trade, service and urban agriculture and the remaining 122 (40.4%) involved in manufacturing and construction sector. Finally, from the findings, majority (62.0%) of the respondents has a work experience between 1 to 5 years, 14.6% had between 6 to 10 years, and 14.6 % had below 1 year. This implies that most of the respondents who participated in the study have been work for one up to five years in their respective areas.

Personal Saving Practice

The majority (59.0%) of the respondents reported a monthly income of between Ethiopian birr 500 and 2000, 20.0% reported between 2000 and 5000, 16.6% reported an income of 5000 to 10000 and 4.5 % above 10000. Besides, majority (83.4%) of the respondents said they had a saving plan that could sustain their recurrent expenditures in case of loss of employment while 16.6% reported lack of such a plan. Moreover, the above results shows that, majority (47.8%) of the respondents sustain their saving in case of loss of employment is 0-3 months , 22.9% reported between 4-6 months, 8.1% reported 7-12 months and 22.3 % above one year. In addition, majority (69.4 %) of the respondents reported that they save below 10% of their income every month, 21.9% of the respondents reported saving between 11 to 15 percent of their income every month, 4.3% save between 16 to 20 percent , 1.1% save between 26 to 30%, and 3.2% save above 30% of their income every months. A general rule of thumb is we should be saving at least 10% to 15% of our income. This is just a minimum amount; it is advisable to save more. This indicates that majority of the respondents save a small proportion of their income. Finally the results shows that, majority (94.8%) of the respondents put their money on bank, 2.1% of the respondents save their money on saving and credit association and 3.1% of the respondents save their money other than bank and saving and credit association, which stated in the open ended question they put their money at home and Equib.

Inter sector comparison of personal saving practice

For the inter sector comparison of personal saving practice of MSE operator's five measuring items are distributed to respondents and the responses are analyzed and interpreted according to the value of mean and mode

The study result shows that those MSE operators who participate in trade, service and urban agriculture the majority of the respondents monthly income ranges from 500-2000 birr and those who participate in manufacturing and construction sectors the majority of the respondents monthly income ranges from 2001-5000 birr. From this researcher conclude that manufacturing and construction sector operators are relatively high monthly income compared to trade, service and urban agriculture operators. Regarding their saving plan almost all operators of each sector have saving plan and there is no significant difference between the sectors. Furthermore, trade, service and urban agriculture operators saving plan sustain from 0-3 months during unexpected loss of employment income whereas manufacturing operators form 4-6 months and construction operators from 7-12 months sustain their saving plan for the period of unexpected loss of employment income. From this the researcher conclude that the construction sector operators are the highest mean value which indicates relatively their saving plan sustain for a long period of time compared to the other sector operator's. Although the proportion saving from their income trade, service, manufacturing and urban agriculture operators save from their earning from 0-10% and construction operators save from 11-15%. From this the researcher concludes that the construction sector operator's relatively high proportion of saving from their income. Finally service, construction and urban agriculture operators exclusively save their money on bank and trade and manufacturing operators the majority of the respondents save their money on bank but not limited to bank they also save money in credit and saving associations and 'equip'.

Saving Behavior

Saving behavior of Respondents by Category

Saving is defined as what is left out of personal disposable income. Alternatively, personal disposable income is defined as income after taxes are paid (Urban Institute, 2008). Saving may also be seen as the difference between income and consumption. This implies that savings automatically decline as consumption increases Lusardi & Mitchell (2014). The study result shows that cross tabulation saving behavior of respondents. Gender of respondents and their saving behavior has no significance difference between male and female. The male mean value is 3.5620 and the female mean value shows 3.5525. The age of the respondents from 26-36 has the minimum mean value (3.4532) as compared to others age categories which have almost no significant difference on the saving behavior measurement factors.

The educational level of the respondents has an influence on their saving habit of respondents. Diploma graduates have a mean value of 3.7119, up to grade 12 completed the mean value is 3.4584, degree holders has a mean value of 3.5968 and masters and above graduates mean value is 3.5313. From this the researcher concludes that diploma holders have a good saving behavior than grade 12 completed, degree holders and masters and above. The marital status of the respondents has no significant difference between married (3.5204) and unmarried (3.6218) on their saving behavior. Moreover, the operating sector's of the respondents urban agriculture operator's have the minimum mean value (3.2872) and manufacturing and construction sector operators has the maximum mean value of 3.7146 and 3.7172 respectively. From this the research concludes that urban agriculture sector operators have no good saving behavior as compared to other operating sectors. The finding shows respondents that have a work experience below one year has less attention to saving which is the mean value 3.3258. Finally when the saving behavior of the respondents compared using the income range from 5000- 10000 birr earners are low saving practices than the other category.

Financial Literacy

Financial literacy of Respondents by Category

Financial literacy is defined as ones' knowledge of facts, concepts, principles, and technological tools that are fundamental to being smart about money (Shaari et al., 2013). While several widely used definitions of financial literacy exist, all of them generally imply the ability of individuals to obtain, understand and evaluate information required to make decisions to secure their financial future as best as possible. After analyzing a host of papers on the subject, Huston (2010), proposed that financial literacy must also include application of financial knowledge; the argument being that absent demonstrated ability to apply financial knowledge, an individual cannot be regarded as being financially literate.

The result shows that cross tabulation financial literacy of respondents. Many Studies have argued that men perform well in literacy tests than women Lusardi & Mitchell (2014), but in this study the gender of the respondents have no significant difference between male and female on financial literacy measurement factors. Lusardi & Mitchell (2014), add that individuals within the ages of 51 to 56 years are the least financially literate. In this study the respondents have age of 25-35 are less financially literate then other age categories.

The educational level of the respondents has an influence on their financial literacy of respondents. A study by Matheson et al. (2020), on individual financial literacy in Southwestern Indiana, concludes there is deficiency of financial literacy in the midst of high school students. In this study also prove that the respondents that have an education level up to grade 12 completed less financially literate compared to others. The Study by Taft et al. (2013), reveals that married persons are more financially literate than those who are single but in this study the marital status of

the respondents have no significant deference between those married and unmarried. Furthermore, the operating sectors of the respondent's urban agriculture operators have the minimum mean value which is 2.731. From this the researcher concludes that urban agriculture operator's are less financial literacy as compared to others. On the other hand work experience and income of the respondents have no significant difference between the respondents on the financial literacy measurement factors

Peer Influence

Peer Influence Practices of Respondents by Category

Dangol & Maharjan (2018), mentioned that the influence of peers, parents remain strong socializing agents throughout young adult phase. They become less dependent on their parents and more oriented towards their peers as well as to the adult world as they compare their status with peer, discuss money management issues, spend their leisure time and involve in spending activities.

The result shows that cross tabulation of peer influence of respondents on saving practice. Gender of respondents and peer influence on saving practice has no significant difference between male and female. The male mean value is 2.6101 and the female mean value shows 2.7224. Also the finding shows that overall the respondents with the age of 26-35 are less influenced by peer as compared to others categories. Education and marital status of the respondents has no significant difference between the respondents on the peer influence measurement factors. On the other hand the operating sector's of the respondents those who participate on construction and urban agriculture less peer influence on the saving practice than compared to others operating sectors. The finding shows respondents that have a work experience between 1-5 years have relatively a less peer influence on the saving behaviors as compared to others. Lately, the peer influences on saving practice respondents compared using income 5,000-10,000 and above 10000 birr earners are relatively less peer influence on saving practices.

Self Control

Self Control Practices Respondents by Category

The survey information provides description of self control practice of the respondents. This study result shows that cross tabulation self control of respondents. Gender of respondents and self control has no significant difference between male and female. The male mean value is 2.6257 and the female mean value shows 2.5643. Respondents with the age of 46 and above relatively have a good self control as compared to the other. In addition the education level who have masters and above relatively has a good self control compared to others. Furthermore regarding the marital status of the respondents have no significant difference between married and unmarried regarding self control measurement factors. When come to the operating sectors of the respondents also have no as such difference on self control measurement factors. Finally the work experience of the respondents has below one year and 1-5 years and the income rage between 5000-10000 birr has relatively good self control practices as compared to the others.

Spending Habit

Spending Habit of Respondents by Category

The survey information provides description of spending habit of the respondents. The study result shows that cross tabulation spending habit of respondents. Gender of respondents and their spending habit has no difference between male and female. The male mean value is 3.2309 and the female mean value shows 3.2212. Regarding age, education and marital status of the respondents also have no significant difference between their spending habits. Furthermore, between the

operating sector's, work experience and income of the respondents has no significant difference on their spending habits.

Training on Saving

The respondents were asked whether they have undergone any saving practice training. The result shows that 84.8% of the respondents reported having undergone saving training while 15.2% of the respondents did not.

Frequency of Training

From the analysis, (47.3%) of the respondents were take training on saving two times, 42.2% of respondents one times, 8.2% of the respondents three times and the remaining 2.3% of the respondents take training above three times.

The Impact of the Training on personal Financial Management

Majority 98.8% of the respondents believed that the training taken results an improvement on saving practices but, 1.2% of the respondents said did not results an improvement.

Challenges of Saving Practice

When the result triangulated using the focus group discussion results shows that the main challenges of the respondents for low saving practice are the income and expenditures are unbalanced, they said that most of the time the expenditure is greater the income so there is no money left for saving. Furthermore, the other challenges of the respondents not to save is the inflation, there is sustained increase in the aggregate or general price level in the country. This general price increase creates a feeling of uncertainty and pessimism about the future among the individuals. Inflation can erode the purchasing power of a person who saves if the current bank interest rate does not much the rate of inflation. The distance between individuals and financial institutions is also another challenge. Even though there is technological advancement that has brought about the development of online banking and automated teller machines (ATMs), the individual may like to do transactions in person, rather than by other means (e.g., telephone, mail or online). If the transportation costs are not so small, then they will tend to forget about saving in the financial institution especially the low income earners. Rahman (1998), demonstrates that, proximity is one of the main causes for which individuals do not deposits with financial organizations.

Conclusions and Suggestions for Further Researches

Conclusions

The aim of this study is to examine the Saving Practice among Micro and Small Enterprise Operators in Addis Ababa Yeka Sub city using the five measurement factors i.e saving behavior, financial literacy, peer influence, self control and spending habit.

Researcher has used five factors with 39 saving practice items. It is found that five of the factors are reliable for measuring saving practices of the MSE operators, and all of the factors of gap measuring are reliable using Cronbach's alpha (α).

A questionnaire survey is conducted to tabulate the respondent's demographic and the finding indicates that majority of respondents education level up to grade 12 with combined percentage of (49.5%), majority of age range 26 to 35 years (65.4) and majority of the respondents are male (71.9%).

The researcher also sought to establish effects of gender, age, education, marital status, operating sector's, work experience and income index on saving practice. The findings conclude that these factors strongly influenced the saving practice. This could be due to the age distribution of the respondents who were mostly aged between 26 and 35 years who are still considered as youthful hence are yet to settle in life hence have relatively low or no family commitments. The study findings further sought to establish whether saving behavior and financial literacy affects saving practice of MSE operators. The results conclude that saving behavior and financial literacy affect the saving practice of the operators. The other saving practice measurement variable which is peer influence, self control and spending habit of the respondents the result shows that it is moderately good in the three variables. In general saving practice, it needs an attention since poor saving behavior adversely affects wellbeing and by extension productivity at work place.

Suggestions for Further Researches

This study focused on to examine the Saving Practice among Micro and Small Enterprise Operators in Addis Ababa Yeka Sub city. It is therefore recommended that similar researches should be replicated in other sub city so as to establish whether there is consistency on saving practice among respondents in the remaining sub city of Addis Ababa.

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Role of Artificial Intelligence (AI) In Hospitality Industry

Seema Jaipuria
Research Scholar,
Amity University, Rajasthan.

Prof. (Dr.) Sanjeeb Pal
Professor and Director,
Amity University, Rajasthan.

Dr. Yashwant Singh Rawal
Associate Professor,
Parul University, Gujarat.

ABSTRACT : In today's era technology has entered in almost all the segments and sectors of our life, being from watching movie to education, banking, hospitals, shopping, power houses, telephone, etc. Nowadays, technology has also changed the way we travel, the experiences and the modes of sharing those experiences. The new-age travelers are preparing their own itinerary by using technology and replacing the traditional one. Hotels are facing tough competition as all the information about the hotel, their rooms, other products and services offered along with rent and charges are just one click away from consumers. Like all other sectors, hotels are also undergoing a wide range of via platforms that are bringing travelers from different parts of the world together. They want and are ready to use technology, value-added services, conveniences and comfort to their guests which never happened in the past.

For hospitality industry, technology driven marketing, is not at all a new concept, principally determined by guest information viz. segment profile, online media involvement and inclinations. Artificial Intelligence (AI) has become the distinct advantage for conventional lodging industry in terms of upgrading hotel's reputation and income by enhancing client experience at another level. This paper examines the role of Artificial Intelligence (AI) in upgrading the Hotel service quality. It features different approaches to utilize AI in accomplishing the quality of services by overseeing guest experiences and client encounters via data analysis & integration and developing AI frameworks. Also, it emphasis on Artificial Intelligence in building up the hotel industry via cost saving, revenue generation and brand perception.

Keywords: Hospitality Industry, Artificial Intelligence, Service Quality, Guest Data.

Introduction

The rise of the internet usage has noticeably changed the way of traveling, making room reservations and other arrangements, as well as the manner the enterprises are doing business in tourism. Hotels have not left any stone unturned in today's immensely aggressive business environment, and a key weapon is technology. Technology has entered hotels too and is providing great results in term of business as well as services and satisfaction. Significant lodging players are augmenting their geological base for getting the raised demand, branding fiercely, initiating strategic partnerships. Globally lodging industry is observing a paradigm shift because of technological advancement. Service transformation by utilizing contemporary ideas and technology drove marketing is need of hour for hotel businesses. Social Platforms have given more data and more extensive decisions to the prospective hotel clients. is the way to consumer loyalty.

Artificial Intelligence (AI) is a part of computer science that enables the machines to perform the tasks usually done by humans and react like them. The term AI was coined by John McCarthy in the year 1956, who defined it as 'the science and engineering of making intelligent machines'. It took years to actually intelligent machines come into existence, perceive their environment, learn and take action. Artificial Intelligence learns from the mistakes happened in the past and seek to evolve themselves to accomplish in a better manner. This paper endeavors to survey the utilization of AI in lodging industry and to discover its effect on service quality and advancement.

Objectives And Research Methodology

The study is based on secondary data collection technique that includes review of published research papers, internet database, articles, tourism management books and magazines, AI experts' web articles that contains relevant data regarding the study.

The objectives of this study are:

- To recognize the applications of AI in Hospitality Industry.
- To analyze the role of AI in enhancing Service Quality of Hotel.
- To identify the impact of AI on development of Hotel Industry.

Review Of Literature

Many researchers such as Gabbie and O'Neill (1997), Juwaheer T. D. (2004), Lau et al. (2005), Marković S. and Raspor S. (2010), Bostanji G.M.A (2013), Antoneta and Charles (2014) have studied service quality of hotels from several outlook like dimensions of service quality, its effect on customer loyalty and satisfaction, quality gaps and other affecting factors.

The inception of AI and robotics in the world of human and economy is anticipated to have cardinal inferences for the nature, structure and work conditions, and as a result , for HRM in serving organisations to captivate and hold on the talent (Colbert et al., 2016). Ivanov and Webster (2017) carried out a financial analysis of deploying of robots, AI and service automation. AI connects intelligence to the hotel industry via AI-enhanced tourism and hospitality operations and administration systems, which has further redefined the hospitality industry (Lai and Hung, 2018). AI has reshaped the means of tourism and hoteling by changing the traditional system, as the technological advancements have enabled the customers to access authentic and precise data which allows them to personalize their demands, make bookings and acquire hospitality products and services straight via technological platforms, instead of dealing with a hotel or travels agent (OECD, 2018; Zlatanov and Popesku, 2019; Buhalis, 2020). It is more affordable and convenient to book and travel through AI, along with making services and prices more standardized, leading to create a competitive advantage in the hotel and tourism industry. It is now about how much of intelligence and data are gathered from technological platforms (Lai and Hung, 2018).

AI provides service transformation in conveying personalized services, as AI-enhanced smart services and robotics like maibots, chatbots and cobots are used to extend human intelligence along with physical proficiency (Cain et al., 2019; Zlatanov and Popesku, 2019; Belias and Varelas, 2019; Ivanov and Webster, 2019). By sleeking the services, validating the reduction of errors, refining the pace of decisions and services, recognizing demand signals, recognizing the guests by their names via facial recognition technique, forecasting guest demands, imparting real-time language translation application to interact with customers globally and delivering interactive virtual along with physical assistance (Ivanov and Webster, 2017; OECD, 2018; Cain et al., 2019; Ivanov and Webster, 2019). Prentice et al. (2019) found that providing services with AI-enhanced technologies in the hotel and tourism industry remarkably impacts employee performance, but not on their turnover, and hence implies that AI can amplify employee productiveness. Prentice et al. (2020) further illustrated that AI service quality has notably contributed to overall service quality in the hotel and tourism industry via employee service quality which calls for a better comprehension of how AI-enhanced technologies can impact service quality and guest satisfaction in the hotel and tourism industry in relation to employee outcomes like employee recruitment, detainment and quality of service.

Role Of AI In Enhancing Hotel Service Quality

The quality of services in hospitality is very important for competitive advantage in terms of guest satisfaction and expanding the word of mouth positively offline as well as online. The 5 Gaps service quality model differentiate the guest expectation with his perception. AI-enhanced techniques in hotel will positively impact the guest perceptions for 5 Service Quality dimensions in the following ways:

- **Tangibility:** Tangibility is associated with the facilities provided physically, sophisticated tools and equipment and employee appearance. AI enabled valet using smart phones can restore the traditional check-in check-out further eradicating the standby at receptions. By deploying facial recognition technique to understand guest arrival, valet can assign the room having guest preferences and can download room key to his smart phone. Many hotels are nowadays using robots for assisting guests regarding check-in check-out like Henn Na Hotel at Tokyo.
- **Reliability:** Reliability is associated with punctuality, the willingness to unravel problems, the kind of services provided and the accuracy of maintaining records. Guests should have the trust that the AI enabled robots can be used for room-services assuring the prompt delivery. Hotels deploying robots on the floor for providing room services have an advantage of allowing hotel staffs to cater other needs of the guests. It has been struggleful to provide good services via traditional wireless networks in large resorts, but now AI-enabled wireless networks provide consistent and reliable services along with troubleshooting the problems. The feature of predicting potential maintenance problems allows workflow to be smooth thus increasing the dependability of this service.
- **Responsiveness:** It relates to speedy delivery of services thus minimizing the waiting time. The chat bots that are based on the Natural Language Processing (NLP) technique can understand the hotel guests' stress coming from different countries, which allows quick delivery of service. Artificial Intelligence algorithms can forecast expected duration of delivery of services. Guests can easily get prompt and precise answers to their queries.
- **Assurance:** It reveals the reliability, courtesy of hotel employee, guest security and aids to employee for outstanding services from hotel patrons. AI can scrutinize the pattern of footfall of hotels and other data to further make decisions related to the staff demand. It will end in prompt delivery of service and optimum human resource utilization. Well prepared and informed employee will always be available stress-free during peak hours and peak seasons. AI-enhanced closed-circuit television (CCTV) are frequently reinforced with evolving object and face recognition. Surveillance camera feeds observed by AI would distinguish the expected dangers and advise the experts for prompt action.
- **Empathy:** This dimension deals with the customization of services, solitary attention and guest convenience. For customized advertising and offers, AI empowered online ads network and social media feeds based on user statistics are now being used, as an illustration video suggestion on you-tube, online lodging promotions as for guest's travel reservations or close by things advertisements with reference to his hotel reservation. In addition to, AI also enables hotels to customize the reward program. The AI voice assistants are beneficial for senior citizens, special attention guests to make reservation queries, to discuss appropriate amenities, to instruct room service, prices, offers and promotions and even for the guests on the go. For example, there are virtual butlers like 'Rose' of Cosmopolitan Hotel and 'Edward' of Edwardian Hotels in Las Vegas.

Role of AI In Development Of Hotel Industry

- **Minimizing Cost-** According to the National Grid, the equipments related to energy consumes around 10% of total hotel revenue. Guest's presence as well as preferences can be detected intelligently and accordingly the equipments can be activated or deactivated thus reducing energy and increasing guest's comfort. The supply chain management systems when enabled with AI can make sure the procurement of materials of right quality and quantity, for rational prices at the right time also ensuring the efficient performance of services.
- **Increasing Revenue-** Customized offerings with solicitous touches like a guest's preferred pillows, mattresses, toiletries, newspaper, television, room views and bathroom settings help keeping guest repetition. Special provisions by following preferences and desires and designing personalized service experience like lavish linen, luxury automobile will contribute additional income. AI also suggests dynamic pricing of the hotel by analyzing patterns of various events taking place and also their impact. AI is used by Airbnb to suggest the pricing strategies to its hosts. Also, it allows to style marketing strategies during such events to maximize occupancy level. AI-enhanced booking engines and hotel websites can escalate the rate of conversion by alternating exhibit options. When a guest searches for a room and a room rate on booking engine then AI recognizes that when the room rates are displayed in descending order then the guests neglect or avoid making reservation but when the room rates are displayed in ascending order the room reservation is higher. Therefore, the system understands that which is the best suitable technique of exhibiting the room rates and informs the hotel employees about the same or accordingly exhibits the room rates by itself.
- **Maximizing ROI (Return on Investment)-** In order to provide high quality of service, the hotels prefer channelizing their resources to get the best return. AI-enabled systems notifies and reminds the hotel employees about the upgrades, and if any replacement or repair work is required for any equipment or property. It analyzes the online reviews, feedback from the guests, occupancy report, etc. to help the hotel make correct strategic decisions so as to achieve maximum returns.
- **Reputation Management-** Artificial Intelligence can scrutinize all the online images, videos, reviews, blogs from the social platforms and hotel websites and can present the real image of the hotel thus guiding the hotel staffs to respond to the negative reviews and take correct decisions on improvement path.

Limitation

This study shows an outline of utilization of Artificial Intelligence in the Hotel Industry; nonetheless, it requires an empirical evaluation of effect of Artificial Intelligence applications on Service Quality of hotel, guest acceptance of AI frameworks, employee awareness, the effect of AI on the financial matters of the hospitality sector and the previously mentioned impacts of AI on the work environment and the replacement of humans.

Conclusion

Artificial intelligence is now changing the conventional prospect of hotel and tourism services with the ability to sleek the processes, providing valuable insights along with optimizing guest's experiences. AI is bringing the new way of responsive, reliable, guest-centric and innovative hospitality to gain better quality of services and overall development of hotel industry. With innovation in a consistent condition of transition and continually opening new chances to improve consumer loyalty and gear up internal efficiency, hotels can stay one step up on rivalry by leveraging their technology.

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Customer Behaviour Towards Corporate Social Responsibility: A Study in the Banking Industry in Mauritius

Eric V. Bindah
University of Mauritius

Leenshya Gunnoo
University of Technology, Mauritius

ABSTRACT : The concept of Corporate Social Responsibility (CSR) has come a long way. Looking back, we can see the essence of the notion turning over a new leaf and morphing in a way that it has now become more important than ever. Through the adoption of CSR practices, businesses can show their stakeholders, customer and the public that they care for the society, the environment, the future, and the planet.

The relationship between CSR and customer behaviour has been analysed in various business fields but this study focuses on the banking sector of Mauritius. To achieve the research aims and objectives, first and foremost the level of customer awareness on CSR was analysed. Secondly, we analyse whether customer attitude toward banks being socially responsible can impact their purchase intention. Lastly, whether the bank's social responsibility image portrayed can influence customers' loyalty, satisfaction and trust toward the bank. A survey questionnaire was developed and administered to collect the required data and a total of 250 respondents answered the questionnaires.

Both SPSS software and Excel were used to perform the tests and analysis. The evidence from the analysis showed that customers are aware of the CSR activities of the bank they do transact with. Moreover, the finding unveiled that CSR has a positive and direct impact on customer purchase intention, loyalty, and satisfaction. However, the research also concluded that CSR has no direct impact on customer trust.

Key words: CSR, Customer loyalty, satisfaction, purchase intention, banking industry.

Introduction

Over the past decades, the notion of CSR has seen to become more prominent among business and financial institutions. Due to the fast-paced era of globalization and social development in the environment, businesses are now seeing CSR as a means to give importance to social and environmental impact rather than negatively contributing to them. Consequently, this realization has fostered growth in environmentally and socially responsible behaviours (Pucheta Martínez et al., 2020).

In the past, businesses mostly engaged in CSR activities to maximize their profits and increase brand loyalty. Nowadays, the classic profit maximization approach has been replaced by a socially responsible approach and has led companies to embrace CSR policies as a pivotal factor of strategy (Mian, 2020). There were many previous studies (Ozkan et al, 2022; Luo and Bhattacharya, 2006; McDonald and Rundle, 2008) that have pointed out the several benefits that CSR provides to companies in terms of increased profitability, brand recognition, raising sales through customer happiness and loyalty, and built a positive reputation.

CSR and customer behaviour is a well-covered topics in the literature; however, the relationship of CSR to the loyalty, satisfaction, and trust of the customers of banks in Mauritius has not been adequately developed. In small developing nations like Mauritius, it is evident that there is a lack of in-depth analysis and research on how customers truly feel about the bank's CSR initiatives and how it influences their behaviour and perception. Hence, the actual issue that needs to be uncovered is the relationship between the CSR activities of banks and customer behaviour and perception toward it. Much research has been carried out on CSR activities in various sectors,

however, the financial sector is the one that emphasizes more to it. There is no denying the importance of customer trust, loyalty, and satisfaction in the banking sector.

The main purpose of this study is to contribute in filling the knowledge gap of CSR activities of banks in Mauritius on customers' awareness, purchase intention, satisfaction, trust, and loyalty towards banks. In other words, the study shed light on banks' CSR activities and how they can have a significant impact on customers' behaviour and attitude toward the bank.

The term CSR is a notion that is being discussed widely among various researchers. Its application has been done in various fields like hospitality, manufacturing, banking and has been associated with different variables such as customer purchase intention, loyalty, satisfaction, word of mouth, and trust. This study aims to bridge the knowledge gap through analysing customer behaviour, beginning with their knowledge and awareness of CSR and how it affects their purchase intention, loyalty, satisfaction, and trust in the banking sector in Mauritius.

Literature review

CSR

The evolution of the CSR concept has a long history. The CSR concept has been viewed and studied by various researchers with different variables including organization performance, employee behaviour, consumer behaviour, and investor behaviour. There have been lots of CSR definitions gathered throughout the years but globally there has not been a common definition of CSR since the concept is still evolving in the modern era. For example, (Dahlsrud, 2008) identified approximately 37 definitions of CSR in literature which were approached from different perspectives.

Various literature and philosophies on the concept of CSR have been developed since its origins date back to the early 1950s in the United States of America. After the Great Depression in America, (Saxena & Mishra, 2017) points out that organizations came under pressure and scrutiny to help and contribute to resolving social and societal issues and problems through CSR activities.

Stakeholder theory

The Stakeholder theory (Freeman, 1984) explains why companies have to take a voluntary and strategic approach to implement their CSR practices. Companies should consider the interests of all different groups that could be affected by their actions, in order to make sure that their programs are effective and sustainable. (Kim, 2022). Stakeholders are described as "those groups who can affect or are affected by the achievement of an organization's purpose" (Freeman, 1984). Stakeholders represent employees, customers, suppliers, investors, and communities that play a key role in the company's survival. The Stakeholder theory states that businesses must take into account all individuals who have a vested interest in business day-to-day operations and customers are among the most important stakeholders (Bhattacharya *et al.*, 2008; Islam 2021)

The Theory of planned behaviour (TPB)

In 1975, Fishbein and Ajzen developed the Theory of reasoned action (TRA) to explain customer behavioural intentions. The TRA looked at how people behave by examining how their intentions and attitudes change based on the situation. It was found that behavioural norms and attitudes play a big role in how we behave (Ham *et al.*, 2018). In 1991, the Theory of planned behaviour a cognitive theory of TRA was proposed by Ajzen. The theory is the same as TRA, except it adds a third element which is perceived behavioural control (PBC). TPB explains how people can have different intentions or plans to behave in different situations. The behaviour of an individual is influenced by his or her beliefs, subjective norms, and attitude.

Customer's awareness of CSR practices

Customer awareness is defined by (Öberseder et al., 2013) as the state of being aware and knowledgeable of the CSR activities of a company by its customers. McWilliams et al.,(2001) argues that if a company wants to be different from the others, they need to make sure their customers are aware of their CSR activities. This will help create a strong emotional connection between the organisation and the customers, and in turn make the customer more likely to buy from the company in the future. Thus, customers' awareness of companies' CSR activities has emerged as a key tool to build an emotional relationship with the consumer (Ayam et al.,2022). Additionally, CSR activities are considered as a marketing strategy that can potentially enhance an organization's value with high customer awareness of its activities.

Several past studies have been conducted that tend to focus on consumer behaviour toward CSR activities but ignore the main aspect that can have a major impact on consumer behaviour is consumer awareness of the CSR activities of the company. (Kodua et al.,2022)CSR is a marketing strategy that is used in the later stages of a product's life cycle, after the company has built a reputation. CSR in developing economies can help build a company's brand awareness. Hidayat et al., (2021), conducted a case study to analyse the level of customer awareness of CSR initiatives in Islamic Banks in the Kingdom of Bahrain and Saudi Arabia. The essence of their investigation shows the extent to which consumer knowledge of Islamic banking activities may advance societal improvement and achieve macroeconomic aims beyond their financial objectives. Therefore, it is said that CSR can predict brand awareness in a good way and thus, the following hypothesis is proposed:

H1: CSR is positively associated with brand awareness.

Relationship between CSR and Consumer purchasing intention.

Purchase intention is a type of decision-making that investigates why a consumer would buy a specific brand (Shah et al., 2022). According to (Mirabi et al. 2015), "Purchase intention is act as a tool for anticipating the buying process since it is a complex process influenced by consumer behavior, perceptions, and attitudes". Based on the diverse interpretations and meanings of purchasing intention offered by the authors. One may argue that consumer's willingness to purchase a specific good or service under specific circumstances is based on their purchasing intention (Budur, 2020; Rashid et al., 2022; Faeq et al., 2022)

Faeq et al., 2022 examined the impact of buying intention in the context of CSR, and the findings indicated a favourable association between the two. According to, (Fatma and Rahman, 2016) building a socially responsible image has a positive effect on consumer purchase intention. Moreover, (Axelrod, 1968) pointed out that to predict actual purchase behaviour, purchase intention is studied with other attitude indicators. Likewise, to support this statement, (Zhang and Ahmad, 2022) concluded that CSR is significantly correlated with brand image and leads to higher purchasing intention of customers. Thus, the following hypothesis is formed:

H2: CSR has a positive significant effect on purchase intention.

Relationship between CSR and customer loyalty

Customer loyalty is a strong feeling of commitment to buying a product or service from a business again in the future, regardless of the business trying to change its marketing process (García and Rodríguez del Bosque, 2011). Moreover, Lagasio *et al.*,2021 pointed out that CSR activities help bank customers learn more about the values and culture of the bank, which can lead to greater customer fidelity. Moreover, from a corporate perspective, customer loyalty is considered a critical factor for the long-term growth of businesses since it has a significant impact on their performance

and profitability. Thus, customer loyalty create is a strong bond between a customer and a company.

Various studies have been conducted to know whether CSR activities play an influential role in shaping consumer loyalty and some recent studies have proven that CSR activities do positively affect consumer loyalty. Further finding confirmed that CSR has a significant impact in boosting customer loyalty. (Park *et al.*, 2017). Also, in the banking sector, Main (2020) concluded from its study that there is a strong relationship between CSR initiatives and brand fidelity in many ways. Likewise, (Mercadé-Meléet *al.*, 2018); (Pérez and Rodríguez del Bosque, 2015); (Abbasi *et al.*, 2022) outlined that CSR and customer loyalty share a positive relationship. Thus, the following hypothesis is proposed:

H3: CSR positively impacts customer loyalty in the Mauritian banking industry.

Relationship between CSR and customer satisfaction

When people are happy with the things they buy or use from a company, the company is considered to be doing a good job, thus this is known as satisfaction, and it shows how closely the company is meeting customer expectations (Anderson *et al.*, 1994). Consumer attitudes regarding a good or service can be used to evaluate customer satisfaction (Opata *et al.*, 2021). According to Oliver (1997), customer satisfaction is defined as fulfilling customer's need and the extent to which the fulfilment has been is satisfied or not. Consumers are likely to be satisfied with the performance of a commodity or service if they believe that it meets their expectations. (Suhartanto *et al.*, 2018; Ahmed *et al.*, 2022).

In several studies, it has been argued that CSR activities positively influence customer satisfaction. Islam *et al.*, (2021) pointed out in their research that customer satisfaction is strongly and directly correlated with CSR initiatives. In addition, findings from a study by Phillips *et al.*, (2019) highlighted the importance of promoting CSR culture and leadership to positively influence CSR performance. This can in turn enhance other aspects of firm performance, specifically customer satisfaction. Bhattacharya *et al.*, (2004) also found that CSR and customer satisfaction are positively linked. Likewise, the study by Luo and Bhattacharya (2006) identified a direct positive link between the relationship of CSR and customer satisfaction. Thus, the following hypothesis is proposed:

H4: CSR positively impacts customer satisfaction in the Mauritian banking industry.

Relationship between CSR and customer trust

Customer trust is the belief and confidence a customer has in a business. Trust has also been found to be one of the critical factors in the customer-bank relationship (Hoq *et al.*, 2010). When customers have faith in a business, they are more certain of the quality of the goods or services they are buying, and they highly believe that trustworthy businesses are those who have high ethical and social responsibilities toward the community and environment (Park *et al.*, 2019). Pivato *et al.*, (2008) also mentioned that CSR activities portrays a business characteristic, that is the level of responsibility and transparency it has in its business activity. In turn the image of being socially and environmentally conscious can lead to increased consumer trust.

Customer trust can be established through consumer perception. According to numerous studies, consumer perceptions of a socially responsible company are positively correlated with the consumer's trust in that particular company. For example, in a study by Park and Kim (2019), it was found that CSR is one of the best strategies to induce trust. Moreover, the research by Martínez and Rodríguez del Bosque (2013) showed empirical evidence that CSR has a favourable impact on consumer trust. Woo and Jin, (2016) suggested that CSR plays a crucial factor in fostering trust between the community and the company. Furthermore, Ruiz *et al.*, (2016) stated that trust is considered key to building relationships within the banking industry and banks must work on their

business strategies to present a good image and build customer trust. Thus, the following hypothesis is proposed:

H5: CSR positively impacts trust in the Mauritian banking industry.

CSR and socio-demographic factors

Numerous studies have concluded that consumers' reaction to CSR activities differs between the basic demographic characteristics of customers that are age, gender, academic level, and occupation. González *et al.*, (2015) and Furman *et al.*, (2020) stated that women are more attentive and knowledgeable to businesses that are engaging in CSR activities and good causes. Also, women and better-educated customers seem to have a greater CSR knowledge than men and less-educated customers (Pérez and Bosque, 2015). With regards to the age factor, it has been observed that there is a direct correlation between the age of the customer and the CSR activities of a company. (Mueller and Theuvsen, 2014). It is also found that nowadays young people appreciate firms involved in CSR more than older people. (Elias, 2004; Perez and Rodriguez del bosque, 2014). Roberts (1996) further stated that customers who have high job positions, high incomes, and higher educational levels are more CSR-conscious.

Methodology

For this study, a mixed-method approach combining qualitative and quantitative research was used to examine the correlations between the dependent variable and independent factors. For the purpose of data collection from Mauritian bank customers, a questionnaire survey has been opted. Although primary data is trustworthy, accurate, and real-time data, the research study cannot rely solely on the primary data. Therefore, to do effective research, secondary data must also be taken into account.

The population of the study refers to the entire general public from which the researcher will target and draw its sample from. Thus, the population targeted in this study was the Mauritian customers of the banking sector. Nevertheless, since many banks have various branches and their customers are dispersed across the island, attempting to reach all of the customers would be impossible. This research focuses on customers in the different densely populated regions of Mauritius.

The Mauritian customer of the banking industry who met the criteria of being 18 years of age or older, being a student or employed, and having a bank account were the targeted group for this study. In total, 384 respondents were targeted for the survey.

A self-administered questionnaire using Google Forms on the internet was utilized to gather data for this investigation. Only closed-ended question categories are included in the questionnaire for respondents to easily understand and be quick to answer. The survey questionnaire was made up of three main sections. Section A pertains to socio-demographic profile: gender, age group, level of education, occupation, and what banks they deal with. Section B consists of the level of awareness and knowledge of CSR. Then lastly, respondents were asked to estimate on Likert scale their degree of agreement from strongly agreed to strongly disagree which was dedicated to find out the correlation of CSR and customer loyalty, satisfaction, and trust. All the questions were taken from previous studies (Leclercq-Machado *et al.*, 2022) and (David Servera-Francés & Lidia Piqueras-Tomás, 2019).

The questionnaire was administered to about 384 respondents who are presumed to have a bank account, and the response rate is 65.10% (250 responded). Hence, the data was collected using 250 questionnaires distributed over the course of 5 weeks from the 4th of December 2022 to the 4th of January 2023. The software named Statistical Package for Social Sciences (SPSS) of version 22 was used. Moreover, the 5- Likert scale questions [section C] are ordinal in nature and are coded were used.

Results and discussion

To ensure the reliability of all scales in this study, SPSS Statistics 22 software was used. According to Cronbach and Meeh(1955), a questionnaire is considered reliable if its Cronbach's alpha value is greater than 0.70. The range is considered excellent if it falls between 0.729 and 0.800. The reliability test is done with the 19 scale survey questionnaire questions and the reliability of this analysis is 0.880 as shown in Table 1 below. Since the value is significantly larger than 0.7, the variables are therefore considered to be trustworthy and valid.

Table 1: Reliability Test of Questionnaire
Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.880	.880	19

Table 2: Cronbach's Alpha Reliability Test of each section of the Questionnaire

Attributes	Number of items	Cronbach's Alpha
<i>CSR</i>	3	0.968
<i>Purchase intention</i>	4	0.876
<i>Customer loyalty</i>	4	0.911
<i>Customer Satisfaction</i>	4	0.935
<i>Customer trust</i>	4	0.967

With regards to the validity analysis, KMO and Bartlett's Test was conducted in order know whether there is significant correlation among the questions. Therefore, Table 3 below shows that the KMO coefficient is 0.812, which implies that the sampling data is adequate and for Bartlett's test the significance value is below 0.005. Hence, the validity evaluation of the survey is positive. (Shrestha 2021; Zhang 2022)

Table 3 : KMO and Bartlett's Test
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.812
Bartlett's Test of Sphericity	Approx. Chi-Square	5697.577
	df	171
	Sig.	.000

Demographic profile of the respondents

Table 4: Demographic profile of the respondents

Demographic information of the respondents			
Characteristics	Measures	Frequency(n)	Percentage (%)
<i>Gender</i>	Male	114	45.6
	Female	<u>136</u>	<u>54.4</u>
	Total	250	100
<i>Age Group</i>	18 - 20	13	5.2
	21 - 30	156	62.4
	31 - 40	63	25.2
	41 - 50	14	5.6
	Above 50	<u>4</u>	<u>1.6</u>
	Total	250	100

<i>Level of education</i>	Primary	14	5.6
	Secondary	24	9.6
	Tertiary	<u>212</u>	<u>84.8</u>
	Total	250	100
<i>Occupation</i>	Employed	114	45.6
	Self- employed	2	0.8
	Unemployed	6	2.4
	Student	<u>128</u>	<u>51.2</u>
	Total	250	100
<i>Residence</i>	<i>Rural</i>	<i>122</i>	<i>48.8</i>
	<i>Urban</i>	<u>128</u>	<u>51.2</u>
	Total	250	100
<i>Bank preference</i>	MCB	127	50.8
	SBM	114	45.6
	Bank One	5	2
	HSBC	2	0.8
	Others	<u>2</u>	<u>0.8</u>
	Total	250	100

Table 4 presents the demographics features of the 250 participating respondents of the research showing a major percentile of 54.40% who are female respondents and about 45.60% of them are male customers of the selected banks in Mauritius. In terms of age, it is broken down into 5 groups of age: 13 participants belonging to the 18–20 age group (equal to 5.20% of the total); 156 participants between 21 and 30 years (62.40%); 63 participants between 31 and 40 (25.20%); 14 participants between 41 and 50 (5.60%) and 4 respondents about the age group above 50 (1.60%). With regards to the occupation of the participants the majority were students that are 128 (51.20%), 114 (45.60%) are employed; 2 (0.8%) are self-employed and 6 (2.4%) are unemployed. The results also indicated that participants preferred Mauritius Commercial Bank over the other banks.

Tabulation of knowledge of CSR against Gender

Table 5: Tabulation of knowledge of CSR against Gender

		Gender		
		Male	Female	Total
		Count	Count	
Knowledge of CSR activities	Yes	97	116	213
	No	17	20	37
Total		114	136	250

The results of the cross-tabulation of respondents' gender and CSR knowledge are shown in table 5 above. The results demonstrate that females (116) are more knowledgeable than males (97) about the notion of CSR activities. Additionally, 20 female respondents were more likely to confess that they were ignorant of CSR compared to males (17). In parallel according to a research conducted by Lagasio & Cucari, (2019), it is found that that women are more ethically responsible and aware of CSR activities than men.

Tabulation Of Knowledge Of CSR Against Age

Table 6: Tabulation of knowledge of CSR against Age

		Age					Total
		18-20	21-30	31-40	41-50	Above 50	
		Count	Count	Count	Count	Count	
Knowledge of CSR activities	Yes	12	141	55	3	2	213
	No	1	15	8	11	2	37
Total		13	156	63	14	4	250

As shown in the table, the largest group of respondents was from 21 – 31 years of age. This can indicate that persons in this age group are more willing to respond because they are more engaged and interested in the notion of CSR. Additionally, as per the result above, it can be interpreted that the age range between 18 to 20 and 31 to 40 falls are likely to fall under the category of average level to know about CSR. People between the ages of 41-50 and above 50 have the least knowledge on CSR. Thus, similar to the study by Dobrowolski et al., (2022), it is noted that Generation Z, that is younger people, are more conscious of economic and social aspects, which is why they are increasingly concerned and environmentally aware of new concepts such as CSR.

Although the majority were aware familiar and have knowledge of CSR activities, two tests were used to verify if the analysis is effective and if the respondents who claimed to be aware of CSR were indeed aware of the CSR initiatives of their particular banks.

Table 1: Chi-Square Tests

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24.432 ^a	4	.000
Likelihood Ratio	19.642	4	.001
Linear-by-Linear Association	.058	1	.810
N of Valid Cases	250		
a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .30.			

Table 8 : Correlations

Correlations			
		Awareness Of CSR	Knowledge of CSR
Awareness of CSR	Pearson Correlation	1	.015
	Sig. (2-tailed)		.810
	N	250	250
Knowledge of CSR	Pearson Correlation	.015	1
	Sig. (2-tailed)	.810	
	N	250	250

The data obtained (24.432) is associated with a significant value of 0.000, which is smaller than the alpha value of 0.05 indicating that the result is significant and the respondents who said that they are knowledgeable about CSR were therefore truly well familiar of the CSR activities of their preferred bank. Hence, rejecting the null hypothesis and accepting H1.

From the result of Pearson Correlation illustrated in Table 8 that is .015 lies between 0 to 0.5 and the total number of respondents being 250 (N) that is superior to 30, it is to be concluded that CSR awareness and knowledge of CSR activities share a positive relationship. Therefore, we accept H1. As mentioned in the review of literature, a favourable and substantial impact of CSR on purchasing intention was found (Faeq et al., 2022). Hence, below are the hypothesis that have been framed in relation to this:

H2: CSR has a positive significant effect on purchase intention.

H2a: CSR has a negative effect on purchase intention.

In order to carry out the multiple regression test, the result of the questions (Section C: Questions on CSR and Question 14 on Purchase intention) from the questionnaires were assessed.

Table 2: Results of Linear Regression between CSR and Purchase Intention

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.582 ^a	.339	.337	.621
a. Predictors: (Constant), CSR				

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	49.156	1	49.156	127.345	.000 ^b
	Residual	95.728	248	.386		
	Total	144.884	249			
a. Dependent Variable: PI						
b. Predictors: (Constant), CSR						

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.641	.119		5.386	.000
	CSR	.667	.059	.582	11.285	.000
a. Dependent Variable: PI						

The R-value of 0.582 from the Model Summary, signifies the multiple correlations between CSR (independent variable) and Purchase intention (dependent factor). The R square (33.9%) signifies the variability of the dependent variable that is the socially built image through CSR can vary consumer purchase intention. The F statistic (127.345) in the ANOVA table is relevant since the significant value is 0.00, which is less than 0.05.

Moreover, in Table 9, the (Coefficient) result demonstrates a favourable and significant relationship between CSR and purchase intention ($t = 11.285$, $p < 0.05$). The outcome indicates that an increase in purchasing intention is expected when CSR has a beta value of 0.621. The following evidence supports hypothesis H2: CSR has a favourable and significant impact on purchasing intention.

According to the analysis and studies conducted by Abbasi et al., (2022), it is confirmed that there is a positive influence of CSR on customer loyalty, hence the following hypothesis is formulated:

H3: CSR positively impacts customer loyalty in the Mauritian banking industry.

H3a: CSR negatively impacts customer loyalty in the Mauritian banking industry.

Table 3: Results of Linear Regression between CSR and Customer loyalty

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.274 ^a	.075	.071	.664
a. Predictors: (Constant), CSR				

ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.866	1	8.866	20.132	.000 ^b
	Residual	109.218	248	.440		
	Total	118.084	249			
a. Dependent Variable: CL						
b. Predictors: (Constant), CSR						

Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.354	.127		10.653	.000
	CSR	.283	.063	.274	4.487	.000
a. Dependent Variable: CL						

In Table 10, (Model summary) the significance of the F test(20.132) shows that CSR and Customer loyalty is relevant because the significant value is 0.00 which is lower than 0.05. Moreover, 7.50% ($R^2 = 0.075$) change in Customer loyalty can be accounted by CSR and at the level of $p < 0.05$ it shows that the impact of CSR on customer loyalty is statically significant. Thus, it clearly indicates that CSR does have an influence on Customer loyalty.

The data analysis is further supported by the Coefficientstable above. It indicates a positive and significant effect of CSR on customer loyalty ($t = 4.487$, $p < 0.05$). Therefore, hypothesis H3: CSR has a positive and significant correlation with customer loyalty is supported.

Referring to the relationship between CSR and customer satisfaction and whether customers are satisfied with the CSR practices of the bank we refer to the study of Islam et al., (2021) whereby it was found that CSR has a substantial positive correlation with consumer satisfaction, as mentioned in the empirical Review.

H4: CSR positively impacts customer satisfaction in the Mauritian banking industry.

H4a: CSR negatively impacts customer satisfaction in the Mauritian banking industry.

Table 4: Results of Linear Regression between CSR and Customer satisfaction

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.204 ^a	.042	.038	.659
a. Predictors: (Constant), CSR				

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.704	1	4.704	10.819	.001 ^b
	Residual	107.840	248	.435		
	Total	112.544	249			
a. Dependent Variable: Customer satisfaction						
b. Predictors: (Constant), CSR						

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.840	.126		14.571	.000
	CSR	.206	.063	.204	3.289	.001
a. Dependent Variable: Consumer satisfaction						

In Table 10, the Model summary and the ANOVA table indicates that the statistical significance has been achieved because the F value (10.819) is significant at 0.001, which is p less than 0.05. The last table which is the coefficient table describes that the element of CSR is positively linked with Customer satisfaction. The result is favourable since the value of the significant variable was lower than $p < 0.05$. Therefore, the null hypothesis is rejected and hypothesis H4: CSR has a positive and significant effect on customer satisfaction is supported.

Researchers like Park and Kim(2019) claimed that a company being socially responsible positively influences consumer trust. In line with this, the subsequent hypotheses were built:

H5: CSR positively impacts customer trust in the Mauritian banking industry.

H5a: CSR negatively impacts customer trust in the Mauritian banking industry.

Table 5: Results of Linear Regression between CSR and Customer trust

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.109 ^a	.012	.008	.679
a. Predictors: (Constant), CSR				

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.367	1	1.367	2.966	.086 ^b
	Residual	114.269	248	.461		
	Total	115.636	249			
a. Dependent Variable: Customer trust						
b. Predictors: (Constant), CSR						

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.721	.104		16.555	.000
	CSR	.105	.061	.109	1.722	.086
a. Dependent Variable: Customer trust						

As seen in Table 12, (Model summary) the significance of the F test is 2.966, indicating that the CSR and Customer trust is not relevant because the significant value is 0.086 which is higher than 0.05. Moreover, only 1.2% ($R^2 = 0.012$) of the variance in CSR and customer trust are statistically not significant as $p=0.086$ which is greater than the 0.05 level. The Coefficients show a negative effect of CSR on customer trust ($t=1.722$, $p>0.05$). Thus, CSR does not show a statistically significant relationship with customer trust. Thus, the null hypothesis H5a is supported.

Conclusion and recommendations

Despite that CSR has raised a lot of attention during the past decades and much empirical literature being made regarding the correlation between CSR and customer behaviour, the real customer's conception is yet to be discovered in the Mauritian banking industry. Thus, this research is aimed at knowing the real perception of CSR of banks on customer behaviour in Mauritius. The foremost goal of the study was to determine whether customers are actually aware of the CSR initiatives carried out by the bank they deal with and whether they even have a concrete understanding of it. Findings brought light to the analysis that consumers are truly well aware of CSR practices of their preferred bank. Regarding the second aim, whether the buying intention of the consumers is affected by the CSR activities of their respective banks, it was discovered that CSR does have a significant and positive effect on customer buying intention. Finally, the third aim of the thesis is to investigate whether the CSR activities of banks have a direct and positive relationship with customer loyalty, satisfaction, and trust. The outcome showed that CSR activities of the customer's respective banks positively influence them to continue having a long-lasting liaison with the bank and positively impact customers' satisfaction also. However, in contrast, the finding concluded that CSR does not have a positive and direct effect on customer trust in the Mauritian banking industry.

The research findings demonstrated that banks should engage in CSR activities for the betterment of society as those activities show a positive increase in customer purchase intention, loyalty, and satisfaction toward the bank. It is clear that customers are more prominent to engage with banks that are benevolent and more charitable, thus banks in Mauritius should aim more on contributing more to socio-economic development, promote environmental protection, give charitable for the welfare of children from vulnerable groups, and work toward the eradication of absolute poverty. The findings show the importance of those activities that act as a marketing tool to attract customers and benefit the community. Hence, this study showed that when a bank prioritizes social responsibility, it may boost profits through increased client loyalty, a stronger reputation, and improved risk management.

Customers acknowledged that they were aware of the bank's CSR initiatives, but few of them were aware of the true meaning of CSR. Banks need to spend more on communication if they want to be more transparent about the CSR initiatives they are pursuing. Thus, CSR disclosure should not only be done through annual reports, but they should find alternative ways to reach out to more customers. An effective way of communicating CSR activities could be through social media platforms, which are highly used nowadays. Social media is a flexible way of communicating and be more informative about CSR activities being undertaken. It will reach out to a massive number of customers. Besides, banks can opt to communicate directly with their customers. The principle of direct communication like sending emails to customers about CSR activities and sustainability programmes is a great way for them to be aware of those activities.

The current study sheds light on how customer behaviour is affected by the CSR activities carried out by banks in Mauritius. And just like other studies, this study does have certain limitations that are addressed as follows. Due to time constraints, only 250 questionnaires were obtained. There was no way of knowing how genuine a respondent was or how much thought they must have put into completing the questionnaires and due to the respondent's busy life, some did not want to collaborate, while some found it a waste of time to fill out the questionnaires. Moreover, the questionnaires were sent only through Google Forms.

The limitations provided an opportunity for future research. More approaches like analysis of other mediating factors could have been analysed to provide an in-depth analysis and contribute to future studies. In-person interviews can bring a different aspect to the findings and future analysis. Future studies can also focus on the social demographic factors that are the different perceptions on CSR between generation Z and the millennials can be analysed as these groups can provide different perceptions and attitudes toward CSR activities.

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Level of Continuous Quality Improvement and Factors Affecting the Implementations of CQI in Public Hospitals - Addis Ababa, Ethiopia

Ketemaw Zewude Public Health Department in Reproductive Healths, at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia	Dessie Abebaw Public Health Department of Reproductive Healths, Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia	Baye Sisay Department of Public Management, Ethiopian Civil Service University, Addis Ababa, Africa	Getabalew Endazenaw Public Health Department of Reproductive Healths, Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia
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ABSTRACT : Background: In the health care sector quality is highly important to reduce the cost of care and Quality Improvement is also a proven, effective way to improve care for patients, residents, and clients, and to improve practice for staff. However, either internal or external factors like availability of leadership engagements, human resources participation, resources allocation, improper patient cooperation, or a quality culture among providers affect its implementation.

Objective: To assess the level of continuous quality improvement and factors associated with it in public Hospitals, Addis Ababa Ethiopia, 2021.

Methods: Institutional-based cross-sectional study design was conducted from April 30 to June 30, 2021, to investigate factors affecting continuous quality improvement in Gandhi Memorial Hospital and Minilk II Referral Hospital. A simple random sampling technique was used to select the study participants. A total of 384 study participants were involved in the study. Data was entered into EPI data version 3.1 and analyzed by SPSS version 25. Findings were presented in texts, tables. Multi-variety. Logistics regression was used to identify factors statistically associated with the outcome variable, with 95% confidence intervals and a p-value of less than 5% as a statistically significant association.

Result: A total of 384 staff participated with a response rate of 100%. More than half (52.1%) of the respondents were male. The overall level of continuous quality improvement was 77.6%. Variables of staffs participation, quality improvement plan (4.728(2.433-9.189)), use of indicators (0.44(0.209-0.925)), staffs recognition (0.267, 95% CI (0.128-0.564)), and staffs satisfaction (0.289 (0.106-0.791)) were the identified predictors of continuous quality improvement implementation in the study settings.

Conclusion: More than half of respondents have implemented continuous quality improvement and staff satisfaction, QI plan and indicators use are among the factors affecting continuous quality improvement implementation.

Introduction

Continuous quality improvement, also known as total quality control, is a management philosophy that aims to help organizations of all types improve performance by eliminating poor quality during the production or delivery of a product or service rather than attempting to fix the results after the product has been manufactured(1).

Another term for CQI is "Total Quality Management," which is a quality management system that demands everyone in the organization to work together to deliver services or products that consider quality from the standpoint of the customer. All services and goods must meet or surpass

the expectations of the customer. quality is an integral aspect of every stage of the manufacturing process under total quality management (2).

Delivering high-quality health service by health facilities is achieved through the implementation of continuous quality improvement and quality improvement is now a driving force in health care and is an essential aspect of service delivery at all levels(3, 4).

Because quality is such a broad word with so many definitions and interpretations, the term "continuous quality improvement" is frequently used to refer to techniques for enhancing treatment. quality improvement is a distinct management approach and collection of tools and strategies that are coordinated to guarantee that departments consistently meet their communities' health needs(5).

Quality Improvement is a tried-and-true method for improving patient, resident, and customer care, as well as staff practice. There are always possibilities to improve, streamline, develop, and test procedures in the healthcare system, and quality improvement should be a constant process and an inherent part of everyone's job, regardless of role or position within the company(3).Physicians and other health care providers in practice improvement (PI) and quality improvement activities are an important part of improving health care, improving patient and provider satisfaction, and lowering healthcare costs(6).

Continuous Quality Improvement in Health Care is a systematic organizational process in which physicians and other health care professionals plan and implement continuing proactive changes in care processes to provide high-quality health care outcomes(7).Quality improvement is now a driving force in health care, and it is a necessary component of service delivery at all levels(4).

Quality and safety in the health care sector are highly important was reduce the cost of care, prevent adverse healthcare outcomes, enhance the overall quality of care provided to the patient and maintain public confidence in the health sector. quality of Health Care is the degree to which health services for individuals and populations increased the likelihood of desired health outcomes and are consistent with current professional knowledge.

Continuous quality improvements are various road blocks to project implementation affected by deference factors, some of the factors are insufficient training of the staff this indicates there was less understanding about the quality improvement, lack of confidence, line supervisor resistance; Lack of management support for the quality improvement initiatives, poor monitoring system, physical resources, lack of Planning. Another important aspect for barriers is no proper planning for quality and Objectives are not being publicized, Mostly government hospitals are disorganized and the staff spends most of their time on non-value-added activities. Hence they are unable to concentrate on their quality improvement activities, Incompatible rewards, and compensation, (8).

In 2016,Ethiopia's ministry of health started a healthcare quality effort, with governance structures in place at the federal, regional, and sub-regional levels to supervise implementation. To achieve the health improvement strategy builds on some quality initiatives and tools that have been developed and implemented all of which have been aimed at improving the quality of health care delivery and services.From 2006 started national Health Care quality Strategy builds on existing quality initiatives within our Ministry and across Regional quality initiatives(9). Gandhi Memorial Hospital currently has more than 470 clinical and non-clinical staff and Minilik II Referral Hospitals has also more than 978 clinical and non-clinical staff, patients referred from all over the country. The two hospitals are dedicated to serving maternity service and other different service and it provides health care through different departments.

In light of the above preliminary examination of health-care quality is a key global concern in the healthcare delivery system. Many people are damaged during the healthcare delivery system, according to a World Health Organization study from 2017, resulting in lasting injury or death.

Medical errors are the third largest cause of death in the United States, according to this report.(10)Many low- and middle-income nations have adopted ambitious health policies and strategies to improve health service delivery (HSD) and achieve the health-related Millennium Development Goals, but they are having trouble putting them into practice (12).

There are several aspects that go into implementing continuous quality improvement programs in health care institutions to address quality issues. These elements include primarily leadership-related, human resource-related, planning-related, proper data analysis, and decision-making-related aspects, as well as work-processing-related factors. Moreover, it could be caused by knowledge gaps, incorrect applications of current technology, an organization's unwillingness to change, a failure to align practitioner incentives, or other factors(11).

The Ethiopian Ministry of Health has shown a strong commitment to enhancing health care quality by launching the fifth health sector transformation initiative (2016-2020), which prioritizes quality and equity. The country attempted to combine quality improvement solutions that solve quality issues while also speeding up the improvement process in the program of healthcare quality at all levels of healthcare establishments. However, the reality on the ground revealed a barrier in implementing continuous quality improvement across all health facilities. (12).Lack of adequate studies in the domain of continuous quality improvement implementation factors in the health facility, is the key problem in conducting this research. Because of its relevance not just in promoting health but also in affecting government budgets for the upkeep of health care settings, continuous quality improvement is becoming a major concern. As a result, reliable and timely giving care is critical to the effective operation of healthcare services and to support the government in making decisions about the provision of high-quality and treatment at the regional and national levels.

The importance of this research is thought to be in locating valuable evidence and resources to overcome problems in implementing continuous quality improvement. This research provided evidence and understanding for public health care, facilities to witness leadership involvement and employee commitment as a result of this increase the quality of health care delivery for clients in need of services and policy implementation gaps on ongoing quality improvement and ensuring the involvement of health care personnel and administrative staff must be addressed level of continual quality improvement researches, according to the researcher's knowledge, was not found in its published form today. As a result, this research is critical as a baseline for the Ministry of Health, health institutions, and individual researchers to enhance the health-care delivery system. This demonstrates a gap in continuous quality improvement implementation and identifying the factors that influence continuous quality improvement implementation, both of which aid in improving health care quality. As a result, the goal of this research is to determine the primary factor that influence efficiency. Further, the results of CQI is the curiosity of health experts and other researchers to undertake additional research in the area. This aids in proper healthcare management as well as the development of an evidence-based health care delivery system in the country.

Conceptual framework

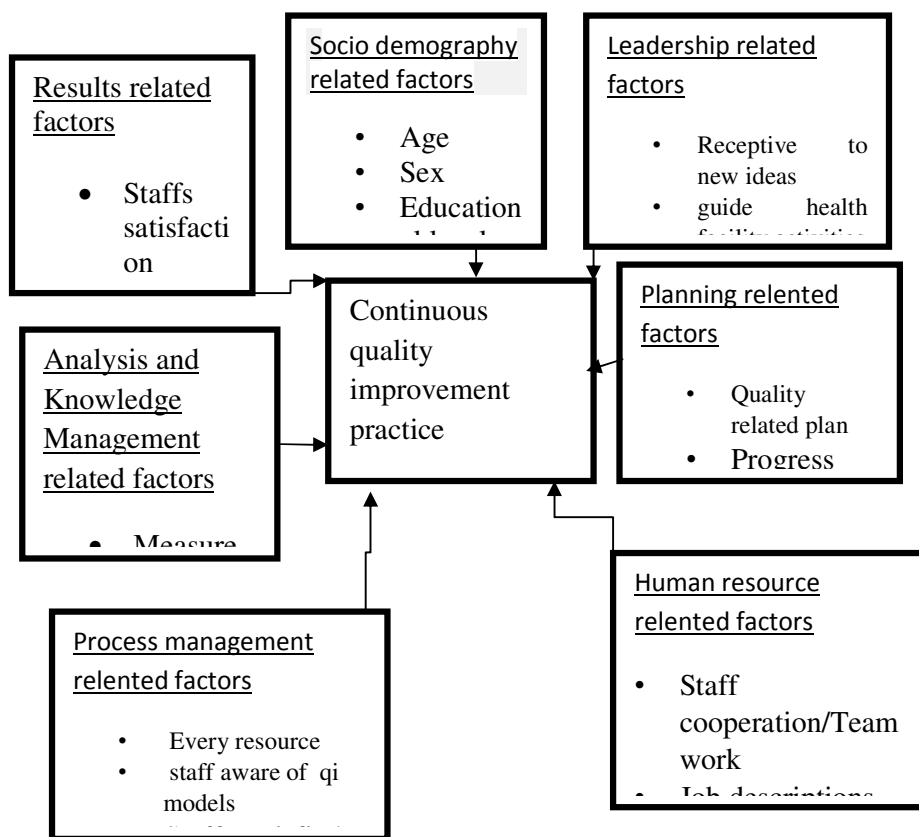


Figure 1 : Conceptual framework for implementing research (developed by the researcher after reviewing relevant literature) (33-36)

Method

Study area and period

This study was conducted in Gandhi Memorial and Minilik II Referral Hospital, Gandhi Memorial Hospital is found in Addis Ababa, Kirkos sub-city, near to Ethiopian Red Cross main office led by Addis Ababa Health Bureau. Gandhi memorial hospital is the only known Mother-child service hospital in Addis Ababa city administration. It was established in 1959. Currently with 470 employees from these 304 health professionals and 166 are the supportive staff.

And it has given different clinical services such as inpatient services, outpatient service, antenatal and neonatal, clinics which also include child and adult ART clinics and it also serves more than 1 million people, as a referral hospital providing the community with preventive and curative service for the Gynecologist and obstetric care. In 2020 Gandhi Memorial Hospital has served 48,133 clients and Menelik II Referral Hospital is also the earlier and historical public hospital established in 1909 found in, Addis Ababa in Yeka sub-city and it is lead by. Addis Ababa city administration health bureau, currently has 978 employees from these 633 health professionals and 345 are the supportive staff. The hospital has been serving more than 2 million populations as a referral hospital, with outpatient, inpatient, and emergency services providing all general service, urological, gynecological, orthopedics, ophthalmology, and emergency surgery services. There are 1448 total health workers in both hospitals, with 637 Healt Professionals and 511 administrative staff. The data gathering period lasted from April 30 to June 30 in 2021

Study design

An institution-based cross-sectional study was conducted was from October, 2020- January 4-10, 2021.

Source population

All employees working in Addis Ababa city administration government hospitals

Study population

An employee working in Gandhi Memorial Hospital, Minilik II Referral Hospital who were eligible according to the inclusion criteria from October 24, 2020- January 4-10, 2021.

Inclusion and Exclusive criteria

Inclusive criteria

- Employees who work in Gandhi and
- Minilik II Referral hospital for at least six months
- Employees volunteer to give consent.

Exclusion Criteria

- Employees less than six months of experience
- Employees who were critically ill
- Any medical students

Sample size determination

The sample size was calculated by using the single population proportion formula. The prevalence of the implementation of continuous quality improvement was 35% (30) CI = 95%, $\alpha = 0.05$,

$$n = \frac{(z_{\alpha/2})^2 P(1-P)}{d^2} = \frac{(1.96)^2 (0.35)(0.65)}{(0.05)^2} = 349, \text{ Considering 10\% contingency the sample size will be calculated to be } = 384.$$

Where n = required sample size

$Z_{\alpha/2} = 1.96$ (Z=score corresponds to 95% confidence level)

P= prevalence (35% is preferred to obtain the largest possible sample size)

D2= margin of error (0.05). N= total population.

Sampling technique and procedure.

A simple random sampling technique was used for the selection of sampling units. There are a total of 6 hospitals under Addis Ababa City Administration Health Bureau, from those 2 hospitals are selected (Gandhi Memorial Hospital and Minilik II Referral Hospital) by using simple random sampling (lottery) method and the calculated sample size was distributed to each hospital by proportion to population size then study participants were selected by using a stratified sampling method. This method was used to select participants from Gandhi Memorial Hospital and Minilik II Referral Hospital, from April 30 to June 30, 2021, which was 511 from supportive staff and 637 participants from health care providers.

From each stratum in Gandhi Memorial Hospital and Minilik II Referral Hospital simple random sampling technique with the first participant to be stratified again depending on their professional

status of health care provider, and then a simple random sampling technique was used to select each study participant from the stratum. The principal investigator was looking at the HRIS file and use a Hospital ID number to select study participants by using the lottery method. When the selected participant is absent from the working area due to medical conditions, Employees who do not give consent, Employees less than six months of experience, Employees who are mentally ill, Employees who are critically ill, or unpredictable events. For other reasons, the person with the next ID number was included in the study.

Study Variables

Dependent variable

- Continuous quality improvement implementation

Independent variables

- Socio demography characteristics (Age, Sex, Educational level, and Profession, Monthly income
- Leadership characteristics,(receptive to new ideas, guide health facility activities, Safe work environment, Share information, and Generate innovative ideas)
- Planning characteristics, (quality-related plan and Progress about service delivery)
- Human resource characteristics, (staff cooperation/Teamwork, Job descriptions, Trained on quality improvement, Improvement committee, and enough health staff).
- Process management characteristics, (making decisions about their work and Measure the quality).
- Workforce process characteristics, (Staff can get every resource they need to, Staff aware of QI models, and Staff satisfied with their work).
- Knowledge management characteristics, (Workplace relate and Knowledge and skill).

Operational definitions

Continuous quality Improvements implementation: For the current study, a health facility is considered to having a good continuous quality Improvements implementation don, if they scored above the median (38%) percent on constructs making up the continuous qualityImprovements implementation, otherwise poor if below the median (1),(30).

Data collection procedure

The questioners adapted from Malcolm Bridge national quality award criteria (MBNQAC) of a structured self-administered questionnaire that addresses the objective of the study were developed by the principal investigator for data collection. It contains seven sections includes Socio demography, leadership, planning relented, human resource, process management, workforce process, and knowledge management. The questionnaire was developed, first in English then translated into the local language by officially authorized personals, the data collectors were trained health providers (two BSC nurses and two Health officers).

Data quality assurance

The data collectors were trained by two BSC nurses and two health officers who have to work at Gandhi Memorial Hospital and Minilik II Referral Hospital. Data consistency and completeness were checked, throughout the data collection process. Pre-testing was conducted one week before at Zewditu Memorial Hospital on 5% of study participants (18 participants), by using the Cronbach alpha test73%. Continuous supervision will be done by the principal investigator to control the data collection procedure and completeness of all the data forms. Each data collector

checked the data for its completeness and missing information during data collection. The data was cross-checked and corrected by the investigator before analysis.

Data analysis

Data was entered into EPI data version 3.1 and analyzed using SPSS version 25, analysis was described by frequency distribution, mean, median mode, an SD would be used, tables, graphs, and paragraphs were used to display the main finding of the response given by the participants. Multivariate Logistic regression was used for the variables having a p-value is ≤ 0.2 to analyze the association b/n dependent and independent variables. Results are claimed to be statistically significant when the p-value is equal to or less than 0.05. Odds ratio along with 95% CI was used to determining the strength of association.

Results

Socio-demographic characteristics

A total of 384 health professionals and administrative staff participated in this study. All of them were willing to participate and replied, giving a response rate of 100%. More than half of the respondents, 200 (52.1%) were male. More specifically by age group, less than half of the respondents, 187 (48.7 %), were found with the age group of between 21 and 30 and 130(33.9%) were between 31-40 years. Concerning the type of profession, 104 (27.1 %) of the respondents were nurses followed by physicians, 79 (20.6 %). On the other hand by their educational level of the respondents showed that more than half of the participants, 228 (59.4 %) have first degree holders followed diploma, 95 (24.7%. The majority of the respondents, 253(65.9%) were from the clinical service area. (Table 1)

Leadership characteristics

From 384 respondents, 167(43.5%) said that the hospitals didn't implement continuous quality improvement in the last year whereas, 252(65.6%) half of the respondents had not got the opportunity to participate in a quality improvement,194(50.5%) of the respondents had said that their leaders were not receptive to a new idea while 182(47.4%) said that the leaders did not use the values of the organization to guide health facilities activities. According to the respondent's rate 191(49.9%) leaders did not share information about health facility service delivery status. 229(59.6%) of the study participants said that leaders were not creating a safe work environment. Of the total respondents, 187(48.7%) did not perceive that leadership encourages learning that will help all employees advance their knowledge. 180(46.9%) of the study participants have responded that the leadership didn't encourage employees to generate innovative ideas whereas 175(45.6%) have responded that leaders were not engaged in quality improvement implementation action(Table 2)

Planning characteristics

Among 384 respondents more than half, 197 (51.3%) of the respondents said that the health facility has a quality improvement project plan while the 166(43.2%) of the participants said that the hospitals solved quality-related problems by establishing multi-disciplinary team whereas 161(41.9%) said by assessment. Of the total respondents, 236(61.5%) did not know how to plan a quality improvement project. 198(51.8%) health facilities didn't use indicators to tell progress about service delivery. (Table 3)

Human resource characteristics

Among all participants majority of them, 243 (63.3%) have revealed that staff members have an effort to improve their working habit, while 85(22.2%) had not, and 50(13%) of the respondents

did not know at all, 190(49.5%) of the respondent said that sometimes, all staff members were cooperative and worked as a team while 155(40.4%) were always cooperative and worked as a team while 39(10.2%) of respondents did not cooperate at all. 216 (56.3%) said that their preference to improve the medical service delivery system in the hospital was to work as a team. Most of the respondents responded that 218(56.8%) all Staff has job descriptions including specific responsibilities of the Staff while 52(13.5%) had not at all. 199(51.8%) of the study participants were given QI training.196(51%) of the staff said that the hospitals were established quality improvement departments independently. 115(29.9%) of the staff were absent and 73(19%) of the staff didn't know.149(64.8%) of the respondents said that the hospitals have established performance monitoring teams and 136(35.2%)of the staff did not know the establishment of performance monitoring. 235(61.2%) of participants said that the health facility had no enough. 164(42.7%) of the participants responded that the hospitals were supported by external quality experts. 151(39.3%) of study participants said that the hospitals have been recognized for their work. (Table 4)

Measurement and analysis characteristic

Measurement and analysis characteristics of 384 participants, 88(22.9%) of them had responded that all staff of the health facilities has known how to measure the quality of their work while 102(26.6%) of respondents said that they didn't know at all. 65(16.9%) of the respondents said that hospital Staff has known how to analyze the quality of their work to see if changes are needed. Out of the total participants, 236 (61.5%) of the respondents said that staff used the analysis for making decisions about their Work. 63(16.4%) of the study participants said that the hospital staff has got all the important information they need to do their work while129(33.6%) of them didn't get any important information about their work. (Table 5)

Process management characteristics

Out of the 384 respondents, 248 (64.6%) of them said that they got some resources needed to do their job and 73(19%) of them said that they were getting every resource needed and the rest, 63(16.4%) said that nothing was available. Out of the total respondents,58(15.1%) of them said that their health facility staff were aware of QI models, and utilize them while 263(68.5% of respondents said that staff was awarded quality improvement but not properly used it. On the other hand, 86(22.4%) of the respondents said that they thought that it is very easy to implement the steps to develop the quality improvement projects while 159 (41.4%) of the respondents said that it is moderately easy to implement and 75(19.5%) of them said that it is quite difficult to implement. (Table 6)

Result related characteristics

Among 384 study participants, more than half of the respondents 217 (56.5%) said that they were not satisfied with their work while 84(21.9%) were satisfied and 83(21.6%) of respondents were neutral. 143(37.2 %%) of the respondents didn't think that their health facility uses staffs' talent well while 77(20.1%) of participants didn't think so. Of the total participants, 69(18%) of the participants said that their health facility was removing almost all barriers for quality improvement implementation. Out of all 172(44.8), respondents said that they were removing some barriers and 143(37.2%) did not know. The majority of the respondents, 206 (53.6%) thought that quality improvement project implementation could contribute to improving the respective hospitals for their work while 25(6.5%) didn't think so. Among the participants, 93(24.2%) of the respondents believed that quality knowledge was the factor critical to the successful implementation of a quality improvement project while 86(22.4%) were agreed that employer involvement was very crucial, following this, while, 79(20.6%) believed that leadership could be important about quality and 66(17.2%) of them said that teamwork could be best to contribute the successful implementation of a quality improvement. On the other hand, 27(7%) of the study participants said

that enough resources could be the factor for the successful implementation of a quality improvement implementation (33(8.6). (**Table7**)

Factors affecting continuous quality improvement

In the bi-variate logistics regression; Variable that was significantly associated were included ever got the opportunity to participate in a quality improvement implementation, hospitals prepared a quality improvement plan, organizations implement quality improvement in the last year, staff use indicators to tell progress about service delivery, in your working area leaders receptive to new ideas, leaders share information about health facility service delivery status, staff recognized for their work, leadership encourages employees to generate innovative ideas, staff satisfied with their work, leaders engaged in quality improvement, quality improvement implementations could contribute to improving the work, health facility establish a performance monitoring team and health facility have enough staff. Variables that are associated significantly in the multi-variate logistics regression includes:- quality improvement implementations could contribute to improving the work, staff satisfied with their work, staff recognized for their work, staff use indicators to tell progress about service delivery, opportunity to participate in a quality improvement implementation and hospitals prepared a quality improvement plan.

The bi-variate logistics regression, ever got the opportunity to participate in a quality improvement implementation, Hospitals prepared a quality improvement plan, Staff use indicators to tell progress about service delivery, Staff recognized for their work, Staff satisfied with their work, and quality improvement implementations could contribute to improving the work at your unit. Were the non-implementation of continuous quality improvement was 70.7% higher among workers who never had an opportunity to participate in quality improvement compared against those who ever had participated (AOR:0.293, 95%CI: 0.117-0.732, P<0.01). Hospitals that didn't prepare a quality improvement plan was 5 times more likely to prepare and implement continuous quality improvement plans than staff prepared quality improvement plan (AOR=4.728,95%CI:2.433-9.189, CI, P<0.1). The odds of non-implementation of continuous quality improvement was 56% higher among staff who didn't know the use of indicators to tell progress about service delivery compared against those who use indicators to tell progress about service delivery (AOR: 0.4495%CI:0.209-0.925,p<0.05). While the odd of non-implementation of continuous quality improvement was 73.3% higher among Staff who didn't recognize for their work compared against those who were recognized for their work (AOR: 0.267,95%CI:.128-0.564,p<0.01).In another way, the odds of non-implementation of continuous quality improvement was 71.1% higher among Staff who did not satisfied with their work compared to those who were satisfied with their work (AOR:0.289,95%CI:0.108-0.791:P<0.05). But the odds of non-implementation of continuous quality improvement was 76.4% higher among staff who had neutral satisfaction with their work compared against those who were satisfied with their work (AOR: 0.23, 95%CI: 0.80-0.698: p<0.01). On the other hand, the odds of non-implementation of continuous quality improvement was 75.8% higher among Staff who didn't believe that quality improvement project implementations could contribute to improving work at their unit compared against those who believed that Quality improvement project implementations could contribute to improving for their unit (AOR: 0.242,95%CI:0.094-0.624,p<0.01). But the odds of non-implementation of continuous quality improvement was 56.2% higher among staff who believed that to some extent quality improvement project implementations could contribute to improving work at their unit compared against those who believed that quality improvement project implementations fully contribute to improving work at their unit(AOR:0.438,95%CI:0.25-0.758, P<0.01). (**Table8**)

Discussion

The aspects connected with the execution of continuous quality improvement are grouped into six theme areas in this study: leadership, planning, human resource management, process management, measurement and analysis and result characteristics. According to the findings, 22.4

percent of the participants in this survey did not adopt continuous quality improvement. The results are better than those of research performed in the South Nation Nationality People Region, which found that 35% of respondents said their institution did not adopt continuous quality improvement. (30).

This is due to the high degree of professional involvement in this study, which included administrative staff and employees who had sufficient resource to support the implementation of continuous quality improvement. In this study, not-implemented continuous quality improvement among workers who never had an opportunity to participate in a quality improvement was 65.6% which is lower than those who had participated. A similar study conducted at St Poul Milinum medical college Hospital showed that not continuous quality improvement implementation among workers who never had an opportunity to participate in a quality improvement was 80.6% which was higher, this is the fact that workers had got the opportunity to participate in CQI more experienced (25).

The opportunity not to participate in quality improvement implementation of continuous quality improvement had an association with continuous quality improvement implementation inline study conducted in St Paul Miliniem Medical college (25).

Because this is the fact that the opportunity to participate in quality improvement implementation can improve continuous quality improvement implementation. In this study, staff were not recognized for their work which was (34.9%) lower than the study conducted in the Southern Nations Nationalities and Peoples Region of Ethiopia (38.9%) (30)

Hospitals that didn't prepare a quality improvement plan was less likely to prepare and implement continuous quality improvement plans than staff prepared quality improvement plan 73.3% which was less than the study conducted in Southern Nations Nationalities and Peoples Region 86.2% ((30) because in this study there was a high level of professionals involvement including administrative staff and workers had got enough resources and information that support to prepare a plan on quality improvement.

The staff did not use indicators to tell progress about the service delivery of non-implementation of continuous quality improvement was 51.6% higher among staff who didn't use of indicators to tell progress about service delivery as a compared study conducted in South nation nationality people Region which was 28.7% (30).

In this study, the Staff did not satisfied with their work (29.2%) which is less than the study conducted in the South nation nationality people region (61.7%) (30) this is due to leadership engagement, administrative staff involvement, study site is urban and comfortable to the staff.

Staff who didn't believe that quality improvement implementations could contribute to improving work at their unit (6.5%) which is less than the study conducted in south nation nationality Region, (30.9%) (30), compared to those who believed that quality improvement implementations could contribute to improving their unit. But the odds of non-implementation of continuous quality improvement was 56.2% higher among staff who believed that to some extent quality improvement project implementations could contribute to improving work at their unit compared against those who believed that quality improvement project implementations fully contribute to improving work at their unit.

Conclusions and Recommendations

Conclusion

Based on the finding from this study the following points conclude about continuous quality improvement project implementation factors:

The level of continuous quality improvement implementation in the included hospitals was better achievements than previous research. I identified high factors affecting the continuous quality improvement implementation such as quality improvement implementations could contribute to improving their work, staff satisfaction with their work, staff recognized for their work, staff use indicators to tell progress about service delivery, opportunity to participate in a quality improvement implementation and hospitals prepared a quality improvement plan.

Recommendation

After analyzing the major findings from this study the following recommendation was forwarded to Public Hospitals.

- ❖ A strategic quality improvement plan shall be developed by each respective hospital to implement the continuous quality improvement implementation effectively
- ❖ The satisfaction level of all staff shall be boosted for better implementation of continuous quality improvement implementation.
- ❖ Hospitals should be recognized by all staff with their work and the hospital chief executive and the quality team should enhance staff use indicators to tell progress about service delivery,
- ❖ The health facility should be inviting staff to participate during the quality improvement preparation plan.

List of Acronym

AARHB	:	Addis Ababa Regional Health Bureau
ANC	:	Antenatal Clinic
CI	:	Continuous Improvement
CQI	:	Continuous Quality Improvement.
FMO	:	Ministry of Health.
HMC	:	Hospital Medical College
HO	:	Health Officer.
HRIS	:	Human resources information system
IHI	:	Institute for Health Care Improvement.
IOM	:	Institute of Medicine.
LHD	:	Local Health Departments.
PI	:	Physicians in Practice Improvement.
PRCMM	:	Performance Review and Clinical Mentoring Meeting.
QI	:	Quality improvement
REC	:	Reaching Every Community
WHO	:	World health organization

Ethics approval and informed consent

A support letter was received from the Y12HMC research publication office then ethical approval and clearance were obtained from Addis Ababa public health research and emergency management directorate to the three selected public hospitals.

Permission letter would provide to Menelik II Referral Hospital, Yekatit 12 Hospital Medical College, and Rasdesa Damtew Hospital chart documentation office to proceed with data collection. Anonymity will be assured on the data retrieval form by omitting names, telephone numbers, and chart numbers of patients, and confidentiality of the information from an individual chart are maintained.

Consent form for the study subjects

I the undersigned have been informed about the purpose of this particular research project and I have been informed that the information I give will be used only for the study. Besides, I am also informed that my identity, as well as the information I will be providing, will be kept confidential. Based on this, I agree to participate in the research voluntarily.

Data sharing statement

All relevant data were included in the manuscript.

Conflict of interest

The authors have no conflict of interest relevant to this article.

Authors' Contribution

The first authors developed the proposal, undertook the literature search and review, and then collect and analyse the data under supervision of my respective advisers. The second and the 3rd authors give constructive comments and guidance and work with the main author with respect to the research objective.

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A Review of The Legal Framework on Money Laundering And Terrorism Financing In Mauritius In The Context of The Trade Relationship Between Mauritius And India

Bhavana Mahadew

Senior lecturer

School of Business Management & Finance

University of Technology, Mauritius

Bhavana.mahadew@utm.ac.mu

ABSTRACT : This paper provides for an overview of the legal framework on money laundering in Mauritius. With the volume of trade being conducted between Mauritius and India, it is apposite for attention to be given to the high potential of money laundering occurring within this trade relationship. Increased trade between India and Mauritius can be a great thing, but it can also be a significant and non-negligence source of money laundering, as the Financial Action Task Force (FATF) has identified a long range of risk indicators related to trade-based money laundering. Hence, knowledge of Mauritius's legal framework regarding money laundering is pertinent and timely for the academic community, decision-makers in government, and business professionals. There is no question that such an effort must also be reciprocal, with Mauritian counterparts gaining some adaptability with the Indian framework for combating money laundering in order to make it simpler to identify, stop, and prosecute cases of money laundering within the trade arrangements between Mauritius and India.

Keywords: Mauritius, India, Money laundering, FAFT, Legislations.

Introduction

Mauritius and India share a strong cultural, political and economic relationship given that 70% of the Mauritian population are of Indian origin. Since independence, the various governments have succeeded in maintaining and nourishing this privilege tie that the country has with India. Amongst other things, this has resulted in an imported volume of business and trade between these two countries. On February 22, 2021, Mauritius and India signed the Comprehensive Economic Cooperation and Partnership Agreement (CECPA), which became effective on April 1, 2021. Eight chapters and 16 annexes make up the CECPA, which covers topics like trade in goods, rules of origin, sanitary and phytosanitary measures, technical trade barriers, trade in services, and dispute resolution (Mauritius Trade, 2023). Mauritius exporters receive privileged market access for a selection of 615 products in international trade. With tariff rate quotas on about 100 products, including spices, tea, plastic items, hardwood furniture, and parts for motor vehicles, Mauritius offers privileged access to 310 products. Additionally, both Parties concurred that negotiations to extend preferential market access on a list of goods that interest each Party should continue after the Agreement enters into force.

India has pledged to opening up its market to approximately 94 service industries, including professional, business, financial, and telecommunication services. The Agreement also establishes a framework for Professional Bodies of the two nations to negotiate mutual recognition of educational and professional credentials in the fields of architecture, engineering, medicine, dentistry, accounting and auditing, nursing, veterinary medicine, and company secretariat within a year of the Agreement's entry into force. This would strengthen Mauritius' position as a center of learning for Indian students. The CECPA includes a chapter on economic cooperation as well. Over 25 industries are covered in this chapter, including those in the pharmaceutical, agro-industrial, small and medium-sized business (SMB), manufacturing, ocean economy, information and communications technology (ICT), and financial services sectors, among others.

The Financial Action Task Force (FATF) has identified an extensive list of risk factors related to trade-based money laundering which makes it evident that an increased volume of trade between India and Mauritius, while being a great thing, can also be an important and non-negligence source of money laundering (FATF, 2021). It is therefore relevant and timely for the academic community, policy makers and trade practitioners to be conversant with the legal framework on money laundering in Mauritius. There is no doubt that such an attempt must also be reciprocal with Mauritian counterparts developing a certain degree of versatility with the Indian money laundering framework for a greater ease of deciphering, preventing and prosecuting cases of money laundering within the trade relationship between Mauritius and India.

This informative paper therefore provides for a detailed legal framework on money laundering in Mauritius with relevant case law cited. It adopts a doctrinal approach in terms of methodology as it reviews laws and regulations pertaining to the combat against money laundering with a general sense of understating the main question of 'what is the law' in connection with this particular type of financial offence.

Money laundering has a negative influence on organisations all around the world (Lowe, 2017). According to the UNODC, between two and five percent of the world GDP, or \$800 billion and \$2 trillion, is estimated to be laundered abroad annually. The prevalence of this fraudulent activity makes terrorist plots easier to execute and might even skew the market. Financial institutions paid a total of \$10.4 billion in fines and penalties worldwide in 2020 for breaking the Know Your Customer (KYC), anti-money laundering, data privacy, and Markets in Financial Instruments Directive (MiFID) legislation.

Criminals employ money laundering as a technique to conceal the ownership and genuine source of the profits they make from their unlawful activity. If done properly, it allows them to maintain control over those revenues and, ultimately, provides them with a trustworthy justification for where their money comes from. Since it is by definition a clandestine business, it is challenging to estimate the size of the problem or the amount of illicit funds produced locally or globally every year. Yet, failing to block the laundering of money earned through illicit activity allows criminals to profit from their actions, making crime a more enticing endeavour (Strafer, 1989: 149). Money is essential to a country's economy, and if money laundering is not addressed and prevented, it can have detrimental and far-reaching effects. Enterprises both domestically and abroad may be impacted, which would have a negative impact on society as well as the economy. What does it mean when it is said that the money in circulation is "dirty"?

Unstable Money Demand

For money launderers, the cash input and outflow are simple. Spending rates rise as a result of the nation's unconstrained and rapid money flow. Imports, exports, the balance of payments deficit, inflation, interest rates, and unemployment might all see considerable increases. The numerous requests for money related to black money will have a detrimental impact on monetary policy (acharya & Madhur, 1983). The global reach of these fraudulent activities affects market stability, and financial crises in one nation can spread to others. Whether or not the demand for money is predictable determines how central banks' monetary policies are impacted. One possible explanation for the central banks' unsuccessful policies is the effect of black money on money demand.

Loss Of Government Revenue

Money laundering makes it difficult for the government to collect taxes from related transactions. The fall in tax collection also results in a reduction in overall government income. Losses of public funds can be detrimental to institutions that rely on them, such public hospitals. Taxes account for the vast majority of all public funding. If income is low, there is a strong probability that public revenue will fall short of public expenditures, which could result in budget deficits (Quirk, 1996).

Instability Of Financial Institutions

If financial institutions unknowingly engage in money laundering, their assets and obligations could quickly change. The public authorities are alerted by reports of money laundering at particular banking institutions, which prompts a closer review of those organisations' auditing and harms their reputation (Korejo et al, 2022: 671).

Distortion Of Markets

The availability of commodities at prices below the cost of production restricts the growth of the private sector. In order to launder their money, criminals may change prosperous businesses into unprofitable ones. In the end, this makes it difficult for enterprises to compete, which has an effect on the productivity of the economy. In addition, money laundering can result in irregular variations in the demand for money as well as significant volatility in global capital flows and exchange rates (Novaro et al, 2022).

Corruption

If criminal enterprises are made legitimate, money obtained via illicit activity can be used to fund them. Both society and the economy are impacted by money laundering. It gives criminals economic sway over the populace, the government, and the market, which promotes crime and corruption.

Brief literature review

Criminals must always be prevented from converting "dirty" money into "clean" money in order to legalise the proceeds of their crimes, which is crucial in the fight against crime. The ability to launder money through the financial system is an essential element of criminal activity success. Money launderers must use the tools provided by the global financial sector companies if they hope to make money off of their activities (Naheem, 2016: 135). Unchecked use of the financial systems for this purpose raises the risk of jeopardising particular financial institutions and, ultimately, the entire financial sector. The growing global financial system integration, the lifting of limits on the free movement of cash, and the growth of electronic banking have all contributed to the ease with which unlawful money can be laundered and the difficulty in tracking it (Brown & Gillespie, 2015: 371).

The ability to attract and hold onto legally acquired money is crucial to the long-term prosperity of any financial industry in the world. The term "ecosystem" refers to a group of people who work in the construction industry. Honest depositors are deterred, and financial systems' reputation and integrity are compromised. Anyone or any organisation involved in a money laundering incident stands the risk of being prosecuted and losing their reputation in the marketplace.

Stages Of Money Laundering

The three steps of the normal laundering process are as follows. Throughout each stage, the launderers may engage in a number of transactions that could arouse suspicions of money laundering: Placement - Placement is the actual physical disposal of the first unlawful proceeds from criminal activity; Layering - the technique of separating illegally obtained funds from their source by creating a complicated web of financial transactions that conceals the audit trail and provides anonymity; Integration- giving the impression that money gained illegally is legitimate. Integration plans would reintroduce the cleaned-up revenues into the economy in a way that would make them appear to be regular business money when they reentered the financial system if the layering process was successful (Schneider, 2008: 387).

Because financial sector organisations handle deposits, efforts to curb money laundering have historically concentrated there because that is where the launderer's activities are most likely to be discovered. Criminals have only recently realised, meanwhile, that putting cash into institutions in the banking sector can frequently lead to more enquiries. There have been various attempts to convert or combine illegally obtained money with legitimate cash profits before it enters the financial system in order to make it harder to identify at the placement stage. Examples include the use of "smart" cards and wire transfers, both of which are challenging to trace (Filipkowski, 2008).. Financial institutions should therefore consider the money laundering risks posed by the products and services they offer, particularly in cases where there is little to no face-to-face interaction with clients.

Given that they provide a variety of money transportation services, all financial institutions are prone to being employed in the placement stage of money laundering as well as the layering and integration stages. Electronic funds transfer services, which make it possible to easily move cash deposits between accounts with different identities and in different countries, increase the vulnerability.

A few financial institutions may also be the target of sophisticated criminal organisations and their "professional money launderers." To move their illegal funds from one jurisdiction to another, such organisations will create up significant but fictitious international trading activities, possibly utilising front businesses and candidates as a cover. They will use made-up letters of credit to further obscure the situation while faking foreign trade by artificially inflating invoices to produce what seem to be legitimate international wire transfers (Chhina, 2016: 160). In order to finance the business activity, several of the front firms may even seek their lenders for financing. Banking institutions that support foreign trade should be on the watch for different forms of laundering.

The State of the Republic of Mauritius has made clear through a number of actions that it is fully committed to preventing money laundering and the financing of terrorism. On December 23, 1997, Mauritius agreed to the Mutual Evaluation process and the 40 Financial Action Task Force (FATF) recommendations. The Financial Action Task Force is the organisation in charge of establishing international guidelines for fighting money laundering (FATF). The FATF was established at the G-7 Summit, which took place in Paris in July 1989. It published its Forty Recommendations in 1990, outlining the fundamental guidelines for initiatives aimed at preventing money laundering. The Mutual Assessment procedure and the 40 Financial Action Task Force (FATF) recommendations were accepted by Mauritius on December 23, 1997. The term "ecosystem" refers to a group of people who work in the construction industry (FATF). The FATF was founded at the G-7 Summit in Paris in July 1989. It published its Forty Recommendations in 1990, outlining the fundamental guidelines for initiatives aimed at preventing money laundering (Bank of Mauritius Guidelines, 2005).

Also, on October 20, 2000, Mauritius consented to follow the guidelines established by the United Nations Minimum Performance Programme, which was ratified at the Global Programme Against Money Laundering Plenary meeting in the Cayman Islands. The UN Convention against Transnational Organised Crime and the UN Convention against Illicit Trade in Narcotic Drugs and Psychotropic Substances, often known as the Vienna Convention, were also approved by the Government of Mauritius (also known as the Palermo Convention).

The Economic Crime and Anti-Money Laundering Act 2000 was passed by the government in June 2000 and became effective in Mauritius on July 7, 2000. The Economic Crime and Anti-Money Laundering Act of 2000 encompassed fraud and corruption. The Economic Crime and Anti-Money Laundering Act 2000 was eventually repealed and replaced by the Financial Intelligence and Anti-Money Laundering Act 2002, which gave a Financial Intelligence Unit (FIU) clear authority to gather, analyse, and disseminate information. Since June 10, 2002, Mauritius has been operating under this Act (Beebeejaun, 2022).

Among other things, it mandates that financial institutions report suspicious transactions to the FIU right away rather than the Bank of Mauritius as was the case in the past. However, the Economic Crime and Anti-Money Laundering Act 2000's corruption provision is not included in the Financial Intelligence and Anti-Money Laundering Act 2002. It was included in the Prevention of Corruption Act of 2002, which also provided that offences involving money laundering would be looked into by the Independent Commission Against Corruption formed under that Act.

Regulations (G.N. No. 79 of 2003), which went into effect in Mauritius on June 21, 2003, were announced on June 19 under the Financial Intelligence and Anti-Money Laundering Act of 2002. They include provisions for identification verification and record keeping. The Financial Intelligence and Anti-Money Laundering (Amendment) Regulations 2005 (G.N. No. 117 of 2005) and the Financial Intelligence and Anti-Money Laundering (Amendment) Regulations 2006 have updated these Regulations, among other things, to better account for eligible and group introducers (G.N. No. 127 of 2006). The Anti-Money Laundering (Miscellaneous Provisions) Act was also approved by Parliament on September 16, 2003. The Financial Sector Assessment Program (FSAP) mission of the World Bank and International Monetary Fund made recommendations that led to the development of the Act. As a result of the Act, significant modifications were made to Mauritius' institutional and regulatory framework for anti-money laundering. Mauritius was a founding member of the Eastern and Southern Africa Anti-Money Laundering Organization (ESAAMLG). The ESAAMLG is now recognised by the FATF as an associate member.

The main pieces of legislation pertaining to money laundering are the Anti-Money Laundering (Miscellaneous Provisions) Act 2003, the Financial Intelligence and Anti-Money Laundering Regulations 2003, the Financial Intelligence and Anti-Money Laundering (Amendment) Regulations 2005, the Financial Intelligence and Anti-Money Laundering (Amendment) Regulations 2006, and the Prevention of Money Laundering Act. The primary pieces of legislation that deal with terrorism financing are the Convention for the Suppression of the Financing of Terrorism Act, the Prevention of Terrorism Act 2002, the Prevention of Terrorism (Special Measures) Regulations 2003 (G.N. No. 14 of 2003), the Prevention of Terrorism (Special Measures) (Amendment) Regulations 2003 (GN No. 36 of 2003), and the Financial Intelligence and Anti-Money Laundering Act (FIU, 2023).

Unknowingly or intentionally, people may utilise the services of financial institutions to move money used for terrorist attacks and the means by which they are carried out. Terrorism may have a different ultimate purpose than other unlawful activities, which normally attempt to generate money. To carry out their goals, terrorists still want financial support. Like any other criminal organisation, a successful terrorist organisation needs to be able to build and maintain an effective financial infrastructure. To accomplish this, it must first develop financial sources, a means of money laundering, and finally a means of ensuring that the funds can be utilised to purchase the supplies and other logistical equipment required to carry out terrorist activities (Keatinge & Danner, 2021).

Therefore, financial institutions should take precautions to avoid acting as a conduit for such activities and use their current money laundering policies and procedures, existing due diligence requirements, and enhance them as necessary to detect transactions that may potentially involve terrorist funds. Financial institutions should review their activities in this area as part of their routine internal and external audit procedures. Financial institutions are advised to consider the risks outlined by the FATF in its Report "Emerging Terrorist Financing Risks," which was released in October 2015, while assessing their policies, procedures, and mandated due diligence. In light of the Report's assessment of the methods and strategies for funding terrorism, they should strengthen their systems and controls (Aamo, 2017).

Closely linked to money laundering is the issue of financing of terrorism. There are two main sources from which terrorist financing may originate, while there are other important sources as well. Wealthy individuals and nations or organisations with substantial infrastructures that can

raise money and then give it to them are the primary sources of funding for terrorist organisations. The second main way that terrorist organisations are funded is through direct income from various "revenue-generating" operations. A terrorist organisation, like a criminal organisation, may get funds from criminal activities or other unlawful endeavours, such as large-scale smuggling, various types of fraud, theft and robbery, and drug trafficking (Freeman, 2011).

Yet, in contrast to criminal organisations, money for terrorist organisations occasionally comes from legitimate sources, like contributions, or from a combination of legitimate and illicit sources. Terrorist organisations are distinguished from more traditional criminal organisations by the fact that they derive their funding from legal and ostensibly legitimate sources. The FATF has emphasised that numerous law enforcement investigations and prosecutions have uncovered a connection between a commercial enterprise and terrorist organisations, including franchised restaurants and used car dealerships, where money from the commercial enterprise was being used to support the terrorist organisation (Raphaeli, 2003).

Community canvassing and fundraising efforts are two incredibly effective ways to raise funds for terrorism. Such fundraising initiatives are typically carried out under the auspices of organisations that are legally recognised as charitable or assistance organisations. In many cases, the organisations that accept donations are legitimate in the sense that they engage in some of the activities they advertise. The bulk of the group's members are not aware that a portion of the donations the charity receives are being used for terrorist activities in a pattern that may be identified. The collection of membership dues and/or subscription fees, the sale of publications, cultural and social events, door-to-door solicitation within the community, appeals to wealthy members of the community, and donations of a portion of one's own earnings are just a few of the specific fundraising techniques that may be used.

The methods used by terrorists and their allies to obtain money from illegal sources are substantially similar to those used by well-established criminal organisations. Terrorists frequently need to conceal or detangle connections between their funding and their legitimate funding sources, even though income from legal sources does not need to be "laundered." Thus, terrorists must devise ways to launder these funds in order to use them without catching the attention of law enforcement. After examining terrorist-related financial operations, FATF experts came to the conclusion that terrorists and the organisations that support them frequently employ the same strategies employed by criminal organisations to launder money.

One or more of the specific strategies used by different terrorist organisations have been identified as cash smuggling, deposits into or withdrawals from bank accounts, purchases of different financial instruments (traveler's checks, bank cheques, money orders), use of credit or debit cards, and wire transfers. The terrorist's main objective is not to make money via his methods of fundraising, but to gather resources to pay for his crimes. The route that fund transfers take would therefore be crucial for tracking down terrorist financing. A determination in this regard may be made on the basis of recurring, comparable transactions from a single account or from a number of accounts maintained in the same institution by various persons (Gomez, 2010: 4).

When terrorists obtain funding from reliable sources, it is more difficult to find and trace these funds (donations, sales of publications, etc.). For instance, it has been claimed that several terrorist organisations receive substantial funding from charities, non-profits, and other legitimate businesses. Due to the funding's apparent legal source, it may initially seem as though there are few, if any, indicators that would make a particular financial transaction or series of transactions stand out as related to terrorist operations. It is more difficult to identify terrorist financing because of other important factors including the volume and type of the transactions involved. A number of FATF experts claim that financing terrorist operations does not always require large sums of cash and that the transactions involved are frequently straightforward and include the transfer of small amounts via wire transfers. Improved due diligence techniques are therefore required to uncover

terrorist financing. Financing terrorism is a crime in and of itself, but it also acts as a cover for money laundering (Teichmann, 2019).

The Financial Intelligence and Anti-Money Laundering Act 2002

First explicitly addressing the risks of money laundering in Mauritius was the Economic Crime and Anti-Money Laundering Act 2000. The Economic Crime and Anti-Money Laundering Act was abolished on April 1, 2002, by the Prevention of Corruption Act of 2002. The Financial Intelligence and Anti-Money Laundering Act of 2002 (hereafter referred to as FIAMLA) was enacted by Parliament on February 27, 2002, and it became effective on June 10, 2002. In response to the examination of our legal system conducted by the joint IMF/World Bank Financial Sector Assessment Program Mission, the Anti-Money Laundering (Miscellaneous Provisions) Act 2003 updated the Financial Intelligence and Anti-Money Laundering Act 2002.

From the Economic Crime and Anti-Money Laundering Act 2000 to the FIAMLA 2002

The Economic Crime and Anti-Money Laundering Act of 2000 mandated that financial institutions alert the Bank of Mauritius to any dubious transactions. In compliance with the FIAMLA, any allegation of money laundering must now be reported directly to the Financial Intelligence Unit. The Economic Crime Office, which was also established under the Economic Crime and Anti-Money Laundering Act of 2000, was mandated to investigate money laundering offences. The Independent Commission Against Corruption is responsible of conducting investigations into offences involving money laundering, per the Prevention of Corruption Act of 2002.

The Economic Crime and Anti-Money Laundering Act of 2000 did not have any provisions for regulatory agencies to report questionable transactions that they learn about while performing their supervisory obligations to the Financial Intelligence Unit. This was inserted in the FIAMLA. Additionally, it provides a comprehensive structure for the communication of information to other governmental and law enforcement organisations. The FIAMLA's definition of a suspicious transaction particularly mentions transactions involving terrorism.

The Financial Intelligence Unit (FIU)

All suspicious transactions must be reported to the Financial Intelligence Unit by financial institutions. The Financial Intelligence Unit was authorized to be created by the FIAML on June 10, 2002. The Financial Intelligence Unit is led by a Director and is governed by a board that consists of a chairperson and two other members. In Mauritius, the FIU is the main organisation entrusted with gathering, requesting, analysing, and communicating with the investigative and supervisory bodies disclosures of financial information regarding: (a) alleged money laundering offences and suspected proceeds of crime; (b) information required by or under any law to combat and prevent money laundering; or (c) financing of any activities or transactions related to terrorism. The Financial Intelligence Unit is largely a data organisation that collects and organises information on money laundering and terrorism. It acts as the main repository for financial information about alleged or verified money laundering and terrorism financing.

On July 23, 2003, the Financial Intelligence Unit joined the EGMONT Group as a representative of African FIUs. When it comes to cases involving money laundering for the Financial Intelligence Unit, members of the Group cooperate with one another. The EGMONT Group, which presently unites Financial Intelligence Units from 151 countries, distributes financial intelligence data among other things to aid its members' national anti-money laundering programs.

The offence of Money Laundering

Section 3 of the FIAMLA provides for money laundering offences as follows:

(1) *Any person who -*

- (a) *engages in a transaction that involves property which is, or in whole or in part directly or indirectly represents, the proceeds of any crime; or*
- (b) *receives, is in possession of, conceals, disguises, transfers, converts, disposes of, removes from or brings into Mauritius any property which is, or in whole or in part directly or indirectly represents, the proceeds of any crime,*

where he suspects or has reasonable grounds for suspecting that the property is derived or realised, in whole or in part, directly or indirectly from any crime, shall commit an offence.

- (2) *A bank, financial institution, cash dealer or member of a relevant profession or occupation that fails to take such measures as are reasonably necessary to ensure that neither it nor any service offered by it, is capable of being used by a person to commit or to facilitate the commission of a money laundering offence or the financing of terrorism shall commit an offence.*
- (3) *Reference to concealing or disguising property which is, or in whole or in part, directly or indirectly, represents, the proceeds of any crime, shall include concealing or disguising its true nature, source, location, disposition, movement or ownership of or rights with respect to it.*

It should be emphasized that a bank includes anyone running a non-bank deposit taking company licensed under the Banking Act as well as moneylenders, credit unions, and other businesses with the same definition as under the 2004 Banking Act, according to section 3(2) of the FIAMLA. An institution or person that is licensed, registered, or required to be licensed, registered, or required to be registered under (a) section 14 or 77 of the Financial Services Act, (b) the Insurance Act, or (c) the Securities Act is referred to as a financial institution.

Referring to case law, both Accused were jointly charged with "Money Laundering" in violation of sections 3(1)(a) and (b) of the Financial Intelligence and Anti Money Laundering Act in the matter of ICAC v. Dumont and Another 2011 INT 77. To establish the crucial factor shared by both offenses, the prosecution presented the following evidence: 1. The various deposits made into the joint bank accounts held by both Accused, including the deposits of 80,000 rupees on November 10, 2006, 40,000 rupees on February 15, 2007, 20,000 rupees on February 27, 50,000 rupees on March 19, 2007, and 100,000 rupees on April 27, 2007. According to the court, it is only appropriate to say that the facts of this case unmistakably show that both Accused had good reason to believe that the various quantities in question were received partially, directly, from the aforementioned crime—drug dealing. The conclusion that such a reasonable suspicion does exist in the current case under all counts can therefore be drawn safely and logically. In this instance, there are no further data that might have undermined or destroyed the inference drawn. Money laundering was found to be committed by both defendants.

Limitation of payment in cash

Section 5 of the FIAMLA further provides that:

- (1) *Notwithstanding section 37 of the Bank of Mauritius Act 2004, but subject to subsection*

- (2) *any person who makes or accepts any payment in cash in excess of 500,000 rupees or an equivalent amount in foreign currency, or such amount as may be prescribed, shall commit an offence.*
- (2) *Subsection (1) shall not apply to an exempt transaction."*

Upon conviction, the Intermediate Court has the authority to order the forfeiture of assets in addition to any other penalties it may impose, such as a fine of up to 2 million rupees and a term of imprisonment not to exceed 10 years. The Intermediate Court has the authority to try any offence committed in violation of the Act or regulations made thereunder. Any property that belongs to, is controlled by, or is in the custody of someone who has been convicted of a money laundering offence is regarded as having been acquired illegally, and the court may order its confiscation.

The Act defines "crime" as (a) an offense punishable by I penal servitude, (ii) incarceration for a term longer than 10 days, (iii) a fine greater than 5,000 rupees, (b) an action taken outside of Mauritius that would have been regarded as a crime if it had taken place there, and (c) an action taken outside of Mauritius that would have been regarded as a crime if it had.

In addition, regarding what amounts to suspicious transaction, the FIAMLA provides as follows:

- (a) gives rise to a reasonable suspicion that it may include the laundering of money, the proceeds of any crime, or funds connected to, related to, or intended for use in acts of terrorism or by prohibited organisations, regardless of whether the monies involved are the proceeds of a crime;
- (b) is made in circumstances of unusual or unjustified complexity;
- (c) appears to have no economic justification or lawful objective;
- (d) is made by or on behalf of a person whose identity has not been established to the satisfaction of the person with whom the transaction is made; or
- (e) gives rise to suspicion for any other reason.

The criteria that is applicable to both suspicions of and offences concerning money laundering is the objective standard. Hence, the offence may have been committed if the authorised officer of a financial institution ought to have a reasonable suspicion but didn't actually have one. Such officers should be familiar with the "Know Your Customer Principle," which is discussed in section 6 of these guideline notes.

To ensure an audit trail and as a preventative measure against the laundering of illegal funds, a cap on cash transfers has been imposed under the Act. Therefore, with the exception of a few exempt transactions, all cash transactions worth more than 500,000 rupees are forbidden. Exempt transactions are transactions for which the 500,000 rupee limit does not apply and are typically transactions between I the Bank of Mauritius and any other person, (ii) a bank and another bank, (iii) a bank and a financial institution, (iv) a bank or financial institution and a customer, where (a) the transaction does not surpasses an amount that is equivalent with the lawful activities of the client, and 1) the customer is, at the time the transaction occurs or b) the chief executive officer or chief operating officer of the bank or financial institution, as the case may be, personally approves the transaction in accordance with any guidelines, instructions or rules issued by a supervisory authority in relation to exempt transactions; or (v) between such other persons as may be prescribed.

In *ICAC v. Shibani Finance* 2012 INT 177, the accused company, as represented, is accused of three charges of "Limitation of payment in cash," in violation of sections 5(1) and 8 of the Financial Intelligence and Anti-Money Laundering Act as well as section 44(2) of the Independent and General Clauses Act. It is claimed in the information that on or about July 9, July 14, and July 19, 2004, the accused as described knowingly, willfully, and criminally accepted payments in cash in foreign currencies from Mr. Mohammad Yousouf Meeajun totaling GBP60,000 (Rs3,103,800),

GBP35,000 (Rs1,811,250), and GBP 15,000 (Rs780,000), all of which were greater than Rs350,000.

It was held that there is evidence on record that... the accused company... could not have had any business relationship with Mr Y. Meeajun. The transactions were confined to three days in one month. The fact that the accused company ascertained that the money was withdrawn from the account of the Mr Meeajun's daughter, by the daughter and that she authorised her father to make the exchange, is not really verification of the source of the funds.

Obligations of Financial Institutions

To combat money laundering and the funding of terrorism, every financial institution must take steps to ensure that neither it nor any services it offers can be used to conduct or facilitate a money laundering crime. The FIAML also mandates that financial institutions confirm the true identity of all parties with whom they transact business. Financial institutions may only open accounts for cash deposits in conformity with the Banking Act of 2004 if they are certain that they have positively identified the person to whom the funds are to be attributed.

Financial institutions must also adopt internal reporting policies, which may include the designation of a money laundering reporting officer, and install internal controls and other precautions to stop money laundering and the support of terrorism.

Legal requirements pertaining to reporting

In *Beezadhur v ICAC* 2013 SCJ 292, the Supreme Court of Mauritius held that “...banks or other financial institutions have a duty and are responsible for reporting any suspicious financial transactions exceeding the prescribed limit to the Financial Intelligence Unit.”

Every financial institution is obligated by section 14 of the FIAMLA to notify the FIU as soon as practically possible but no later than 15 working days of any transaction that it has reason to suspect might be a suspicious transaction. The FIU has created a form to that aim. Financial institutions are required to use the form provided by the FIU to report any suspicious transactions. Financial institutions are required to use the form provided by the FIU to report any suspicious transactions. The following details must be included in every report submitted to the Financial Intelligence Unit: the identity of the party or parties to the transaction; the amount of the transaction; a summary of its nature; all circumstances and contexts giving rise to the suspicion; the nature of the person of interest's business relationship with the financial institution; and, if the suspect is an insider, any information pertaining to whether the suspect is still connected.

Following receipt of a report, the FIU will communicate the study's results in writing to the relevant financial institution and the Bank of Mauritius. Reports of suspicious transactions are never acceptable as evidence in legal proceedings. After a financial institution alerts the FIU to a suspicious transaction, the FIU director is permitted to contact that financial institution and any other financial institutions that are or appear to be involved in the transaction for additional information. A financial institution is required to give the FIU the needed information as soon as it is practical, but no later than 15 working days after receiving a request for more information from the FIU's director. The FIU Director's power is nevertheless subject to the following two restrictions: -(i) The additional data may only be sought to establish if it should be given to supervisory or investigative authorities. (ii) All supplementary information must be connected to the financial institution's report of a suspicious transaction.

The Act expressly prevents anybody involved in the reporting of a suspicious transaction from informing the parties involved in the transaction or any unauthorised third party that the transaction has been reported. If someone is found guilty of tipping off, they could be sentenced to up to five years in prison and a fine of up to one million rupees. A tip-off offence won't occur if

you make initial questions about a possible client to confirm their identification, find out more about their financial status, or ascertain the precise nature of the transaction they are engaging in. However, where a suspicious transaction has already been reported and further investigation is necessary, extra caution should be taken to avoid customers from finding that their identities have been brought to the FIU's attention.

A fine of up to one million rupees may be imposed on any financial institution, director, or employee who willfully and without justification fails to I comply with a request from the FIU under section 13(2) or 13(3) of the FIAMLA, (ii) submit a report under section 14 of the FIAMLA, or (iii) verify, identify, or maintain records, registers, or documents as required under section 17 of the FIAMLA.

The Bank of Mauritius may, in the absence of a convincing defence, take any of the following actions if it finds that a financial institution under its supervision violated an FIAML requirement or a regulation that applies to that financial institution and that the violation was the result of a careless act or omission or a serious flaw in the implementation of any such requirement:

- (a) If a bank is involved, file a lawsuit against it in accordance with Sections 11 and 17 of the Banking Act 2004 because it is operating against the interests of the general public.;
- (b) A cash dealer or holder of a deposit-taking business license may be sued under sections 16 and 17 of the Banking Act 2004 for working against the interests of the general public.

The Financial Intelligence and Anti-Money Laundering Regulations 2003

The Financial Intelligence and Anti-Money Laundering Regulations 2003 were passed on June 19, 2003, and they were effective on June 21, 2003. However, these regulations have been updated by the Financial Intelligence and Anti-Money Laundering (Amendment) Regulations of 2005 and the Financial Intelligence and Anti-Money Laundering (Amendment) Regulations of 2006.

The Regulations as amended set forth the prerequisites for identity verification, the minimal documents required, record-keeping requirements, adoption of internal reporting procedures, including the designation and appointment of a Money Laundering Reporting Officer, implementation of internal controls, and other measures for preventing money laundering and the funding of terrorism, as well as the degree of reliance by financial institutions.

Conclusion And Recommendations

The legal framework on money laundering can be said to be more or less aligned to international standards provided by mechanisms such as the UN and FAFT. However, this is an area which evolves arguably more rapidly than the law itself. It is therefore imperative that a collaborative approach be taken between India and Mauritius in order to be able to engage in an effective combat against money laundering. More effective collaboration is needed at the state-state level, institution-institution level as well as from the academic and research perspective. Only then the trade relationship between the two states will be free from the ill effects of money laundering.

A Micro-Businesses Perspective on Factors Affecting the Adoption of Mobile Payment Services During The Covid-19 Pandemic In Mauritius

Leenshya Gunnoo
University of Technology Mauritius
leenshya@gmail.com

Eric V. Bindah
University of Mauritius
bindahe@yahoo.co.uk

Abstract : The Covid-19 pandemic which first appeared in December 2019 had a huge impact on people's lives. SMEs had to alter their routines as well as find a new way of doing business. For instance, in the last two years, the adoption intention of Mobile payment has increased to avoid getting infected by the virus. However, even though there is a strong demand for it globally, in developing countries, there is still a comparatively low usage rate.

This study aims at analyzing the factors affecting the adoption intention of Mobile payment services by Micro-businesses in Mauritius. To achieve an understanding of the factors affecting the adoption intention of mobile payment, variables such as Performance Expectancy, Effort Expectancy, Personal Innovativeness and Perceived Security have been explored.

For this study, micro-businesses from the retail industry in Mauritius were surveyed. Therefore, this quantitative survey consists of 200 respondents and the data collected were used to analyze the relationship between the independent variables and the dependent variable which is adoption intention. The results revealed that all four variables have a positive relationship with intention to adopt mobile payment. Lastly, the study also provides some recommendations as well as some proposals for further research in this field.

Keywords: *Mobile Payment, Adoption, MSMEs, Covid-19, Mauritius, Performance Expectancy, Effort Expectancy, Personal Innovativeness, Perceived Security*

Background of the Study

The increasing usage of mobile phones has permanently changed the lifestyle of people. Over the past few decades, mobile phone, capabilities have significantly increased from only being a communication tool to a multi-tasking device that can be used for utility payments, money transfers, and other things (Chang *et al.*, 2020). The use of mobile phones and other digital technology has become part of daily life and has had major changes in both consumption patterns (Wilska, 2003) and business strategies (Kane *et al.*, 2015). From business owners in the financial sector (Lin *et al.*, 2012; Shaikh, 2013) to smaller retailers (Wang Lin and Dai Xuefeng, 2020), M-Payment has progressively started to replace their traditional systems, which mostly supported cash or credit card payment. M-Payment has efficiently helped businesses to connect with consumers, clients, and vendors in innovative ways and at any time which has improved customer service and enhanced their competitiveness (Chang *et al.*, 2020).

However, even if both larger organizations and smaller businesses would experience the same effects from intention to adopt, the amount of those effects would vary. Studying their effects has already been a focus of research for quite a few authors in the context of larger organizations, where M-Payment has already been adopted on a wide scale (Tsai *et al.*, 2018; Gan *et al.*, 2016). Thus, small businesses' reactions to this M-Payment solution would be an instructive and useful topic, deserving of a wider investigation, especially during this new era of the Covid-19 pandemic. The significance of SMEs in the Mauritian environment cannot be understated. Since SMEs which have been dramatically affected by Covid-19 are crucial to improving the country's economic

performance, the use of M-Payments among these companies will eventually have an accelerating effect on reaping its benefits. Such a benefit would be that it enables one to execute correct transactions at anytime and anywhere for both consumers and businesses (Lu et al., 2011; Carton et al., 2012). The SMEs in Mauritius have been hesitant in using M-Payment in their business and foregoing cash, which somewhere makes adoption relatively low (Dahlberg et al., 2015; Koloseni & Mandari, 2017). When taking into account the adoption and use of intentions, it is clear that some SMEs tend to be skeptical of new technologies and to be resistant to innovation (Jahanmir & Lages, 2015, 2016).

Even though many researchers have conducted studies on the adoption of MPS, it is discovered that they tend to concentrate on developed countries (Chung and Kwon, 2009; Khattak *et al.*, 2021), with only a small number of developing countries like Mauritius being discussed. Furthermore, while numerous studies have been done in the past to advance the knowledge of how users adopt technology, few have focused on MPS in the Mauritian context. Additionally, it has been noted that the TAM and TRA models have been utilized, respectively, to analyze the adoption of technology (Lai, 2017), but very few research has combined a variety of theories better understand the adoption of technology, especially in the context of M-payment. Dahlberg *et al.*, (2015) discovered that firms have received significantly less attention than consumers in M-Payment research (Chandra *et al.*, 2010; Tan *et al.*, 2014). Moreover, there is currently a rise in the use of mobile payments, particularly during the COVID-19 period. However, despite the surge in M-payment usage in developing nations like Mauritius during the pandemic period, scholars have not given the topic adequate attention. Therefore, the goal of the study is to fill the research gap in this field.

This study aims to investigate the factors affecting the intention to adopt Mobile Payment by Micro businesses during the Covid-19 pandemic: in the context of the retail industry in Mauritius. Although services like Juice by MCB and MY. T Mobile is transforming Mauritius into a cashless society, it cannot yet be entirely regarded as such. Potential users are still based on an analysis of the advantages and disadvantages of such services. Moreover, as per the researcher's knowledge, there is very limited comprehensive research conducted on the MPS, especially from business perspectives in Mauritius. Consequently, this study proposed to fill the gap in a local context by investigating the factors that affect micro businesses in their intention to adopt M-Payment in Mauritius.

Literature Review

Technology Acceptance Model (TAM)

The TAM model was first introduced by Davis (1989) and was created to examine IT user acceptance. The Theory of Reasoned Action served as the foundation for this approach (Ajzen and Fishbein, 1980). It became increasingly well-known when it was frequently utilized in a variety of technologically-related studies (Venkatesh *et al.*, 2003). The TAM model has arrived at a point where it is being used to forecast consumer acceptance of many FinTech technologies, including M-Payment (Zhong *et al.*, 2013). It has been viewed as a powerful theory and the most reliable, cost-effective, and widely used model for acceptable behavior.

Diffusion of Innovation Theory (DOI)

The Diffusion of Innovation Theory (DOI), put forth by Rogers in 1995, describes diffusion as the process through which an idea spreads gradually within a social system. He contends that five inventive characteristics which are, relative benefit, complexity, compatibility, trialability, and observability can be used to explain why people accept new technologies. Relative benefit, complexity, and compatibility were all found to be more consistent in describing technology acceptance in several earlier investigations.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT model, which is based on the underlying theory of technology users' behavior, was proposed by Venkatesh *et al.*, (2003). It is formed by the integration of eight prominent user technology adoption models which include: Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), the Diffusion of Innovation Theory (DOI), the Theory of Planned Behaviour (TPB), the combined TAM-TPB, the Model of PC Utilisation (MPCU) and the Social Cognitive Theory (SCT). This approach is based on three moderators namely, gender, age, and intention of use, and uses four factors, that is, performance expectancy, effort expectancy, social influence, and facilitating conditions. Nevertheless, the moderators are irrelevant because the research is business-focused.

Performance Expectancy (PE)

The degree to which a user expects that utilizing a technology would help them perform better at work is known as performance expectancy (Venkatesh *et al.*, 2003). Numerous previous findings have revealed a strong and positive connection between expected performance and adoption intention (See and Goh, 2020; Tang *et al.*, 2021; Thakeret *et al.*, 2022). For instance, Jambulingam (2013) used the UTAUT model to examine behavioral intentions to adopt mobile technology, and the assertion that there was a favorable association between performance expectancy and adoption intention was supported by this researcher's findings. Additionally, PE has a significant link with the intention to use the m-payment system, according to Morosan and DeFranco, (2016). There is evidence that mobile payments enable anytime, anywhere banking and are a source of widespread, prompt payment options compared to cash (Slade, 2015). When adopting new technology, individuals are mostly worried about whether it will make their work more efficient (Davis, F. D., 1989). Businesses often look toward the most practical and adaptable payment choices when it comes to M-Payment to grow their clientele and, eventually, their sales. Previous acceptance tests on M-Payment have demonstrated that PE under the TAM Model has the same influence as perceived usefulness (E.L. Slade, Y.K. Dwivedi, N.C. Piercy, and M.D. Williams, 2015). The user automatically adopts a favorable attitude toward the system once they see its usefulness through their daily payments (Nambiar and Bolar, 2022). Therefore, it might be stated that the use of mobile payment services during COVID-19 had a favorable effect on the uptake of services. Thus, the following hypothesis is derived:

H1. Performance Expectancy has a positive impact on intention to adopt M-Payment.

Effort Expectancy (EE)

The ease of use of a system is a key factor in effort expectancy (Venkatesh *et al.*, 2012). According to Venkatesh *et al.*, (2003), users have demonstrated a willingness to utilize the M-Payment services and have higher expectations for achieving the desired outcome after discovering that the new system was much easier to use and required less work. Previous studies show that a person's behavioral intention to use a mobile payment system is positively influenced by the technology's usability and convenience (Teo *et al.*, 2015; Cimpermanet *et al.*, 2016; Friadiet *et al.*, 2018; Tang *et al.*, 2021). Similarly, Mtebe and Raisamo, (2014) emphasized the existence of a positive relationship between behavioral intention and effort expectancy in mobile learning. The same relationship was seen while examining the effects of online tickets in Escobar Rodriguez and Truzillo's research (2014). A study by Gupta and Arora (2020) also found that effort expectancy has a positive effect on people's behavioral intentions to use mobile payment systems in India. Users are particularly worried about payment accuracy and efficiency during the COVID-19 epidemic to prevent contracting the virus. Therefore, if users think M-payment is an easy way to finish their transactions during the pandemic, they will choose it over traditional payment. Therefore, based on the findings above, the following hypothesis is developed:

H2. Effort Expectancy has a positive impact on the intention to adopt M-Payment.

Personal Innovativeness (PI)

The willingness of a person to try something novel and different is how personal innovativeness is defined (Chang, Cheung, & Lai, 2005). According to Liébana-Cabanillas *et al.*, (2021a), PI refers to how likely a person is to use and accept new technologies that will be essential to their internal environment. Kang (2019) assert that PI is an important element in research examining the uptake of mobile payments and that it was discovered to affect the uptake of various advances in IT systems. Individuals with high levels of curiosity and innovativeness are eager seekers of new technology (Tariq, 2017; Fang & Zhang, 2019). Additionally, those with higher levels of PI in the information technology sector tend to see incorporating new technologies into their daily life more positively (Lu, 2014). When factors influencing the pre-adoption and post-adoption phases of M-Payment adoption in China were examined, a similar result was found (Tan *et al.* 2014; Yang *et al.*, 2012). Furthermore, a Malaysian study found a beneficial relationship between innovation and individuals who use cashless payments (Rahman *et al.*, 2020). Moreover, it has been discovered to affect India's adoption of M-payments (Patil *et al.*, 2020). Since M-Payment is now more widely used in Mauritius, notably during the Covid-19 pandemic, acceptance will mostly reflect an individual's level of innovation, which is a crucial factor there. Accordingly, the third hypothesis is developed:

H3. Personal Innovativeness has a positive impact on the intention to adopt M-Payment.

Perceived security (PS)

Safety concerns are essential components of online interactions. One of the main obstacles to people using new technologies, particularly when it comes to online transactions, is perceived security (Salisbury *et al.*, 2001). Several research on technology adoption focused on the importance of security to strengthen customers' trust as well as determining whether users will adopt M-payments. (Liébana-Cabanillas *et al.*, 2018; Hossain, M.S., 2018; Shao *et al.*, 2018). Businesses are equally concerned about these issues since the latter are major determinants of the relationship between the business and its customers. Perceived security is thus, considered to be a key factor (Liébana-Cabanillas *et al.*, 2017; Patil *et al.*, 2020) and is observed to be positively correlated with adoption intention (Cheng, Lam, & Yeung, 2006; Oliveira *et al.*, 2016). According to Johnson *et al.*, (2018), a user's inclination to use M-payment is most substantially positively impacted by perceived security. Furthermore, Shaw (2014) stressed the unquestionable concern of users towards security and privacy despite their willingness to trade risk for the perceived advantages that M-Payments would offer.

Customers will use these technological systems more frequently as a result of a business using a strong security system for its technological operations (Rahman *et al.*, 2020). Due to the rise in digital payment used during the COVID-19 epidemic, the safety issue cannot be disregarded. (Kwabena *et al.*, 2021; Sivathanu, 2019). Users' views of perceived security are therefore taken into account as a crucial element in fostering their trust in embracing M-payment during the pandemic. Accordingly, the study formulates its fourth hypothesis as follows:

H4. Perceived Security has a positive impact on the intention to adopt M-Payment.

Research Methodology

In order to analyse the SMEs perspective on the adoption of Mobile Payment in Mauritius, quantitative research shall be used for this study. Furthermore, both primary and secondary data will be collected in order to satisfy the study's objectives. A strategy was devised to determine the data sources, target population, sampling technique, research equipment, and methods of data collection. The targeted population will be the micro businesses in Mauritius. Based on the variables influencing the uptake of M-Payment in Mauritius during the Covid-19 epidemic era, a sampling size of 250 SMEs for this study was selected.

A questionnaire was used as a research instrument for gathering primary data. It is critical to follow the correct values at all stages of the study to avoid research misconduct. For the study, the questionnaire was divided into two sections and consisted of several questions, with items rated on a 5-point Likert scale to gauge respondents' answers. The questions in the first section were set on the usage and awareness of M-payment. The second section focuses on the several constructs that were found to be influencing the adoption of M-payment by Micro-businesses. A total of 26 questions were sent to the respondents, asking them to provide information on the variables to be analysed. Special attention was made to ensure that Basic English was utilized to avoid any misunderstandings. The structure and phrases were simple to read and double-barreled questions were eliminated.

However, since it would be challenging to choose businesses at random from the retail industry, a convenience sample method will be used. An online survey was conducted utilizing the non-probabilistic "convenience" technique, which in which the sample is taken from a population is the one that is accessible. The questionnaires were sent to the targeted population through Facebook, WhatsApp, and Emails.

The most commonly used parameter is Cronbach's coefficient alpha. To have strong reliability, the Cronbach Alpha must be larger than or equal to 0.7. Any value below this is considered to be unreliable. The table below (Table 1) shows that the Cronbach Alpha of all the variables is higher than 0.7, indicating a highly reliable construct.

Table 1: Cronbach Alpha Results

Study Variables	No. of items	Cronbach Alpha	Status
Adoption	4	0.920	Valid
Performance Expectancy	4	0.967	Valid
Effort Expectancy	4	0.880	Valid
Personal Innovativeness	4	0.952	Valid
Perceived Security	4	0.966	Valid

Regarding online surveys, there are several constraints. The data was shown to be biased in several cases and some of the questionnaires were not completely answered. That is why the sample size was lowered to 200 because several participants declined to open the Google form and complete it because they might have thought it would be too lengthy or uninteresting.

Moreover, it was challenging to study all the smaller enterprises on the island because of the Covid-19 pandemic. Future research might use a larger sample by getting acquainted with the vast majority of micro-businesses in Mauritius.

Results and Interpretation of Findings

It can be noted that 37% of the survey respondents are aware of the three M-Payment services namely Juice by MCB, My.T Money by Telecom, and Blink by Emtel. However, when regarded separately from the survey, Juice by MCB is discovered to be more widely known than the two others by 30%. It can be observed that My.T Money accounts for 20% while the remaining 10% of the respondents are aware of Blink by Emtel. None of the respondents denied not knowing about any of the three services.

The retail sector of the economy has been expanding quickly, and it is located in an environment that is becoming more and more demanding. Participants in this study are chosen from the retail industry in Mauritius. It can be noted that 39% of the respondents are concentrated in the Food and Restaurants business, 30% in Textile and Garments, 14% in Grocery Stores, 11% of them in Handicrafts and finally, 6% in the Tourism business.

It can also be deduced that 43.5% of the respondents are in the age group of 35-45 years with the highest frequency rate of 87. In addition, respondents aged 46 to 55 had a frequency rate of 53 and a percentage rate of 26.5%, followed by 33 respondents aged 18 to 35 years (16.5%), and lastly, respondents aged 56 and above had the lowest frequency rate of 27 and a percentage rate of 13.5%. It can be noted that the majority of the participants in this study are middle-aged people.

It can be seen that 150 respondents accounting for 75% use M-Payment services while the remaining 50 respondents (25%) do not. This could be because some micro-businesses are unsure if M-Payment is appropriate for their company, or they may discover that using only cash and credit card systems is more advantageous for them. The majority of the participants (51.5%) among the user of M-Payment revealed that they frequently use these services while (17.0%) reported that they rarely use them. The remaining respondents (6.5%) admitted that they only use it occasionally.

Among those who currently use M-Payment services, (10.5%) respondents selected to use it to pay suppliers, while (40.5%) respondents preferred to use it to accept payments from consumers. Micro-businesses may find it easier to pay their suppliers in cash or by check due to their frequent large purchases and need for a receipt or invoice which is not possible with M-Payment services. (3.0%) respondents said they use M-Payment services for a variety of purposes, including paying bills and employees.

Pearson Correlation Matrix

The Pearson Correlation Matrix is a common tool in research and its main application is to ascertain the relationships between the dependent and independent variables. In other terms, it assesses how strongly two variables are linearly related and is denoted by the symbol r . In the table below, the Pearson Correlation analysis was performed to determine whether Performance Expectancy, Effort Expectancy, Personal Innovativeness, and Perceived Security on Adoption Intention are related. A correlation coefficient is considered to be significant when the value ranges from -1 to +1 which implies a strong relationship, whereby a correlation coefficient of 0 shows that the variables do not have any linear relationship.

Table 2 : Correlation

	Adoption Int	PE	EE	PI	PS
Adoption Int	1				
PE	.927**	1			
EE	.885**	.930**	1		
PI	.916**	.913**	.839**	1	
PS	.917**	.923**	.877**	.921**	1

**. Correlation is significant at the 0.01 level (2-tailed).

A high correlation value is displayed in the above table. The correlation value lies within the range of 0.839- 0.930. As can be observed, performance expectancy and adoption intention have a strong correlation ($r = 0.927$, P value < 0.01), thus indicating a positive relationship between the variables. Additionally, it may be highlighted that there is a direct correlation between effort expectancy and adoption intention ($r = 0.885$, P value < 0.01). Personal innovativeness is also seen to be related to adoption intention ($r = 0.916$, P value < 0.01). Lastly, perceived security and adoption intention are found to be positively correlated ($r = 0.917$, P value < 0.01). It is evident that there is a significant association between all of the independent variables and the dependent variable.

Regression Analysis

Regression Analysis is the most important type of quantitative data analysis which is frequently used to examine the relationship between multiple independent variables and one dependent

variable. For the study, a multiple linear will be utilized to test whether the independent variables: Performance Expectancy, Effort Expectancy, Personal Innovativeness and Perceived Security have a significant relationship with the adoption intention of M-Payment.

Table 3: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.948 ^a	.899	.897	.33722
a. Predictors: (Constant), PS, EE, PI, PE				

Table 4: ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	198.102	4	49.526	435.506	.000 ^b
	Residual	22.175	195	.114		
	Total	220.277	199			
a. Dependent Variable: Adoption						
b. Predictors: (Constant), PS, EE, PI, PE						

From table 4, the r-square value is 0.899 which indicates that 89.9% of the variation in adoption intention can be perfectly explained by the variation in the four independent variables. As a result, the r-square is regarded as being relatively high. Other elements that affected the adoption intention of M-Payment, such as facilitating conditions, social influence, and attitudes, which were not examined in this survey questionnaire, can be used to explain the remaining 10.1%.

Under table 4, the F-value which is used to test the overall significance of the model is 435.506, which indicates that the f-value is significant since the P-value is less than 0.05. Based on the outcome, the P-value is 0.000 which is below 0.05. Therefore, this implies that the regression model statistically predicts the outcome for the variables.

Table 5: Coefficients

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.320	.108		2.965	.003
	PE	.226	.071	.271	3.169	.002
	EE	.166	.063	.165	2.617	.010
	PI	.329	.067	.319	4.908	.000
	PS	.191	.058	.229	3.298	.001
a. Dependent Variable: Adoption Intention						

From the findings, it can be observed that there exists a positive relationship between the dependent and independent variables as well as their significant level.

Firstly, it can be seen from the beta values, PI has the highest influence on the respondent's adoption intention ($\beta = 0.319$). Along with this since the P-value = 0.000 is less than 0.05, it

implies that the relationship is likely to be significant as well. Similarly, effort expectancy is found to have a positive and significant relationship ($\beta = 0.165$, P value = 0.010). Moreover, PE is also found to have a significant link with adoption intention since ($\beta = 0.271$, P-value = 0.002) which is less than 0.05.

Furthermore, it can be also observed that perceived security has a positive and significant relationship with adoption intention with an estimated value of ($\beta = 0.229$, P-value = 0.001) which is found to be below 0.05.

Discussion

Performance Expectancy

Based on the empirical findings of Onyango *et al.*, (2014), we note that there is a significant relationship between PE and the dependent variable. In this study, a similar result was found to have a positive relationship with an estimated value of ($\beta = 0.271$, P-value = 0.02). This significance reflects the 41.5% and 25.5% of the survey respondents who agreed and strongly agreed that M-Payment is a useful method of payment during the pandemic. For instance, despite lockdown restrictions during the Covid-19 pandemic, SMEs were still able to conduct their business online. According to Kirui & Onyuma (2015), M-Payment transactions increase the productivity of SMEs.

Effort Expectancy

According to the results of the regression analysis, EE significantly affects the adoption intention of M-Payment, with an estimated value of ($\beta = 0.165$, P-value = 0.002). The result is in line with several studies that claim EE is an essential factor in businesses' convenience and success (Kim *et al.*, 2010, Apanasevicet *al.*, 2016, Zhou, 2011). According to the survey, 57% of the micro-businesses regarded M-Payment as a practical and simple method of payment. Therefore, it can be argued that EE is a crucial component for the acceptance of M-Payment.

Personal Innovativeness

Based on the regression analysis of the quantitative results, it can be seen that PI has the highest impact on the adoption intention of M-Payment with an estimated value of ($\beta = 0.319$, P-value = 0.000). This significance reflects the 41% and 11.5% of the survey respondents who agree and strongly agree to explore new technologies. This outcome is consistent with a study by Hausman A. (2005) that found PI has a significant impact on the adoption intention of M-Payment. The majority of respondents, 120 out of 200, are between the ages of 18 and 45, which may explain why they are more likely than older respondents to be interested in experimenting with new technology. According to Chen, K.Y. and Chang, M.L., (2013), younger people typically experiment with new technology or use M-Payment more frequently than older people.

Perceived Security

According to the statistical results, PS has a positive and significant association with adoption intention with an estimated value of ($\beta = 0.229$, P-value = 0.001) which means that PS has a huge impact on the adoption intention of M-Payment. According to a study, by Mallat & Tuunainen (2008), concerns about trust and security were deemed to be crucial factors from the seller's perspective. As a result, statistics from the survey conducted for this research have been able to prove a significant relationship between PS and the dependent variable. In reality, businesses' concerns regarding the convenience and ease of mobile payments are less significant than their security concerns.

Hypothesis Testing

Table 6 : Below Shows The Results Of The Hypothesis Testing Based On The Quantitative Survey.

Table 6: Hypothesis Testing result

	Hypothesis	Results
H1	Performance Expectancy has a positive impact on the intention to adopt M-Payment.	Supported
H2	Effort Expectancy has a positive impact on the intention to adopt M-Payment.	Supported
H3	Personal Innovativeness has a positive impact on the intention to adopt M-Payment.	Supported
H4	Perceived Security has a positive impact on the intention to adopt M-Payment.	Supported

Conclusion and Recommendation

Mobile payment services gained popularity during the COVID-19 pandemic, which significantly changed daily life throughout the world and pushed individuals to limit their social interactions in order to stay safe from the virus. However, we found an absence of studies concentrating on the adoption of mobile payments in Mauritius during the pandemic from a business perspective. Accordingly, we identified the research gap and the main objective of the research was to investigate the various factors affecting the adoption of M-Payment in Mauritius by micro-businesses during the Covid-19 period.

This study has effectively contributed to the body of knowledge on M-Payment from a business aspect, while the majority of M-Payment-related studies have focused on customers in Mauritius. Through previous research, this study has been able to identify the determinants in a very systematic way. The TAM model, DOI model and UTAUT model were used to access the factors affecting the adoption intention of M-Payment and initially developed 4 hypotheses. For this research, the micro-businesses from the retail sector were surveyed with a total of 200 respondents. The findings of this study have made several contributions to the existing literature review. According to this quantitative survey, it is found that micro-businesses are aware of the M-Payment services and intend to use them in the future. Even though all micro-businesses use M-Payment services, the majority of them stated that they will most likely use it in their individual firms in the future. It has been discovered that PE, EE, PI and PS are all the major predictors of the intention to adopt in the context of M-Payment. Hence, we can conclude that all of the determinants have a strong relationship with the adoption of M-Payment.

Despite their potential to increase productivity, it has been discovered that owners are still dubious of their practicality for business purposes. Considering personal innovativeness as a determining factor, it is important to come up with measures that would first enhance the perception of the individual. It is essential in this situation that the service providers make the advantages of their services known. Moreover, this study determined that perceived security has a significant impact on the intention to adopt M-Payment. This would necessitate the providers to emphasize the security component by adding more security seals. However, it is advised that these micro-businesses and start-ups take the time to weigh the advantages and disadvantages of such services to make sure that they are the best fit for their operations.

Since different industries have different needs for these services and we have focused on the retail sector in this research, generalizing the results to all SMEs in Mauritius may be misleading.

Because this topic is so new, evaluating these conclusions with additional empirical research in industries other than the retail sector is required. Moreover, the progression of M-Payment is also a useful area for future studies, whether or not they compare Covid-19 and non-Covid-19 periods. Furthermore, it would be interesting to qualitatively investigate the factors affecting the intention to adopt M-Payment from micro-businesses.

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Content Analysis of BYJU's App Reviews: Data Analytics Approach

S.S. Jadhav

Student, MBA
Chhatrapati Shahu Institute of Business
Education and Research
Kolhapur, India

R.S. Kamath

Associate Professor,
Chhatrapati Shahu Institute of Business
Education and Research
Kolhapur, India
rskamath@siberindia.edu.in

ABSTRACT : The article reports the insights gained from the study of customer reviews of BYJU's app on google play store. The prime objective was to understand the customer needs & pain points to supplement the research & development of similar Ed-Tech products. The data for the study was scraped from google play store using web scraping and stored in structured format. The analysis was done using both Natural Language Processing as well as manual content analysis. Sentiment analysis was done to sample the 30,000 reviews with extreme emotions in order to generate word clouds. Another sample of 3000 was taken to perform content analysis. The output of the research is a list of suggestions and features to be considered by the new players in the Ed-Tech market. Top pain points of the customer's were found to be slow responsiveness of the app, toxic calls and unprofessional behavior of sales personnel and absence of majorly demanded topics/subjects. Top satisfaction points of customers were found to be clear explanations, expertise of educators and use of visualizations in teaching. Total 130 themes were identified during content analysis, but only 20 themes with the criteria of more than 40 theme counts are explained in this paper.

Keywords : BYJU's, App, Customer Reviews, Pain Points, Satisfaction, Suggestions, Word Clouds, Content Analysis

Introduction

According to Forbes, India's ed-tech market is expected to develop significantly and reach \$10.4 billion in 2025 with 37 million paid users (Zheltov, 2022). It is observed that this increase is being driven by the rising demand for nonacademic courses in second and third-tier cities as well as the ed-tech sector's need for customization. Global ed-tech leaders like Byju's, which is valued at \$22 billion, have entered the market as a result of the sector's huge private investment over the past five years (Byju's – the learning app - apps on Google Play, Google). Market leaders including Unacademy, upGrad, Vedantu, and others have also recently emerged. The rise of online schooling was sped up by the pandemic. Due to the rising inclination of students and parents to complete their education from home using various online educational platforms, lockdowns have resulted in a large increase in investment in the ed-tech sector.

Even though the competition seems tough, there is still space for new Ed-Tech companies to prosper if they deliver better services and something innovative. All these current Ed-Tech giants are more or less the same and their crowns can be disturbed by a significant revolution in the Ed-Tech concept. Ozibook Tech Solution Pvt. Ltd. is developing an innovative Ed-Tech App that is aiming to do the same.

But where do we find these customer requirements and pain points? The answer is customer reviews on Google Play Store. The Google Play Store reviews are the best and most raw source to peek into customers' minds. The researchers procured these reviews using Web Scraping to further analyze them using hybrid analytical techniques (Rubik's Cube, 2022). The system, process and code developed by this study is reusable and can be applied to other platforms like Unacademy,

upgrade, Vedantu etc. This study has considered only a 10.37 % sample among all reviews for manual theme counting due to constraints on human resources. Although, the company can take a bigger sample when conducting a similar study on a different platform in future. Obtaining a suggested list of features for a new Ed-Tech App is the prime purpose of this study. This list of features can be considered by the development team to make a superior platform (Content analysis, 2023).

Related Work

A study by Demir&Akpınar presents how undergraduate students' academic achievement, attitudes toward mobile learning, and animation development levels are affected by mobile learning applications (Demir&Akpınar, 2018). In the study, a quasi-experimental design was used. Authors have reported an interpretive study of educational apps (Camilleri&Camilleri, 2019). The study is based on interviews with the learners. As per the learners their skills have improved as a result of using the educational apps.

In order to learn more about the use of mobile apps in tertiary education and research, researchers at a New Zealand university were surveyed using an online questionnaire to find out which apps were used for which tasks and what obstacles prevented their use (Hinze et al, 2022). This study discovered that academics and students utilized mobile apps for both teaching and research, primarily for document and data storage, exchange, and communication. A case study on learning apps has examined the impact that the Byju app had on students during the COVID-19 pandemic, as well as whether or not subscriptions to the app increased during the outbreak (Sathyan&Karani, 2021). This research also looked at how e-learning apps can help improve customer focus and subscription rates while also improving students' experiences. This study resulted in Byju's app being a leading online education brand during the COVID-19 pandemic. 85% of parents subscribed to this mobile application for their child's education.

Singh &Suri have portrayed reviews of mobile learning apps. On the Google Play store, 2000 reviews of four highly rated, downloaded, and reviewed mobile learning apps were subjected to word frequency, sentiment, and content analysis. The findings showed that teaching, mobile applications, and courses were the most frequently mentioned subjects. The majority of the reviews were favorable. The most prominent feelings were found to be trust, anticipation, and happiness (Singh &Suri, 2022). Sruthi and Mukharjee have reported the detailed study of BYJU's learning app and explored a group of high school and postsecondary students from CBSE and Kerala State Board to analyze the transition from traditional classroom instruction to technology-based personalized instruction (Sruthi&Mukharjee, 2020).

In the backdrop of the research portrayed here the present study reports the insights gained from the study of customer reviews of BYJU's app on google play store.

Methods and Materials

Data Collection

The data used for this study is secondary in nature and is scraped from Google Play Store using google-play-scraper (Google-play-scraper). The data is basically the most relevant 2 Lack 89 Thousand & 182 app reviews and some important dimensions of them like score, thumbs up count, etc. We have scraped reviews for each score (star rating) separately and then appended them later in the analysis phase to form a master data frame. We have chosen this approach as it would be too time & resource consuming to scrape all 2 Lack 89 Thousand & 182 reviews at once. The aim of this project is to supplement the research process for the development of a new Ed-Tech app. The study was looking for things from which inspiration can be taken and things to avoid can be noted through studying the customer reviews of BYJU's APP.

Sampling Techniques

This study used analytical techniques as mentioned above and the sample used for each technique was different. There were a total of 2 Lack 89 Thousand & 182 reviews and using them all would not be efficient as well as effective. Hence, appropriate samples were taken as required by each analytical technique.

Sampling for Theme Counts

Reading all 2 Lack 89 Thousand & 182 reviews will be extremely time-consuming. Although it might give us superior results, the study considered a sample of 3000 reviews that follow the following criterion:

- The review must have at least one thumbs up
- The length of the review should be more than 50 characters
- The number of reviews must be the same from positive and negative categories

Sampling for WordClouds

All 2 Lack 89 Thousand & 182 could not be fed into the Word Cloud generator. Doing so would have caught so many unnecessary repetitive words and irrelevant reviews. The researchers have considered extremely positive reviews, extremely negative reviews & a mix of extremely positive and extremely negative reviews to generate 3 separate WordClouds (Erickvarela, 2021). This is to give a quick peek into the satisfaction & pain points of users to the stakeholder

Criteria for a positive sample of 15,000:

- First priority has been given to reviews with the highest polarity
- Second priority has been given to reviews with the highest number of thumbs-up counts
- Third priority has been given to reviews with the highest review lengths

Criteria for a negative sample of 15,000:

- First priority has been given to reviews with the lowest polarity
- Second priority has been given to reviews with the highest number of thumbs-up counts
- Third priority has been given to reviews with the highest review lengths

Criteria for a mixed sample of 30,000:

- Positive Sample appended to Negative Sample

BYJu's App Reviews' Content Analysis

Theme Counts and Theme Summary

The researchers went through the picked-out sample, read each review, identified recurring themes and counted the number of times each theme had been observed in reviews manually. The procedure followed to calculate theme counts is as follows:

For each review:

- Read the review thoroughly
- If a new theme is discovered, then add a new column to count that theme & add 1 at the intersection of that review row and the new theme column
- If an existing theme is detected, add 1 at the intersection of that review row and the detected theme column

Once the above procedure is applied to all the reviews:

- Sum all the columns to get the count for each theme
- Generate a barplot to visualize the weightage of each theme in the sample

Table 1 gives theme counts and theme summary with pain points and corresponding suggestions. This is visualized in figure 1. Table 2 explains theme counts and theme summary of themes satisfied with. Figure 2 shows the corresponding visualization.

Table 1: Theme Counts & Theme Summary: Pain Points / Suggestions

Theme	Theme Summary	Count
Slow Responsivity/ Bugs	Users found the app to be buggy. There were many bugs related to phone number authorisation using OTP, video loading, login attempts etc. Despite having a full-speed internet connection, the app indicated that there is no internet connection. The slow video loading was the most prominent issue users faced.	326
Toxic Calls/ Shady Activity	Users suffered from toxic & highly frequent calls from BYJU's sales team. There were reviews that mentioned unprofessional behavior from the sales team of BYJU's. Despite uninstalling the app and discontinuing the services, the calls still kept coming.	283
Missing Topics	Users found a lack of many subjects and topics in existing subjects. People requested for following subjects: 1. Commerce Related Subjects 2. Languages like Hindi, and English 3. Social Science & Humanities Subjects like History, Civics 4. Economics 5. Political Science Etc.	155
High Pricing/ Not Free	Users found this app to be too expensive or expected it to be a free app. The app was accused by a significant number of people to have made education into a pure business. People were not happy with the fact that they have to pay money to be able to access the application.	153
Video Limit / Not-Self Paced	Users were frustrated because of the video limits in the app. In simpler words, the app is not self-paced. It forces users to revise the content they have just watched and prohibits them from watching further videos for a certain amount of time.	143
Add Languages	Users complained that the content on the app is majorly available in English. English is not the first language of many Indian people and education should be accessible in various vernacular languages.	122
Data Consuming/ Video Resolution Adjustment Feature	There is no option to adjust the video resolution in the app. The lack of this feature causes two major problems: 1. When the internet speed is slow, the video resolution is set so low by the app that it is unfathomable. 2. When the internet speed is adequate, the video plays at the highest resolution possible which results in unnecessary loss of user data. 3.	106
Poor Customer Support	Users found the customer support of the app to be poor. The process to reach customer support was found to be	104

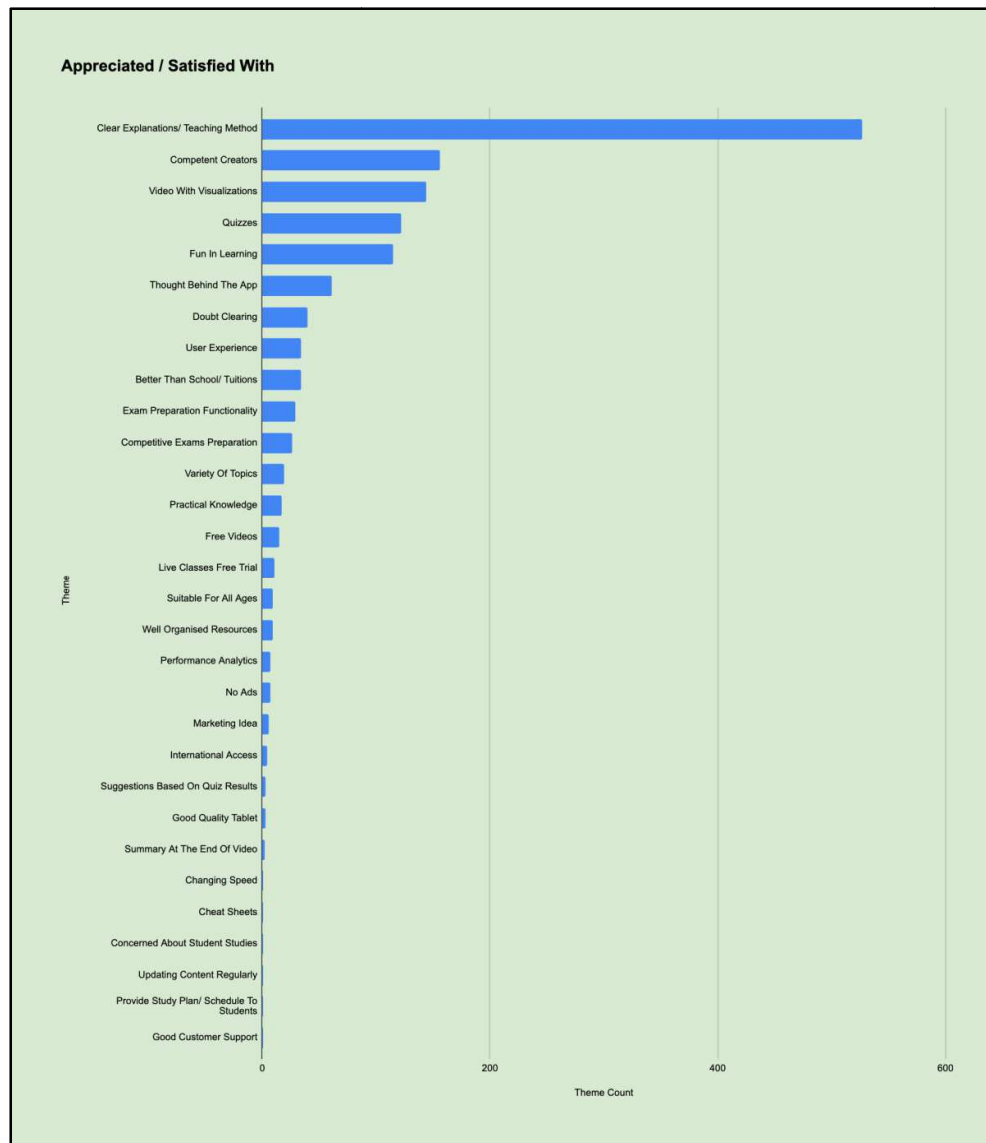
	complicated. Many times, users could not reach the customer support team despite calling repeatedly. A considerable number of users got an automated message that claimed that the support team will call them shortly, but never got a callback.	
Errors With Gamification	The gamification done in the app included small tests and quizzes. Users found errors in these modules. There are games in the app where users can play educational games with other users. Many users reported an error where the game showed victory on the opponent's part despite doing all the necessary things to win.	86
Poor Quality Topics	Users were not satisfied with the content provided under certain topics. The quality refers to the quality of material, videos & delivery by the teachers.	65
Lying	Users complained that many unethical tricks were used by the marketing team to lure people into buying this app. There were many users who were disappointed by the fact that the app was advertised to be free but is in fact paid. The marketing team doesn't let you use the app for free for long & start disturbing you with calls to force you to buy the subscription.	55
No Cancellation/ Refund	Users were furious because they were denied the refund upon cancellation. There were many cases where the users were lured into buying a plan using the idea of 'No Questions Asked' Return Policy. The return policy was in reality very complicated and the users faced a partial or complete loss of the sum paid.	47

Table 2: Theme Counts & Theme Summary: Appreciated / Satisfied With

Theme	Meaning	Count
Clear Explanations/ Teaching Method	Users loved the methods used to explain different concepts. They mentioned that the most difficult concepts were explained so seamlessly that they understood them right away. The optimum and precise way of explaining concepts appealed to users to a larger extent.	527
Competent Creators	Users complimented the teachers on the app. The expertise of teachers and their ability to explain things was hugely complimented. The language used by the teachers and their demeanor also appealed to a large number of users.	156
Video With Visualizations	The use of visualizations is the moat point that BYJU's used in their marketing. The same is also loved by the users largely. Visualizations make it easier to understand the concepts in a better way. As they say.	144
Quizzes	The app makes a use of Quizzes to make the learning process fun and help students retain the knowledge that they have gained. The gamification in the app is loved by the users. There is a module in the app called Quizzo.	122
Fun In Learning	Users stated that they loved the way in which BYJU's is making learning more fun. The traditional attitude of	115

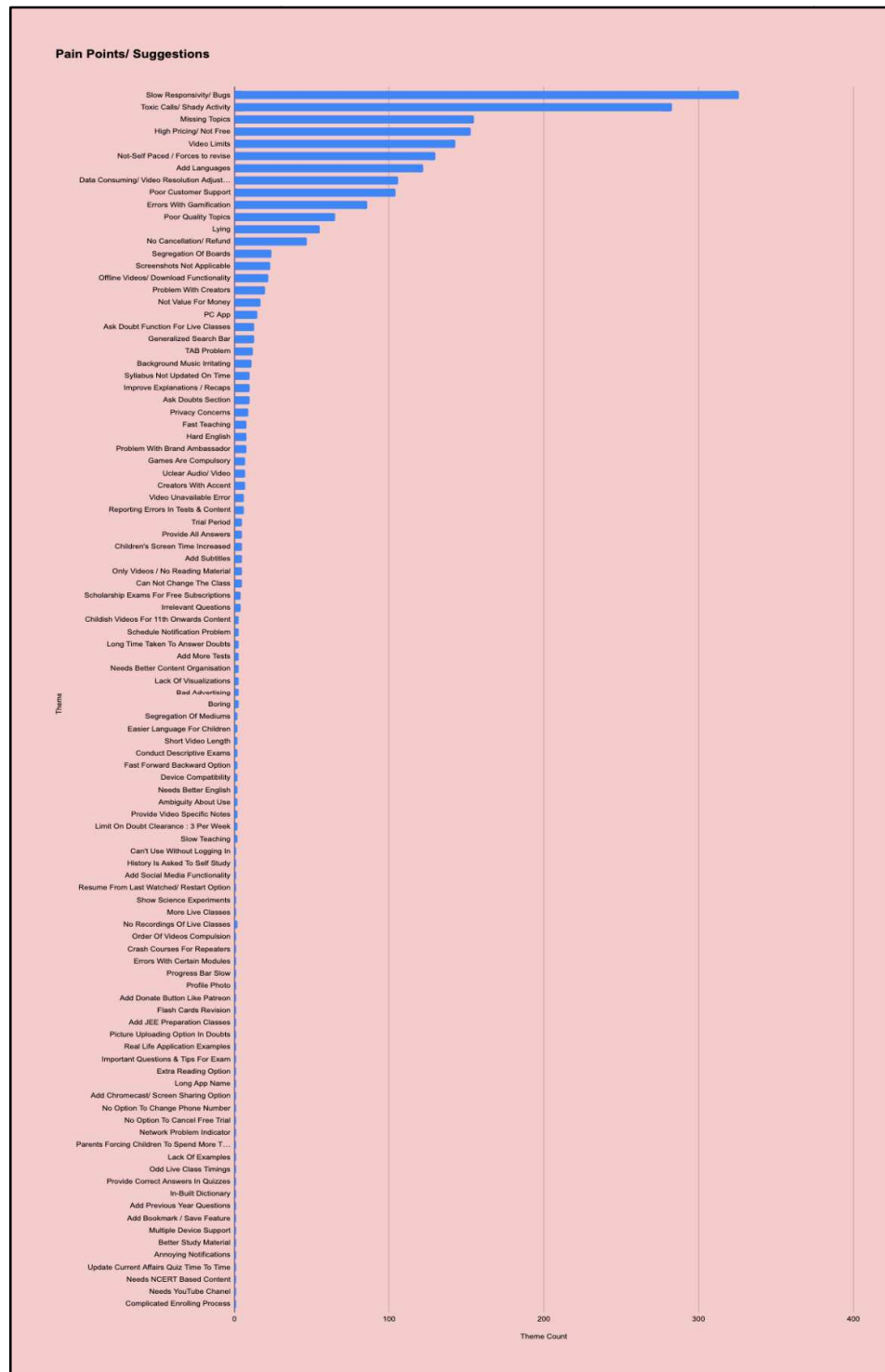
	children toward learning is not so enthusiastic.	
Thought Behind The App	Users loved the thought behind the app which is making education more accessible. The students don't necessarily need to attend schools or tuitions to gain knowledge now.	61
Doubt Clearing	Users loved the doubt clearing feature of the app. Students get many doubts from time to time and they can ask it on the app.	40

Figure 1. Theme Counts Visualizations with pain points and corresponding suggestions



Appreciated / Satisfied With:[link](#)

Figure 2. Theme counts and theme summary of themes satisfied with



Word Cloud Generation

Word Cloud is a visualization method which is highly effective at giving the viewer a sense of what is contained in the textual data (Erickvarela, 2021). It also indicates how much weightage a word has through the relative size of the word to all the other words present in the cloud. The three Word Clouds are generated to visualize the mixed reviews, the most positive reviews and the most negative reviews. For this three sample datasets are prepared by using Natural Language Processing. The datasets are as follows:

- `df_pos` : Data frame containing extremely positive 15,000 reviews
- `df_neg` : Data frame containing extremely negative 15,000 reviews
- `df_ex` : A data frame containing 30,000 reviews from the above two data frames

The process of generating WordClouds was as follows :

For each Word Cloud:

- Consider the respective data frame
- Run it through the respective WordCloud generating function we have made for each Word Cloud
- Save the Word Cloud

Figure 3, figure 4 and figure 5 portrays WordCloud for mixed reviews, positive reviews and negative reviews respectively.

Figure 3: WordCloud for mixed reviews

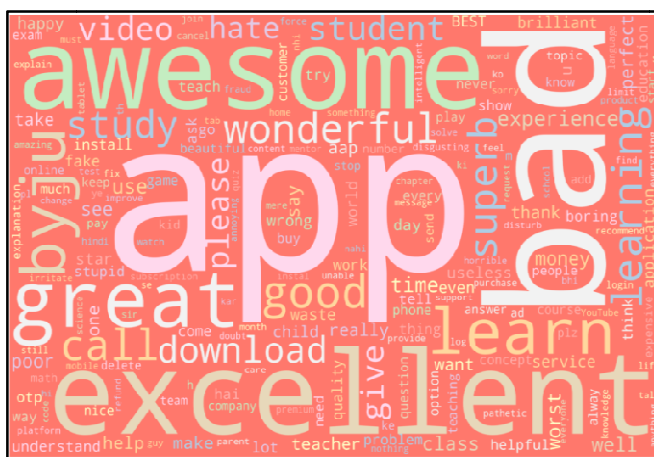


Figure 4: Word Cloud of positive reviews



Figure 5: Word Cloud of negative reviews



Features and Suggestions

Based on the above findings, a list of features and suggestions was made to be considered by the developer of a new Ed-Tech app. These are explained in table 3.

Table 3: Features and Suggestions

Feature	Based on	Explanation
Fast Responsivity	Slow Responsivity/ Bugs, Video Unavailable Error, Errors With Certain Modules, Progress Bar Slow	The product under development should be as fast as possible with a well optimized cloud that is easily scalable to handle higher user load. The testing process should be air tight and shall detect and fix all the bugs in the product.
Moral Marketing	Toxic Calls/ Shady Activity, Lying	The marketing for the product should be done in the most moral way possible. A business is meant to make money at the end of the day. Although, it is observed that a huge number of users are sensitive towards this topic.
Expansive Subjects & Topics	Missing topics	The product should feature an expansive range of subjects. All subjects should contain all the necessary topics under it & some extra ones.
Competitive Pricing	High Pricing/ Not Free, Not Value For Money, Free Videos, Live Classes Free Trial	The pricing of the product should be initially very competitive to the existing Ed-Tech products in the market. This will help the company gain more users. The product should provide some content for free and few live classes in order to incentivize users to sign up on the platform.

Free Offerings	High Pricing/ Not Free, Free Videos, Live Classes Free Trial	The product should offer a variety of free services to attract more customers. Availability of free content is something that has been observed to be most desired by the users.
Self Paced Learning	Video Limit / Not Self Paced, Order Of Videos Compulsion	The courses on the product should be self paced. The users should have the freedom to learn as much as they want without any restrictions from the product.
Expansive Language Availability	Add Languages	The product should feature content in as many vernacular languages as possible. Users have demanded the content in languages such as Hindi, Urdu, Tamil etc.
Video Resolution Adjustment Option In Video Player	Data Consuming/ Video Resolution Adjustment Feature	The video player should be given a feature that lets the user adjust the streaming resolution as per the need and availability of data.
High Quality Customer Support	Poor Customer Support	The customers in this line of business are quite sensitive as the development of their offspring is in question. The best quality customer support should be provided for the product that ensures the satisfaction & acts on complaints by the users.
Unbiased, Error-Free & Entertaining Educational Games	Errors With Gamification, Fun In Learning	The product should feature games based on educational content to make learning entertaining and captivating. Although, the company should ensure the proper working of these games before integrating them inside the product.
Top Quality Content	Poor Quality Topics	It is crucial to cater top quality content under all the subjects and topics. Users tend to resort to Ed-Tech apps as they face difficulties with understanding certain topics at schools and tuitions.
Easy & Ensured Cancellation & Refund System	No Cancellation/ Refund	There should be an effective Cancellation & Refund System in place to ensure that the users don't feel cheated. Opting out of a course and getting the money back should not be a hassle.
Segregation Of Boards	Segregation Of Boards	The courses and the content on the product should be well segregated by the boards. The name of the board should be clearly mentioned in the course name or through a tag system. Example : "Geometry : Class 9 CBSE Board"

Save Snapshot	Screenshots Not Applicable	There should be a feature that lets the user save snapshots from videos inside the app. Letting the user save it to the camera roll may lead to plagiarism issues.
Download Video Feature	Offline Videos/ Download Functionality	The product should let the user download the video they want. It should also let the user decide the resolution in which the video should be downloaded.
Impressive Teachers	Problem With Creators, Competent Creators	The product should feature top rated teachers who are capable of explaining things in an easy manner. The qualification of a teacher should also be considered to allow him on the platform.
Multiple Device Support	PC App, Device Compatibility, Multiple Device Support	The platform should offer support to a variety of devices such as mobile phones, tablets, iPads, iPhones, TVs, Laptops, MacBooks etc.
Tasteful Background Music	Background Music Irritating, Fun In Learning, Childish Videos For 11th Onwards Content	The music used for pre-recorded videos should be tasteful and low enough so that the speaker is audible. It is appropriate to add funny background music for children, but the videos for older users should be tasteful or non-existent.
Up-To-Date Syllabus	Syllabus Not Updated, Update Current Affairs Quiz Time To Time	As per the changes in syllabus, the content under the old courses should be edited from time to time.
Easy Explanations	Improve Explanations / Recaps, Clear Explanations/ Teaching Method	The method of explaining should be easy. The content should be delivered in small understandable chunks. The easy explanations provided on the app can be a moat point for the product.
Ask Doubts Tab	Ask Doubts Section, Limit On Doubt Clearance : 3 Per Week	Under every course, there should be a tab under which students can post their doubts. The teachers should be bound to give timely responses.
Reasonable Paced Teaching In Videos & Live Classes	Fast Teaching, Slow Teaching	The teaching in the videos and live lectures should be reasonably paced i.e neither too slow nor too fast
Simple & Understandable English	Hard English, Creators With Accent, Easier Language For Children, Needs Better English	The English used for teaching should be simple in terms of vocabulary and Indianized in terms of accent for the better understanding of the users from vernacular background.

High Quality Audio & Video	Unclear Audio/ Video	There should be a set standard for creators on the platform to be able to qualify as a creator. Example : The videos uploaded should be of minimum xyz P & the audio quality should be abc KBPS
Error Reporting Function	Reporting Errors In Tests & Content, Provide Correct Answers In Quizzes	The users should be able to report corrections if they find any problems, anomalies or errors in the content or questions provided by the teacher.
Subtitles	Add Subtitles	Subtitles should be available for all videos. There should be at least three options : 1. The language of the video 2. English 3. Auto Generated
Variety Of Study Material	Only Videos/ No Reading Material	The study material provided should be in multiple formats like, videos, pictures, PDFs, links to external content etc. The creation of this content can be another service that the product can provide to the teachers.
Competitive Exams For Free Subscription	Scholarship Exams For Free Subscriptions	Competitive exams should be conducted for each course. The toppers of that exam can be awarded with a free subscription to that course. This can be a great opportunity for the product to generate some buzz and receive some mouth publicity.
Schedule / Calendar	Schedule Notification Problem	The product should feature a function where the user can see all the upcoming classes and assignments due in the format of a calendar.
Use Of HQ Visualizations	Lack Of Visualizations, Video With Visualizations	The videos should include high quality visualizations for better understanding of users. The company can hire animation artists and graphics designers in order to provide visualizations as a service to the teachers on the platform.
Segregation Of Mediums	Segregation Of Mediums	The courses should be classified on the basis of medium attribute. Example : English Medium, Marathi Medium, Gujarati Medium etc.
Variety Of Video Lengths	Short Video Length	There should be a variety of video lengths available on the platform. It has been observed that, the videos of shorter length are easily understandable and less intimidating.

Seamless UX	Ambiguity About Use, User Experience	The user experience of the platform should be seamless. The information architecture & user flow should be intuitive.
Social Media Functionality	Add Social Media Functionality	Users should be able to network with other users and teachers like a social media platform.
Resume From Last Watched/ Restart Option	Resume From Last Watched/ Restart Option	There should be a function that plays the video from where you stopped it last time. There should also be an option to restart the video.
Practical Knowledge	Show Science Experiments, Practical Knowledge, Lack Of Examples, Real-Life Application Examples	The teachers should include more real life examples and show experiments for better understanding of students. An example can explain any concept quicker than mere theory.
Library Of Old Recordings	No Recordings Of Live Classes	The recording of old live classes should be saved and accessible by the users.
Flashcards Gearation Feature	Flashcards Revision	Users should be able to generate their own flashcards along with some preset flashcards on each topic. Flashcards Revision is one of the most widely used methods for revision.
Picture Uploading Option In Doubts	Picture Uploading Option In Doubts	There should be a feature where users can upload pictures along with their doubts. This feature can be useful to ask doubts in subjects like mathematics.
21 Expected & Previous Year Questions	Important Questions & Tips For Exam, Add Previous Year Questions	Like the Navneet 21 set, there should be a feature that can let a teacher provide most expected questions in exams, a list of tips to write the exam in a better way & previous year's solved question paper.
Extra Reading Option	Extra Reading Option	There should be a list of extra readings provided by the app in a separate section. Students can explore the other material on the internet after completing the content on the app.
Screen Sharing	Add Chromecast/ Screen Sharing Option	There should be a function where a user can use Screen Sharing Technology to watch videos on a bigger TV screen.
Screen Time Limiter	Parent Forcing Children To Spend More Time On App	There should be a feature that a parent can use to put a screen time limit on the student's app usage.

In-Built Dictionary	In-Built Dictionary	A user should not need to go outside of the platform to find the meaning of a certain word. There should be an in-built dictionary, where a user can simply select a word and look up the meaning and its use in a sentence.
NCERT Standardization	Needs NCERT-Based Content	The content being taught should comply with NCERT norms.
YouTube Channel	Needs YouTube Channel	There should be a YouTube channel of the app that features some of the basic concepts of various subjects.
Easy Enrollment Process	Complicated Enrolling Process	The user should be able to enroll in a class hassle free and with fewer clicks.
Make learning desirable	Fun In Learning	Learning by nature is a painstaking process. The product should try to make it interactive, interesting and attractive. This can be done by introducing games, competitions, fun facts etc.
Revision Section	Exam Preparation Functionality	There should be a section in the product that will let users choose the content and revise it. This feature can include various multiple choice questions, shuffled questions and hidden answers etc.
Analytics Dashboard	Performance Analytics	A user should be able to see his own progress over time in a format of a dashboard. This dashboard can show the performance of a user in terms of quiz scores, test scores, attendance, screen time etc.
Marketing Idea : Advertise as the best gift option	Marketing Idea	Advertisements can show that it is the best gift a student can receive. Show how perfumes and clothes are low value gifts and courses are high value gifts.
Marketing Idea: Send birthday gifts like stationary items to users.	Marketing Idea	This will help the company to position the product in the minds of the users and maintain healthy relations with them.
Cheat Sheets/ Mind Maps	Cheat Sheets	The product should offer cheat sheets of each subject where all the important points are mentioned in the form of points to remember.

Conclusion

The research talked about customer reviews of using BYJU's app. It is one of a kind in how it looks at reviews written by customers on Google Play. Using web scraping, the study's data were

extracted from the Google Play Store and saved in a structured format. Both natural language processing and manual content analysis were used in the analysis. Word clouds were created by performing sentiment analysis on a sample of the 30,000 reviews that displayed strong emotions. The research output is a list of suggestions and features that the new players in the Ed-Tech market should take into consideration.

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Computerized Generic Model for Selection of Manufacturing Method Based on Multiple Objectives and Functions

Girish R. Naik

Dept of Mech.Engg.,
Gokul Shirgaon,
Kolhapur – 416234
India

Poornima G. Naik

Dept of Computer Studies,
CSIBER, Kolhapur – 416004
India

ABSTRACT: Presently many manufacturing methods are available and the challenge before the organizations is the selection of appropriate manufacturing method based on organization objective and functional requirements. Owing to the dynamic nature of business environment every organization focuses on next stage of excellence by constantly updating and upgrading its business objectives. As the installation of a manufacturing method might be a very time consuming and expensive project, organization needs a tool support for the same. There is no single solution that is best for everyone. The problem boils down to proposing methods that are mapped according to the multiple objectives and functions aimed at improving organizational performance. In the current research, the authors have designed and implemented a generic manufacturing method selection model for the selection of the appropriate manufacturing process based on organizational objectives and functions.

Keywords: Auxiliary Solution, Grading Table, Manufacturing Method, Method Selection Matrix, Philosophical Solution, Software Solution, Technological Solution.

Introduction

The systematic analysis of organizational objectives and functional requirements is a basis for manufacturing method selection. Hence more than 110 manufacturing methods belonging to different classes have been proposed. For every strategic choice that organization makes for the manufacture of a new product, cost and quality management initiatives must be validated by selection of appropriate manufacturing method in order to meet organizational multi criteria economic objectives. The basic objective is to make the entire value chain faster, better and more profitable. The manufacturing method selection approach is conceptualized and designed to meet organization's specific requirements based on their objectives and functional requirements. This system revolves around four pivots, method selection based on single objective, multi objectives, single function and multi-functional requirements offering cost conscious and cost improvement methods

Manufacturing methods are categorized primarily into 5 different categories based on technological solution, software solution, management solutions, philosophical solutions, and auxiliary solutions. In order to provide a useful tool for managers in the selection of the best manufacturing method, two mapping methods based on organizational objectives and functions crucial to the organization are available. Gideon Halevi (Halevi 2003) has proposed 16 different manufacturing objectives, 24 different organizational functions grouped in four categories containing six functions each and 110 different manufacturing methods. The author has presented a review of manufacturing methods and their objectives (Halevi 2003). In the current work, the objectives as proposed by Gideon Halevi are considered for selection of a particular manufacturing method.

The applicability of each method to a particular objective is assigned one of the following grades based on its significance to the organization.

- | | |
|--|--------|
| • Excellent for a particular objective | • Good |
| • Very Good | • Fair |

Objective and Function Grading Table

The structure of the objective and function grading table is shown in Fig. 1.

Method No.	Class	Function																								Objective																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Fig. 1. Structure of Objective and Function Grading Table.

The objective and function grading table consists of 110 rows and 42 columns. The second column refers to the method classification. The columns in the range 3-26 refer to 4 different functions grouped into 6 different categories. The last 16 columns refer to the 16 different objectives. If the method in a particular row is not applicable to the objective or function in the corresponding column then the cell is indicated as blank.

In the current research the authors have designed a computer based framework for selection of manufacturing method based on multiple objectives and multiple functions. The method is generic and easily accommodates new objectives and functions.

Literature Review

Manufacturing methods can be systematically categorized on the basis of their main focus. Methods like Computer Aided Design (CAD) / Computer Aided Manufacturing (CAM), flexible manufacturing systems and manufacturing execution systems are supported by manufacturing hardware (Halevi 2003, Gardan & Minich 1992). In order to cater the needs of industry, knowledge management emerged as key area of research which resulted in focus on areas like expert system, artificial intelligence etc. (Co-Davies 1986, Coyne et.al. 1989). During the recessionary trends survival of organizations was crucial. This led to focus on improvement in productivity and to sustain lean phase in business cycle, organizations employed total cost management to remain competitive which resulted in emergence of methods like lean manufacturing, optimized production technology, theory of constraints etc. focusing on production planning and production control (Munro 1999, Goldratt 1988). Then focus shifted to more simplification of production processes, this led to emergence of group technology, just-in-time, constant work in process for the efficient utilization of organizational resources (Rao & Scheraga 1988). Cost leadership equips organizations with competitive advantage. Cost efficiency of organization's activities reflects its ability to perform similar activities better than its competitors. This led to emergence of methods like activity based costing, cost estimation, statistical process control etc. (Turny 1990). Competitive environment compelled organizations to fine tune their product design strategies. As a long term strategy, many organizations focused on building capacities for product design and development. The challenges faced by the organizations were controlling engineering costs against targets and mainly conforming product development process to meet time to market targets. These strategic initiatives led to emergence of methods related to product design and development (Datz 1987). Efficient human resource management removes redundancy and powers productivity. Efficient

performance management is proving to be an excellent cost optimization tool in the hands of smart organizations. It is the employee who drives the process rather than organization. The individuals input ensures an achievement oriented culture especially where change management is concerned. The main objective was to build learning organization to meet future challenges through development of high performing, energetic and enthusiastic human resource. This led to dedicated efforts in the direction of human resource development and management related methods such as executive excellence, cross functional leadership etc. (Becker & Gerhart 1996).

Research Methodology

The following section presents the mathematical mode for selection of manufacturing method based on multiple objectives and functions. The conceptual model is presented

Mathematical Formulation - Method Selection Matrix

The possible manufacturing methods suitable for a specific objective are organized in a matrix of order 11x10 in a method selection matrix. The method selection matrix has an element 1 if a particular manufacturing method is suitable for that objective, irrespective of its grade, otherwise the corresponding entry has a value 0.

Multi Objective Multi Function Criterion for Manufacturing Method Selection

Let $M^{(k)}$ represent a method selection matrix of order 11x10 for k^{th} objective where the ij^{th} element of $M^{(k)}$ is given by

$m_{ij}^{(k)} = 1$ if $(i+j)^{\text{th}}$ method has a grade 'a' or 'b' for the objective k, where $1 \leq k \leq 16$ or a function f where $f \in [1.1-1.6, 2.1-2.6, 3.1-3.6, 4.1-4.6]$

in the case of single objective and/or single function criteria,

$= g * c * o$ if the $(i+j)^{\text{th}}$ method is applicable to objective k in the case of multi objective criteria and
 $= g * c * f$ if the $(i+j)^{\text{th}}$ method is applicable to function k in the case of multi-function criteria.

In the above expressions g, c, o and f, refer to grade weight, class weight, objective weight and function weight, respectively.

We define the union operation on the method selection matrices M and M' as follows.

Let $M = [m_{ij}]$ and $M' = [m'_{ij}]$ represent two method selection matrices.

$M \cup M' = m_{ij} + m'_{ij}$ iff $m_{ij} < 0$ and $m'_{ij} < 0$
 $= 0$, otherwise.

With this type of representation, where various methods available for each objective and function are represented in a matrix form, it becomes plausible to address various cases pertaining to the manufacturing method selection for

- Single Objective
- Single Function
- Single Objective and Single function
- Multi Objective
- Multi Function
- Multi Objective and Multi Function

Without such a representation, the number of various permutations and combinations to be considered in various cases ignoring different classes are depicted Table 1.

Table 1. No of Permutations for Selection of Manufacturing Method in variousScenarios

Selection Type	No. of Permutations
Single objective	16
Single function	24
Single objective and single function	384
Multiobjective	${}^{16}c_1 + {}^{16}c_2 + {}^{16}c_3 + \dots + {}^{16}c_{16} = 2^{16} - 1 = 65,536$
Multi-function	${}^{24}c_1 + {}^{24}c_2 + {}^{24}c_3 + \dots + {}^{24}c_{24} = 2^{24} - 1 = 1,67,77,216$
Multi-objective and multi-function	$(2^{16} - 1) * (2^{24} - 1) = 10,99,51,16,27,776$

As seen from the Table 1., no. of permutations for multi-objective, multifunction criteria boils down to 10 trillion. Hence the above model tries to address this issue through data matrix representation thereby offering the solution in polynomial time. Without such a representation, the number of various permutations and combinations to be considered in various cases are depicted Table 1. The work flow of the conceptual model is depicted in Fig. 2.

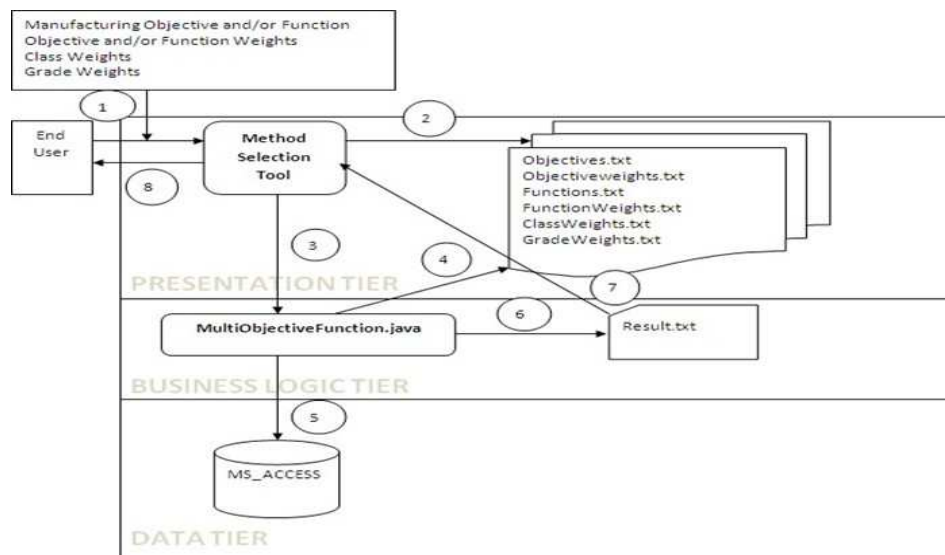
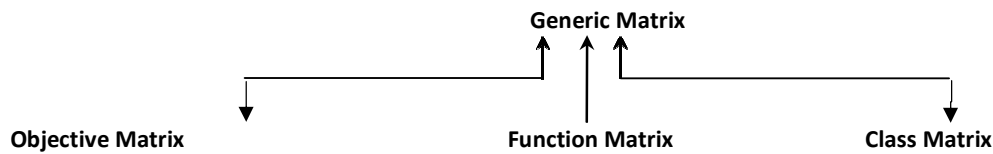


Fig. 2. Work Flow of the Conceptual Model

Class Diagram for Implementation of Business Logic

Generic Matrix
name : String grade : int[][]
Generic Matrix (Name: String, Grades :int[][]) to String(void):String
Union (GenericMatrix gm):Generic Matrix Find Method (Om: Objective Matrix): Method



Objective Matrix, Function Matrix and Class Matrix are simply the symbolic names for Generic Matrix having the same structure as Generic Matrix.

Method	MultiObjectiveFunction
method number :int method name :	grade : int[][]
string classification code : string	main(string[]):void create Objective Grade
value : int	Matrix():voidcreate Function Grade
method(int, String, String, int):void	Matrix():void
to String(void):String	find Methods (type: String): String[]

Results and Experimental Work

The model developed in section 3 is applied for the selection of manufacturing method based on multi objectives and multi functions.

Problem Definition: Select a set of manufacturing methods for a hypothetical organization conforming to the following organizational objectives.

Objective 2– Reduce Production costs

Objective 3– Rapid response to market demands – product design

Objective 6 – Progress towards zero inventory – increase inventory turnaround

Objective 7 – Improve management knowledge and information– enterprisecommunication

Objective 13– Improve enterprise integration – improving supply chain globally,

The weights assigned to different objectives, classes and grades are depicted in Tables2.1-2.3

Table 2.1 Objective Weights

Objective	Weight
2	10
3	8
6	8
7	6
13	6

Table 2.2 Class Weights

Class	Weight
M	4
P	3
S	5
T	5
X	1

Table 2.3 Grade Weights

Grade	Weight
a	6
b	4
c	3
d	1

Solution :

The method selection matrix is formulated for each of the objectives taking into account, corresponding objective weights, weight of the class to which the method belongs and objective's grade weight as given in Table 2.1-2.3.

The method selection matrices for objectives 2 and 3 are depicted in Fig. 3 and similar matrices exist for other objectives.

Note : Matrix starts with zero index

Method Numbers for Objective 2															
1	22	43	57	77	94	0	150	0	120	0	0	120	0	90	120
3	24	44	58	79	95	0	0	0	120	40	0	90	0	0	150
6	26	46	60	82	97	150	0	30	0	150	0	160	90	0	0
8	27	47	62	84	98	90	0	0	50	150	0	0	30	10	200
9	30	48	67	86	99	0	0	0	120	120	0	90	30	90	0
13	33	50	68	87	101	120	160	90	120	0	0	160	90	120	0
14	34	51	69	88	103	40	0	120	0	0	0	0	90	200	120
16	37	52	70	91	105	120	0	0	90	0	0	30	120	0	120
19	38	53	73	92	107	0	0	50	0	150	0	90	30	90	0
20	39	56	76	93		0	40	150	120	120	150	0	30	40	40
						0	160	0	120	0	30	0	90	0	0
						0	0	0	0	0	0	0	0	0	0

Method Numbers for Objective 3															
2	21	38	50	67	83	0	0	32	96	24	0	0	160	24	120
3	23	39	51	68	85	0	0	160	0	24	40	0	0	0	0
4	25	42	52	69	86	40	160	0	72	0	24	0	72	0	24
7	27	43	53	70	88	0	160	240	0	120	144	0	24	24	160
8	29	44	54	73	90	0	0	24	120	96	240	24	24	24	32
9	31	45	57	75	91	72	120	24	96	120	0	0	96	32	0
12	32	46	58	77	92	0	24	120	0	0	72	0	72	120	120
14	34	47	61	79	93	120	0	0	24	0	32	0	120	0	96
15	35	48	62	80	94	24	0	160	96	0	96	24	0	24	0
20	37	49	63	82	95	160	24	40	32	120	160	0	0	120	0
						0	120	160	120	160	96	160	0	0	96
						72	0	0	0	0	0	0	0	0	0

Fig. 4.
Fig. 3.

Method Selection Matrices for Objectives 2 and 3. depicts the application of union operation on the method selection matrices for objectives 2 and 3.

Objective 2 U Objective 3

Method Numbers for Objective 2 and Objective 3			
3	43	58	86
8	44	62	88
9	46	67	91
14	47	68	93
20	48	69	95

Method Numbers for Objective 2 and Objective 3

27	50	70	
34	51	73	
37	52	77	
38	53	79	
39	57	82	

0	0	0	216	0	0	0	0	114	248
0	0	0	0	64	0	0	0	0	0
190	0	0	0	0	0	0	162	0	0
0	0	0	0	270	0	0	54	34	360
0	0	0	248	216	0	114	54	114	0
192	288	114	216	0	0	0	186	152	0
0	0	248	0	0	0	0	162	320	248
248	0	0	114	0	0	0	248	0	216
0	0	210	0	0	0	114	0	114	0
0	64	190	152	248	310	0	0	168	0
0	288	0	248	0	126	0	0	0	0
0	0	0	0	0	0	0	0	0	0

Fig. 4. Application of Union Operation on the Method Selection Matrices for Objectives 2 and 3

Similarly, performing the union of method selection matrices for objectives 2, 3, 6, 7 and 13, we get the final matrix shown in Fig. 5.

Objective 2 U Objective 3 U Objective 6 U Objective 7 U Objective 13

Method Numbers for Objective 2 and Objective 3 and Objective 6 and Objective 7 and Objective 13			
9	39	98	
14	43		
20	50		
37	68		
38	94		

0	0	0	0	0	0	0	0	0	544
0	0	0	0	138	0	0	0	0	0
470	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	134	100	760
0	0	0	544	0	0	0	0	0	0
390	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	690	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	544	0	0	0	440	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

Fig. 5. Final Selection Matrix for the Objectives 2, 3, 6, 7 and 13.

The generic model presented above is implemented in Java in a business tier with MS-Access as back end for storing the domain specific information. The structure of the database is shown in Figure 5. The Graphical User Interface is developed in VB which invokes the business logic for generating the required output. The output is routed to a text file which is retrieved and displayed by the presentation tier logic. The graphical user interface of presentation tier is depicted in Figure 6.

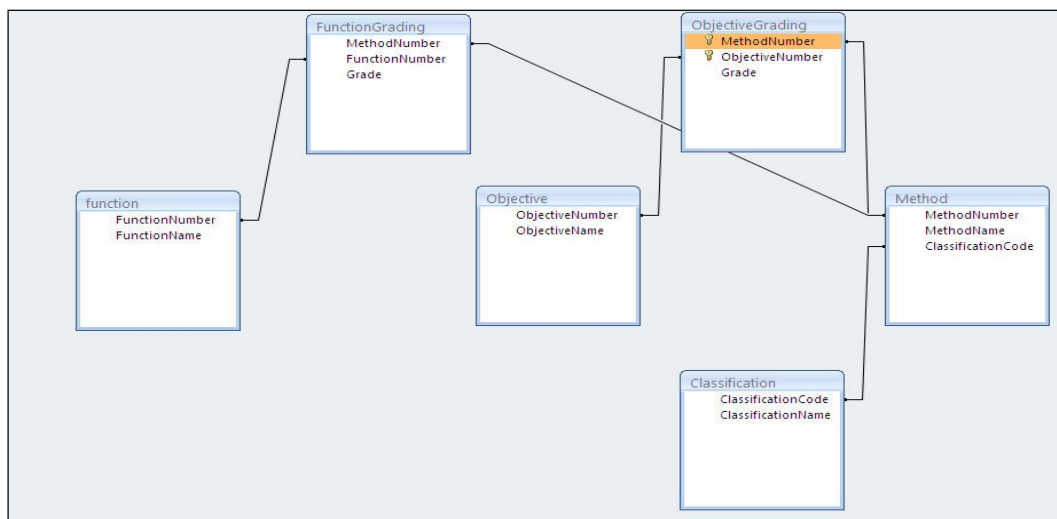


Fig. 6. Structure of Manufacturing Database



Fig. 7. Graphical User Interface for Presentation Tier

Fig. 8(a)-8(b) depict the selection of manufacturing method based on asingle objective for all classes and class M, respectively.

Single Objective Criteria for Selection of Manufacturing Method

Class
Select All

☒ M
☒ P
☒ S
☒ T
☒ X

Find Methods

☐ Meeting Delivery dates - production planning and control
☐ Reduce Production costs
☐ Rapid response to market demands - product design
☐ Reduce lead time - production
☐ Progress towards zero defects - quality control
☒ Progress towards zero inventory - increase inventory turnaround
☐ Improve management knowledge and information - enterprise communication
☐ Improve and increase teamwork collaboration
☐ Improve and increase team work collaboration
☐ Improve procurement management and control
☐ Management strategic planning - competitiveness - globalization
☐ Improve human resources management
☐ Improve enterprise integration - improving supply chain globally
☐ Continuous improvement
☐ Environmental production
☐ Marketing - market share

Selected Methods :

9-Borderless corporation
 10-Business intelligence and data warehousing
 13-Cellular manufacturing
 14-Client/server architecture
 16-Common-sense manufacturing
 22-Constant work-in-process
 30-Cycle time management
 32-Digital factory
 37-Electronic data interchange
 39-Enterprise resource planning
 41-Executive excellence
 43-Extended enterprise
 45-Flexible manufacturing system
 58-Just-in-time manufacturing
 60-Kanban system
 68-Manufacturing execution system
 94-Supply chain management
 97-Theory of constraint
 98-Time base competition
 109-Workflow management

Fig. 8 (a) Selection of Manufacturing Methods for a Single Objective (Objective 6) for allclasses

Form3

Single Objective Criteria for Selection of Manufacturing Method

Class
☒ M
☐ P
☐ S
☐ T
☐ X

Find Methods

- ☐ Meeting Delivery dates - production planning and control
- ☐ Reduce Production costs
- ☐ Rapid response to market demands - product design
- ☐ Reduce lead time - production
- ☐ Progress towards zero defects - quality control
- ☒ Progress towards zero inventory - increase inventory turnover
- ☐ Improve management knowledge and information - enterprise communication
- ☐ Improve and increase teamwork collaboration
- ☐ Improve and increase team work collaboration
- ☐ Improve procurement management and control
- ☐ Management strategic planning - competitiveness - globalization
- ☐ Improve human resources management
- ☐ Improve enterprise integration - improving supply chain globally
- ☐ Continuous improvement
- ☐ Environmental production
- ☐ Marketing - market share

Selected Methods :

- 9-Endless corporation
- 13-Cellular manufacturing
- 43-Extended enterprise
- 58-Just-in-time manufacturing
- 90-Kanban system
- 94-Supply chain management
- 98-Time base competition
- 105-Workflow management

Fig. 8 (b) Selection of Manufacturing Methods for a Single Objective (Objective 6) for Class M

Figure 9(a) depicts the selection of manufacturing methods for the function 4.3, Focus on Management Control with Figure 9 (b) depicting the execution of business logic in middle tier.

Form3

Single Function Criteria for Selection of Manufacturing Method

Class
☒ M
☐ P
☐ S
☐ T
☐ X

Find Methods

4. Focus on Management Functions

- ☐ 4.1 Focus on Strategic Planning
- ☐ 4.2 Focus on Operational Organization
- ☒ 4.3 Focus on Management Control
- ☐ 4.4 Focus on Decision Making Methods
- ☐ 4.5 Focus on Human R Utilization
- ☐ 4.6 Focus on Guidance

Selected Methods :

- 1-Activity-based costing
- 10-Business intelligence and data warehousing
- 15-Collaborative manufacturing in virtual enterprises
- 24-Computer-oriented PICS
- 32-Digital factory
- 39-Enterprise resource planning
- 70-Master product scheduling
- 81-Performance measurement system
- 96-Team performance measuring and managing
- 109-Workflow management
- 110-World class manufacturing

Fig. 9 (a) Selection of Manufacturing Methods for a Single Function 4.3

```

C:\WINDOWS\system32\cmd.exe
1 0 0 0 0 0 0 0 0 0
0 1 0 0 0 0 0 0 0 0
0 0 0 0 0 0 1 0 0 0
0 0 0 0 0 0 0 0 0 1
1 0 0 0 0 0 0 0 0 0

1-Activity-based costing
10-Business intelligence and data warehousing
15-Collaborative manufacturing in virtual enterprises
24-Computer-oriented PICS
32-Digital factory
39-Enterprise resource planning
70-Master product scheduling
81-Performance measurement system
96-Team performance measuring and managing
109-Workflow management
110-World class manufacturing

D:\multiojectivefunction>pause
Press any key to continue . . .

```

Fig. 9(b) Execution of Business Logic in Middle Tier

Figure 10(a) and 10(b) depict the selection of manufacturing methods based on multi objectives and multi objectives and multi functions, respectively.

```

C:\WINDOWS\system32\cmd.exe
G:\multiojectivefunction>cd\
G:\>g:
G:\>cd g:\multiojectivefunction
G:\multiojectivefunction>set path=C:\Program Files\Java\jdk1.5.0\bin
G:\multiojectivefunction>set classpath=.
G:\multiojectivefunction>javac MultiObjectiveFunction4.java
G:\multiojectivefunction>java MultiObjectiveFunction4
result :
Selected Method...
Method Number      : 39
Method Name        : Enterprise resource planning
ClassificationCode : 8
Value              : 760

G:\multiojectivefunction>pause
Press any key to continue . . .

```

Fig. 11(b) Execution of Business Logic in Multi objective Method Selection

Fig. 10(a). Selection of Manufacturing Methods Based on Multi Objectives and Multi Functions

Multi Objective Multi Function Criteria for Selection of Manufacturing Method

Class

Select All ☐ M ☐ P ☐ S ☐ T ☐ X

Weights

1] Meeting Delivery dates - production planning and control ☐ 2] Reduce Production costs ☒ 3] Rapid response to market demands - product design ☒ 4] Reduce lead time - production ☐ 5] Progress towards zero defects - quality control ☐ 6] Progress towards zero inventory - increase inventory turnaround ☒ 7] Improve management knowledge and information - enterprise communication ☒ 8] Improve and increase teamwork collaboration ☐ 9] Improve and increase team work collaboration ☐ 10] Improve procurement management and control ☐ 11] Management strategic planning - competitiveness - globalization ☐ 12] Improve human resources management ☒ 13] Improve enterprise integration - improving supply chain globally ☐ 14] Continuous improvement ☐ 15] Environmental production ☐ 16] Marketing - market share ☐

Find Methods

Grade

Weights

a ☐ b ☐ c ☐ d ☐

3. Focus on Performance Achievement

3.1 Focus on Quality Functionality ☐ 3.2 Focus on Cost ☐ 3.3 Focus on Enterprise Flexibility ☐ 3.4 Focus on Customer Satisfaction ☐ 3.5 Focus on Meeting Delivery Dates ☒ 3.6 Focus on Lead-Time Duration ☐

Selected Methods :

Method Number : 50
Method Name : Global manufacturing system

Fig. 10(b) Execution of Business Logic in Multi objective and Multi Function Method Selection

```
C:\Windows\SYSTEM32\cmd.exe

0 0 0 0 0 0 0 0 0 0
1360 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 777 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0

Selected Method...
Method Number : 50
Method Name : Global manufacturing system
ClassificationCode : P
Value : 1360

d:\multiobjectivefunction>pause
Press any key to continue . . .
```

Scope for Future Work

The current research can be extended further to develop a model based on fuzzy logic for fine tuning the selection criteria providing a blended approach where a single method fails to meet the objectives and functions.

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Technology's Impacts on Tourism Management: A Study

Saurabh Dattatray Vichare

Student

Chhatrapati Shahu Institute of Business
Education & Research, Kolhapur

ABSTRACT - Strategic operations that take place within them and use information technology have a big impact on the tourist and hospitality sectors today. It is driven both by the fierce competition present in the industry and by the emergence of novel, innovative ideas. Tourism refers to travel that is done for business, pleasure, or both. The tourism business greatly benefits from information technology. Information technology is employed in the travel, lodging, and tourist industries. These technologies are used to recognise and meet the constantly changing needs of the travel and tourist sector. Technology has come to be regarded as a template for India's future tourist economic growth and E-tourism development based on the liberalisation and globalisation policies.

Key-Words : Tourism, Information Technology, Accommodation, E-Tourism, Innovation

Introduction

The use of information technology has been one of the most explored topic in tourist technology since the 1980s. The disruption of digital technologies has accelerated the evolution of the tourism and hospitality sectors. A number of changes in the tourism business have been brought about by the advancement of modern technologies. These changes may be seen in both the tourism demand and supply sides.

Since the turn of the century, every product that used to have a years-long life cycle has changed to one with a much shorter life cycle of months. Tourism and hospitality are two closely related industries that make extensive use of information technology. It is typically employed to enhance communication between travellers, tour operators, and service providers in the tourism industry. Therefore, its adoption in various tourist destinations, hotels, modes of transportation, as well as by other related service providers, is a clear indication that it is a component of the tourism and hospitality business. E-tourism is currently high, as are digitalized tourism and hospitality activities like online booking, flash packets, travel blogs, e-tour guides, and online service platforms, among other things.

Both the tourist industry and other industries connected to it are significantly impacted by technology. These include, among other things, the transportation, communication, and tourism industries. The usage of technology in tourism has evolved over time to offer incredibly upscale services all over the world. When technology was less prevalent in the tourism industry in the recent past, the majority of services were of extremely low quality and equally unreliable. The quality of service has, however, significantly improved with the passage of time thanks to technology.

Objective

1. To discover how technology can make contribution to the growth of the tourism industry.
2. To Study the present scenario of technology in Tourism Management.
3. To evaluate the components of technology and tourism management industry.

Research Methodology

Descriptive methods of study were used for this research paper. The Technology impact on Tourism Management were covered for the present study. This paper fully based on secondary source of data. All the data used for the purpose of this research has been data sourced from various sources like research papers, books, news let, Paper articles, websites. Collected data were presented in the theoretical form.

This research paper scope of the study is limited to Technology impacts on Tourism Management.

Need of Technology In Tourism Management

All of us have connections in travel. The recent technological revolutions and the alterations to social structures that they have caused have increased in the twenty-first century. As a result, tourism management is currently becoming more intense. They need in-depth information on each place they intend to visit. The exact elements of these information demands are as follows:

- Geographical details, including place, topography, and climate.
- Information Needs in Tourism Management
- Accommodations, restaurants, and entertainment options
- The region's unique social traditions, culture, and other elements
- Leisure and recreation amenities Seasons of visitation and other distinctive characteristics
- The average expenses of the facilities, taking exchange rates and their quality into account

Though travellers are the information's intended end users, the tourism sector, which consists of destination service providers and managers actually profits financially from it. To better serve their customers and grow their businesses, travel intermediaries like travel agencies, tour operators, and reservation systems keep such information on each destination on hand. To meet the information needs of the clients as rapidly as possible, they require the information in a format that is the simplest to get.

Three sectors contribute up the tourism industry:

1. The Transportation Sector,
2. The Accommodation Sector, and
3. Attraction sector,

Technology And Tourism Management Industry Components

1. The Transportation Sector

The travel industry is entirely computerised both globally and in several regions of India. Since all travel-related services, including train, car, bus, coach, and airline tickets, are computerized, effective information management is made possible. The data produced by numerous tourism organizations makes information on the visitors or passengers of the past, present, and future easily accessible.

There are many types of travel services that use software applications.

i) A Rental Car

Worldwide and in major cities, car rentals are a significant industry. Corporate or business travellers, as well as tourists looking for superior service and conveniences while travelling, make up many automobile rental customers.

Amadeus, Sabre, and other information and reservation systems are utilised for car rentals and information in other countries, particularly in America and Europe where the car rental industry is entirely computerized.

ii) Railways

A few years ago, the train services began to be computerized. The software system utilised for ticketing and other customer services was created especially for Railways. The PNR (Passenger Name Report) number listed on each customer's ticket is the main focus of the computerised system. Each of these PNR numbers is distinct and uniquely identifies the passenger on the ticket, together with the passenger's personal information, as well as the train and the intended destination. A person can now make reservations immediately and book tickets well in advance of the journey date. Computerized customer service facilities have replaced the computerized ticketing system.

iii) Airlines

In the travel industry, computerization has been most pronounced in the airlines. All airlines utilise the Computer Reservation System (CRS) to book reservations. The CRS helps to increase occupancy rates while also giving airlines better marketing and distribution options. A more effective and reliable distribution system was required due to the rising global popularity of air travel. The first Information and Reservation System (IRS) was created in the US in 1970. This system offered CRS for direct booking on the preferred airline as well as information about the travel business, including that of the airline industry.

Airlines pay attention to the following factors:

- Enhancing accessibility, client relationships, and business partners
- Electronic Reservations
- Online ticket reservations
- Yield Management
- Electronic auctions for last-minute seats
- Agency charge restructuring and disintermediation
- Increasing the new electronic distribution channel's productivity

2. The Accommodation Sector

Due to the way that tourism is managed, enterprises in the accommodation industry lack direct contact with tourists and customers. The way businesses operate in this industry has altered as a result of technology. In fact, organisations in the hotel industry are creating communication networks to compete with Global Destination Systems, a database of information about availability, costs, and related services for airlines, car rental agencies, hotels, rail agencies, etc. that also allows for the issuance of tickets. Additionally, A Global Destination Systems makes any or all of these features available to airlines, booking engines, and travel agencies that subscribe. Amadeus, Apollo, Galileo, Worldspan, and Sabre are the Global Destination Systems leaders. The main users of these Global Destination Systems, which are significant information management technology solutions, are airlines and travel firms. The Global Destination Systems have evolved into vendors of technology solutions for lodging in order to compete with this new threat. Expedia and E-Travel cater to both leisure and business travellers.

3. Attraction Sector

Owners of attractions, whether they are man-made or natural, must inform their current and prospective customers about their products. It is crucial to have knowledge about the type of attraction, its location, and directions to get there. The information is used by the attraction owners, in particular the national tourist officers, to carry out their job of promoting the country's tourist attractions.

Internet And Tourism

The TCP/IP protocol connects computers all over the world via the Internet, an interconnected system of networks. The internet serves as a global "people's network" for communication and information sharing today. It is made up of the World Wide Web and E-mail, two strong tools. A sizable worldwide knowledge resource, or library, has recently evolved on the WWW, a section of the internet. Because the tourism industry is one of many that can be checked, enquired about, and ordering online easily, and conveniently communicated and delivered electronically via the Internet, the use of the Internet for communication and transacting with customers has been growing quickly. Examples include e-booking of hotel rooms, airline tickets, travel packages, etc.

The tourism sector uses the internet in a variety of ways, including the following:

- a) Marketing technology is used in almost every aspect of marketing, including editorial and newsletters, search engine marketing, email promotion, word-of-mouth via social networks like blogs with customer reviews, communities like the free flickr photo sharing website and YouTube video sharing site, discussion groups, and Facebook.
- b) Real-time reservation and marketing solutions are necessary since, according to current data, more than half of travellers prefer to book their bookings online.
- c) The last item is providing tourist experiences. Offer a first hand experience online, for instance through experience-driven web content or tasters delivered prior to trip via online audio podcast or video clips offering audio tours for on-site consumption on MP3 devices. Connect tourists to more experiences in your area by, for example, emphasising extra sites or activities on your website or as part of a tour or experience. Provide interpretation utilising handheld or mobile devices. With this strategy, you may help your customers understand how they can improve the visitor experience.

Technology Used In Tourism Management

Information and communication technology (ICT) is frequently used as a longer synonym for information technology (IT). However, it is usually a more general term that emphasises the significance of unified communications and the integration of telephone lines and wireless signals, computers, middleware as well as necessary software, storage, and audio-visual systems, which allow users to create, access, store, transmit, and modify information. ICT includes all forms of audio and video processing, transmission, and network-based control and monitoring functions. There are also IT, broadcast media, and telecoms involved. Dennis Stevenson, who was endorsing the new National Curriculum guidelines for the UK in 2000, used the aphorism for the first time in a 1997 report to the UK government.

Here are a few scenarios in which technology could be used in the travel industry.

- Managing Resources at the Destination
- Tourism Resource Inventory
- Managing Attractions and Sites
- Finding a Tourist-Friendly Location
- Control visitor statistics

NEW TECHNOLOGIES SOLUTIONS FOR THE TOURISM INDUSTRY

There are many technology options that the tourism industry can operate and use. There, in the table below, we can see some of the tourism technology options that are now available.

Table 1 : New Technologies in Tourism Industry.

Technology	use
Online Booking Systems	The availability of online booking systems has made it easier for travellers to plan and book their trips. Travellers can make reservations for flights, accommodation, tours, and activities online from anywhere in the world.
Mobile Applications	Mobile apps are useful for travellers on to go. They can use apps to search for local attractions, restaurants, and accommodations. Mobile apps also provide features such as GPS based navigation, real time information, and in app payments.
Social Media	Social media platforms are used to market tourism destinations and attractions. Tourism boards and travel companies use social media to engage with customers, provide customer support, and create brand awareness.
Virtual Reality	Virtual reality technology is used to provide immersive experiences to travellers. Virtual reality technology can be used to showcase tourism destinations, museums, and historical sites.
Big Data	Big data analytics is used to collect and analyse data from various sources such as social media, booking systems, and customer feedback. This data is used to gain insights into customer behaviour and preferences, which can be used to improve tourism products and services.
Internet of Things (IoT)	IoT technology can be used to enhance the customer experience by providing personalized services. For example, hotels can use IoT devices to adjust the temperature and lighting in guest rooms based on guest preferences.
Artificial Intelligence (AI)	AI technology can be used to automate tasks such as customer service and reservation management. AI chatbots can provide instant customer support and answer frequently asked question.

Conclusion

In order to improve the current infrastructure of the tourism sector, this article explores numerous information technology impacts on the area of tourism management. This Article has shown that both the influence and the willingness of technologies on tourism are enormous. The transportation, accommodation, and tourism industries stand to benefit most from the technology listed.

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“A Case Study : Utilization of Boiler Fly Ash To Reduce TheParameters of Effluent Generated In Shree Datta S.S.S.K. Ltd., Shirol ”

Deepa Bhandare
Env. Officer, SDSSSK

Varsha Kadam
Field Officer, MPCB

Vishwajit Shinde
Prod. Manager, SDSSSK

ABSTRACT : The large quantities of waste water generated at all stages of sugar production are highly contaminated. Waste water management in sugar industry must implement safe and effective methods to reduce impurities. A sequential combination of different physical unit operations and chemical and biological unit processes constitute major parts of our waste water treatment. The general criteria for measuring effluent treatment plant efficiency are the degree of COD / BOD/TSS reduction, which constitutes organic pollution.

Introduction

Sugar industry is the one of the most important and second largest agro based industry in India and highly responsible for creating significant impact on rural economy. Sugar industry is seasonal in nature and operates for about 140 days in a year. Significant amount of effluent is generated during the operation of Sugar Industry which contains large amount of pollution load particularly BOD, COD and TDS. This high colored effluent with unpleasant odour and having lesser dissolved oxygen content is highly toxic for aquatic living species. Its treatment is the most and foremost important task because this treated effluent is generally used for land irrigation. The Central Govt. as well as State Govt. have set up the certain parameters like COD, BOD, TSS, TDS, pH etc. for the treated effluent and both the bodies are supervising on these parameters through Online Monitoring System.

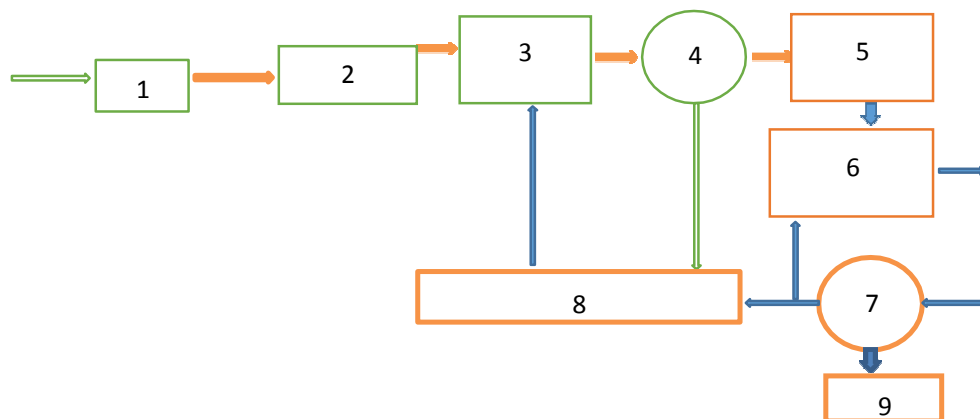
Even though the effluent of sugar industry is not reaching to the natural streams directly but treated effluent is given to farmers for irrigation purpose. Strict monitoring and good treatment practices for effluent plays vital role. If proper treatment practices are not followed then this bad/poor quality treated effluent makes impact on human / soil health, aquatic life, ground water and surface water etc.

The effluent generated through the sugar industry is of both types i.e., alkaline and acidic. The alkaline and acidic effluent treatment is the challenge at sugar industry effluent treatment plant. Water is an important natural resource and pollution of the same is to be strictly monitored and must be treated suitably before it enters into the environment. A number of treatments methods are available such as coagulation, membrane separations, adsorption, ion exchange, advanced oxidation process, biological treatment, cavitation, etc. to bring down the COD / BOD level to prescribed norms. Although some of these methods are well established, industry generates Secondary waste that again needs to be treated or disposed of suitably.

Shree Datta S. S. S. K. Ltd., Shirol is a Sugar Complex having capacity 9000 TCD along with 60 KLPD distillery and 30 KLPD ethanol plant. Steam and power is supplied from co-generation plant, which is working under the separate management. The management of the Shree Datta S. S. S. K. Ltd., Shirol is very keen about protecting the environmental norms and committed to improve the environment in line with social responsibilities towards global initiatives. Shree Datta S. S. S. K. Ltd., Shirol have planted around 40000 trees as the Karkhanasite, which is full grown.

METHODOLOGY

DIGRAM OF ETP



1. Bar Screen	4. Primary Clarifier	7. Secondary Clarifier
2. Oil & Grease Trap	5. Anaerobic Filter	8. Sludge Drying Beds
3. Equalization Tank	6. Aeration Tank	9. Discharge tank

Above-described technology is used in Shree Datta S. S. S. K. Ltd., Shirol to minimize the COD/BOD levels in effluent generated. This particular project has been taken in hand to find alternate cost-effective way to minimize the COD, BOD, TSS, colour/ odour etc. For this study we have used the fly ash which is the waste generated during boiler operation. Fly ash is the waste product generated in substantial quantity and needs to be disposed of with great precaution. We have utilized this fly ash for filtration purpose of effluent generated from sugar factory. Firstly, we have utilized the fly ash for filtration and filtered waste water is analyzed for COD, BOD, TSS, colour / odour etc. Then after the fly ash was washed with raw water and dried completely for reuse,

For filtration purpose we made one assembly of plastic can of 50 litres and converted that plastic can into multi-bed filter. For this multibed filter we have used the different size of small stones, sand and upper layer is covered with fly ash. We passed the effluent taken from the inlet of the equalization tank and filtered effluent is analyzed for the chemical properties i.e., BOD, COD, TSS, pH and physical properties like odour and colour.

Need Of The Study

Generally, the effluent treatment plant is designed as per the crushing capacity of the sugar factory, effluent generation and the organic load going to ETP. In Maharashtra generally every sugar factory is doing its capacity utilization more than 100% to crush maximum sugar cane in minimum time to achieve maximum recovery. This excess crushing leads to the generation of excess effluent and it becomes difficult to handle this excess effluent for ETP and it becomes very difficult to maintain the prescribed norms of treated effluent. This heavy organic load deteriorates the working of ETP as well as the treated water parameters.

Many times ETP has to treat more load of effluent than its basic designed capacity. This hampers the working of ETP and there may be large deviation in the prescribed parameters of the treated effluent. Frequent heavy organic loads on ETP keeps ETP working parameters disturbed, which ultimately leads towards the bad quality of treated effluent water.

This particular project study has taken in consideration to overcome problems arising from the higher organic loads going towards ETP, to establish alternate method to reduce excess COD/ BOD/ TSS/ colour/ odour etc., to consider problems arising from expansion of ETP for higher

crushing rates of factory, to overcome major expenditure required to expand the ETP, and to take care of any kind of disturbance of routine working of ETP.

Observations

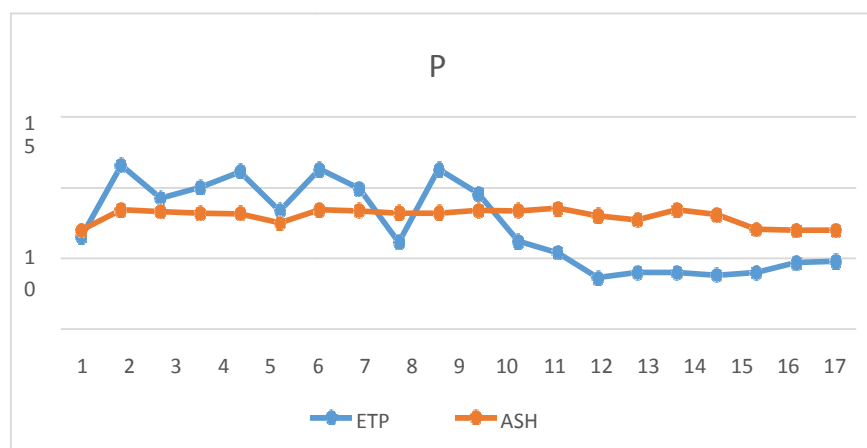
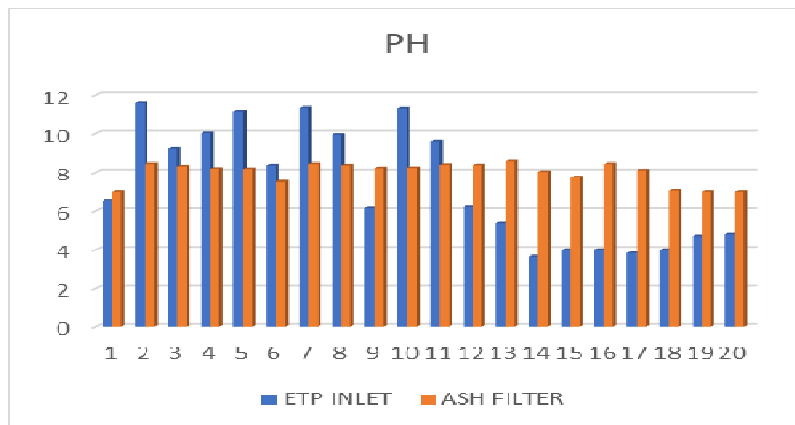
Different Studied Parameters –1

pH:

Study of pH of ETP waste water from DSSSK.

Sr. No.	pH Etp. Inlet	pH After Ash Filter	Sr. No.	pH Etp Inlet	pH After Ash Filter
1	6.53	7	11	9.58	8.4
2	11.59	8.44	12	6.21	8.38
3	9.26	8.32	13	5.41	8.55
4	10.02	8.19	14	3.65	8.02
5	11.14	8.18	15	3.99	7.73
6	8.37	7.51	16	3.99	8.44
7	11.32	8.44	17	3.82	8.1
8	9.93	8.37	18	3.99	7.06
9	6.15	8.22	19	4.68	7
10	11.3	8.23	20	4.78	7

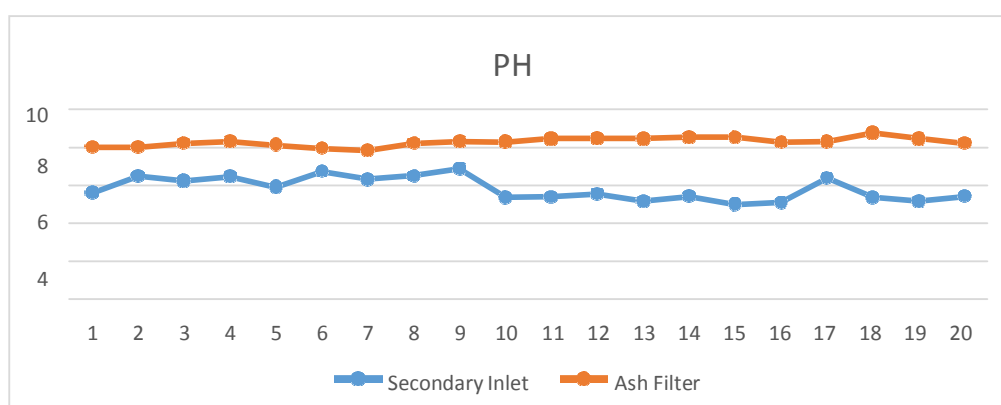
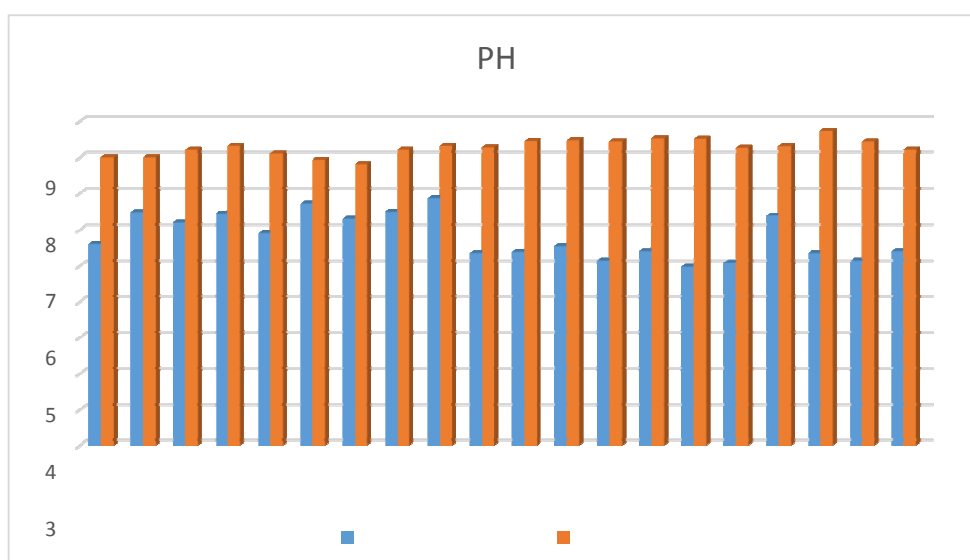
(Observation Table no. 1)



Study of pH of Secondary Inlet waste water from DSSSK.

Sr. No.	PH Secondary Inlet	PH AfterAsh Filter	Sr. No.	PH Secondary Inlet	PH After Ash Filter
1	5.59	8	11	5.38	8.45
2	6.49	8	12	5.53	8.47
3	6.2	8.2	13	5.15	8.44
4	6.45	8.3	14	5.4	8.52
5	5.9	8.1	15	4.97	8.51
6	6.72	7.93	16	5.09	8.25
7	6.3	7.82	17	6.39	8.29
8	6.5	8.2	18	5.35	8.74
9	6.86	8.3	19	5.15	8.44
10	5.35	8.26	20	5.4	8.2

(Observation Table no. 2)

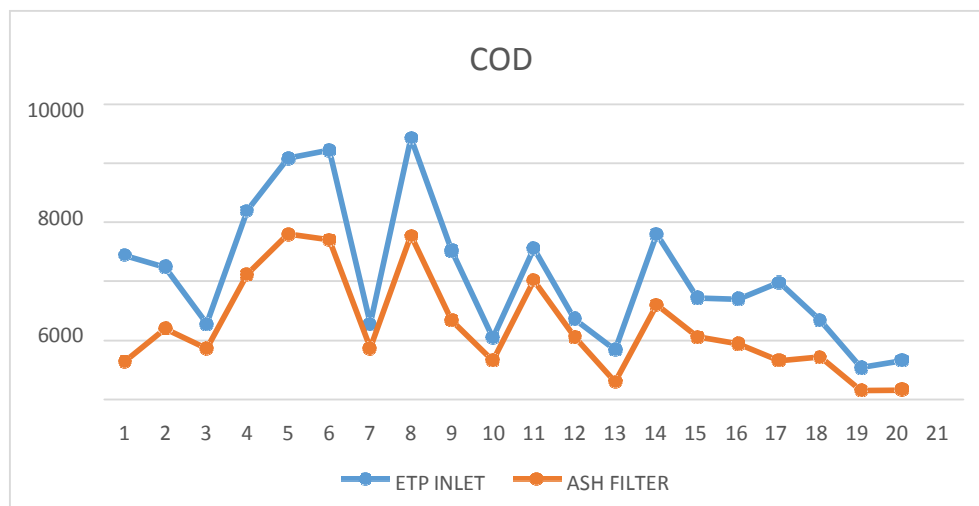
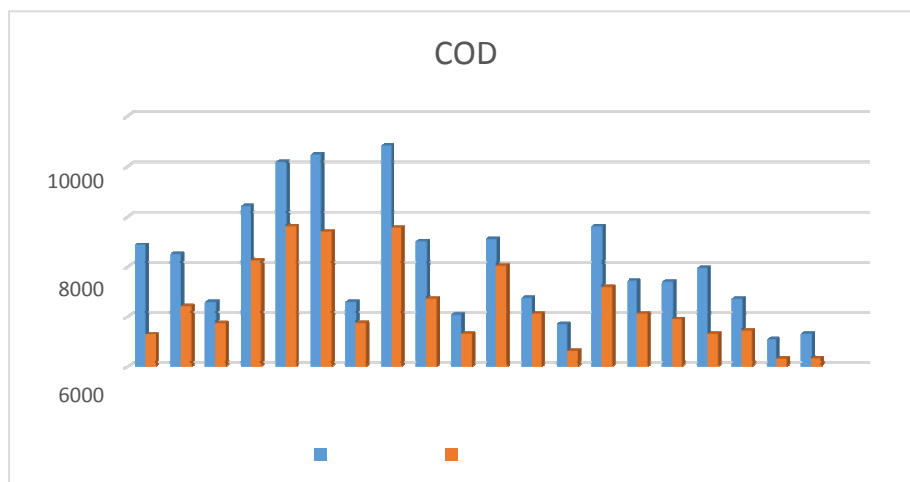


COD:

Study of COD of ETP waste water from DSSSK.

Sr. No.	Cod EtpInlet	Cod AfterAsh Filter	Sr. No.	Cod Etp Inlet	Cod AfterAsh Filter
1	4880	1280	11	5120	4040
2	4480	2400	12	2720	2120
3	2560	1720	13	1680	600
4	6400	4240	14	5600	3200
5	8160	5600	15	3440	2120
6	8440	5400	16	3400	1880
7	2560	1730	17	3960	1320
8	8850	5550	18	2680	1440
9	5040	2680	19	1080	304
10	2080	1320	20	1320	320

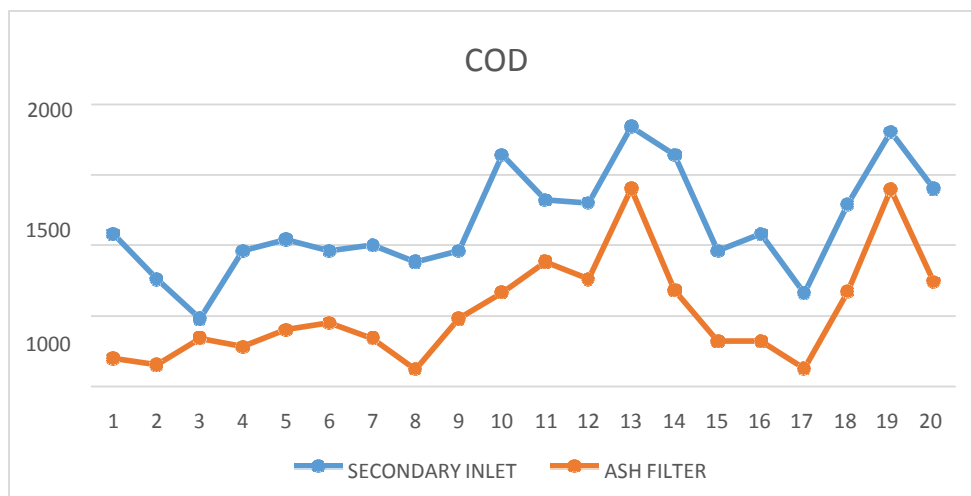
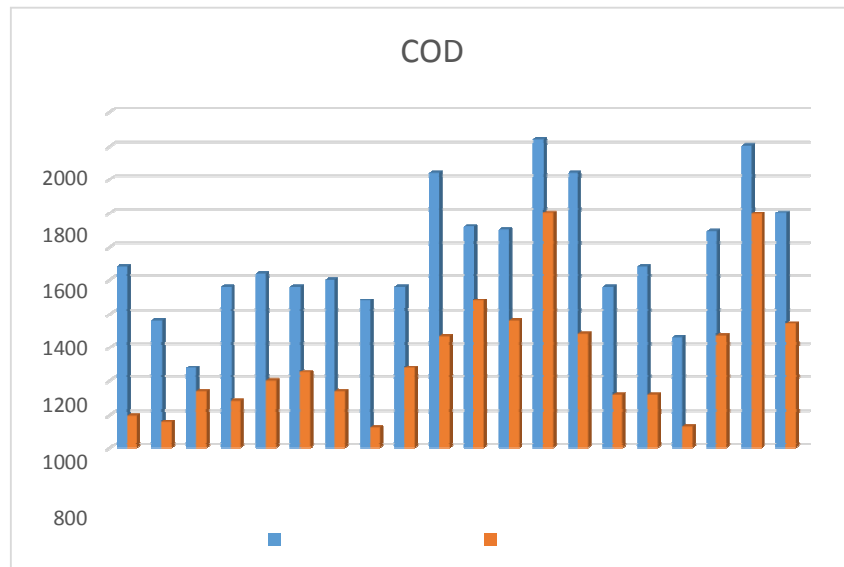
(Observation Table no. 3)



Study of COD of Secondary Inlet waste water from DSSSK.

Sr. No.	Cod Secondary Inlet	Cod AfterAsh Filter	Sr. No.	Cod Secondary Inlet	Cod AfterAsh Filter
1	1080	197	11	1320	880
2	760	152	12	1300	760
3	480	340	13	1840	1400
4	960	280	14	1640	680
5	1040	400	15	960	320
6	960	1088	16	1080	320
7	1000	340	17	660	125
8	880	120	18	1290	670
9	960	480	19	1804	1395
10	1640	666	20	1400	740

(Observation Table no. 4)

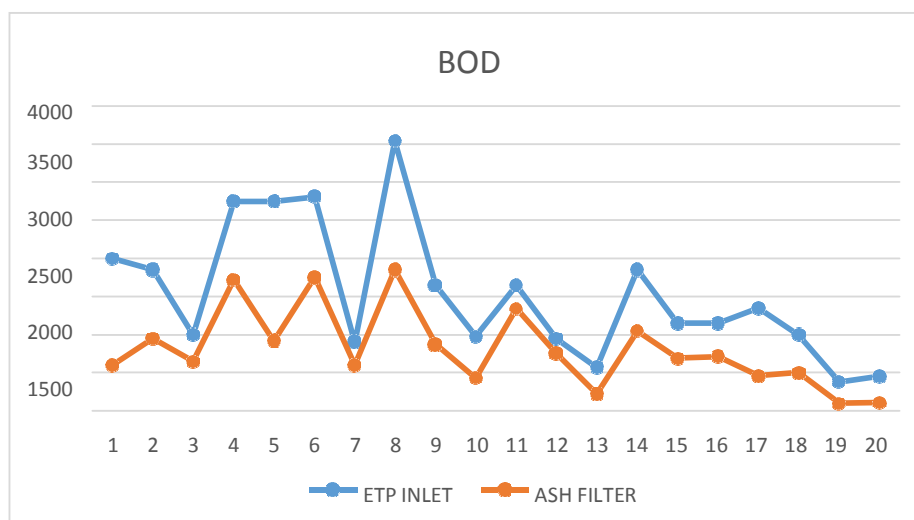
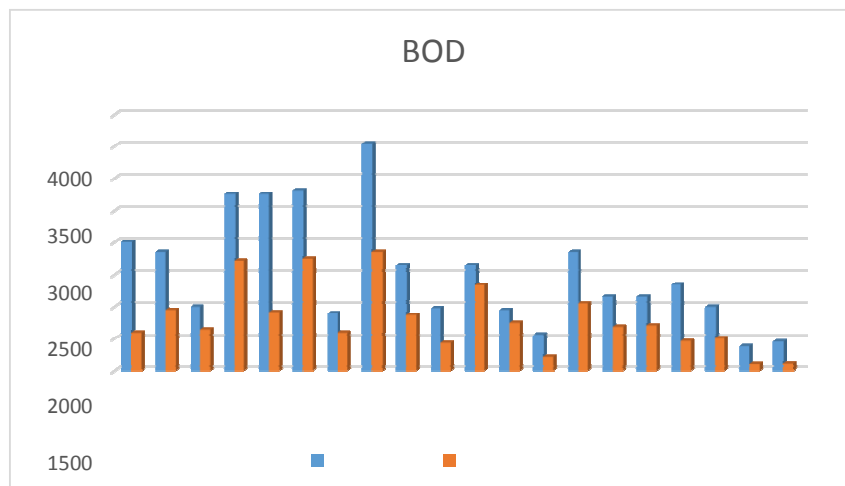


BOD:

Study of BOD of ETP waste water from DSSSK.

Sr. No.	Bod EtpInlet	Bod AfterAsh Filter	Sr. No.	Bod EtpInlet	Bod AfterAsh Filter
1	2000	600	11	1650	800
2	1850	950	12	950	750
3	1000	650	13	570	220
4	2750	1320	14	1850	1050
5	2750	916	15	1150	690
6	2810	1430	16	1150	710
7	900	600	17	1350	460
8	3540	1450	18	1000	500
9	1650	870	19	380	100
10	980	430	20	450	105

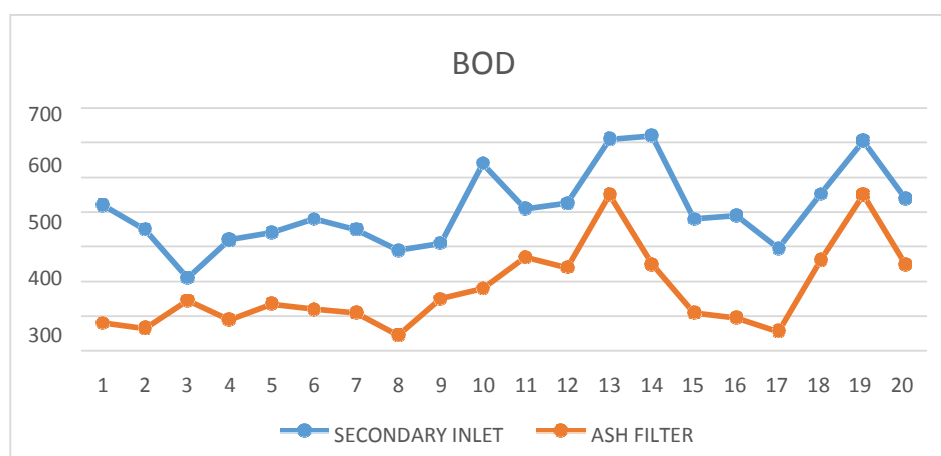
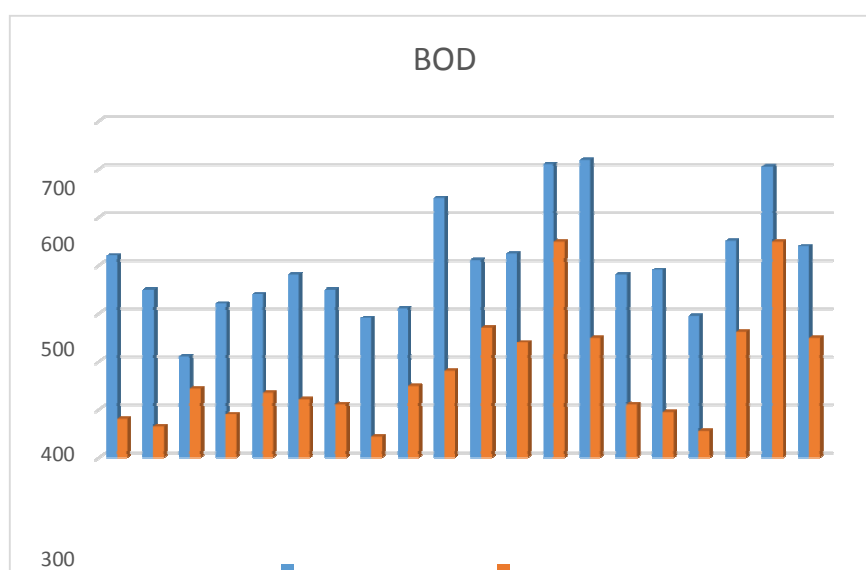
(Observation Table no. 5)



Study of BOD of Secondary Inlet waste water from DSSSK.

Sr. No.	Bod Secondary Inlet	Bod After Ash Filter	Sr. No.	Bod Secondary Inlet	Bod After Ash Filter
1	420	80	11	410	270
2	350	65	12	425	240
3	210	145	13	610	450
4	320	90	14	620	250
5	340	135	15	380	110
6	380	120	16	390	95
7	350	110	17	295	56
8	290	45	18	452	262
9	310	150	19	605	450
10	540	175	20	440	250

(Observation Table no. 6)

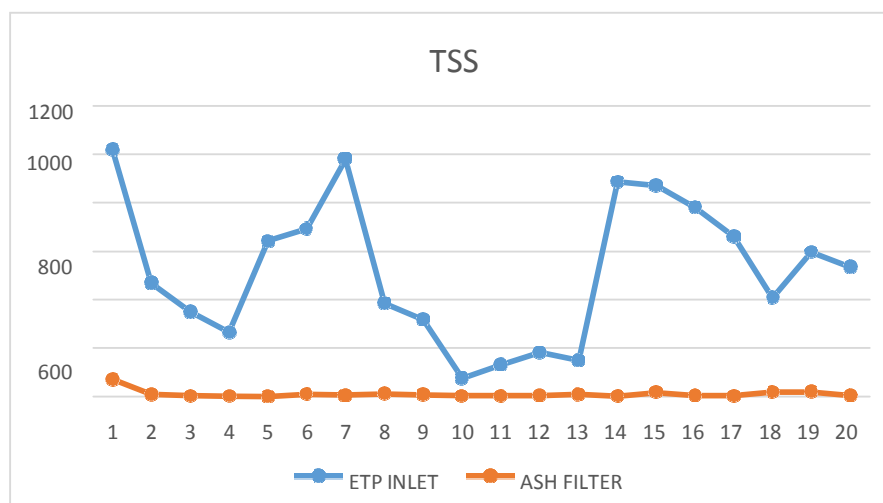
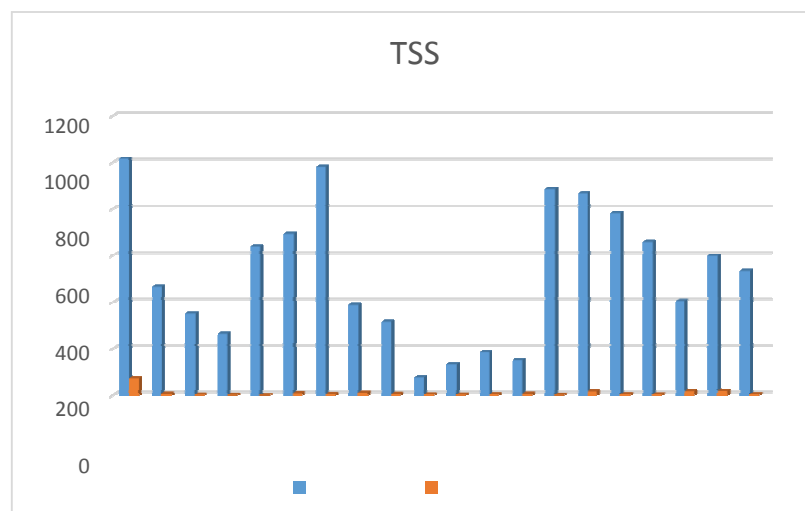


TSS:

Study of TSS of ETP waste water from DSSSK.

Sr. No.	Tss EtpInlet	Tss After Ash Filter	Sr. No.	Tss EtpInlet	Tss After Ash Filter
1	1018	71	11	132	3
2	467	8	12	182	5
3	350	3	13	149	8
4	264	2	14	886	2
5	642	1	15	869	18
6	693	10	16	781	5
7	980	6	17	660	4
8	385	12	18	408	19
9	317	7	19	597	20
10	75	4	20	535	5

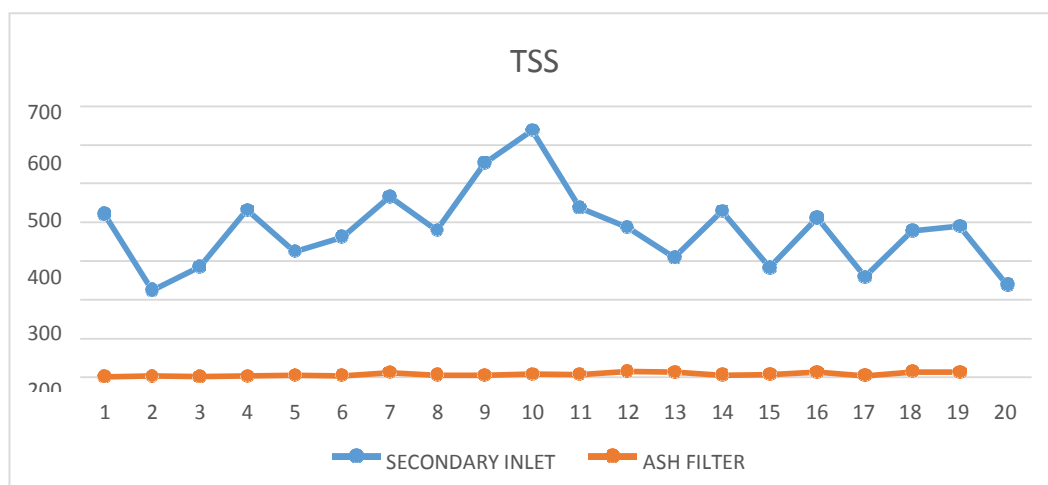
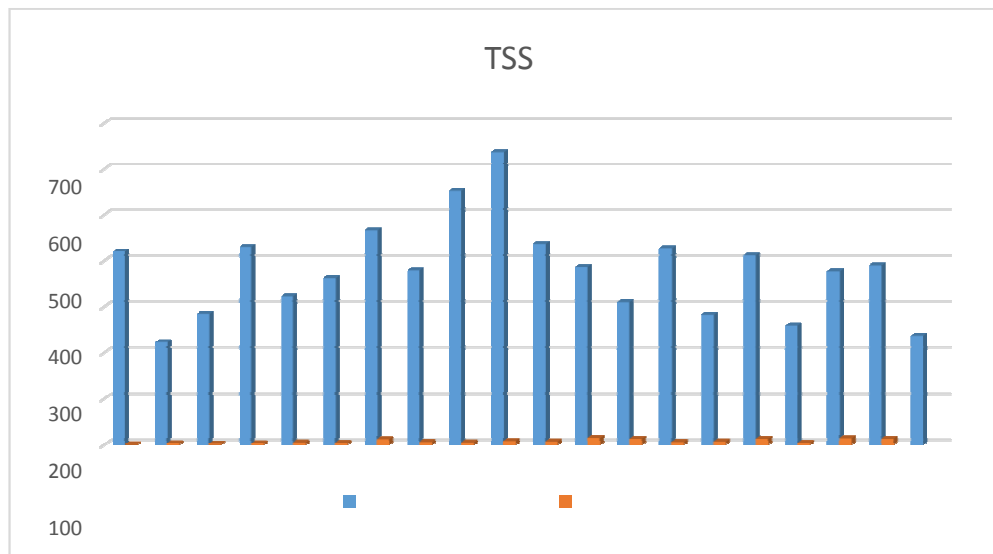
(Observation Table no. 7)



Study of TSS of Secondary Inlet waste water from DSSSK.

Sr. No.	Tss SecondaryInlet	Tss AfterAsh Filter	Sr. No.	Tss SecondaryInlet	Tss AfterAsh Filter
1	421	1	11	438	7
2	224	3	12	387	15
3	285	2	13	309	13
4	432	3	14	429	6
5	325	5	15	283	7
6	362	4	16	411	13
7	466	12	17	259	4
8	380	6	18	378	14
9	553	5	19	390	13
10	638	8	20	238	7

(Observation Table no. 8)

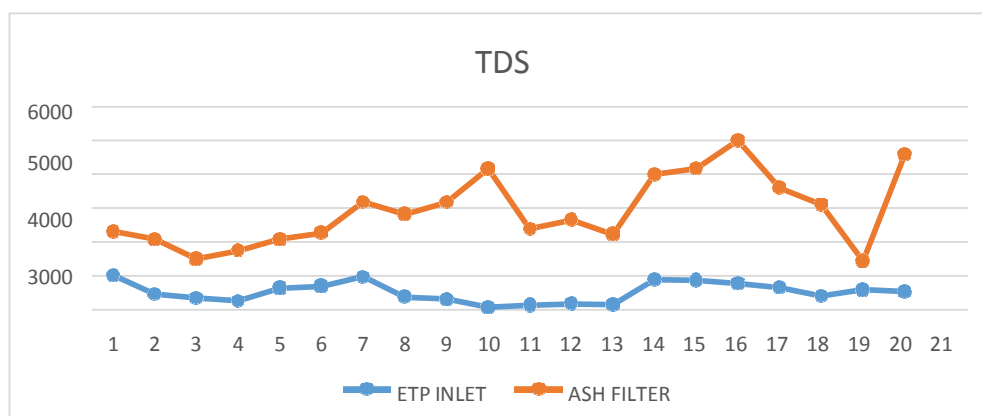
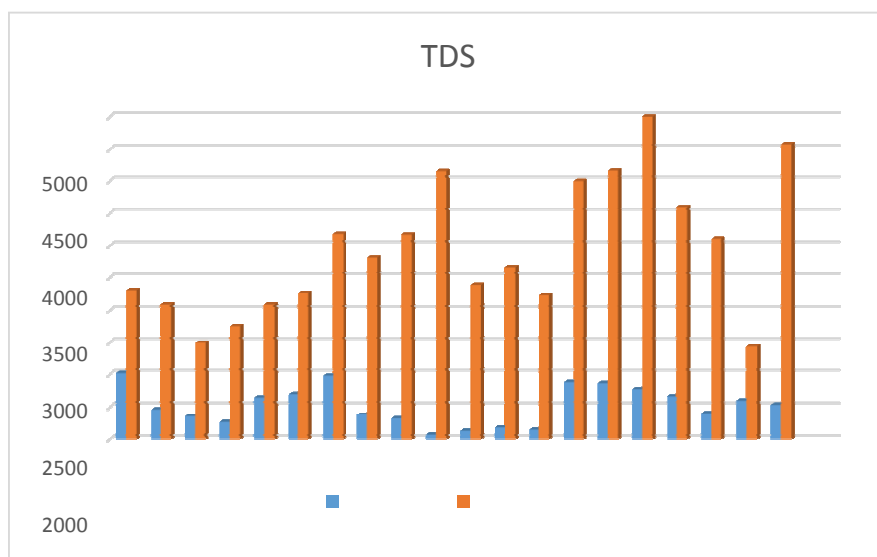


TDS:

Study of TDS of ETP waste water from DSSSK.

Sr. No.	Tds Etp Inlet	Tds After Ash Filter	Sr. No.	Tds Etp Inlet	Tds After Ash Filter
1	1758	2310	11	951	2390
2	2490	2090	12	854	2660
3	902	1497	13	702	2230
4	1153	1746	14	1931	4000
5	1749	2090	15	1689	4170
6	1300	2270	16	1771	5000
7	3250	3180	17	1778	3600
8	1260	2820	18	1489	3110
9	1299	3170	19	1845	1440
10	1588	4160	20	1685	4580

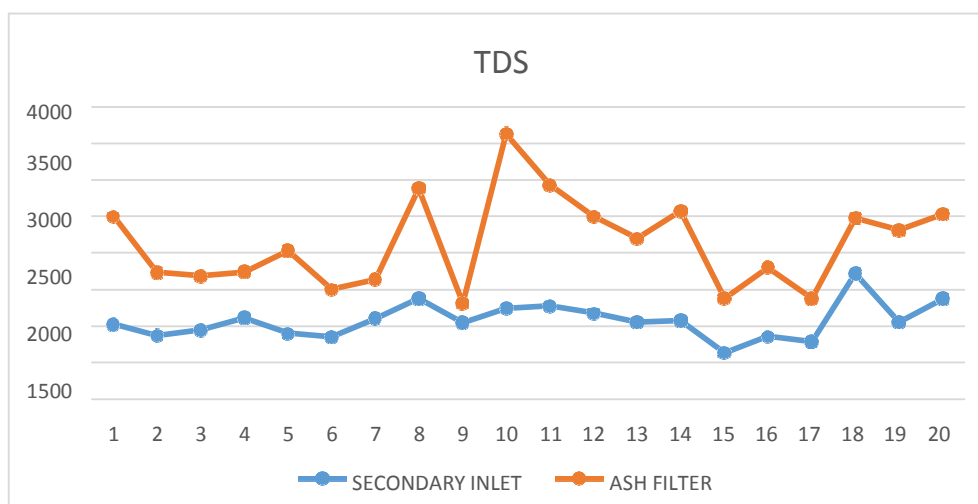
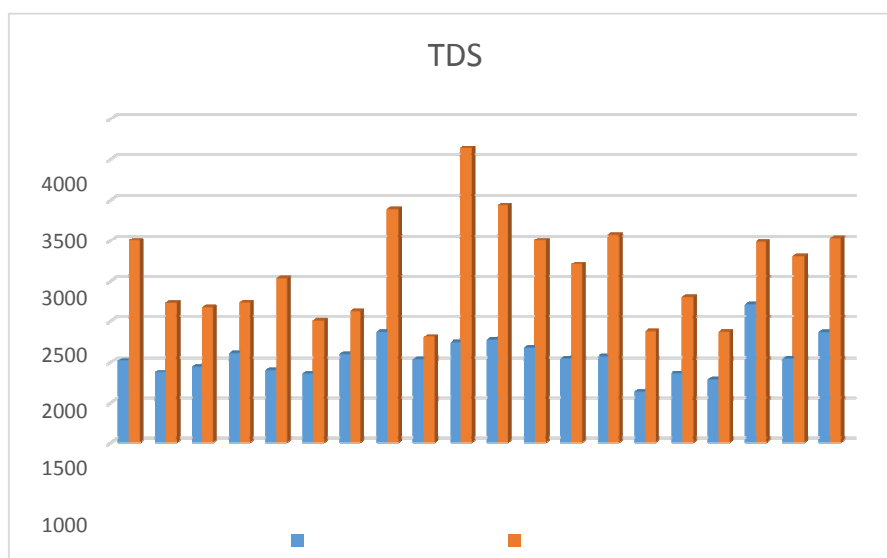
(Observation Table no. 9)



Study of TDS of Secondary Inlet waste water from DSSSK.

Sr. No.	Tds Secondary Inlet	Tds AfterAsh Filter	Sr. No.	Tds SecondaryInlet	Tds AfterAsh Filter
1	1020	2500	11	1270	2930
2	873	1733	12	1177	2500
3	944	1682	13	1050	2200
4	1113	1737	14	1075	2570
5	903	2030	15	630	1380
6	851	1503	16	856	1800
7	1102	1636	17	783	1373
8	1372	2881	18	1717	2480
9	1042	1310	19	1050	2310
10	1240	3630	20	1370	2530

(Observation Table no. 10)



COLOUR:**Study of COLOUR of ETP waste water from DSSSK.**

Sr. No.	Colour Etp Inlet	Colour After AshFilter	Sr. No.	Colour Etp Inlet	Colour After AshFilter
1	PALE YELLOW	COLOURLESS	11	YELLOW	COLOURLESS
2	BROWN	COLOURLESS	12	YELLOW	COLOURLESS
3	BROWN	COLOURLESS	13	YELLOW	COLOURLESS
4	PALE YELLOW	COLOURLESS	14	BROWN	COLOURLESS
5	PALE YELLOW	COLOURLESS	15	YELLOW	COLOURLESS
6	BROWN	COLOURLESS	16	YELLOW	COLOURLESS
7	YELLOW	COLOURLESS	17	YELLOW	COLOURLESS
8	YELLOW	COLOURLESS	18	YELLOW	COLOURLESS
9	PALE YELLOW	COLOURLESS	19	YELLOW	COLOURLESS
10	PALE YELLOW	COLOURLESS	20	YELLOW	COLOURLESS

(Observation Table no. 11)**Study of COLOUR of Secondary Inlet waste water from DSSSK.**

Sr. No.	Colour Secondary Inlet	Colour After Ash Filter	Sr. No.	Colour Secondary Inlet	Colour After Ash Filter
1	LIGHT BROWN	COLOURLESS	11	BLAKISH	COLOURLESS
2	BLAKISH	COLOURLESS	12	BLAKISH	COLOURLESS
3	BLAKISH	COLOURLESS	13	BLAKISH	COLOURLESS
4	BLAKISH	COLOURLESS	14	BLAKISH	COLOURLESS
5	BLAKISH	COLOURLESS	15	BLAKISH	COLOURLESS
6	BLAKISH	COLOURLESS	16	BLAKISH	COLOURLESS
7	BLAKISH	COLOURLESS	17	BLAKISH	COLOURLESS
8	BLAKISH	COLOURLESS	18	BLAKISH	COLOURLESS
9	BLAKISH	COLOURLESS	19	BLAKISH	COLOURLESS
10	BLAKISH	COLOURLESS	20	BLAKISH	COLOURLESS

(Observation Table no. 12)**ODOUR:****Study of ODOUR of ETP waste water from DSSSK.**

Sr. No.	Odour Etp Inlet	Odour AfterAsh Filter	Sr. No.	Odour Etp Inlet	Odour AfterAsh Filter
1	Nuisance	ODOURLESS	11	Nuisance	ODOURLESS
2	Nuisance	ODOURLESS	12	Nuisance	ODOURLESS
3	Nuisance	ODOURLESS	13	Nuisance	ODOURLESS
4	Nuisance	ODOURLESS	14	Nuisance	ODOURLESS
5	Nuisance	ODOURLESS	15	Nuisance	ODOURLESS
6	Nuisance	ODOURLESS	16	Nuisance	ODOURLESS
7	Nuisance	ODOURLESS	17	Nuisance	ODOURLESS
8	Nuisance	ODOURLESS	18	Nuisance	ODOURLESS
9	Nuisance	ODOURLESS	19	Nuisance	ODOURLESS
10	Nuisance	ODOURLESS	20	Nuisance	ODOURLESS

(Observation Table no. 13)

Study of ODOUR of Secondary Inlet waste water from DSSSK.

Sr. No.	Odour Secondary Inlet	Odour After Ash Filter	Sr. No.	Odour Secondary Inlet	Odour After Ash Filter
1	UNPLEASANT	ODOURLESS	11	UNPLEASANT	ODOURLESS
2	UNPLEASANT	ODOURLESS	12	UNPLEASANT	ODOURLESS
3	UNPLEASANT	ODOURLESS	13	UNPLEASANT	ODOURLESS
4	UNPLEASANT	ODOURLESS	14	UNPLEASANT	ODOURLESS
5	UNPLEASANT	ODOURLESS	15	UNPLEASANT	ODOURLESS
6	UNPLEASANT	ODOURLESS	16	UNPLEASANT	ODOURLESS
7	UNPLEASANT	ODOURLESS	17	UNPLEASANT	ODOURLESS
8	UNPLEASANT	ODOURLESS	18	UNPLEASANT	ODOURLESS
9	UNPLEASANT	ODOURLESS	19	UNPLEASANT	ODOURLESS
10	UNPLEASANT	ODOURLESS	20	UNPLEASANT	ODOURLESS

(Observation Table no. 14)

Note: - On LHS of every photo is the beaker having untreated water and RHS includes the water after ASH FILTER TREATMENT





CONCLUSION

This study has been carried out at Shree Datta S. S. S. K. Ltd., Shirol which is the sugar complex having crushing capacity 12000 TCD with 90 KLPD Distillery and 90 KLPD Ethanol Plant. All the samples are collected from the ETP inlet and inlet of the secondary clarifier of effluent treatment plant of capacity 2800 m³ / day.

The analysis of waste water was done for the parameters like pH, COD, BOD, TSS, TDS, odour and colour during the period.

The samples collected were analyzed in the laboratory of Shree Datta S. S. S. K. Ltd., Shirol and the following conclusions were drawn:

1. The pH of samples collected from the ETP inlet and inlet of secondary clarifier having wide range from 3.65 to 11.59 which is not within the norms prescribed by CPCB whereas the samples filtered through fly ash, found with pH variations of 7.82 to 8.74, which was within the norms of CPCB and MPCB.
2. The COD of samples collected from ETP inlet and secondary clarifier having range from 1080 to 8440 whereas the sample results which were filtered through fly ash, found with COD variations of 120 to 1840. It means that in the filtered samples Av. COD reduced by 53.79%.
3. The BOD of samples collected from ETP inlet and inlet of secondary having the range 210 to 3540 whereas the sample results which were filtered through fly ash, found with BOD variations of 45 to 1450, it shows that in the filtered samples Av. BOD reduced by 48.25%.
4. The TSS of samples collected from ETP inlet and inlet of secondary clarifier having the range from 224 to 1018 whereas the sample results which were filtered through fly ash, found with TSS variations of 1 to 71, which is within prescribed limits, it simply indicates that the Av. TSS removed was almost 98%.
5. The TDS of samples collected from ETP inlet having range from 702 to 3250 whereas treated samples TDS range from 1440 to 4580. The TDS of samples collected from secondary inlet range from 630 to 1717 whereas the treated samples range varies from 1310 to 2881. In the both cases Av. TDS increase is almost double but in case of secondary sample the increase in Av. TDS is definitely double but still within the prescribed norm i.e., 2100 mg/lit.
6. During the study it is found that after the filtration TDS goes on increasing so if any additional measure is taken to reduce the TDS within prescribed norms then the system will be up to the mark.
7. We have achieved considerable reduction in COD/BOD values (nearly 50 %), and we are planning to introduce novel ideas in the clarification and aeration units with the help of experts so that COD/ BOD values of economically treated effluent will be within the prescribed norms of pollution control boards.
8. The odour of samples collected from inlet of the ETP and secondary inlet was nuisance and unpleasant respectively whereas the treated samples turned into odorless.
9. The colour of samples collected from inlet of ETP and secondary inlet was yellow and blackish respectively whereas the treated samples were completely colorless.

Suggestion

Now a day's primary and secondary treatment has been followed for effluent treatment. Herewe suggest tertiary treatment for further improvement of treated effluent parameters by utilizing boiler fly ash.

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University Road, Kolhapur - 416004, Maharashtra State, India.

Phone : 0231-2535706, 2535707. Fax : 0231-2535708

Website : www.siberindia.edu.in Email : sajmr@siberindia.edu.in, sibersajmr@gmail.com