NSBM GREEN UNIVERSITY TOWN

STUDENTS' RESEARCH SYMPOSIUM 2019

"EMPOWERING YOUNG RESEARCHERS"

EXTENDED ABSTRACTS

June 20, 2019

National School of Business Management
Mahenwatta, Pitipana, Homagama, Sri Lanka.

NSBM
Students' Research Symposium, 2019

Extended Abstracts

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National School of Business Management
Mahenwatta. Pitipana, Homagama, Sri Lanka

Message from the Vice Chancellor

It is my pleasure to word a message to congratulate the third undergraduate research symposium held at NSBM Green University.

NSBM was set up with the objective of being on par with the evolving economic and educational dimensions of the country, emphasizing the importance of an education system contributing towards such massive transformation. Its mission statement describes its intent to become the creative and innovative Business School of future generations. The Institute is therefore driven by innovation, entrepreneurship, technology and globalization to direct the country towards a knowledge-based globalized economy, while creating synergies with an existing body of knowledge, taking into consideration the needs of higher education in the 21st century.

Enhancing and inculcating a thriving research culture within NSBM, is an essential component to reach the highest standards and be on par with the best global standards of education and research-based learning. With the establishment of the Green University Town in Pitipana, Homagama, we are certain this mammoth will contribute immensely to set up NSBM as a unique environment for knowledge sharing while engagement with research and innovation will raise the university to the caliber of other leading universities in the world. Hence, the significance of this research symposium as a step to promulgate a research oriented and inspired atmosphere.

I congratulate the organizing committee as well as the undergraduates whose research is publicized on this very important occasion. I'm confident that this would pave the way for excellent research contributions to diverse disciplines by NSBM's very own students.

Dr. E A Weerasinghe

Vice Chancellor

Message from Head, Academic Development and Quality Assurance

I am pleased to send this message to the third NSBM Undergraduate Research Symposium, especially since this year, the forum has expanded to include all three faculties. This academic gathering certainly offers young aspiring researchers a platform to enable competence and build confidence to reach their future career objectives.

The organization of such intellectually stimulating forums, is also an integral part of reaching the fully-fledged university status via the combination of academic excellence and knowledge dissemination. For such a concept to become a reality, an academic gathering of this nature is vital. NSBM Green University Town always follows the best practices upheld by renowned universities, locally and internationally. Among them, this symposium strives to make a remarkable and positive impact on both the academia and the industry.

With the view to flourish and encourage a research-centric culture, we have an awe-inspiring array of upcoming academic related interventions such as, the NSBM International Research Conference, Company-Academic Round Table, International Leadership Seminar, Business Magazine, etc. In addition, NSBM Green University Town will establish an International Centre for Tourism and Hospitality and an International Centre for Innovation and Invention. We are indeed confident that the above endeavours will undoubtedly provide a conducive academic environment for our undergraduates, postgraduate candidates and staff to carry out research, consultation and productive collaborative activities between the Industry and the University.

Finally, I take this opportunity to wish our young researchers who have excelled in their final year research work, all the very best for their future academic and professional endeavours.

J Baratha Dodankotuwa

Head, Academic Development and Quality Assurance

Message from SRS Chairperson

On behalf of organizing committee of NSBM Students' Research Conference (NSBM SRS) 2019. First of all, let me congratulate all the young researchers who are presenting their research studies at this prestigious event.

Being an innovative and proactive academic university, NSBM Green University is highly dedicated to developing a research culture in Sri Lanka. In fact, as an institute we believe knowledge created through research is vital for the country's development process. Hence, it is important to initiate such an attitude from the student level itself. NSBM SRS 2019, the unique product offered by Academic Development and Quality Assurance unit of NSBM Green University. This time more than 30 young researchers from NSBM and other higher educational institutes will present their first research study. We believe this initiative will lead to an increase in better research interests among students in future.

Finally, I take this opportunity to thank a few important people who helped us to make this event a reality. First of all, I would like to thank Dr E A Weerasinghe, Vice Chancellor, NSBM Green University for the visionary guidance provided throughout this process. We also like to thank Deputy Vice Chancellor Mr. Chaminda Rathnayaka, for the vital support given, to make this event a success. Further, it is important to mention the initiator of this event, Mr. Baratha Dodankotuwa, Head, Academic Development and Quality Assurance for advising us and being with the team at all the ups and downs we faced to make this event a success.

Sulakshana De Alwis

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NSBM Students' Research Symposium
June 2019

A study on the impact of women's presence in top corporate positions to the organizational performance of banks in Sri Lanka

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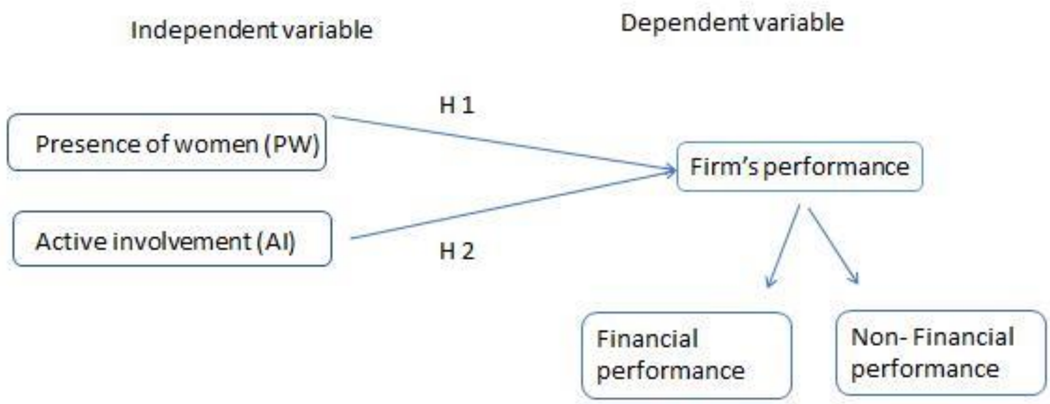
Background

The research study has been designed in order to investigate the Glass Ceiling effect which still prevails in many organizations in Sri Lanka. The banking sector which is a very vibrant industry in Sri Lanka has been selected to conduct the analysis. The core objective of this study is to identify the impact on women participation in senior management positions in banks in relationship with organizational performance

The role of women in the corporate world is highly significant. This research study investigated the relationship between the presence of women in leading corporate positions in the banking industry and firm performance i.e. both financial and non-financial performance of the corresponding firms. The study further examined the percentage of women in the executive board, the proportion of female executive directors and the level of active participation, factors and forces influencing it on the firm performance factors among the banking industry in Sri Lanka via the measurements of financial and non-financial data. The research has been conducted by taking into account 9 domestic licensed commercial banks in Sri Lanka. Thus, both secondary as well as a primary



research has been conducted in order to critically analyze the ―Glass Ceiling Effect in the banking sector in Sri Lanka.

Methodology

Data required for the study gathered by online questionnaires, in-depth interviews and from the annual reports of listed companies in the Colombo Stock Exchange. This research was to address the significance of the role of women in corporate growth, women leadership and empowerment. Further, the research also focused on gender diversity, corporate governance in SL, and critical topics related to the role of women in the corporate world.

The research study used regression analysis methodology. In addition, the study provided insights of significance of women in this era which can help to enhance the provision of resources in women's leadership skills and empowerment by the government and other institutions. Finally, a series of quality solutions were recommended in order to eliminate the ―Glass Ceiling Effects‖ in the banking industry.

Findings

A total of 120 questionnaires were distributed manually, although only 100 responses were received. Gender distribution was demonstrated first where the male population of the sample is 54%, where the female population is 46%. The organization distribution was illustrated next where the highest numbers of respondents were from the private sector banks of 59%. Most of the Respondents were managerial level employees. Also most respondents working experience at banks were 4-6 years.

The hypotheses were tested. According to the significance value of both dimensions that is the presence of women on board and their active involvement were ≤ 0.05. Therefore, all the hypotheses are accepted. This explained that there is a positive relationship between women in top-corporate positions and firm performance at the banking industry. Very low moderate positive Correlation was found among the independent variables and the dependent variable, also displaying a significant relationship. Finally, to support this very small impact, the in-depth interview results held among top corporate women, on their perspective towards women on board against firm performances.

Practical and Social implications

Particularly in Sri Lanka, this issue has been well addressed in the commercial banking sector and as it is still prevailing, this research shows both quantitatively and qualitatively that the reduction takes place in the glass ceiling effect which prevails and awards women career involvement according to their performance and skills without discriminating gender wise. Thus, secondary analysis shows that there is only a 13.25% of female participation in the top management positions in 9 Commercial Banks in Sri Lanka. Therefore, it is evident that there is an existence in the Glass Ceiling Effect in the banking industry.

This research will create a better awareness on how women impact corporate performance in Sri Lankan developing contexts where women are underrepresented in corporate governance structure mostly and where there are no laws that pressure firms to appoint women in corporate governance positions. And also, will create a base framework for the need to actively engage women in managerial decisions in the banking arena. Moreover, this study will further provide evidence insights for governments and other institutions in their efforts to provide resources that will help enhance women's leadership skills and empowerment.

Although primary research findings proved this point by revealing that there are challenges associated with the female participation in the banks in Sri Lanka, yet finally sets a broader idea on recommendations such as engaging females into management training programmes, sensitization programmes, ensuring equal employment opportunities etc. will eliminate the glass ceiling effect from not only corporates but also banking operations apparently.

Areas for Future Research

- Due to time constraints this research was only done in banking industry, hence requesting future researchers to examine other industries as well.
- Factors affecting women to contribute to firm performance can be analyzed.
- Can do a focus group or more interviews to support further.

Key references

Adams, R. B., & Daniel, F. (2009). Women in the boardroom and their impact on governance and performance. Journal of Financial Economics, 94, 291–309.

Jabir Ali, Sana Shabir, (2017) "Does gender make a difference in business performance?: Evidence from a large enterprise survey data of India", Gender in Management: An International Journal, Vol. 32 Issue: 3, pp.218-233

Muneza Kagzi, Mahua Guha, (2018) "Does board demographic diversity influence firm performance? Evidence from Indian-knowledge intensive firms", Benchmarking: An International Journal, Vol. 25 Issue: 3, pp.1028-1058

Sonam Chawla, Radha R. Sharma, (2016) "How women traverse an upward journey in Indian industry: multiple case studies", Gender in Management: An International Journal, Vol. 31 Issue: 3, pp.181-206

An alternative view through the glass ceiling using capabilities theory to reflect on the career journey of senior women', Women in Management Review, vol. 20 no. 8, pp. 595 – 609

Lottery Numbers Identification System

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Background

The use of image processing techniques to help day to day human activities is a common occurrence. It is extensively used in aerospace and defense, sports and medical applications. In this paper, the use of image processing techniques to digitally identify and process lottery ticket numbers using the android platform has been explored. Sri Lankans spend thousands of rupees on lotteries daily. People buy multiple tickets in the hope of increasing their chances of hitting the jackpot. According to the National Lotteries Board, income of lottery ticket sales in 2016 was 201 million rupees (NLB, 2016). Currently, the results of lottery tickets can be checked through the lottery websites, newspapers, or lottery sellers. These methods are manual processes and manually checking multiple tickets is cumbersome and time consuming.

The proposed solution is to provide convenience for users and is implemented using the client- server architecture. It provides two options to users in checking lottery results. One option provides users to capture an image of the lottery ticket, and other option provides QR scanning feature to check the lottery result. When the user captures the image of the lottery, the mobile application will send the captured image to the server to perform a number of extractions using image processing and that information is sent to another server which runs a java application which will process the lottery results. There are several image processing mobile applications available currently, none of which is able to check lottery results.

Methodology

This image processing server application has been written using C++ and uses the OpenCV library. OpenCV stands for Open Source Computer Vision. It is a one of the best image processing libraries. The first step of the process is receiving an image. Then, the colored image is converted to a grayscale image. According to Hari Krishnan, processing a grayscale image takes less time compared to a color image (Harikrishnan, 2017). The main reason for this is that a grayscale image has only a single-color channel. Processing an image with a single-color channel is easier than processing an image with multiple color channels. The main intention of the program is to identify lottery numbers and draw numbers. These components reside in one boundary of the lottery ticket image. The second step is the program identifying the area which has lottery numbers and draw numbers. To identify the boundaries of objects in an image, the program performs an edge detection procedure. Here, it uses the 'Canny edge detection method' to identify the edges of an image. It is considered as the most famous edge detection algorithm which was developed by John Canny in 1984 and is a multi-stage algorithm (OpenCV, n.d.). After identifying the boundaries of objects in the image, the program finds different factors of a boundary such as height, width and aspect ratio to identify which boundaries are pertinent to lottery numbers and the draw number. After identifying the boundaries which have lottery numbers and the draw numbers, the program extracts the contents inside the boundaries. Then it performs different types of image processing techniques such as image binarization and dilation to extract the lottery numbers and draw numbers. For image binarization purpose, thresholding function was used. Here, it uses 'Thresh Binary Inv' along with 'Thresh Otsu' for image thresholding. According to the Jian Yu, Otsu method is one of the best methods for image thresholding (Yu, 2009).

Figure 1 **Above image shows the steps of image processing.**

Finally, after extracting the lottery numbers and draw number, it uses KNN algorithm to perform character recognition. According to Adrian, the KNN algorithm can be considered as one of the simplest classification algorithms with the highest accuracy for character recognition (Rosebrock, 2016). The idea of the algorithm is to search for the closest match of the test data in feature space (OpenCV, n.d.).

Findings

Currently, fifty lottery images have been processed under reasonable light conditions out of which 42 lottery ticket images received the correct lottery numbers and the draw numbers. Therefore, this test shows that this system has an 84% accuracy in identifying lottery numbers and draw numbers. 5 lottery ticket images did not get the correct lottery numbers due to recognition problems. The most common recognition problem was distinguishing between '0' and 'o'. Two lottery tickets did not provide correct information due to image blurring.

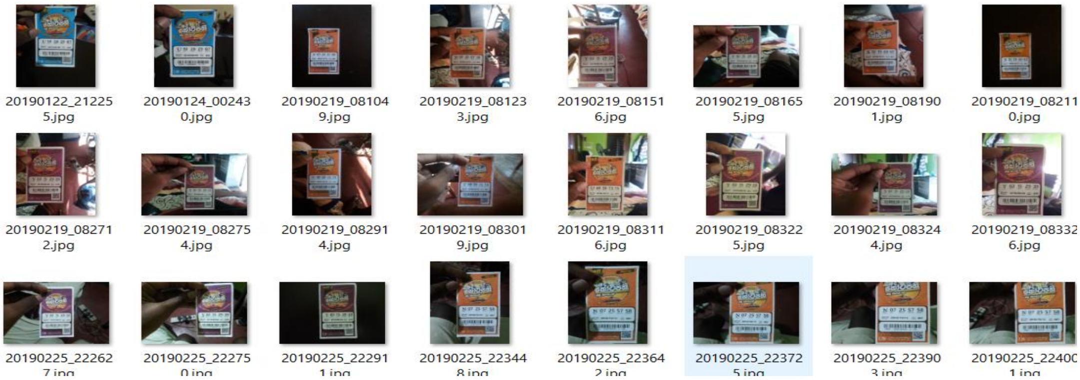

Figure 2 **Above image shows the sample tested images.**

Practical and Social Implications

The main advantage of this application is the reduction of time spent on checking lottery results. One of the main challenges the application faces is the requirement of images to have a certain minimum resolution which is 240*180 pixels.

In addition to lottery results checking, this system provides a web solution for lottery users and the lottery company to visualize the statistical data of lottery tickets such as data presentation using bar charts and pie charts.

Currently, this application supports only the 'Ada Kotipathi' lottery ticket and the android platform. In the future, the portfolio of tickets and platforms will be expanded.

Key references

Harikrishnan, K., 2017. *medium.* [Online]
Available at: https://medium.com/@kharikri/image-processing-tips-for-computer-vision-and-deep-learning-tasks-e5247ec94f3
[Accessed 07 03 2019].

NLB, 2016. *auditorgeneral.* [Online]
Available at: http://www.auditorgeneral.gov.lk/web/images/audit-reports/upload/2016/state_corporations_2016/NationalLotereisBoardE.pdf
[Accessed 24 01 2019].

OpenCV, n.d. *OpenCV Python Tutorials.* [Online]
Available at: https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_canny/py_canny.html
[Accessed 28 05 2019].

OpenCV, n.d. *Understanding k-Nearest Neighbou.* [Online]
Available at: https://docs.opencv.org/3.0-beta/doc/py_tutorials/py_ml/py_knn/py_knn_understanding/py_knn_understanding.html
[Accessed 28 05 2019].

Rosebrock, A., 2016. *Pyimagesearch.* [Online]
Available at: https://www.pyimagesearch.com/2016/08/08/k-nn-classifier-for-image-classification/
[Accessed 08 03 2019].

Yu, J., 2009. *Otsu Method and K-means.* Shenyang, IEEE.

Implementing Integrated Reporting in Sri Lanka: An Analysis of Barriers for Preparers

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Background

Integrated Reporting, a process of creating corporate value and sustainability to organizations which will communicate a clear, concise, integrated story of the entity is a new concept introduced mainly for better understanding and ensuring that information flows fully and freely between different parts of the business and also for better communication including a sufficient context for a reader to understand a firm's strategy without burdening a report with irrelevant information. Chairman International Integrated Reporting Council (IIRC) Prof. Mervyn King, in his keynote speech at Inauguration of the Corporate Director's program in Sri Lanka said "Integrated reporting is not about how much money you make but how you make it and while making money how it impacts financial, social, environment aspects."

With the increasing need of the corporates to create corporate value, , the CA Sri Lanka is taking numerous efforts to promote Integrated Thinking and reporting through various methods, "Since then, and based on the current requirements, we have taken steps to publish a supplementary guide which covers various guiding principles under the framework, which are relevant for organizations in

Sri Lanka," explained by Mr.Asite Talwatte, Chairman Integrated Reporting Council of Sri Lanka at the ceremonial launch of the Preparer's guide to Integrated corporate Reporting. (The institute of Chartered Accountants of Sri Lanka, 2015)

A research by Mary Anne McNally, Dannielle Cerbone and Warren Maroun identifies challenges of preparing an Integrated Report conducted through detailed interviews and semi structured interviews , few more challenges are found and listed down in another research stating that "In a constrained environment, reporting guidelines are used as disclosure checklists, stakeholder engagement is limited, systems are not always compatible and data analysis is difficult integrated reports are taken seriously by investors, further limited the interconnection between sustainability performance and integrated reporting." (McNally, et al., 2017). Another research simply proves that providing a concise integrated report itself is a challenge (de Villiers, et al., 2014).

Research, "Early Assessment of the gap between IR and current corporate reporting" By Warwick Stent and Tuyana Dowler in the New Zealand context tends to identify challenges faced in following IR, concludes "None of their sample published a full IR for 2011. (Reporting score was from 70% - 80%).They suggest that current reporting processes lack the integration, oversight and due attention to future uncertainties required by IR." (Stent & Dowler, 2015).

Therefore, based on previous findings, it is evident that irrespective of whether adoption of IR is mandated or not, the adherence to the required content elements of IR remains poor except in some best practice companies, in terms of what is required to be disclosed and what is actually disclosed by companies publishing integrated reports.

Methodology

A mixed research methodology which comprises a content analysis and a set of semi structured interviews were used in conducting the research.

The content analysis of annual reports were carried out by crosschecking the information with a checklist based on a previous research on IR (Herath & Gunarathne, 2018) according to 8 specific criteria of the standard IR framework where the recent Annual Reports of the selected sample of 168 companies were used in this study.

Semi-structured interviews were carried out with the stakeholder who were responsible for IR practices. These interviews were then analysed through Thematic Analysis.

Findings and Discussion

According to our data analysis the average level of adherence was calculated as 47%, the findings from this research identified few sample companies which already published integrated reports as a percentage of 45% (75 companies) of the total sample scoring higher marks. On the other hand remaining 55% (93 companies) produced a relatively lower score. This research findings suggest that improvement can be made to the IR frameworks criteria 6 (Performance), Criteria 4 (Strategy and resource allocation) and criteria 2 (Business model) in overall due to lower rate of disclosures for the annual reports in order to enhance the transparency of the organization.

As of the findings of this research the highest level of adherence is seen in the Telecommunication sector (75%), where the lowest is in Oil palm sector (25%). Considering all scales the overall adherence for large scale (60%), Medium Scale (51%) and small scale (34%), where the highest adherence level is depicted in the large scale companies.

The highest adherence levels with the same high score of 95% is seen in two companies Banking and finance sector, large scale Peoples Leasing & Finance PLC and Motors sector, medium scale Diesel Motor Engineering PLC (DIMO).Whereas the lowest is found in plantation sector, small scale Agalawatte Plantations PLC (12%).

Sector	Average	Percentage	Small		Medium		Large		MIN	MAX	GAP	% OF GAP
Oil Palm	19.00	25%			15.00	20%	31.00	41%	15	31	16	52%
Stores Supplies	21.33	28%	21.00	28%	22.00	29%			21	22	1	5%
Investment Trusts	24.79	33%	19.50	26%	30.00	40%	25.00	33%	17	35	18	51%
Land and property	25.85	34%	22.75	30%	28.25	38%	27.00	36%	17	38	21	55%
Chemicals & Pharmaceuticals	28.15	38%	22.66	30%	36.50	49%	25.00	33%	16	38	22	58%
Healthcare	30.20	40%	19.00	25%	32.00	43%	49.00	65%	19	49	30	61%
Information Technology	31.00	41%	31.00	41%					31	31	0	
Hotels & Tourism	31.84	42%	22.50	30%	32.75	44%	47.00	63%	14	62	48	77%
Diversified Holdings	33.09	44%			25.00	33%	39.83	53%	17	70	53	76%
Plantation	33.22	44%	20.67	28%	39.50	53%			9	68	59	87%
Manufacturing	34.31	46%	27.14	36%	34.20	46%	46.00	61%	15	61	46	75%
Construction & Engineering	35.20	47%	26.00	35%	29.00	39%	66.00	88%	26	66	40	61%
Trading	35.50	47%	23.50	31%	33.00	44%	56.00	75%	20	60	40	67%
Banking & Finance	41.67	56%	30.17	40%	44.17	59%	50.67	68%	19	71	52	73%
Beverage , Food & Tobacco	43.50	58%	40.50	54%	43.50	58%	47.25	63%	26	64	38	59%
Power and Energy	43.71	58%	27.00	36%	45.00	60%	58.50	78%	24	66	42	64%
Motors	45.00	60%	16.00	21%	71.00	95%	51.00	68%	16	71	55	77%
Services	45.63	61%	40.75	54%	70.00	93%			20	70	50	71%
Footware & Textiles	49.67	66%			55.00	73%	39.00	52%	39	55	16	29%
Telecommunication	56.50	75%					56.50	75%	43	70	27	39%
AVERAGE	35.46	47%	25.63	34%	38.10	51%	44.67	60%	25.63	44.67	19.04	25%

Table 1. Adherence Level (Scale Based)

According to the thematic analysis significant barriers were identified through the semi structured interviews, where few barriers were frequently spoken about in a number of interviews. The compliance mindset, the entity practicing IR to a minimum requirement just for the sake of practicing IR by using key terminologies in the preparation of annual reports.

Some identified that the process of producing an Integrated Report is costly rather than producing a typical annual report, which is also a highly spoken barrier on the progress of our interviews.

Entities also have a genuine fear of making forward looking statements as they are highly involved in processes which are unpredictable in nature.

Conclusion

This paper's findings show the average adherence level of IR in Sri Lanka is low. Also, it can be concluded that in the Sri Lankan context large scale companies usually show the higher adherence level. The results of 47% average level of adherence from this dissertation was reconfirmed at an interview with the secretary Integrated Reporting Council Sri Lanka, CA Sri Lanka which stated that "We have also come up with a result of approximately 45% when it comes to the level of adherence of IR practices in Sri Lanka considering all the listed companies in the Sri Lankan context."

Therefore, from above findings it can be concluded that adherence level of IR for listed companies in the Sri Lankan context is moderately low.

Key References

de Villiers, C., Rinaldi, L. & Unerman, J., 2014. Integrated Reporting: Insights, gaps and an agenda for future research. *Accounting, Auditing & Accountability Journal,* 27(7), pp. 1042-1067.

Herath, R. & Gunarathne, N., 2018. *Assessing the gap between Integrated Reporting and current Integrated corporate reporting practice: A proposed checklist.* Colombo: University of Sri Jayawardhanapura.

McNally, M.-A., Cerbone, D. & Marou, W., 2017. Exploring the challenges of preparing an integrated report. *Meditari Accountancy Research,* 25(4), pp. 481-504.

Stent, W. & Dowler, T., 2015. Early Assessment of the gap between IR and Current Corporate Reporting. *Meditari Accountancy Research,* 23(1), pp. 92-117.

The institute of Chartered Accountants of Sri Lanka, 2015. *A Preparer's Guide to Integrated Corporate Reporting.* s.l.:s.n.

The Impact of Employee Empowerment on Organizational Commitment (Special Reference to Brandix Essentials Central Ltd, Kahawatta)

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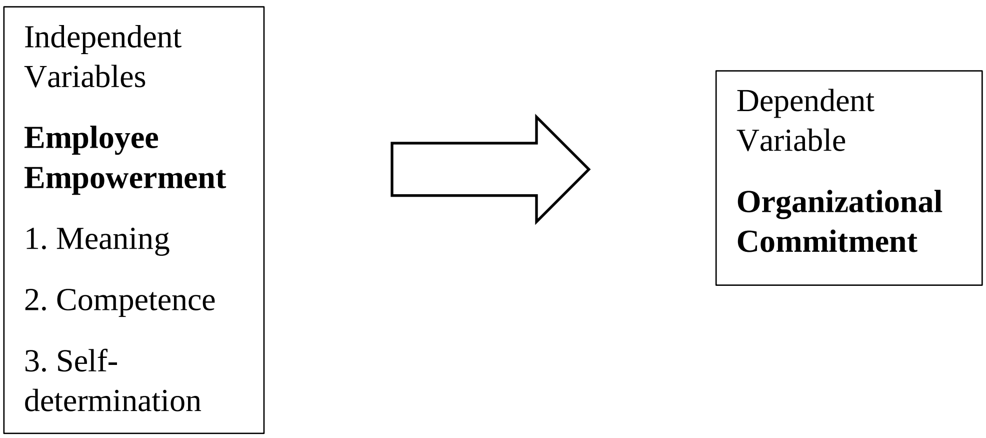
Background

In this study, the conceptual framework is designed based on article of Spreitzer (1995).It presented four dimensions on empowerment. They are meaning, competence, self-determination and impact. This research measured empowerment and commitment. Empowerment will be measured using a scale developed by Spreitzer (1995).

The commitment can be defined as the employee's emotional attachment to, identification with, and involvement in the organization. Allen and Meyer (1990) defined organizational commitment the attachment to an employing organization, including its goals and values and thereby define it as a mindset. In this article, organizational commitment is divided in three components; affective commitment, continuance commitment and normative commitment. In this research employee empowerment is the independent variable and organizational commitment is the dependent variable. To conduct the study researcher used meaning, competence, self-determination and impact as the four independent variables. Those are dimensions of employee empowerment. It is showed in the following figure.



Conceptual framework of the study in 2018
Source: Developed by the researcher

Borghei et al. (2010) hypothesized there is a positive relationship between meaning and organizational commitment. The study is conducted by Ambad (2012) there is significant relationship between meaning and organizational commitment as his secondary hypothesis. Vacharakiat (2008) stated there is relationship between psychological empowerment component of meaning and organizational commitment. Spreitzer (1995) showed a positive relationship between the dimension meaning and organizational commitment. Thus, researcher developed that there is a positive relationship between meaning and organizational commitment. The second hypothesis was developed based on the work of Amed (2012), Borghei et al. (2019). Ambad (2012) developed there is significant relationship between competence and organizational commitment to conduct the research. There is a significant relationship between competence and organizational commitment (Borghei et al., 2010, Vacharakiat, 2008). Thus, the researcher developed hypothesis as there is a positive relationship between competence and organizational commitment.

According to Borghei et al. (2010) there is a significant relationship between self-determination and organizational commitment. The study conducted by Ambad (2012) there is a significant relationship between self-determination and organizational commitment as his secondary hypothesis. Vacharakiat (2008) identified there is relationship between self-determination and organizational commitment Thus researcher developed there is a positive relationship between self-determination and organizational commitment.
Finally, Ambad (2012) developed that there is a significant relationship between impact and organizational commitment to conduct the research. There is a significant relationship between impact and organizational commitment (Borghei et al., 2010). There is positive relationship between impact and organizational commitment (Vacharakiat, 2008).Westgeest (2011) hypothesized people who score high on affective commitment affect empowerment impact. Thus, the researcher developed the hypothesis as there is positive relationship between impact and organizational commitment.

Methodology

This research is a quantitative research because, through this study, the researcher found the relationship among dependent and independent variables.

The population target for this study are supervisors who are working in all sections in Brandix Essentials Central Ltd, Kahawatta,in the following sections; cutting, fabric inspection, finishing, maintenance, planning, production, quality and technical, stores, work study and training school which was counted for 60 supervisors (n= 60). Since there are 60 supervisors in those 10 departments, the researcher decides to do a population study by using the census method. For the purpose of this study, the researcher selected the population as sample. The researcher collected only primary data for the research. Here primary data is collected using a questionnaire.

The data is collected by using a questionnaire which is delivered to supervisors of Brandix Essentials Central Ltd, Kahawatta.

The researcher did analytical data in a process. And also showing data by using descriptive strategy (Bar chart, Pie chart). The quantitative data is entered into a computer following the Statistical Package for Social Science (SPSS) to analyze.

Findings

In Brandix essential central, the most influential variables are meaning and impact on organizational commitment. To increase employee empowerment the organization should be considered more meaningful and impactful. Then BAKEA can increase organizational commitment. The other two variables which are competence and self – determination are related to the organizational commitment. But those are not influenced.

The findings from this study emphasized the importance of organizational commitment and then the organization can take appropriate retention strategy to retain their employees to the long term. And also, this research produces fresh knowledge to the company. Low organizational commitment will cause the work related to attitudes and behavior of employees to become poor. Employees will not be satisfied when they cannot reach the commitment with the top management. This will lead to poor performance and low motivation of employees to continue their work. These findings help the organization to take care of acceptable needs from employees and try to satisfy them in order to increase their job satisfaction.

And also, organizations can take appropriate actions to increase the commitment of their employees. This study will contribute to the organization to change their management practices such as incentive packages, motivational strategies, types of power, authority, decision making power, internal communication process, chain of command and organizational structure. When the organization receives knowledge about commitment and empowerment of their employees it will support to modify their management style. The flexibility of the management style was associated with greater commitment in the private sector. Although there are samples of research conducted about the relationship between employee empowerment and organizational commitment in different contexts, absence of research in the Sri Lankan context especially in the manufacturing organization. Therefore, there is a vacuum in this research field and this research fills the above vacuum. Further, it will be more important to researchers who are interested in the employee empowerment and organizational commitment subject area.

For Sri Lanka, managers in the garment sector, this study will give them perspectives on whether empowerment influences their employees' commitment. This information and knowledge will therefore, enable Sri Lankan managers to have a better understanding of their employees' perception about empowerment. It will also help managers to better manage their employee to improve their individual and organizational performance through improving their commitment to the organization and how to improve employees' commitment through empowering their employees. Furthermore, it will help policy makers to have better knowledge on impacts on employee empowerment and future research. In addition to those benefits it also helps employees to have a greater awareness of factors that empower them and how it affects their perceptions of commitment to the organization. In addition, researchers are able to improve their knowledge of Human Resource Management and gain the experiences of the way of conducting research promptly.

Key References

Thomas, K. W., & Velthouse, B. A. (1990). Cognitive elements of empowerment: An "interpretive" model of intrinsic task motivation. *The Academy of Management Review.*

Spreitzer, G. M. (1995). An empirical test of a comprehensive model of Intrapersonal Empowerment in the workplace.*American Journal of Community Psychology*.

Spreitzer, G. M. (2007). Taking stock: A review of more than twenty years of research on empowerment at work.*In C.Cooper&J.Barling (Eds.), The handbook of organizational behavior* (pp.54-73).Thousand Oaks, CA: Sage Publications.

Porter, L., Steers, R., Mowday, R., &Boulian, P. (1974). Organizational Commitment, Job Satisfaction and Turnover among Psychiatric technicians.*Journal of Applied Psychology*.

Allen, N., & Meyer, J. (1990).The measurement and antecedents of affective, continuance and normative commitment to the organization.*Journal of Occupational Psychology*.

Ambad, S. N. A. (2012). Psychological Empowerment: The Influence on Organizational Commitment Among Employees in the Construction Sector .*The Journal of Global Business Management*, *8*(2).

A Video Game for Education

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Background

In Sri Lanka, music is taught in schools from grade 6 up to grade 13 (Advanced Levels). There are 3 main genres of music taught in Sri Lankan schools as a part of the curriculum at the secondary level, such as, oriental music, western music and Carnatic music (Widanapathirana, et al., 2016). The western music, which is taught as a separate subject in schools, it is found out that students are failing in history parts of this subject. This is since the students have to memorize these parts of the subject with traditional learning method and they find it boring and uninteresting. So, a solution to make these history parts more interesting and reduce failure rates in these parts of the students is needed. In this project, an educational video game is proposed as a solution to this problem.

To develop this video game, a research was done to find existing similar systems. The only similar system found was candela learning. But this system was developed only for teaching science subjects. They also had a pc version of their solution and a very recent mobile version but no web solution. The target group of this project are students who follow western music subjects from grade 6 to 9. In developing this video game, research was done about video games and decided to develop it as a 2-dimensional role playing (RPG) educational video game. To develop this game, unity game engine was selected (Unity Technologies, 2019). It is the most recommended video game engine by the game developers as a game engine that can be used by anyone. It is easy to use and comes with a lot of functionalities. Also, it is free to use for educational purposes.

Methodology

The game is decided to be first developed for windows pc platform, but later decided to develop for android mobile platform and WebGL web platform. The scripting was done using visual studio 2017 which has a free version for educational use (Micosoft, 2019) and language used is C#. The mobile android version was developed since most of the students has got mobile phones than pcs. Also, web version was developed so anyone can play the game from the browser without installing it. To develop and test the android version of the application, android studio is used which is the native environment to develop android apps. To develop the web version of the game with unity, WebGL is used which is a JavaScript API for rendering graphics in compatible browsers (Mozilla Corporation, 2019). With Unity, the game will be developed and

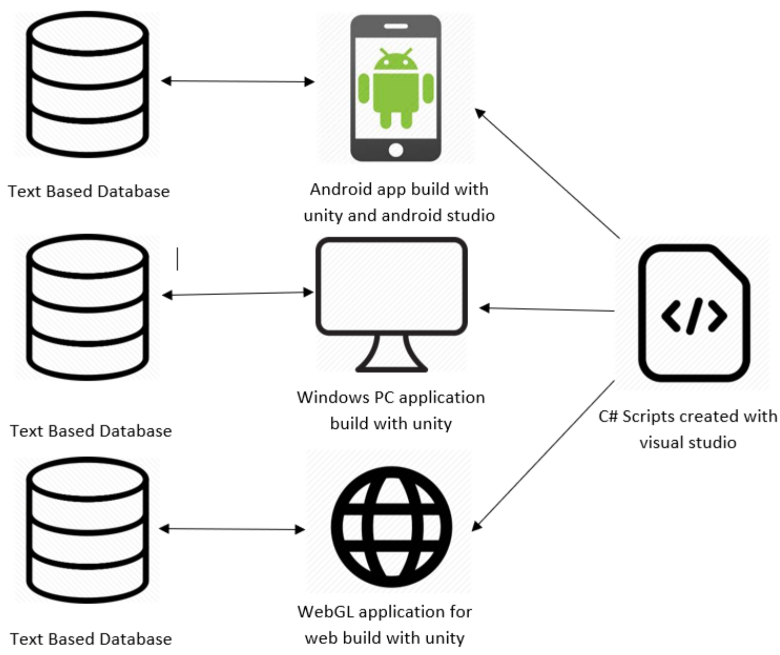

Figure 3 High Level Design

scripted using C# language once and later will be built for each separate platform. Thus, with this, scripting for each platform separately is not needed. To save gameplay data, a text-based database is used which resides in the device that player is using to play the game. This eliminates the need that player must be online each time that player plays the game. The high-level design diagram (Figure 1) which explain this scenario is given below.

Findings

To play the game, players must first create accounts and log in to their accounts. The player can start a new game (Figure 2) or load a level they desire. To load a level, the player must have completed the level before (Figure 3). Also, the player can look at the highest scores that he/she got for each level from the main menu. In a game level (Figure 4), it goes as a conversation between the game character and player, and the game character asks questions and the players give answers to them. For each level, player has 5 lives. For each correct answer, player gets 25 points and can proceed to the next level. For each wrong answer, the player's points are reduced by 5 points and he/she loses a life. If a player successfully completes a level, he can proceed to the next level of the game. If the player loses all the lives, it is game over and the player will have to play that level again to proceed to the next level. All these questions are created from grade 8 teachers' guide for western music subject (National Institute of Education, 2017). In this way players have fun while learning. Below are some screens from the game.

Figure 2 Main Menu

Figure 3 Level Load Screen

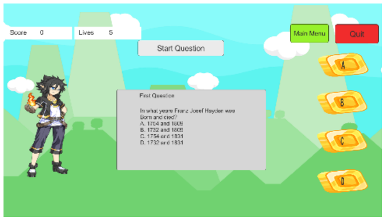

Figure 4 A Game Level Scene

The game is tested successfully for all the platforms it is built for. The game is tested both for Windows 8 and Windows 10 successfully for the PC version of the game. For android mobile platforms, the game is successfully tested for a range of devices running android API version 19 to latest API version 28 in a range of devices, both emulated and actual devices like Huawei Honor 4C (API version 19) and Xiaomi Redmi 7 (API version 28). Also, web version of the game is successfully tested for browsers such as Google Chrome, Microsoft Edge and Internet Explorer.

The feedback from users was collected from a google form and it was mostly positive. The feedback suggested some improvements are needed for the user interfaces. But overall acceptance of the application was very well received.

Practical and Social Implications

In this way, this application has provided new, interesting and fun ways of teaching the historical aspects of the Western Music subject to the students. Also being available for multiple platforms has made this game more accessible for users. As future improvements, an online database will be developed to update in-game questions through that database without accessing the code and also made it possible for players to play the game from where they stopped in one device from another device by using that online database to update saves.

Key references

Candela Learning, 2018. *Welcome to Candela Learning.* [Online]
Available at: http://www.candelalearning.lk/
[Accessed 20 03 2019].

Google Developers, 2019. *Android Studio.* [Online]
Available at: https://developer.android.com/studio
[Accessed 17 04 2019].

Micosoft, 2019. *Visual Studio 2019.* [Online]
Available at: https://visualstudio.microsoft.com/downloads/
[Accessed 20 03 2019].

Mozilla Corporation, 2019. *MDN Web Docs.* [Online]
Available at: https://developer.mozilla.org/en-US/docs/Web/API/WebGL_API
[Accessed 20 03 2019].

National Institute of Education, 2017. *Western Music Teachers Guide Grade 8.* 1st ed. Nugegoda: Nanila Publications .

Unity Technologies, 2019. *Unity Store.* [Online]
Available at:
https://store.unity.com/?_ga=2.130983368.61680359.1553772157-826847951.1552616428
[Accessed 20 3 2019].

Widanapathirana, S., Mampitiya, U., Jayawardena, R. C. & Chandratilleke, K. L., 2016. *Study on Curriculum Development in General Education in Sri Lanka*, Nugegoda: National Education Commission.

Factors Affecting the Production Cost of 'Vishakas Garment'

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Background

The background of this study contains about the Sri Lankan apparel industry and the micro aspect of the selected apparel manufacturing company with regard to the case study research design.

Central Bank of Sri Lanka (2014) showed that the increasing growth in manufacturing and construction sub sectors but other electricity and mining are indicating a decline. Manufacturing is the largest industrial subsector, accounting for 18% of GDP. Textile and Apparel Industry includes the Factory Industry context. Factory industry accounts for around 16 percent of Gross Domestic Product recording a substantial growth of 8.5 percent in 2014 compared to 7.8 percent in 2013. According to that information, one can identify that the Sri Lankan apparel sector is one of the major contributors from other manufacturing sectors.

The Vishakas Garment which is one of the medium scale Bed Sheet manufactures in Sri Lanka. The company conducts both Weaving and the Sewing Process in their operation segment.

The main problem stems from the total production cost of the Vishakas Garment. It can be defined as the people who are engaged with Vishakas garment have to incur a high cost to do their production. Due to this, they have earned a low profit from their operation.

According to the profit margin of the Vishakas garment in the year 2013 to the year 2017, they calculate their profit margin from both weaving and the sewing processes separately. When considering the weaving section from year 2013 to 2017, the profit margins are 1.44%, 1.20%, 1.16%, 1.03% and 0.91%. According to that information, one can identify that their profit margins were decreasing year by year. When it comes to the sewing section, the profit margin from year 2013 to 2017, the profit margins are 0.83%, 0.73%, 0.70%, 0.63% and 0.71%.

Conceptual framework

Independent Variables **Dependent Variable**

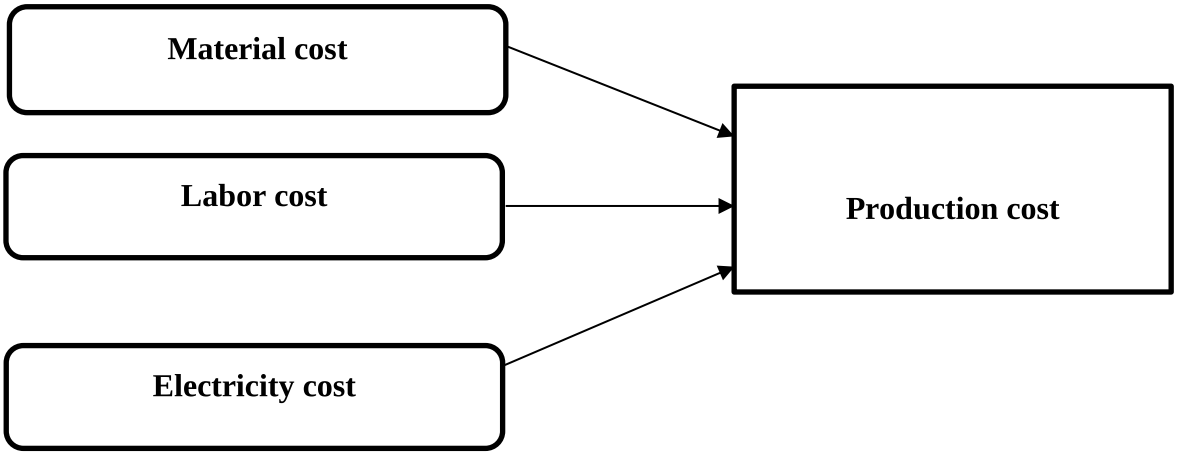

Figure 4: Conceptual Framework

Conceptual framework represents the relationship between Production cost and the main cost components of the production cost.

Dependent Variable

Production Cost - Production is the process of altering resources or inputs so they satisfy more wants. Before goods can be distributed or sold, they must be produced. Production, more specifically, the technology used in the production of a good and the prices of the inputs determine the cost of production (Reynolds 2005).

Independent Variables

Material Cost - Material cost is one of the important elements of cost of product or unit. It constitutes a substantial proportion of the total cost of production. The first element of the cost of the product is raw material. Material is an important part of the cost of a product and therefore proper control over materials are necessary.

Labor Cost **-** Labor cost is one of the major elements of the production cost – all businesses incur labor costs which are the costs of wages and salaries of all their employees. So, the Labor cost is viewed as the full cost to the organization of employing labor as a factor of production (Antos 1983).

Electricity Cost - The textile and apparel supply chain significantly contribute to global climate change, mostly because it's primary energy (mostly electricity) source is fossil fuels (IPCC 2014).

Methodology

This research utilizes both quantitative and qualitative approaches regarding the case study research design. In quantitative analysis, the data is analyzed through Microsoft excel by means of correlation analysis and multiple regression analysis. In qualitative aspects of the Vishakas Garment, the researcher has collected production cost details for last five years.

The research objectives which are,

(i) To identify factors that affect the production cost of the Vishakas Garment.

(ii) To evaluate how those factors will impact to the production cost of the Vishakas Garment.

(iii) To suggest remedial measures to reduce the production cost of the Vishakas Garment.

This research identifies the major cost components that highly affect the production cost of the Vishakas Garment based on the review of literature and the opinions of management. The researcher mainly identified the relationship between production cost and production cost components such as Material cost, Labor cost, Electricity cost and the Maintenance cost from the literature review. The researcher evaluated how those factors highly affected the production cost from in-depth interviews. Finally, supplied remedial measures to reduce the production cost of the Vishakas Garment.

Findings

In Quantitative analysis, the correlation analysis explains the relationship between dependent and independent variables. According to the correlation results, all the independent variables have a strong positive relationship between the production cost within both weaving and the sewing sections.

Simple regression analysis is employed by the researcher to identify the impact of independent variables with the production cost in Vishakas garment.

When it comes to the hypothesis testing of all the variables, the weaving section consists of the total model, intercept and main independent variables are statistically significant and the sewing section represented the total model and main independent two variables which are material cost and labor cost have a significant relationship but the intercept value and one independent variable which is the electricity cost, are statistically insignificant.

In qualitative analysis, the researcher described the main reasons for high production cost within both the weaving and sewing sections by using company details.

Practical and Social implications

This research will mostly impact the Textile and Apparel industry. Production is the main function in all manufacturing companies. The researcher aims to show the major cost components of the cost of production as well to show the impact and supply the remedial measures to reduce the production cost in Vishakas garment.

Thus, any organization can apply these solutions to reduce the production cost from reducing the material cost through purchasing quality yarn at a competitive price, optimizing the material flow and preventing damages. Textile and apparel companies can reduce the labor cost by recruiting a skillful workforce; eliminating overscheduling and applying lean production. The low electricity cost can be found by using quality mortars at the competitive price, improving the preventive maintenance system for the old machines and facilitating standardized wiring systems. All the solutions will impact to the high profit margins in the apparel sector and the economic growth.

Future Research

The suggestions which could be made by the researcher are, as the study was carried under the monthly observations of ten years, the future research could carry on their studies by extending the data period including daily, weekly data.

There were a few micro-variables used under the study. But, the future researchers can consider other macro variables as well as micro factors which influence the production cost.

Key references

Antos, JR 1983, 'Analysis of Labor Cost',The Journal of National Bureau of Economic Research, 153-181.

Board of Investment of Sri Lanka Ministry of Economic Development 2013, Employment (Cumulative), Colombo: Board of Investment of Sri Lanka.

Chandler, AD 1992, 'Organizational Capabilities', Journal of Economic Perspectiv, Vol. 6, no. 3, pp. 79–100.

Choudhary, AS 2015, 'Cost1 Analysis in Garment Industry', International Journal of Recent Advance in Multidisciplinary Research .

Gamberi, M 2017, 'Energy saving in case of intermittent production by', International Journal of Production Research, pp. 1-20.

Professional Social Network for the Music Industry

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Background

Internet-based social media programs enable us to connect with friends, family, customers and clients. Social networking could either be for social or business purposes and in some instances, for both. Facebook, Instagram, Snapchat, Twitter, LinkedIn are among the most popular social media platforms in today's world. These platforms offer unique services and each platform has a certain category of users prominently using and engaging with the platform. Facebook and Twitter have a wide variety of users ranging from teenagers to middle-aged adults and above. Snapchat users are mostly teens and millennials. Instagram and Twitter are popular platforms used by celebrities and mainly used by teenagers and middle-aged adults. LinkedIn is a social networking site designed specifically for the business community. The site aims to allow registered members to establish and document networks of people they know and trust professionally. Social networks like LinkedIn could be categorized as professional social networks.

The music industry consists of many talented individuals from all over the world who could be very difficult to get in touch with via other platforms such as Facebook and Twitter. Simultaneously, there are many talented individuals all over the world with great potential or expertise, undiscovered or being limited to their local industry. This platform, 'Maestro' aims to bridge that gap between worldwide talent, worldwide professionals and companies, while providing opportunities for every user to use the network for productive purposes to further improve their expertise, connections and business.

There are three platforms that offer similar services and correspond with the idea for the platform proposed in this study. Talenthouse (Talenthouse, 2019), SoundCloud (SoundCloud, 2018) and The Artist Union (TheArtistUnion, 2019), when taken independently, offer their services as they should to fulfill their requirements but does not necessarily meet the requirements in the proposed solution. In essence, the proposed platform could be represented more or less as a merging of these platforms into a single one, while providing a few additional and unique features.

Disadvantages of the existing platforms are discovered as follows:

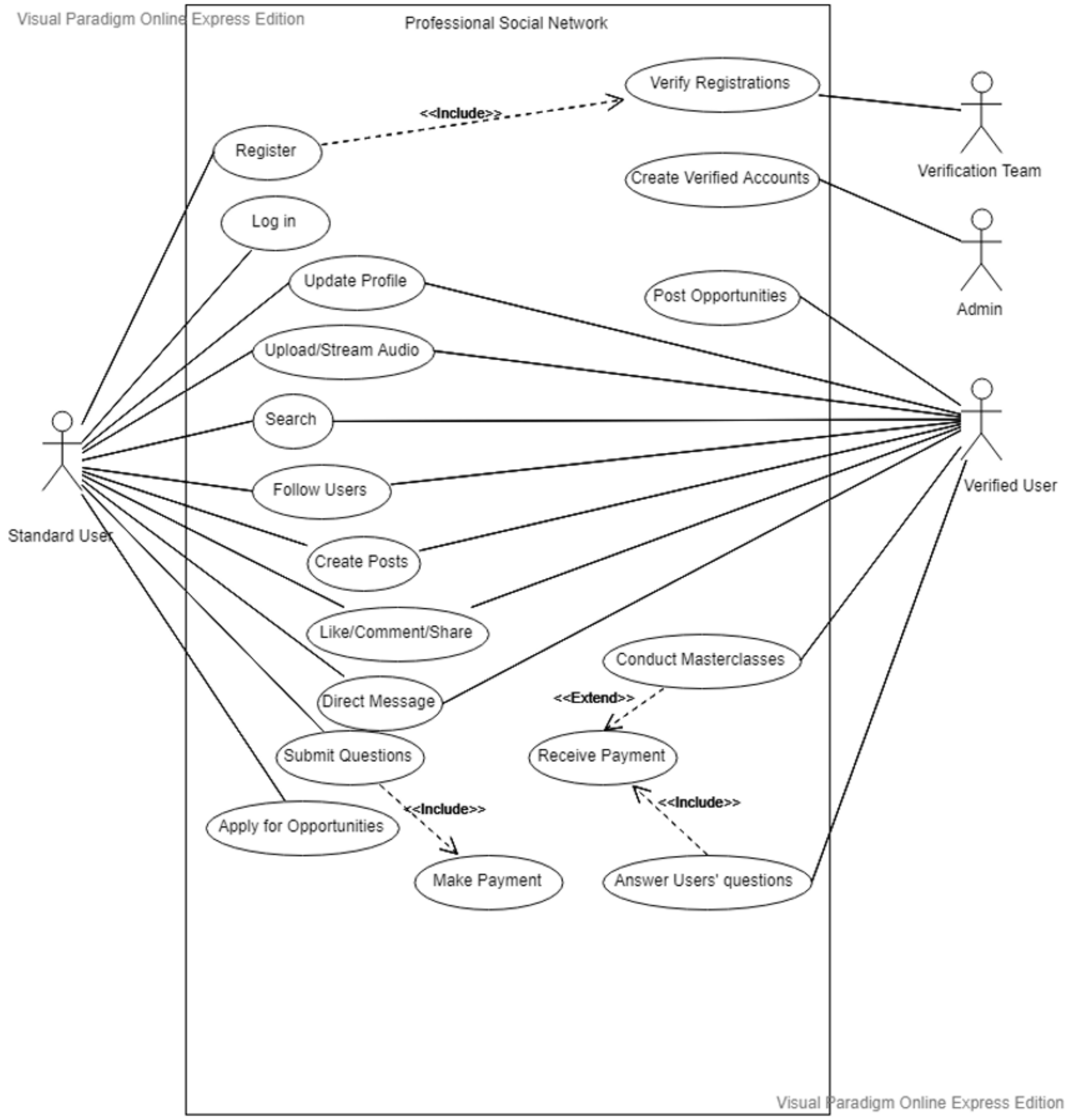
- Talenthouse - Opportunities for musicians are very less and haven't been updated.
- The Artist Union - Supports artists to only grow their fanbase. - Can't directly connect with other users on the platform itself.
- SoundCloud - Among the users who are professional and semi-professional musicians, there are many amateurs. - Not every user is an artist/musician.

The proposed system 'Maestro' will allow,

- Users to apply for an account and log in if they meet the requirements after a review, post status updates and send direct messages
- An admin panel to review and approve the submitted registrations forms submitted if the applicants meet the requirements.
- Standard users to submit questions to professional users. A payment is required to use this feature. Questions should be strictly professional and will have a limited word count. The user will then receive a guaranteed video response from the professional. The video ensures that the question was indeed answered by the professional and not otherwise a third-party hired to maintain the account which is prominent in other platforms.
- Payment gateway to pay per question submitted.
- Professional Users to answer questions, review and provide feedback for projects submitted by Standard Users, host Webinars/Master classes, promote opportunities to allow Standard Users to collaborate with them.
- Record Producers to post music they produced and stream music on the platform.
- Record Producers to discover potential collaborators to collaborate on projects based on their requirements.

Methodology

An agile approach was taken to the project management and software development of this project due to the reason that agile encourages development in small iterative steps. Agile development is a structured and iterative approach to making software. It gives you the ability to respond to change without going off the rails. (Radigan, n.d.). The following diagram depicts the usecase diagram of the proposed platform.



The following tools and technologies were utilized for the development.

• HTML5 (Techopedia, 2019) & (Heffernan, 2011) • CSS (Techopedia, 2019) • Bootstrap • JavaScript • Ajax (Technologies, 2013) • jQuery (Christensson, 2013) • PHP (Daniel, 2019) • MySQL • Adobe XD – To design wireframes (Leung, 2019) & (Heffernan, 2011)• Google Drive – To store and manage documents • Google Keep – To take notes and document tasks undertaken • Google Forms – To create the questionnaire • Asana – To manage the timeframe and the allocated tasks • GitHub – For code version controlling • Visual Studio Code – Integrated Development Environment.

Findings

The conducted research and the analysis of existing systems made it quite easy to determine most of the requirements of this project. However, this proposed system follows a different business concept targeted at a niche market. Therefore, it was crucial to determine the feasibility of the project. A questionnaire was created to determine the feasibility.

The questionnaire was created with the idea of sharing it with only a few professional music producers in the music industry and the questions were articulated in a way that would explain the overall system as briefly as possible without giving away too much about the project concept.

The set of questions asked were as follows:

a) As a professional music producer, do you have an environment set up for music production enthusiasts from around the globe to easily reach out to you for support and advice?
b) How would you prefer to be reached if an upcoming artist seeks support or advice in music production?
c) On which social media platforms are you mostly active on?
d) From the above, which platform/s do you prefer to use to communicate with anyone who seeks your support?
e) What are your thoughts on a professional social network with exclusive access, dedicated for those engaged in the music industry, that may provide opportunities of income for its users? To get a basic idea of the platform, imagine services provided by SoundCloud and most of the services provided by Facebook or LinkedIn merged into a single platform.
f) What kind of unique services would you like or expect from a platform as mentioned above in order to be an active user?

Based on the responses received, it is identified that professionals in the industry do not have an organized environment setup for them to be reached by enthusiasts for support and also they find it difficult to filter through all the inbound messages on social media to find good questions to answer if an upcoming artist seeks support or advice in music production. At the moment, they are using e-mails to monitor all of their social media networks for direct messaging. There is a possibility that professionals missing out chances to provide support for an upcoming artist. A platform like Maestro would be an ideal solution for all the problems identified above.

Practical and Social Implications

A platform like Maestro would help a lot of upcoming artists to be discovered, access resources that would help them improve themselves, engage directly with the professionals in the industry and apply for local or global opportunities. Furthermore, the platform would help professionals to have an organized space where they could efficiently engage with musicians around the globe, support and collaborate with them, and share their knowledge. Partnered companies could directly market their opportunities to potential applicants or discover talent for their long-term or short-term projects. Both professionals and upcoming artists have opportunities to earn money with the services provided.

Future Research

As for future work, it is important to research more about the feasibility of the product. The business model consists of partnering up with professional artists and companies, so it is crucial to understand its feasibility and the actions that should be taken to do so. Although signing up for an account is free, not everyone will get an account unless they meet certain requirements. What requirements should the users meet must be understood and finalized. Meeting these requirements would give us an idea about how skilled they are and would verify that they are indeed engaged in music production. It is essential to learn more about music business in depth and understand legality and copyright associated with music distribution. As the product is scalable it is required to investigate how the features could be improved and what new features could be introduced that would benefit the users. Services such as allowing any user to easily provide monetary support by transferring money to another user's account, royalty for each play, and a dashboard to get the analytics of the user's account, are also in mind for future implementations.

Key References

Christensson, P., 2013. jQuery. [Online] Available at: https://techterms.com/definition/jquery

Daniel, 2019. PHP Tutorials. [Online] Available at: https://www.youtube.com/watch?v=qVU3V0A05k8&list=PL0eyrZgxdwhwBToawjm9f aF1ixePexft-

Heffernan, S., 2011. HTML5 Video and Audio. [Online] Available at: https://www.linkedin.com/learning/html5-video-and-audio

Kenney, R., 2019. Make a Social Media Website. [Online] Available at: https://www.udemy.com/make-a-social-mediawebsite/learn/v4/overview

Leung, M., 2019. HTML and CSS Foundations. [Online] Available at: https://www.udemy.com/html-and-css-foundations/learn/v4/overview

Radigan, D., n.d. Running agile programs (without losing your mind). [Online] Available at: https://www.atlassian.com/agile/project-management/program

SoundCloud, 2018. https://soundcloud.com/pages/contact. [Online] Available at: https://soundcloud.com

Talenthouse, 2019. https://www.talenthouse.com/about. [Online] Available at: https://www.talenthouse.com

Technologies, S., 2013. What is Ajax and Where is it Used in Technology?. [Online] Available at: https://www.seguetech.com/ajax-technology/

Techopedia, 2019. Cascading Style Sheet (CSS). [Online] Available at: https://www.techopedia.com/definition/26268/cascading-style-sheet-css

Techopedia, 2019. HTML5. [Online] Available at: https://www.techopedia.com/definition/1891/html5

TheArtistUnion, 2019. https://theartistunion.com/about. [Online] Available at: https://theartistunion.com

A Comparison of Customer Complaint Behavior with Reference to Post Purchase of Electrical Appliances of Loyal Customers and First Customers

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Background

With the rapid development of technology, the customers have been more empowered with the access to information. In this increasingly competitive environment, when the customer has to have a bad experience on what they purchased, they become more discriminating in their purchase and making complaints on the poor after services, product quality, value for money and etc.

Thereby, customer complaint behavior has been the topic of much academic research and there is an exceptional situation that makes the customers more broadminded about negative experiences related to the retail purchase of electrical appliances. The purpose of this research is to test the differences in customer complaint behaviour between first customers and loyal customers; who are frequent customers while recommending the service provider to others.

The model of customer complaint behaviour by Singh, (1988) is widely accepted in customer complaint behaviour literature and responses are directed as (i) voice responses, (ii) private responses and (iii) third-party responses. The research is based on this model.

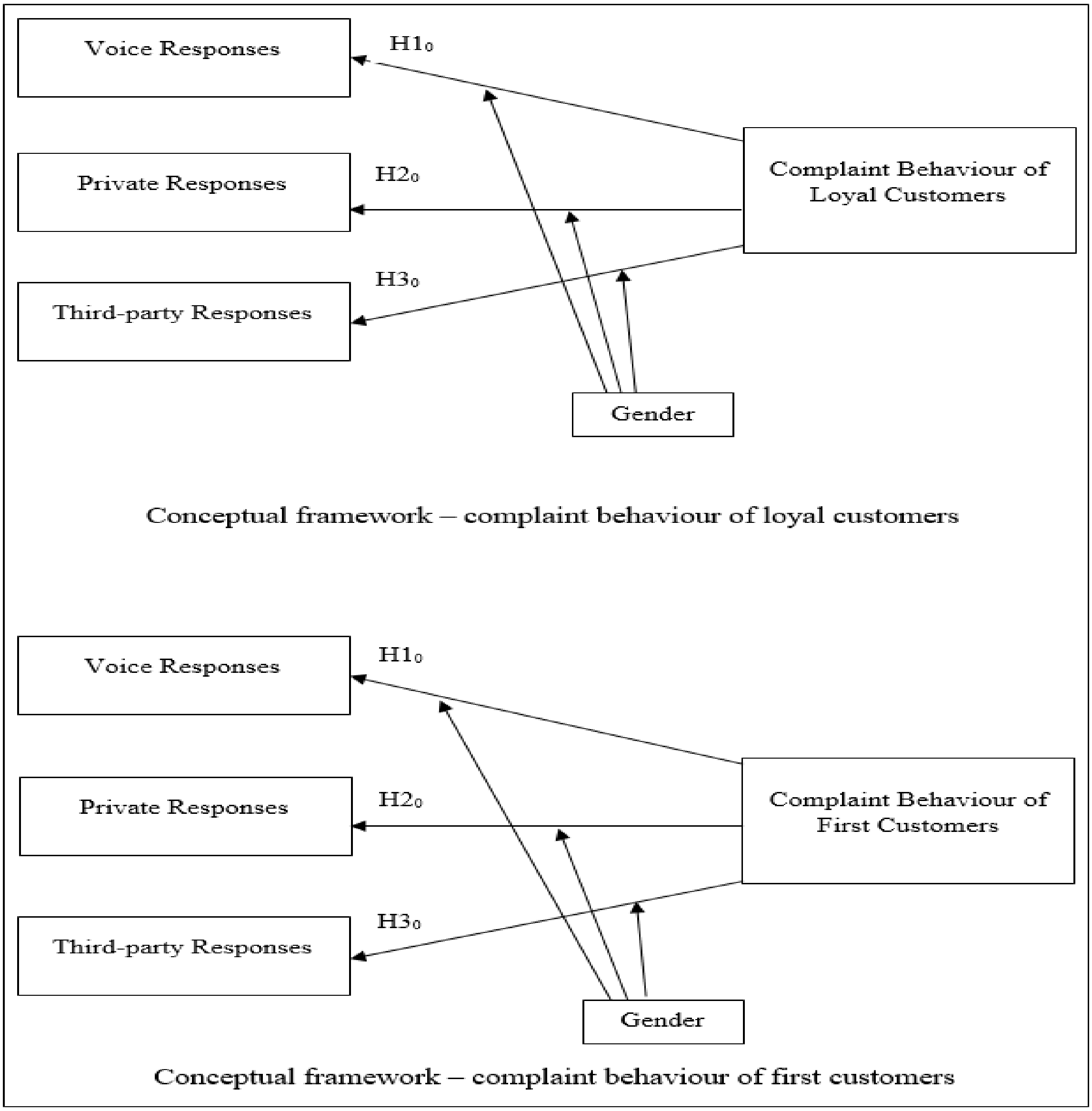
Further, the positive result of the pre-study which was conducted justify that there is a significant need of a study on customer complaint behavior with reference to post purchase of electrical appliances.

The aim of this research is to contrast whether there is any significant difference in complaint behaviour between loyal customers and first customers in terms of complaints.

The research objectives are, (i) to identify the main problem areas of electrical appliances, which made the customers dissatisfied and complain, (ii) to identify whether there is a difference in complaint behaviors between loyal customers and first customers in terms of complaining, (iii) to identify whether there is a difference in complaint behaviors between loyal customers and first customers in relation to the actions of voice responses, private responses and third-party responses and (iv) to identify whether there is a difference between customer complaint behaviour based on gender.

The conceptual framework demonstrates the relationship between the independent variables and the dependent variables.

Figure 1: Conceptual framework
Source: Author constructed



The hypotheses are formulated, based on the inter-relationship between the independent variables and dependent variables.

$H1_0$: There is no significant difference in the complaint behaviors between loyal customers and first customers in terms of: (a) voice responses, (b) private responses, (c) third-party responses.

$H2_0$: There is no significant difference between loyal customers and first customers in relation to the actions of voice responses: (a) discussing the problem with the manager or other employee of the firm, (b) asking the firm to take care of the problem (e.g. to fix or replace item or to return your money), (c) informing the firm about the problem so the firm will do better in the future and (d) forgetting about the incident and doing nothing.

$H3_0$: There is no significant difference between loyal customers and first customers in relation to the actions of private responses: a) avoiding that firm's products or services from then on, (b) buying from another firm the next time, (c) speaking to friends and relatives about the bad experience and (d) convincing your friends and relations not to do business with that firm.

$H4_0$: There is no significant difference between loyal customers and first customers in relation to the actions of third-party responses: (a) writing a letter to local newspaper about the bad experience, (b) reporting the problem to a consumer agency, (c) taking legal action against the firm.

Methodology

The methodology and the approaches that were used to gather data were interviews and survey data on the sample of 315 customers of electrical appliances. The research questionnaires determined the demographic profiles and the level of dissatisfied complaint actions using five-point likert scale. SPSS 25.0 for Windows was used for data analysis. Descriptive statistics such as mean, frequencies, Independent Sample t-test and Cronbach's Alpha were calculated.

Findings

The results reveal that the first customers are more willing to engage in private responses in complaining such as negotiation and word-of-mouth comments and telling friends and family about their bad experience compared to loyal customers. Further, first customers are more willing to take legal action against the firm rather than loyal customers. Furthermore, it reveals that the main source of customer dissatisfaction is product faults and the least source is advertising. There is no significant difference in customer complaints in terms of gender. However, the majority of the male customers are willing to utilize voice and private response compared to female customers and the majority of female customers are willing to take third-party responses compared to male customers.

Practical and Social Implications

This research represents valuable information for assisting retailers & marketers of electrical appliances to understand the customer complaint behavior of both loyal customers and the first customers. Managers need to make strategic plans to improve customer satisfaction and use as a way of promoting customer loyalty. According to Kitapci and Dortyol, (2009) there is a possibility to create an increase in between 5 and 80 percent of firms' profitability, as a result of how much the customers are loyal to the firm.

Loyal customers often return and continue to do business with the firm while first customers never return and cease their patronage. Therefore, the first impressions are critically important for first customers. Firms should pay more attention to create a positive initial impression of their firm for first customers.

Managers should also take steps to reward employees who can successfully handle the complaints made by firm customers, by providing recognition through various incentives. This will motivate the firm's staff to take a willing part in the processes of handling customer complaints, effectively and efficiently managing complaints and increasing the quality of the product and service offered by the firm.

Future Research

Instead of looking only at the retail service of electrical appliances, the future research can be conducted based on both service and tangible goods, where the respondents experienced a dissatisfying problem: such as store-bought clothing and eating at a restaurant while considering the income, education level and age.

Key References

Broadbridge, A. & Marshall, J., 1995. 'Consumer complaint behaviour: the case of electrical goods'. *International Journal of Retail and Distribution Management,* 23(9), pp. 8-18.

Kitapci, O. & Dortyol, I. T., 2009. 'The differences in customer complaint behaviour between loyal customers and first comers in the retail banking industry: The case of Turkish customers'. *Management Research News,* 32(10), pp. 932-941.

Liu, R. R. & MaClure, P., 2001. 'Rcognizing cross-cultural differences in customer complaint behaviour and intentions: an empirical examination'. *Journal of Consumer Marketing,* 18(1), pp. 54-75.

Ndubisi, N. O. & Ling, T. Y., 2006. 'Complaint behaviour of Malaysian consumers'. *Management Research News*, 29(1/2), pp. 65-76.

Singh, J., 1988. 'Consumer complaint intention and behaviour: definitional and taxonomical issues'. *Journal of Marketing,* 52(1), pp. 93-107.

NSBM 3D Walk Through

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Background

There are countless virtual tour platforms and 3D visualizations to be found on the internet. (Salon, 2019), (Talumis, 2019) & (Technologies, 2019). None of these programs/projects provide a completely immersive experience. Most of them are video walkthroughs of pre-rendered models with a fixed camera moving on a predefined path. Some lets the user navigate the environment using the mouse. The user points and clicks on the desired destination. The user will then be moved to the hotspot closest to the point where the user clicked (usually done with a sliding animation).

In the real world, there are many experiments that cannot be run on a system, simply because they either expensive or impractical to run. The effective way to test these scenarios on a system would be to run simulations. They will provide users with analytical and practical feedback based on the simulation which is simulating a real-life scenario. Simulators are used abundantly in various number of fields such as in Flight training, Space Exploration, Surgical training, Bomb Defusal and Army training to name a few. They are used to give the user a feel of what they are supposed to do in a realworld situation. Flight Simulation involves training pilots to handle real world flight scenarios that includes changing weather conditions, runway take-offs and landings. In this work, a user can virtually walkthrough NSBM without the physical presence at the location.

Architecture Visualizations is the graphical representation of a model (Paauwe, 2019). It can be represented either physically or digitally. It is mainly used to showcase the attributes and practical application of principal of content of a proposed building. For example, Architectural Visualization includes design sketches and blueprints.

A game engine is the software provides the necessary tools and set of features required by the users build quickly and efficiently (The Knights of Unity, 2019). Game engines provide the necessary framework to bring together several core aspects of game development: Graphics; rendering engine used to generate 3D/2D graphics, Audio; audio engine which contains algorithms related to sound and audio, Networking; APIs which allows players to connect with each other in a network but not used in this work, Physics; engine that lets the game implement the physical laws of nature, Graphical User Interface (GUI); tools to design a 2D interface which the user will interact with, Scripting; scripts that holds all the logic in the game. AI is also a core aspect, but it is not used in this work.

There are 3 main Game Engines available to the public:

• Unity: This game engine is the easiest to work on since it has a very simple user interface. It is the obvious choice for beginners who want to dabble in the arts of game development. Unity has their own plugin store, which sells plugins made by other developers which can be used in the editor, called the Asset Store. It also has many free-to-use plugins. Unity can create games which support multiple platforms. Using the cross-platform capabilities Unity, developers can create games for Android, Linux, IOS, etc. Unity has free version (for students and hobbyists) and a paid version (for professionals and enterprises) where the paid version has extra minor features. Scripting language used is C#.

• Unreal: Unreal offers the most realistic graphics. It's known for creating some of the best landscapes in gaming. Unreal is a bit more powerful than Unity and is aimed more towards advanced users. Unreal has no paid version. Instead they charge a 5% royalty from the game sales. Scripting language used is C++.

• Game Maker Studio: This is not a traditional game engine. While game engines require the developer to code several aspects of the game for it to work, Game Maker Studio has readily available drag-and-drop components. While this certainly is easier, the engine will have a lot of limitations when creating more complex games. It also limits the number of 3rd party plugins and extensions that can work with the engine. A free version is offered here as well but it has a significantly smaller number of features than the paid version.

In this work, a 3D Walkthrough of NSBM is proposed. The Walkthrough will include buildings that are close to scale as possible. The 3d models of the buildings will be built using SketchUp. The player will be able to move and look around the buildings as if the player was in a simulator. The player will control a humanoid 3D model called Ellen. Ellen contains all the necessary cameras and audio sources required for the game to properly function. The player will control Ellen using the keyboard and the mouse. The model will also contain openable doors with animations done in real time. Every GameObject will obey the laws of physics in the system, meaning that movement and collisions will be realistic. There will be several environments for the user to choose and play on. Each environment will feature a different time of the day with lighting to match the environment. The included GUI/Menus will provide the player with an intuitive method to select and navigate between different environments and levels. The night environments are unique since they have a different lighting scheme than the reset. The entire project will be built using the Unity Game Engine and all scripts will be written C#.

Methodology

Modern game engines can help create games with stunning graphics. They also help import models/assets from other programs and platforms thus eliminating or drastically reducing the waiting time for each import. They also provide users with the architecture and APIs for fast rendering of graphics. • Audio: Game engines allows the user to add audio, natively or through other software, to their games. They can place these sounds creatively anywhere in the scenes to enhance immersion and audio fidelity • Physics: Typically, users have to hard code the laws of physics used by every element in the game. Game engines provide the necessary game components to detect collisions with each other and make sure that they behave in a realistic way. • GUI: Game engines contain the tools which allow developers to design their own GUI with dropdown menus, buttons, etc. that suit the theme and art style of their game. • Scripting: Scripts in a game engine are used to define the logic in the game. The logic is the core of any game. Scripts are used to control the camera, player movements and animations to name a few.

The game engine used in this project is the Unity Game Engine. Unity Is a real-time cross-platform engine and is one of the most popular game engines available in the market. It was developed by Unity Technologies in 2005. When it was first released, it only supported OS X games and was limited to that platform only. Developers had to look elsewhere if they wanted to develop games that could run on other platforms. Currently, Unity supports 27 different platforms including Windows.

The 3D modelling tool used in the project was SketchUp, formerly known as Google SketchUp. Sketchup is a 3D modelling program that is being used in a wide range of applications. It is one of the most popular applications out there which is used in this project. A tape-measure was used to get the dimensions of the desired building. There was no practical way to measure the heights of the walls accurately since the necessary instruments/equipment was not readily available. These height dimensions were approximated using the average human height and then these were marked on some on-site sketches.

The Way-finding map was added to SketchUp and a line was drawn along the wall of the measured section. The length of this line was the same as the dimensions recorded from the tape measure. The photo was then adjusted/scaled so that the measured wall matched the length of the line. The endresult was that now there was a base which is almost exactly to scale for the model to be built.

The Line tool and the Arc tool was used to draw the lines to mark the exterior walls of the faculty. Once all the lines are drawn and complete, the output Closed Surface can be pulled upwards to make the walls using the Push/Pull tool. These walls were pulled up so that it matched the exact dimensions marked on the on-site sketches.

Now that the walls were all built, it looks like a giant block with no openings or cut-outs. The exact positions and dimensions of the openings were found by referring to the on-site sketches. The line tool and the rectangle tool were used to draw the outlines of the cut-outs. Next, the drawn shape was then pulled into the wall using the push/pull tool. The shape was pulled the same distance as the thickness of the wall. This effectively created a hollow opening, which has the same thickness of the wall, where the drawn shape used to be.

The stairs couldn't be built the same way as the walls, meaning it was tricky and a different method was required. The regular method is to draw the outline of one stair using the Line tool (which is a rectangle) and then extrude it using the Push/Pull tool. This process must be repeated for every stair in the staircase while increasing the height with each step. The method used to model this building was different. To build the outer staircase, the Single-Flight straight staircase tool from the 1001bit-tools extension was used. This is a much easier and faster method to build a staircase. The tool provides 4 different staircase profiles for different designs and purposes but for this model, the Type A profile was used.

Perhaps the trickiest part was building the railings, since there was no straight-forward tool that did the job. The first task was to design and build the spindles. This was done by drawing a rectangle on the surface using a rectangle tool. Next, using the push/pull tool, drag the spindle to the desired height. Selects all the faces in the spindle, right click and select the Make Component option. This will group together all the selected components into one. To duplicate this single spindle across the entire rail, a tool called Linear Array in the 1001bit Tools extension will be used. This is the same extension used when creating the staircase. Draw a line

Set the desired number of spindles in the railing and click Build Array. This will close the dialog box and change the cursor to a plus mark. This will allow the user to select the start and end points of the railing. The handrail is much simpler to build. Firstly, the Line tool will be used to draw the path for the handrail. Select the rectangle tool again and draw a handrail sized rectangle at the start of the previously drawn line. Select the 2D shape and select the Follow me tool located in the Tools menu in the Menu Bar. Since the current model require two handrails (one on the top and one in the middle), the same process had to be repeated for a second time but the path for this railing started in the middle of the corner post.

Now that the model is complete, all that is left is to add the 3D model to Unity. The model was first exported to FBX file format (.fbx) since file format contained more information related to the 3D model (lighting, animation, rigs) compared to the Wavefront OBJ file format (.obj), which is mostly used for clean mesh transfers and renders. This exported 3D file can then be imported to Unity as a new asset.

- Scenes

There are 6 different scenes in the project: Morning, Midnight, Daytime, Afternoon, Cloudy and Dusk. Each of these scenes have the same model building and characters. They also contain the same Pause Menu GUI.

• Morning: Contains the Morning skybox. Directional light used in the scene has a light yellowish color to match the mood and the sky/environment. Its direction is also set to look like it's just risen so that the object shadows corresponds accordingly.

• Midnight: Contains the Midnight skybox. Directional light is set to dark gray so that it simulates moonlight. The light provided by the skybox is also extremely dim. This scene also contains several other light sources. These were used to replicate light bulbs placed in rooms, stairs and gardens. Together, these light sources provide a realistic night atmosphere that matches the mood and the overall environment.

• Daytime: Contains the Daytime skybox. Directional light is brighter than all the other scenes and the color Is set to pure white as well to brighten up the environment. There are no artificial light sources since it would be unrealistic for light bulbs to be turned on in the middle of the day.

• Afternoon: Contains the Sunset skybox. Directional light used in this scene has an orange color since the color of light in sunset is usually orange in real-life. The direction of the direction light is also rotated so that it looks like light is shining from the horizon at the objects. All of this helps in providing a realistic atmosphere for the scene.

• Cloudy: Contains the Cloudy skybox. This scene is extremely grim and moody. The sky and the dim lighting provide an atmosphere which makes the player feel like a storm is on its way. The color of the directional light is set to gray.

• Dusk: This scene is very similar to a night scene. The dark starry sky brings out the cold, silent atmosphere. The directional light and the light from the skybox are like the lighting in the midnight scene but here it's a bit brighter. The same artificial lights are also used in the exact same positions as the midnight scene.

The main character model used in the project is called Ellen. This rigged character model is available in the Asset store. A model is usually rigged so that it can be used for animations such as walking and standing. Initially, the character model was to be animated but due to time constraints that feature had to be put on hold. Ellen is the most important GameObject in the entire project. It is the parent object for the two cameras and multiple essential scripts and audio files. Ellen is rendered using the mesh renderer component with the materials and provided with the asset when downloaded from the asset store. To make sure Ellen obeys the laws of physics of the system, the RigidBody component is used. The Use Gravity option should be ticked for an attached object to move/fall realistically in the scene. Rotation on all axes were locked so that it doesn't fall off balance when moving or in collisions. Ellen uses a capsule collider since the capsule shape approximates the shape of Ellen's body better than other collider shapes.

Every scene contains the default main camera and a secondary camera which is used to change viewmode. The main camera is used to render the game in first-person view and the other camera is used for third-person view. The view-mode is changed using a script, which will be explained in detail later in the report. The cameras are attached to Ellen (made a child in the Ellen GameObject) in the Hierarchy window. Once the cameras are attached, the position values in the transform component is set to zero. This will bring the cameras to the centre of the attached object. Using the Move tool, reposition the cameras on a desired axis. The first-person camera (main camera) should be positioned so that it is on the top of Ellen (preferably the head area) and the third-person camera should be positioned a little higher than the main camera and should also be farther back from the model.

The openable doors are a bit tricky but its very easy to implement. Create a 3D cube from the hierarchy and place it where the door should be. Adjust the cube so that it fits the gap nicely. Next, create an empty GameObject and place it where the hinge should be located. Make the 3D cube a child of the empty GameObject. Add the OpenableDoor script to the empty GameObject. Create a box collider in the empty GameObject and tick the isTrigger option. Transform the box collider so that it is a bit bigger than the doors. Navigate the character in the hierarchy and label it as Player. This is for the script to identify the player and function accordingly.

Each camera contains an Audio Listener by default. This component is used to listen to sounds in the environment and play it back to the user through speakers or headphones. Ellen has two Audio Sources attached: Walk Sound and Jump Sound. They are played when the specific keys are pressed. Walk Sound is played when W/A/S/D keys are pressed. Jump Sound is played when Space is pressed. This logic is handled by scripts. An Audio Source object with the relevant script attached is made child of Ellen. Once the positions are reset, audio source should move everywhere with the player just like the cameras. There are 4 different types of light sources:

• Directional light: This is used to represent sunlight. The source position of Directional light doesn't matter since the distance of the light is not defined.

• Area light: This rectangle emits light in all directions but only from one side. Usually used in street lights and interior designs.

• Point light: These are balls of light which emits lights in all directions in the specified range. Usually used to created bursts of light from explosions.

• Spot light: This light source is like Point light but spot light is limited/constrained to an angle. Used mainly for flashlights and headlights.

In this project the direction and point lights are used. Point lights are used as outdoor lights.

Findings

In this work, the proposed 3D Walkthrough of include buildings that are close to scale as possible. Figure 1 depicts the 3d sketches used to build 3D models using SketchUp.

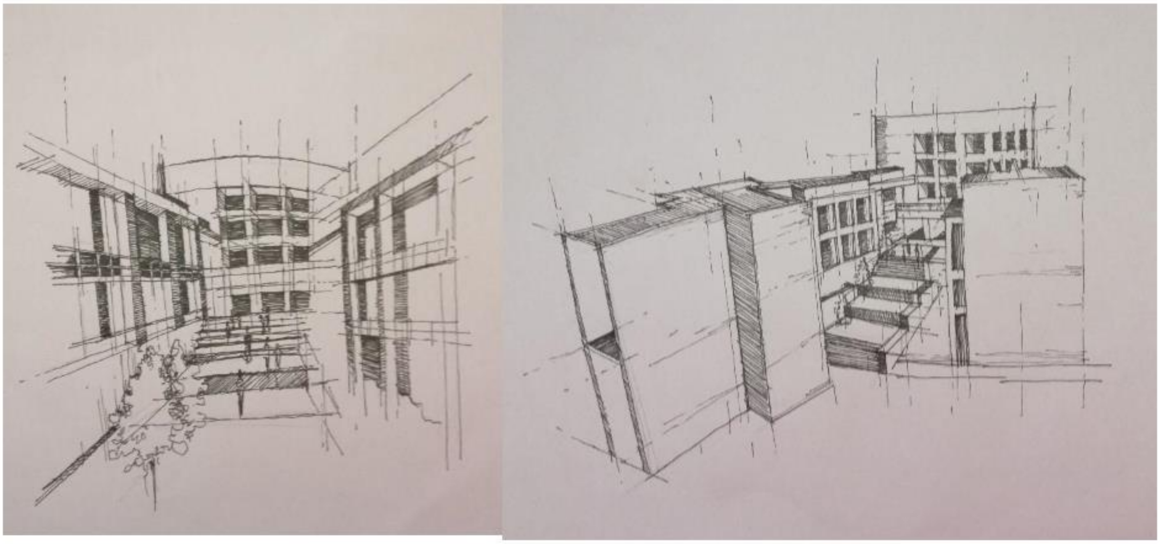

Figure-1: 3D sketups of the building

The player moves and looks around the buildings as if the player was in a simulator. The player will control a humanoid 3D model called Ellen. Ellen contains all the necessary cameras and audio sources required for the game to properly function. The player can control Ellen using the keyboard and the mouse. The model contains openable doors with animations done in real time. There are several environments for the user to choose and play on. Each environment will feature a different time of the day with lighting to match the environment. The included GUI/Menus will provide the player with an intuitive method to select and navigate between different environments and levels. The night environments are unique since they have a different lighting scheme than the reset. The entire project is built using the Unity Game Engine and all scripts are written C#. Scripts are an essential aspect of game development. These files contain the core logic of the components and even the game itself. Scripts in Unity are written in C# using Microsoft Visual Studio. Until Unity 2017, scripts can also be written JavaScript but now that feature has been deprecated. Scripts are required for everything from player input to AI.

There are several scripts used in the project:

• CameraCycle: Used to change the view-mode from 1st person to 3rd person. Assigns 2 cameras and uses a simple bool variable to switch between the two cameras when a key is pressed.

• CamMouseLook: Enables the player to control the attached camera with the mouse.

• CharacterController: Enables the player to control the attached object using the keyboard. The script is also used to hide and lock the cursor at the start of a scene.

• Headbobber: Simple script which bounces a camera along a fixed midpoint to give realistic headbobbing effect when moving.

• Jump and Walk Sounds: Plays a sound when a specific key is pressed. While these are two different scripts attached to 2 different audio sources, the logic in the scripts are more less the same.

• OpenableDoor: Holds all the logic for opening/closing of doors when a button is pressed. Can be attached to any set of doors to add the openable door functionality.

• JumpScript: Allows the user to jump up when a key is pressed. Provides an upward force to the attached RigidBody and pushes it to up few units.

• PauseMenuScript: Contains all the functions to restart and load environments. It's also the script that hides/shows the attached Panel. This script is attached to an empty GameObject, and then its referenced to from multiple buttons and menus.

• RestartScripts: Restarts the current scene on key press.

• StartMenuScript: Very similar to the PauseMenuScript but this script refers to start menu instead.

Practical and Social implications

The project will allow any interested stakeholder to virtually walk in NSBM without having to physically be at the location. A person will be able to feel the premises and experience the real sensation of actual walk through. This can also be used as a marketing material to attract more foreign and local potential students who are seeking higher education in Sri Lanka. Furthermore, this platform will continue to promote education at NSBM in foreign communities.

Future Research

As for future work, we are planning to model the building using the official/genuine floor plans owned by NSBM. The floor plans would provide all the necessary details for the 3D model to be completely modeled to scale. Also extending this work to complexly model the outdoor environment of NSBM will complete this project. We are also planning to model the interior of the building with the accurate dimensions and to further allow a user to walkthrough in the buildings as well.

Key References

metashapes.com. (2019). 3D File Formats - metashapes.com. [online] Available at: https://metashapes.com/support/3d-file-formats/ [Accessed 8 Apr. 2019].

Paauwe, M. (2019). Architecture Visualization Definition - Dragon1. [online] Dragon1.com. Available at: https://www.dragon1.com/terms/architecturevisualization-definition [Accessed 8 Apr. 2019].

polycount. (2019). Fbx vs Obj?. [online] Available at: https://polycount.com/discussion/169104/fbx-vs-obj [Accessed 8 Apr. 2019].

Salon. (2019). A brief history of the "walking simulator," gaming's most detested genre. [online] Available at: https://www.salon.com/2017/11/11/a-brief-historyof-the-walking-simulator-gamings-most-detested-genre/ [Accessed 8 Apr. 2019].

Talumis. (2019). What is simulation | Simulation Software Explained. [online] Available at: https://www.talumis.com/what-is-simulation/ [Accessed 8 Apr. 2019].

Technologies, U. (2019). Unity - Manual: Scripting. [online] Docs.unity3d.com. Available at: https://docs.unity3d.com/Manual/ScriptingSection.html?_ga=2.154449594.383 11 7001.1554613467-627072633.1549638754 [Accessed 8 Apr. 2019].

Technologies, U. (2019). Unity - Manual: Unity User Manual (2018.3). [online] Docs.unity3d.com. Available at: https://docs.unity3d.com/Manual/UnityManual.html [Accessed 8 Apr. 2019].

The Knights of Unity. (2019). Myths and Facts of the Unity Game Engine. [online] Available at: https://blog.theknightsofunity.com/myths-and-facts-of-unity-gameengine/ [Accessed 8 Apr. 2019].

WhatIs.com. (2019). What is 3D modeling? - Definition from WhatIs.com. [online] Available at: https://whatis.techtarge References metashapes.com. (2019). 3D File Formats - metashapes.com. [online] Available at: https://metashapes.com/support/3d-file-formats/ [Accessed 8 Apr. 2019].

Expiry Date Tracker for Super Markets Using RFID Technology

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Background

When I was at a Keells supermarket standing in a long queue to get one item, I wanted to find out how other countries eliminate this problem. When I do a thorough research on this, one video at Chinese supermarket really impressed me, the technology they used was RFID and they call this as cashier-less store.

I wanted to do a questionnaire at the supermarket to see how people react to new technology and if it will be practical enough with supermarkets' daily customer base. Then I went to meet the manager of the branch, I wanted to see whether they have other problems that is looking for a solution so that the project I'm doing has benefits for both the customer and the supermarket.

The branch manager then said currently they need to check expiry dates in the shelves manually. On the 1st and 2nd of every month they allocate about one third of the employees to do this process. The rest of the two third are engaged in the bakery, back office or at the cashier. Sometimes it is hard for them to attend immediately to customers' inquiries. The people who are in the 2/3 box are not qualified enough to handle customers directly.

The manager is looking for a solution where they get notifications about the expiry dates within stock products.

Currently, they use Bar code readers to bill the purchasing products. The only disadvantage in the barcode process is, the barcode numbers needs to be placed

correctly in the barcode reader. There are situations where these serial codes do not scan properly, thus the cashier needs to type the whole code to find the product details in order to bill the product. The other reason why they cannot get the expiry date from the bar code number is, according to international barcode standards, they don't include expiry date details in the initial barcode number.

Methodology

There are 3 main systems. Mobile Application, Web Application, RFID hardware readers.

System 1 gives the solution for customers. Customers have the ability to make payments through applications so that the cards do not need to be physically presented. This eliminates the log queues, because powerful RFID readers can scan a few products at once.

This is a mobile application. That is connected to Web Application in order to connect to inventory.

System 2 is a solution given to the Branch/ Store Manager to track the expiry dates of products in real time. This helps the staff to involve more with customers and to fulfill their requirements.

System 3 is RFID which, holds each product at the branch. This is an individual component that is not directly linked to web application.

Once the branch manager creates/ enters the products, he has to write the RFID tags. This particular tag is placed in each and every product at the super market.

Once the customer comes and purchases the product, through the RFID reader he has the ability to read it. Once the customer has finished shopping, to generate the bill and to update the inventory list there will be a QR code that is generated.

This QR code customer needs to scan from the mobile application to proceed further with payments.

Findings

Practical and Social implications

Sri Lankans like to experience new technology. Since the whole world is now technology driven, it is ideal for us to expose ourselves to the new technological trends. Though Sri Lanka is a small Island surrounded by the Indian ocean, companies like MIT, and Virtusa are doing major projects internationally. Even though, we are named as a third world country these companies have already proved to the developed countries that we have talented and skillful people. It's time for us to apply technology and move with the flow.

China is named as the most populated country in the world. If they can use these technologies in their country, why do we hesitate and find excuses to not apply the new technology to our daily life? It is a fact that technology is making our lives easy when there are reasons to make ourselves a trap with these new gadgets.

What outcomes and implications for practice, applications and consequences are identified? How will the research impact upon the business or society? What changes to practice should be made because of this research? What is the commercial or economic or social impact?

Future Research

- Since John Keells Holdings is a well-known Group of companies in Sri Lanka, there is potential for research into whether they could manage to build this RFID produce in-house.
- The initial cost to implement this system can be easily covered and can earn a profit sooner.
- The methods that customers fraud. And the options how international companies take action against the situation.

Key words

RFID, Supermarket based projects, Raspberry pi, queue elimination methods, expiry date trackers, azure data bases projects, web, mobile and hardware connected projects

Key references

A.,You,H.,Lockers,T.and Important? W.(2019).What is RFID and How Does RFID Work?-AB&R®.[online] AB&R.Available at: https://www.abr.com/what-is-rfid-how-doesrfid-work/ [Accessed 21 Sep. 2018].

Technovelgy.com.(2019).Problems With RFID.[online]Available at: http://www.technovelgy.com/ct/Technology-Article.asp?ArtNum=20[Accessed 10 Jan. 2019].

Anon,(2019).[online]Available at: https://www.researchgate.net/publication/320346349_Case_study_installing_RFID_in_Su permarkets[Accessed 9 Jan. 2019].

Google.com.(2019).The Morning Call-We are currently unavailable in your region.[online]Available at: https://www.google.com/amp/s/www.mcall.com/opinion/mc-xpm2010-03-31-all-explainit.7222176mar31-story,amp.html [Accessed 21 Feb. 2019].

Medium.(2019).Software Engineering—Software Process and Software Process Models(Part 2).[online]Available at: https://medium.com/omarelgabrys-blog/softwareengineering-software-process-and-software-process-models-part-2-4a9d06213fdc [Accessed 16 Jan. 2019].

Dalbey,J.(2019).Software Process Models.[online]Users.csc.calpoly.edu.Available at: http://users.csc.calpoly.edu/~jdalbey/308/Lectures/SoftwareProcessModels.html [Accessed 16 Jan. 2019].

Dam Automation System

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Background

My system facilitates a "Dam Automation System". A dam is a huge barrier built for the protection of an area from water overflows. This is a really important step towards developing more efficient and convenient water management strategies. The proposed system has a total of three gates, the water level indicates automatically without human involvement, providing users timely alert, when the water level reached to the higher level it will make a buzzer sound, for all the 3 levels which is visible to the villagers and other people, in order to recognize which gates have opened (Light System) and it controls automatically. I prefer that the operation on automated systems which are more effective and efficient than manual ones. It is very useful and consumes time, helps dam maintenance, reduces human errors and dam maintenance effort. We can alert the people when water overflows and floods, in cases of excessively risky conditions of the bad weather. This is the major problem faced by the government when it comes to managing water dams. The purpose of the project will refer to the process of changing the reservoir release gate to accommodate a change in downstream demand without human intervention.

The idea that inspired the project was the news of one spill gate open from the "Kotmale" reservoir due to heavy rain on the western slopes of the Central Province on July 16, 2018. Accordingly, the dam includes five spill dam gates. The dam has achieved almost the total level of the water and they have opened one single gate to reduce water overflow. Since the water dam is full of water the dam couldn't hold the pressure of the water and the dam wall will crack. Then people will face a huge disaster. Because of that if the dam gate opens equally from the lower level, the water will flow equally without any harm. By the above-mentioned reasons, the researcher was inspired to create a Dam Automation System.

The objectives of the project will be, to control the operation of opening and closing dam gates using automated systems., provide connection between water level, buzzer sound and the Alert System (SMS), provide staff training to maintain the implemented system, modernize the customer service processes and system in a way that without human involvement and provide users timely alert. This system will help to improve the system effectively, efficiently, conveniently, safely and it will prevent the flood and maintain the irrigation system as well.

Literature Review

The following research projects are closely relevant to the proposed system.

According to the previous surveys Omaryabrata Bharatiya has implemented a PLC based system for a few large water conveyance dams. It is a system of remote monitoring and manual control. (Bharatiya and Sahu, 2019)

Iyerm M., Pai, S., Badri, S .& Kharche, S .carried project research work the embedded Dam Gate Control System is developed .The idea of the project was to develop the proposed system which can control the dams using the embedded system .The Embedded system is the combination of both hardware and software design which contains an automated process that makes easiness for the staff (Iyer, Pai and Badri, 2013).

Marcel Nicola, Florin Velea used PLC/SCADA system to control Hydropower Dam Spillway. The PLC system is huge and suitable only for large dams. This system has the Programmable Logic Circuit for controlling the dam operation (NICOLA and VELEA, 2010).

PLC based Dam Automation Systems were extensively Researched by Sonwane, R., Thakur, N., Akhade, S., Kawale, S., Dusawar, R .& Lalwani, K. This project was meant to develop an automated system that would help with control and monitoring activities at designated dams, making use of Programmable Logic Controllers (PLC's.) A few different components will be used in the implementation of this system (Sorte, 2015).

Prof.Seema Idhate, Ashish Bilapatte, Avinash Rathod and Hanuman Kalbande authors of this project research work of Dam Monitoring System Using Wireless Sensor Networks is to be developed here .The idea behind this project was to develop a system that leaves enough room for the dam to be controlled and monitored from a remote location, using wireless sensor network.The system is fitted with several sensors such as, the Temporary Sensor, the water level sensor, the humidity sensor, the PH sensor and the rain drop sensor .These sensors each take actual results, which then, are conveyed to the microcontroller via a wireless transmitter.

The data taken, in turn, may or may not be displayed on the LCD, depending on the ascertained risk level .The sensors work without pausing, making continuous data .Have been displayed on the LCD, this data then moves on to the RF transmitter .The RF transmitter is used for the transmission of data over long distances .To do this, it usually will engage the use of GSM wireless technology .The transmitted data is gathered at the RF receiver after which it is passed to the PC .The IOT Application has since been developed for use in updating this data into the Internet (Idhate, 2017).

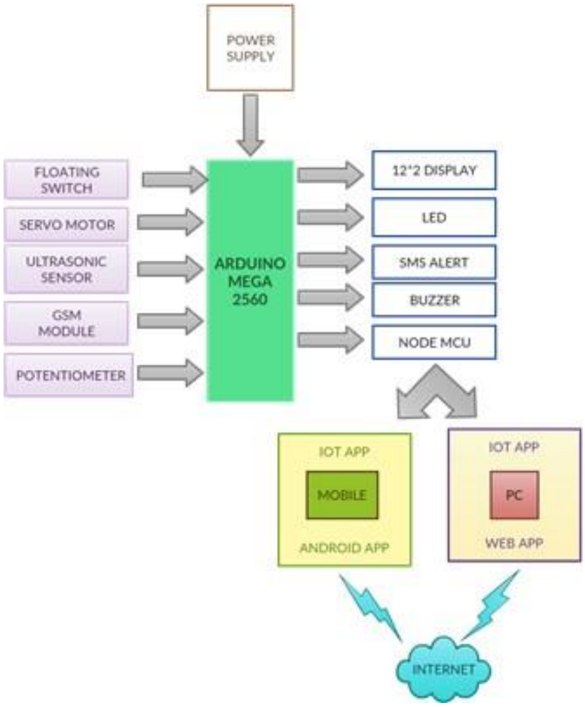

Figure 1. Block Diagram of the Project

Methodology

This system consists of three water level switches (HFP21), Tower Pro SG-5010 Motor (servo), Data Transmission module, buzzer, ultrasonic sensor, LED and LCD display

Dam consists of water. This water level will be high or low due to rainfall. When the water level reaches the first floating switch it will be on the first LED and opens the gate for the water level one. After that water level reaches the second floating switch it will on the second LED and dam gate opens for the second level. Meanwhile an SMS first warning alert will receive the admin as well. At the final stage the dam gate will be fully opened, LED will emit the light, buzzer will sound, distribute ultrasonic sound, and the second SMS warning alert will be sent to the admin as well. You will apply this from the website and the mobile as well.

Practical and Social implications

The Dam Automation System has been implemented using floating switches, Ultrasonic sensor, and GSM module. The first stage of implementation which involves determining the level of water using floating switches. On each level LED bulb will emit the light when the water reaches. Those levels are displayed on an LCD display. Then the staff who are observing the dam status inside the control house would find it easier than earlier. While the water volume will increase at each three levels the servo motor interprets the data and it switched on servo motor which will be connected to the gate mechanism. This will help to decrease the human involvement when operating the dam gate.

The water level data is transmitted to the Arduino board through the GSM module in this stage, on the second and the third level it will send an SMS alert to the admin. In this moment the Buzzer will sound to indicate that the water level is nearly in the flood range. This buzzer sound will sound for people who are in the control house and the people who are closest to the water dam, then they can go to safe places immediately. At the same time, Ultrasonic sound will emit. The most important thing of this sound is that the sound which emits from the Ultrasonic sensor could only be heard within a sound range of over 20,000 Hz. Humana can hear within the sound range of 20Hz to 20,000 Hz. This Ultrasonic sound is used for the animal to save their lives from a flood.

This Dam Automation system helps to save power and totally reduce human energy. This system helps to save money since these electronic devices are cheap at the market. This system is easy to handle and easy installation with LCD Monitoring.

This systems water level indicator is used for creating applications like water tanks, oil tanks, fuel tanks as well as Tsunami warning and sea level monitoring and for irrigation control.

Key references

Bharatiya, O. and Sahu, D. (2019). PLC-Based DAM Automation System. 2nd ed. [ebook] Ahmedabad: IJSRD (International Journal of Scientific Research and Development),p.1.Available at: http://ijsrd.com/Article.php?manuscript=IJSRDV6I21944 [Accessed 5 Dec. 2018].

Iyer, M., Pai, S. and Badri, S. (2013). Embedded Dam Gate Control System using 'C' and Visual Basic. [ebook] International Journal of Computer Applications, p.1. Available at: https://pdfs.semanticscholar.org/d899/8bcd1c3dd5dbba8781e076ce3ac5bf9a159d.pdf [Accessed 7 Dec. 2018].

NICOLA, M. and VELEA, F. (2010). AUTOMATIC CONTROL OF A HIDROPOWER DAM SPILLWAY. 34th ed. [ebook] Craiova: Annals of the University of Craiova, p.1. Available at: http://elth.ucv.ro/fisiere/anale/2010/53.pdf [Accessed 8 Nov. 2018].

Sorte, R. (2015). PLC based Dam Automation System. 3rd ed. [ebook] Chennai: IJERECE,p.1.Availableat:https://www.technoarete.org/common_abstract/pdf/IJERECE/v 2/i2/3.pdf [Accessed 6 Nov. 2018].

Idhate, S. (2017). Dam Monitoring System Using Wireless Sensor Networks. 4th ed. [ebook] Maharashta: International Research Journal of Engineering and Technology (IRJET), p.1. Available at: https://www.irjet.net/archives/V4/i4/IRJET-V4I4368.pdf [Accessed 7 Dec. 2018].

Stray Animal Catcher System

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Background

Stray Animal Catcher or National Pet Organization Cage (NPOC) is a system carried out and developed to reduce the stray animal (eg: Dogs, Cats, Cattles) population in urban areas of Sri Lanka. In Colombo, the stray animals, mostly stray dogs, have become a serious problem for pedestrians, residents and for vehicles. The increase in the growth of strays have led to the increase of some ill effects on the society and the environment. Some of the issues emerged are the spread of diseases like Rabies, hindrance to the garbage management and accidents.
In this kind of a situation, I thought of developing a system to reduce the stray population by introducing NOPC. The system consists of an Arduino powered cage which can identify objects (dogs in this case). The system operates in a manner when a dog is entered, the cage identifies the object as a dog and it closes the cage door. Also the cage has the capability to scan the captured dog for a tag which is given by the authorities to identify the owner of the dog.

Aims and Objectives

Main objective of the project was to capture stray animals without the intervention of the humans. Other objectives are given below

1. Removing additional staff related process
2. Identifying whether the captured animal has an owner or not
3. Broadcasting new entries to the pet stores automatically
4. Removing additional cost

Methodology

Using the Agile methodology, the system is developed step by step. The main objective, capturing the dog is achieved by using two components. First one is the object detection module, which is a software module developed using

TensorFlow and the second one is the cage powered with Arduino which can automatically close the cage door for a specific message. The object detection component identifies the dog and sends a message to the cage in order to close the cage door by itself.

A RFID tag and a reader module is used to achieve the goal of identifying the owner of the pet. The RFID reader module is placed inside the cage, while the RFID tag is given to every pet when they are registered in the database. The RFID reader reads every tag that come across it. When a tag ID is identified by the module, the tag ID will be transmitted to authority where they can inform the owner about the finding of the pet.

The system is programmed to send an email to the authorities when an animal is captured in the cage. If the captured animal is having an ID, the owners are informed by the authorities otherwise the animal details are emailed to Pet Stores that are registered with the authorities.

Findings

The system in a whole performs fine without any errors. But for the practical implementation a technique should be used to place a stand-alone PC with every cage that is to be planted in urban areas.

Practical and Social implications

In order for this system to perform well, all the pets should be registered with the authorities (say National Pet Organization). Then the pets are provided with a collar with the RFID tag which can be used to uniquely identify the pet. All or some of the Pet Stores should be registered with the authorities so, they can be contacted when an animal is captured. The cage and other equipment should be placed in an urban area where the stray animal problems can be found. In order to practically implement this system a technique should be used to keep a stand-alone PC with every cage.

Future Research

What this project basically does is that capturing the animals detecting it and sends emails to specific parties. This project does all the basic functionalities but this should be developed into future continuing from the end of this project.

1. Major components that could be added into the system is a mobile application. This will allow the customers/ users to directly communicate with the authorizing agency.
2. This cage can be developed to manage garbage or proper disposal of garbage around urban areas by attaching a garbage bin to the cage (can be used to provide food for captured animals through this).
3. Providing a GPS tracker along with the tags that are being provided in the pet registration will improve the system to track pets.
4. A veterinary service can be arranged through the mobile application.

Key References

Lyu, P., 2015. *Proposal on Solutions to Stray Dog Problem in American Cities,* Chicago: Pol Sci Pub Aff.

Moore, A., 2019. *Lost Pet Statistics: Survey Looks At Likelihood Of Finding A Missing Dog Or Cat.* [Online] Available at: https://www.huffpost.com/entry/lost-pet-statistics-survey-dog-cat_n_1662860

Pallav Doshi, Shubhankar Punktambekar, Niraj Kini, Simarjeet Singh Dhami, n.d. *Object Detection and its Application using Convolutional Neural Network,* s.l.: s.n.

Raenu Kolandaisamy, Kasthuri Subaramaniam, Indraah Kolandaisamy, Lin Siew Li 4, 2016. *Stray Animal Mobile App,* s.l.: ResearchGate.

Rameez, R., 2016. *Everything You Need To Know About Sri Lanka's Stray Dog Situation.* [Online] Available at: https://roar.media/english/life/environment-wildlife/everything-need-know-sri- lankas-stray-dog-situation/

Wulff, A., 2018. *Secret Door Opener - Arduino Project Hub.* [Online] Available at:https://create.arduino.cc/projecthub/AlexWulff/secret-door-opener b377f2?ref=tag&ref_id=door&offset=3

Home Automation System with Voice Integration

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Background

My project (Home Automation) is designed to automate the appliance in the house and to give a comfortable lifestyle to the residents. Usually, we used to control the appliance in the house manually. When we turn back to modern society, it is tedious to manually control the appliance in the house in view of the fact that almost every human in the world has an excessive amount of workload. The cost of living is higher than the past, as a result of that human beings are stuck with a considerable workload. World health organisation proves that the Considerable amount of suicides occur due to the stress from the above-mentioned factors. Most people, after a hectic workload think about their accommodations/homes, because after an exhausting day they find their own comfort in their accommodations/homes. Home is the best place that humans could relax their mind. Everything in the modern world has been automated in some way. Therefore, instead of manually controlling the appliance in the houses it is more efficient to automate them. If we could control them with our mobile phones or with our voice, it will reduce a considerable amount of work and gradually it will reduce the stress levels of the people. By using the automated system, we can control the appliance in the house with bluetooth. Most home automation systems have only that feature but if we could combine the room temperature or the humidity with the appliance like fans, we could control them more efficiently. Usually we fill up over water tanks when we run out of water in the tap. Rather than that if we could monitor the water level of our water tank by our mobile phone it will be more efficient. Because of the busy schedule, people forget to switch off their gas burners, so because of that large gas leakages can lead to a big disaster. When using my application, they will be notified if there is a gas leakage. As another security feature by using this system we can control the doors and track illegal intrusions within the home boundary.

Methodology

For the successful completion of the project with the achievement of the project goals, developers must follow a suitable methodology. Developers must use a suitable methodology for the development phases because it provides a well-ordered guide for the development of the project which leads to the effective and reliable completion of the projects. For the implementation of the home automation system with voice integration, it is essential to select the perfect methodology for the development.

For the development of this system I have utilized the Agile methodology. Nowadays it is very popular because it uses incremental and iterative work sequences called as Sprints.

Objectives

The objectives are important to achieve the goal. The main objectives of this project are: This system reduces human errors, efforts and makes life easier without compromising on the efficiency of appliances, saves time and has effective control of home appliances by utilizing monitored home statistics whilst ensuring maximum security through the system. In addition, it provides high quality services to the users or family members.

Findings

Before developing the smart home system, we need to search and investigate more details about the needs and knowledge of the people. In order to do that, a Special interview was carried out with a few of my friends and my neighbors. These interviews have been organized to gather the details for the research about home automation systems.

After a discussion with these people the following arguments were raised;

-Most of the users find it easy to handle android applications.
-Most of them are likely to possess connectivity using Bluetooth due to the reason of
pure WIFI connection and failures of internet.
-Others showed the favor to use Bluetooth technology instead of Wi-Fi because they
can save their phone battery.
-Most of them agreed to the gas leak detection function as a security feature in the
home automation system.
-All agreed to use the home controller as a mobile application that they can installed totheir mobile phones.

Because of the interview that I have carried out, a considerable amount of valuable details have been gathered. These are the details about the participants who engaged in my interview session.

After carrying out the interviews, by analyzing the user forms and the research carried out about the existing systems I have gathered so many factors about the home automation concept. After analyzing those factors, then came up with a system design which consists of these factors. To connect the android application and the microcontroller Arduino Bluetooth module and embedded mobile Bluetooth system is used. As the main security component, I have decided to monitor undetected gas leakages. As the second security component I have decided to monitor illegal intrusion detection system.

Future Developments

This project has many applications and a very good future scope. Throughout this project I have gained much knowledge about the technologies and techniques of wireless communication, Arduino programming and android development. By using that knowledge, I have intended to develop more security features to the project and find ways to communicate using multiple communication technologies with the Home automation system. Because of the IOT (Internet of things) concept it is beneficial to add those features to this system. Without using wired communication between the home appliances and the microcontroller I would like to add wireless communication to that part as well. By conducting continuous research about the Arduino and other technologies I would like to add more features to these things and gain much knowledge about new technologies. By using these technologies I'll deliver maximum service to the customers.

Keywords: - *Arduino, GSM, Bluetooth, Automation, Microcontroller*

Key References

Ardam H. and Coskun I., "A remote controller for home and office appliances by telephone", IEEE Transactions on Consumer Electronics, vol. 44, no. 4, pp. 1291-1297, 1998. [Accessed 4 Feb 2019].

Ahmed ElShafee, Karim Alaa Hamed," Design and Implementation of a Wi-Fi Based Home Automation System", International Journal of Computer, Electrical, Automation, Control and Information Engineering Vol: six, no: 8. [Accessed 4 Feb 2019].

Kim Baraka, Marc Ghobril, Sami Malek, Rouwaida Kanj, Ayman Kayssi "Low cost Arduino/Android-based Energy-Efficient Home Automation System with Smart Task Scheduling", 2013 Fifth International Conference on Computational Intelligence, Communication Systems and Networks. [Accessed 5 Feb 2019].

Andrea Zanella, Nicola Bui, Angelo Castellani, Lorenzo Vangelista, and Michele Zorzi," Internet of Things for Smart cities", IEEE INTERNET OF THINGS JOURNAL, VOL. 1. [Accessed 3 Sep 2016].

Nowak, G. (2019). Can You Have Multiple Phones Connected Simultaneously via Bluetooth? - DornerWorks. [online] DornerWorks. Available at: https://dornerworks.com/blog/can-multiple-phones-connected-simultaneously-via-bluetooth [Accessed 25 Feb. 2019].

A Study on The Visual Impact of Animated Cartoon Characters in The Digital Age, and How it Influences Children

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Background

How important is the overall physique of a cartoon, and its characters? Aside from the plot, audio and each personality the character is given, doesn't the overall appearance of the image contribute to how successful a particular cartoon character can be among children?

It is necessary to understand what a child expects to see on screen. More importantly, it is quite essential to take into account how affirmative they are towards certain cartoon characters, they could be from any contemporary or past productions in the animation industry. The comparison of the initial reaction of children towards these characters can supply data on the most suitable visual designs for cartoon characters.

On contrary to the topic of the visual impact a character has on a child, the overall design of the character including the character's own unique storyline, it has the power to compel children to behave either in a positive manner or a negative one.

According to T. Soliman *et al* (2015), a cartoon has the power to move children in their day to day life. More astonishingly they could be lifelong idols and icons whose children might abide by in life. The changes the characters could influence in children in which the writer speaks of are quite astounding.

Objectives

01. To collect data in order to understand the psychology behind the relationship between children and animation.

02. To identify if animation can be used as an instrument for education.

03. To further evaluate how significant the design of a cartoon character could influence children.

04. To understand the various elements in design (e.g. colour, lines, shapes) that appeal to children the most.

05. To understand the key components of visual design in creating a suitable cartoon character for children.

Hypothesis

If there are mythical or imaginary cartoon characters included in an animated show in which the genre is based on fantasy; children who are aged from three to five are more likely to perceive and appreciate it as delightful entertainment, hence inducing them to watch it constantly.

Methodology

Group discussions with children, questionnaires, and interviews were conducted in order to gather relevant data for the case study. The research was conducted between December 2018 and January 2019 from a selected group of children between the ages of four to five years of age. The research was conducted at the kindergarten 'Mavu Senehasa' in Dehiwala, Colombo.

Population and Sampling Group

- Research location was selected within the premises of 'Mavu Senehasa' pre-school.
- Sampling group consisted of 25 students with the aid of pre-school teachers.

Research Design

A self-administered interview about television program was conducted to gather information on the general preference of animated television and web series. Through this information children's attitudes, opinions on local television series were discovered. Their preferences over the kind of characters they would like to see on screen and their opinion on certain visual elements such as shapes and colours were evaluated.

Research Methods and tools

The following techniques were performed for the purpose of sourcing data from the respondents: interviews, casual observations, focus group discussions and drawing activities were directed to verify the collected data. To get a better understanding of the relationship between children and animation, secondary data was researched from different articles and case studies in the world wide web.

Findings

Through the investigation, the researcher was able to identify what triggers children to watch the shows that they watch constantly. Before the research was conducted, it was necessary to understand if there actually was an impact on children after watching animated programs. Therefore, after confirming that animated productions do uphold over the mentality of a child, which consequently affects the child's overall development and behaviour, it is safe to assume that creators must put a lot of thought through trial and error, to design and create a kids' animation. Be it the plot, the visuals, the character design sometimes, even the colours should be taken into consideration when designing elements for an animated production.

Practical and Social Implications

Cartoon characters have the power to influence children, and in order for children to be taught good morals and ethics, these characters could be used as a great example. Just as children are taught about good habits and values through books, the same can be done through animation. And of course, animation has the power to shape the mind. Through the usage of animation, children can be turned towards a good direction. In teaching them the importance of noble deeds. Through animated characters, children are welcomed to a treasure of knowledge. They could be taught valuable characteristics such as Compassion, Kindness, Loyalty and Honesty, all these qualities that would nourish and enrich a child's cognitive performance in adapting to healthy relationships in the society to lead a blissful life.

Future Research

As a future research the author suggests a research to be conducted how cartoon characters can influence children's decision making in everyday life. From food choices to how they interact with their peers and adults.

Another research can be initiated to understand, the key features of a character such as how the face and body can influence our reaction to them. This is relevant not only to children but as to adults as well.

Key References

Aliyeva.A (2013) Hidden effects of cartoons on little spectators Azer News[online]. Available from https://www.azernews.az/analysis/58562.html

Dorr,A. (1986) Television and children: a special medium for a special audience. Sage Publications

Freud (1908) Creative Writers and Daydreamers (s.l.) (s.n.)

Ghilzai, Shazia & Alam, Rabia & Ahmad, Zubair & Shaukat, Amina & Shahum, Syeda & , Noor. (2017). Impact of Cartoon Programs on Children's Language and Behavior. ILSC. 2. 104-126.

Habib, Khaled & Soliman, Tarek. (2015). Cartoons' Effect in Changing Children Mental Response and Behavior. Open Journal of Social Sciences. 03. 248-264. 10.4236/jss.2015.39033.

Kidenda.M (2006) An Investigation of the Impact of Animated Cartoons on Children in Nairobi, University of Nairobi

Karakas.R. (2006) The use of cartoons for developing the skills of understanding and analyzing of children in preschool period . *Procedia-Social and Behavioral Sciences.*(s.l.) (s.n.)Volume 46 Available online at www.sciencedirect.com

Mandrapa.N (2014) Negative Impacts of Cartoons Novak Djokovic Foundation[online].
Available from: https://novakdjokovicfoundation.org/negative-impacts-of-cartoons/

"Incident Reporter" for Surveillance and Management of Active Incidents in Sri Lanka

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Background

Sri Lanka faces many natural disasters during a year and some are man-made incidents. As a government, managing such disasters and incidents is not an easy task. As Sri Lankan citizens getting valid and verified information at the right time seems very rare. According to the surveys done in Sri Lanka there is no system available in the country to centrally manage and inform the public about imminent threats or disasters occurring in the country. Although there are some government sites which inform about weather alerts and natural disasters, they lack efficiency. Some of those websites are Ministry of Disaster Management , Department of Meteorology and Disaster Management Centre. According to the analysis done, the above government websites are not very user friendly and lack some vital information. For an example, the Ministry of Disaster Management website has not been updated for many years. Therefore, people go to find information on social media (mainly Facebook), television and radio. Incidents reported in social media provide many false information to the public.

Some of this information may look real enough, although they are not so. This is because these days with the advancement of technology a person can make a bogus incident to look like a real incident. This has resulted in people being sometimes confused whether the information that they get is accurate or not. Sometimes the people have become victims of same and got into severe trouble by going to act on this false information. According to a recent research conducted most of the people choose social media other than television and radio because people can get real-time information using the comment section and chat features available in social media. While conducting the researches, what the people said most was that the government web sites do not provide information accurately on time and their only choice is social media or other media networks. Therefore the "Incident Reporter" was created to provide information on real time and to gain trust in the people regarding the information provided.

This is a web-based application which reports and manages various types of incidents happening in the country that affect the public. These include landslides, riots, earthquakes, fires, hurricanes, Tsunamis and many more. This web application will help the public to find imminent threats and disasters around them using a single application so that they can take timely action if necessary. The authorized government officials have the final authority to manage and publish the incidents in the system which are reported by the reporters. Furthermore, the public can get warnings and threat alerts according to the gravity of the incidents with exact locations pin pointed on the map of Sri Lanka from this system.

"Incident Reporter" is a real time reporting system and the authorized reporters have the ability to report an incident to the system on the spot with photos and videos. Thereafter, the system will notify the authorized government agents of the "Incident Reporter" immediately to take necessary action.

Methodology

There are five main categories of people in this system. They are Administrator, Incident Managers, Reporters, Registered members and the Public users.

The Administrator would be a top government official having high authority, who appoints the Incident Managers and Reporters. The Administrator can view the details of reports of the registered Incident Managers and Reporters in the system and have the authority to accept or reject them. Though the system has a public registration login, only the Reporters and Incident Managers appointed by the Administrators can access system to work in it. Anyone in the public also can make a request to become a Reporter or an Incident Manager. When such requests are made, the Administrator will contact the applicants via e-mail provided by them and conduct interviews to decide whether to appoint them or not. Further, the public can register in the system as Members if they want. The privilege of being a Member is that they can contact the Incident Managers via the chat feature in the system, to clear any doubts and to get more information regarding the incidents which are published in the "Incident Reporter" system. Further, the members can get Email alerts regarding the incidents with high threat levels, which are being published in the system by the Incident Managers.

Findings

The reporters have the authority to upload any incident to the system. However, the Incident Managers will verify the accuracy of the information provided by the reporters and alert the public regarding the situation. Further, the Incident Manager can accept, reject or edit any reported incident in the system. Therefore, the final information with regard to incidents which the general public can view in the system are totally legitimate and reliable.

The reports provided by the system is 100% government approved and it will be very useful to the local and foreign travelers when planning their trips in those areas. Further, this system will be a life saver for the people in the affected areas as they can take precautionary measures after obtaining information from the system.

Practical and Social Implications

Furthermore, to keep up with world class systems analyzed similar systems that are used in foreign countries like Wellington Live and GeoNet. Knowledge gain from analyzing the above systems help to improve some features of the current system.

According to Mr. Simon Jones, any person who is involved in risk management needs accurate reports of incidents that have taken place in order to plan upcoming events to prevent any repercussions of the same incidents which could lead to accidents or bad situations (Simon Jones, ChristianKirchsteiger, Willy Bjerke, 1999). Therefore, using the "Incident Reporter" system's charts and graphs, the Sri Lankan government can easily create timely solutions. In future, if the Sri Lankan government joins forces with the "Incident Manager" system the above features can be enhanced with the help of government professionals in disaster and incident risk analysis.

Key References

Simon Jones, ChristianKirchsteiger, Willy Bjerke, 1999. The importance of near miss reporting to further improve safety performance. Journal of Loss Prevention in the Process Industries, 12(1), pp. 59-67.

Government, S. L., n.d. Department of Meteorology. [Online]
[Accessed December 2018].

Government, S. L., n.d. Disaster Management Center. [Online]
Available at: http://www.dmc.gov.lk/index.php?lang=en
[Accessed December 2018].

Government, S. L., n.d. Ministry of Disaster Management. [Online]
Available at:
http://www.disastermin.gov.lk/web/index.php?option=com_content&view=frontpage&Itemid=1&lang=en
[Accessed December 2018].

Science, G., 2001. GeoNet. [Online]
Available at: https://www.geonet.org.nz/
[Accessed December 2018].

Wellington, 2017. Wellington Live. [Online]
Available at: http://www.wellington.live/
[Accessed December 2018].

3D Low Poly Animations as Teaching Aids for Pre-school Children

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Background

Any society consists of various types of people. Since a person's birth, he has to pass through all the stages of his life, before becoming an adult in the society. The behavioral pattern of any member of the society depends on the childhood experience that he gets in the past. The purpose of this research study is to investigate the possibility of implanting decent thoughts in the minds of preschool children.

The long-term objective is to improve the quality standard and the spiritual status of future society by implanting noble thoughts in the minds of preschool children through 3D Low Poly animations so that they would reproduce them in a bigger scale when they grow up and become adults.

The short-term objective is to produce a 3D Low poly animation as a teaching aid for preschool children. Although the final product of this research would be a sample 3D Low Poly animation, it should be considered as the core of the task of improving the spiritual standard of the society.

According to this research, preschool children identify objects around them by their outer shapes. This reveals the fact that they can easily interpret the contour drawings of objects drawn on paper to the actual objects. Also, they do not pay attention to details of them. They admire 3D Low Poly animations because of their attractiveness and simplicity. This reveals the fact that 3D Low Poly animations are more susceptible to preschool children. Therefore, this technique can be successfully used as teaching aids for preschool children.

Information for the research was gathered by:

1) Literature review:
    a. Psychological, neurological and sociological aspects of the influence of cartoon animations on children's mentality and change of behavioral pattern.
    b. Collecting information regarding the possibility of using 3D Low Poly animations as teaching aid for the preschool children.
    c. Systematic way of developing 3D Low Poly animations.

2) The interactive session conducted with children and the teacher in the preschool.

3) The surveys she did with parents of preschool children and discussions she had with intellectual people who are knowledgeable about sociology, psychology, and religion.

Methodology

The methodology used for this research study is, to have interactive sessions with preschool children and teachers and find out up to what extent they have gathered information from the environment. To do this, the author got the children to draw some pictures that came to their minds instantly. Then she carefully analyzed those drawings by conducting face-to-face interviews with each of them. Most of the children had drawn flowers, trees, their parents, birds, rising sun etc. One child had drawn helicopters. When asked about it she told the author that she lives close to Rathmalana airport and she frequently happens to see helicopters and planes. It was a good clue to show the influence of the environment to children's mind.

Furthermore, the peripheral knowledge gathered by the author by referring to the Internet, newspapers, magazines and other media enlightened her about the prevailing situation with regard to the feasibility of using 3D Low Poly animations for the educational purpose of preschool children.

A popular cartoon character will have to be used as the cartoon hero of this animation. The reason for doing this is, because nowadays popular cartoon heroes live in the hearts of even small children. They act as cartoon heroes and imitate them. They even speak using their accent. That is the reason why some product advertisers use cartoon heroes to promote their products among children. The author too hopes to implant prosocial thoughts, good manners and safety aspects in the minds of preschool children through a popular cartoon hero.

Findings

By doing this research work the author was able to find out, up to what extend the environment has influenced good or bad ideas in the minds of kids. By further scrutinizing them the author found out that some cartoon characters are remaining in their minds permanently. For instance, "Totoro" is one such character. When the author showed some simple 2D cartoons and 3D Low Poly animations to them, she found out that children are very fond of watching 3D Low Poly cartoons compared to 2D cartoon animations because of the simplicity and easy understandability of them.

Practical and Social implications

By achieving the objectives of this research, the society can be converted to a better place for peace loving people to live in. this will also convey a message to the animation industry to produce more prosocial cartoons for children. These kinds of videos will supersede the negative ideas given to them by the environment where they live in. This will make them future positive minded people.

Future Research

- As a future research the author suggests selecting a sample preschool and use only prosocial cartoon animations as teaching aids and monitor their behavior when they grow up.

Or,

- A further research can be done to find out how cartoons can affect the performance of the society. The methodology that has to be used for this purpose is to select a sample of adults having a mix of good and bad characters and trace their history back to their preschool education period. This can be done by interviewing them.

Key References

Bhutto, A.G., Bhatti, Z., Rehman, S.U and Joyo, S. (2018), 'Multimedia based learning paradigm for School going children', *University of Sindh Journal of Information and Communication Technology*, vol. 02, no.04, 202-207. Available at: https://www.researchgate.net/publication/328802229_Multimedia_based_learning_pa radigm_for_School_going_children_using_3D_Animation [Accessed: 12 December 2018]

Brotherson, S.E. (March 2009). Understanding Brain Development in Young Children. Bright Beginnings #4. Available from: https://www.researchgate.net/publication/252178274_Understanding_Brain_Develop ment_in_Young_Children [Accessed 01 December 2018]

Creative Bloq Staff (2013),*' How to create low-poly 3D models',* Creative Bloq, Available fromhttps://www.creativebloq.com/3d/how-create-low-poly-3dmodels-121310159, [Accessed: 30 December 2018]

[Anon]. [n.d], 'Brain Development from 0-6 years – Facts every parent should know', Adam and Mila, viewed 25 February 2019, Available from: https://www.adam-mila.com/brain-development-children-0-6-years/ [25 February 2019]

Habib, K. and Soliman, T. (2015), 'Cartoons' Effect in changing children Mental Response and Behavior', Open Journal of Social Sciences, vol. **03**, no. 09, pp. 248-264. doi: 10.4236/jss.2015.39033 [Accessed: 05 December 2018]

Garbage Monitoring and Controlling System

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Background

As people are living in the 21st century, technology plays a huge role in the modern society. Presently, everybody has moved towards the bearing of future innovation. Every private and public sector of the world gives their attention to future technologies. Because technology makes our busy life easy.

In the meantime, people are looking for proper garbage management systems. As the municipal council garbage collection system comes once or twice a week to collect garbage. There are so many consequences, even the government started facing huge problems to figure out where to throw this garbage that has been collected from people. Also, people faced problems by having to keep garbage in front of houses which attracted stray animals and birds.

As a solution, people started inventing many public garbage bins in Sri Lanka but irregular garbage management makes problems. Garbage collectors mostly target garbage from some garbage bins. It's such a waste of time. Because many garbage bins aren't full when they collect. If garbage collectors can collect garbage from garbage bins when it is full of garbage, it will be very efficient. So this system provides real time garbage level of garbage bins and locations of garbage bins to the garbage collector. This data helps to get an idea about garbage bins to the garbage collector. The garbage collector can get these details from his android applications. Also, users of bins can report about bins if there is a problem with bin functionality. And garbage cleaners can get a real time view of garbage bins from their android phones. So, garbage cleaners can check garbage bins when an emergency alert is received. The users can get messages about garbage bins, whether the garbage bin is full or not from LCD display of the garbage bin. Further, garbage mountains are another big threat in Sri Lanka. Garbage mountain called Meethotamulla burst on the 14th of April in Sri Lanka. As a solution for this problem, garbage collectors can use image processing applications which are made to receive dimensions of garbage mountains from an image.

Methodology

So as to accomplish project goals, one needs to pick a reasonable methodology for undertaking. The methodology will be a well-ordered guide for developers to follow so as to develop and deliver the project within the constrained time effectively. This section discusses the chosen methodology in the development of smart garbage monitoring system.

Nowadays most developers pick agile methodology as a software development methodology as the Agile Method is a particular method to manage project management that is utilized in programming advancement. This system encourages bunches in responding to the unexpectedness of creating programming. It uses progressive, iterative work courses of action that are typically known as sprints.

Objectives

The main objective of this project is simplifying the work of garbage collectors by providing real time garbage levels of garbage bins and locations to his android smart phone. When providing the real time garbage bin level of garbage bins, the garbage collector notified about the specific garbage bins that require collection within the day. Further, the collector is able to conveniently locate the bin via GPS technology. The garbage collector can stop work according to the timetable from this system. This system will save the time of the garbage collector and reduce garbage problems in Sri Lanka.

Furthermore, he/she will be able to obtain image processing to receive dimensions of garbage collection / mountain. Using that feature, garbage collectors can collect garbage from garbage collection points before exceeding the limit.

- Smart bin that provides important details to the garbage collector and users.

- To implement the new android application to get details about garbage bin.

- To implement application to get dimensions of garbage collections.

Findings

In order to find a solution to the garbage problem, one needs to look at how the garbage issue is affecting the people first. This should be addressed by the people and the municipal workers who are facing the garbage problem.

A questionnaire was circulated among the residents to express their views on the garbage problem and an interview with the workers who work in the municipal council was conducted.

Questionnaire

Google forms was used for this questionnaire. There are 54 responses for this questionnaire and all responses from real participants.

Interview

A group of garbage cleaners from urban council was interviewed.

Practical and social implications: -

Finally, undertaking can be settled as a completed task as masterminded over the span of late months. Creating an image processing System was not a straightforward task. To ensure the convenience of the assignment, commencement archive that was looked into was the basic starter. Research had verified over the errand's necessities and to recognize essentials, a detailed investigation was helpful. Specialized research helped in making and perceiving gadgets and progressions needed to use in the framework. In general, project is an incredible achievement.

The project's main target is to help garbage cleaners to do their job without delay and to clean the environment properly. Taking into consideration the garbage management system in these days, one can identify a lot of loopholes. Thus, providing solution and reducing these loopholes is the objective of this system. The biggest achievement is the answer for garbage collections/ mountains. This is a big environmental problem in Sri Lanka these days and it caused to several disasters. With the implementation of this system garbage collectors will be able to collect garbage in right time people can live healthy life without garbage problems. And also the main income is tourism in Sri Lanka. This project will also be a good effect for tourism.

Future developments

The system was built whilst gaining a lot of knowledge. Gathering data and making the essential choices was critical when building up a project. The System should be plainly distinguished and choosing the right procedures just as the right advances should be taken before the execution of the system. System testing, backing should be done in the long run so as to convey an extraordinary undertaking result with no mistake.

The project result was at an attractive dimension for clients just as the designers' viewpoint, yet there are a few points and functionalities that can be added to the system in future upgrades.

If the garbage bin is locked when the garbage level exceeds the given limit. It will be more user-friendly. In this stage users shall see a message on an LCD panel. But if garbage bin is locked, it will be easier than this to the user.

Keywords: - *GPS, real-time location, DIY, Arduino, garbage, image processing, SMTP, OpenCV, OpenSSL*

Key References

ANANDA RANAWAKE, M. W. A. N. J. G. J. B., n.d. *EFFECTIVENESS OF MUNICIPAL SOLID WASTE MANAGEMENT PRACTICES IN SRI LANKA,* Sri Jayawardenepura: University of Sri Jayewardenepura, Sri Lanka.

Anon., 2017. *stuff.* [Online]
Available at: https://www.stuff.co.nz/environment/88580078/smart-bin-trial-in-central-queenstown
[Accessed 24 march 2019].

Anon., 2018. *GEOSRILANKA.* [Online]
Available at: https://geosrilanka.wordpress.com/tag/colombo-garbage/
[Accessed 12 March 2019].

Eflv3, 2017. *EFL.* [Online]
Available at: https://efl.lk/status-waste-management-sri-lanka/
[Accessed 12 03 2019].

H. E. C. S. L. N. H. A., 2013. Colombo: :Colombo: Ministry of Health, Nutrition, & Indigenous

Karunarathne, H. M. L. P., 2015. *Municipal Solid Waste Management (MSWM) in Sri Lanka,* Sri Jayewardenepura: Department of Estate Management and Valuation, University of Sri Jayewardenepura.

Petley, D., 2017. *The Meethotamulla garbage dump disaster in Sri Lanka.* [Online]
Available at: https://blogs.agu.org/landslideblog/2017/04/16/meethotamulla-1/
[Accessed 20 02 2019].

Pieris, V., 2017. *The Sri Lankan garbage disaster: A crime of capitalism,* s.l.: International Committee of the Fourth International (ICFI).

SL, A.-P., n.d. *Asia Pacific Alliance.* [Online]
Available at: https://apad.lk/index.php/meethotamulla-garbage-dump-a-man-made-disaster-creates-history/
[Accessed 12 03 2019].

Aquarium Automation using Open Source Technologies

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Background

By time, aquariums become impure with nitrates, nitrites, and ammonia. Its pH levels and chlorine levels may then be not appropriate for fishkeeping's ideal conditions. Along with that, there are different parameters such as temperature, lighting conditions and water level measurements to keep the habitat conducive for living. The aim behind "aquarium automation" is to maintain an aquarium in easier ways by continuously monitoring and controlling significant functions and parameters. Automation helps to maintain a necessary, stable aquatic environment for fish and aquatic plants.

In the past, the best you could do is make your aquarium is control the lighting with a timer. Now most LED aquarium lights have built-in timers. Today aquarium automation systems are far more developed than a simple light timer. The level of complexity of automation systems can be very equipped with pH measurer, ORP, water level, lighting control, water pumps and more. Some aquarium controllers further more use apps and cloud-based devices to control and monitor just about everything that happens in the aquarium. There are different types and variations of automation based on the kind of controlling and monitoring systems.

Methodology

Ascertained out the convenient requirements to maintain & develop the aquarium through literature review.

- ✓ Implemented the trial of the prototype after the completion of the prototype design.
- ✓ Established the system successful (software and hardware) interface with each other to synthesize the reports from proposed system.
- ✓ Collected and Recorded the Data from the experimental tests to get results that can be used to take further decisions for make further improvements of the system.

- ✓ Measured temperature of the fish tanks in the aquarium using sensors and collected data were stored in database show it in a web page for review of user.
- ✓ Measured the amounts of food available in the containers by using level sensors or by using ultrasonic sensors.
- ✓ Measured the water level in the fish tank by using a water level sensor and it also stored in the database.

This aquarium automation system under the development consists of two parts which was the hardware development and a software development part.

Practical and Social implications

Data generated from the system was used to examine whether the fish are really getting the needed requirements from the controlled system to remain healthy and stable. The data or the information generated from this system is very important to obtain reasonable confirmation that the system is very helpful for fish to grow, for breeding and staying healthy.

Future Research

Use of more sensors such as pH sensor, Salinity sensor and Calcium sensor etc.;

Camera to capture real-time images and video for monitoring can be more useful.

- ✓ SMS Controlling system can be used to feed fish according to our requirement at any time we can do it using SMS controlling by sending a SMS to GSM Module. Also we can use keypad to control the set values of the program to change the Fish feeding time interval, temperature (>35 C^o) alert. (If temperature increase more than 35 C^o SMS alert will send to fish keeper that set value can be controlled by using keypad other than changing the whole system program towards temperature), set value of water level of fish tank.
- ✓ Develop a temperature controlling system to control the temperature of the fish tank, using heaters for control the temperature in rainy days and whenever a change occurs in normal temperature.

Keywords: - *Global network, IoT, SMS, Aquarium Automation, Arduino, PH level*.

Key References

Anon., n.d. *Aquaculture-watertanks.* [Online]
Available at: (https://www.buwatec.com/aquaculture-watertanks)
[Accessed 05 03 2019].

Anon., n.d. Automated indoor Aquaponic cultivation technique.

Anon., n.d. *Fishkeeping.* [Online]
Available at: (http://en.wikipedia.org/wiki/Fishkeeping)

M.F.Saadi, n.d. Automated indoor Aquaponic cultivation technique.

Mackenzie Banker, C. B. H. H., 2018. Automated Fish Feeder. *Automated Fish Feeder,* p. 80.

Noor, Mohd Nizam Bin Mohd, 2008. *Development And Prototyping an Automatic Fish Feeder,* P. 24.

Impact of Demographic and Organizational Factors on Employee Use of Work-Life Balance Initiatives Focusing on Executives in Telecommunication Sector in Sri Lanka

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Background

Work-life balance has a direct impact on the quality of life, work and personal well-being and as a result it is increasingly becoming a key concern of employees all over the world irrespective of the industry they work. The intensity of this concern varies with a few factors, namely (a) the work pressure and demands of the industry you work (b) your family concerns specifically whether your partner is working or not (c) demand for time allocation for your children, parents and other family members (d) your social life demands etc.

This research is focused on the employees of Telecommunication Services industry where the services are essential for the nation and demands high dedication and commitment to work. The objective of the research is to determine demographic, social and organizational factors affecting the use of work-life balance initiatives in relation to the target research audience.

This research focuses on 10 work-life balance initiatives mainly used by executives in telecommunication sector in Sri Lanka. The use of those 10 initiatives were analyzed against the organizational factors (Managerial Support, Co-worker Support and Organizational Commitment) and demographic factors (Age, Gender, Marital Status, No. of dependents, Tenure) based on a research questionnaire.

Literature Review

This discusses about the past literature and the theoretical background of the main variables such as Concept of Work-Life Balance, Role Conflict, Work-Life Balance Initiatives, Age, Gender, Marital Status, No. Of Dependents, Tenure, Managerial Support, Co-Worker Support and Organizational Commitment.

Previous research shows that "Work Life Balance isn't only about families and childcare. Nor is it about working less. It's about working smart. About being fresh enough to give all you need to both work and home, without jeopardizing one for the other. And it's a necessity for everyone, at whatever your stage in life." (Department of Trade and Industry, 2001) The accomplishment of better work-life balance can yield dividends for employers in terms of having a more motivated, productive, less stressed workforce, increased productivity, and reduced absenteeism. work-life balance can have an influence on both individual as well as the organization.

Definitions for work-life balance differs from employer and employee perspectives. Work-life balance, from the employee perspective, is maintaining a balance between responsibilities at work and at home. Employers view the benefits or the working conditions that they provide to help employees to balance the family and the work domains as work life benefits (Russell & Bowman 2000). Initially the concept of work life conflict focused on the impact of family demands on work. It now extends to the impact work has on individual stress, relationships and family well-being (Russell & Bowman, 2000).

The outcomes of the Hobson et al. study deliver a dominant explanation for why work-life initiatives are so successful. These programs provide support and assistance to employees in handling life's most overwhelming challenges in situations where employees are often at their most vulnerable. Work-life balance strategies have been recognized as things that boost the autonomy of workers in the process of coordinating and integrating work and non-work aspects of their lives (Felstead et al., 2002). This definition permits a wide range of practices or strategies to be included Work-life Balance Initiatives. Work life balance initiatives in organizational settings include policies covering flexible work arrangements, child and dependent care and family and parental leave (Bardoel et al., 1998; Kramar, 1997).

When comparing employee usage of work life balance initiatives with the amount of Work-life Balance Initiatives implemented in the organizations, the findings overall suggest that employee usage holdup behind the implementation of Work-life Balance Initiatives; there is some delay between an organization's efforts to introduce Work-life Balance Initiatives and employees taking up the opportunity to make use of the available Work-life Balance Initiatives. This finding is justified by the research by Kirby and Krone (2002), who initiate that an organizational culture which is unsupportive of Work-life Balance Initiatives may lead to employee unwillingness to utilize benefits.

Conceptual Framework
INDEPENDENT VARIABLE DEPENDENT VARIABLE
Demographic Factors

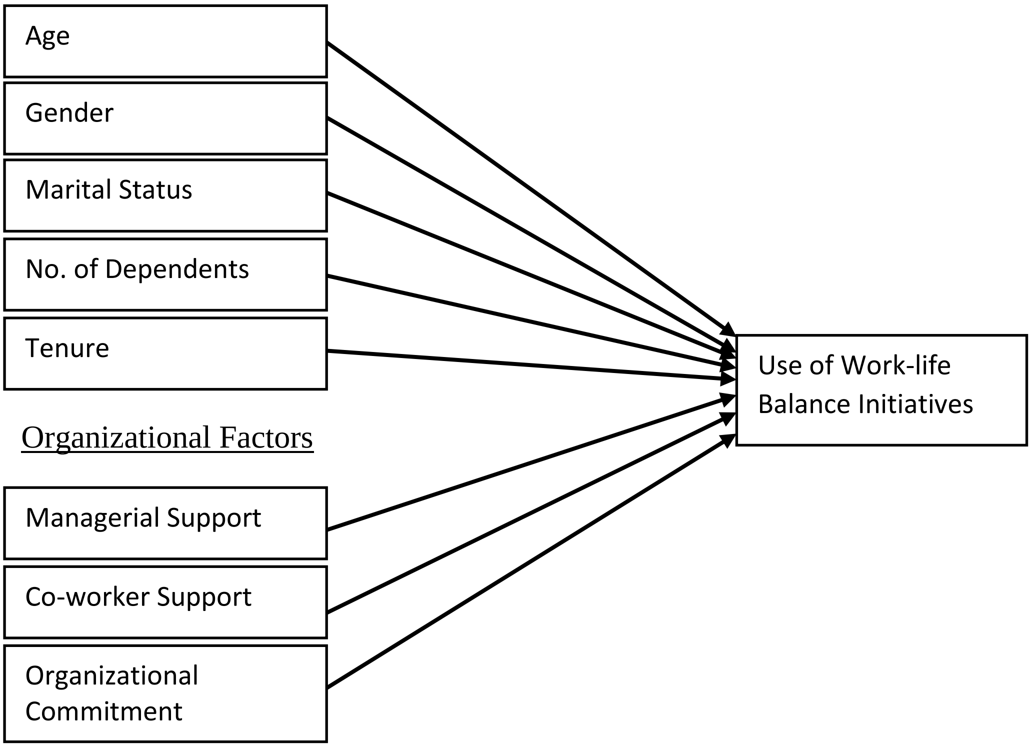

Figure 1The conceptual framework of the research

Source: Developed by the Researcher

Methodology

The population of the study is 210 executive level employees in telecommunication sector and SPSS (Statistical Package for Social Scientists) software was used for the data analysis. For gathering the secondary data, the researcher used previous scholar's articles, business journals and websites.

Findings

According to the survey, the majority of the respondents were males 69.5% and the remaining 30.5% were female respondents from the selected companies. From the sample, 1.9 % or 4 were of the age category of 56 or above and 46.7% or 98 were from the age category of 36-45. According to the sample, 11-15 years experienced respondents are the highest. As a percentage 35.2 %. Least number of respondents recorded from 6-10 years experienced category. Among these responses there were 52 single and 158 married, as a percentage 24.8% single and 75.2% married.

Highlights of the research findings include

a. older employees use more WLB initiatives than younger employees
b. female employees use more WLB initiatives than male employees
c. married employees use more WLB initiatives than single employees
d. employees with longer tenure use more WLB initiatives than employees with shorter tenure
e. there is no significant difference between employees with more and fewer dependents
f. managerial support, co-worker support and organizational commitment has a positive impact on the use of WLB initiatives.

Hypothesis	**Levene's Test Sig.**	**Sig. (2-Tailed)**	**Mean Values**	**Significant Difference**	**Accepted/ Rejected**
H1a- Age	0.509	0.012	Younger- 2.3727 Older- 2.7723	Significant Difference	Rejected
H1b- Gender	0.000	0.000	Male- 2.6301 Female- 2.9594	Significant Difference	Accepted
H1c- Marital Status	0.402	0.031	Single- 2. 5481 Married- 2.7905	Significant Difference	Accepted
H1d- No. of dependents	0.111	0.202	No or fewer- 2.7071 More- 2.8962	No Significant Difference	
H1e- Tenure	0.000	0.008	Short- 2.4364 Long- 2. 8084	Significant Difference	Accepted

Hypothesis	**Sig.**	**Beta**	**Positive/ Negative**	**Impact**	**Accepted/ Rejected**
H2a- Managerial Support	0.004	0.197	Positive	Significant	Accepted
H2b- Co-worker support	0.013	0.171	Positive	Significant	Accepted
H2c- Organizational Commitment	0.000	0.268	Positive	Significant	Accepted

Table 1 Hypothesis Testing

Practical and Social implications

This research helps the managerial level employees who are responsible for decision making to get an understanding about the initiatives needed by the employees and the initiatives employees use the most.

Future Research

Ideas and recommendations for future research can be summarized as below:
It would be valuable to repeat this research on a larger sample to identify whether these findings can be generalized to other organizations in Sri Lanka. This sample was selected from the telecommunication industry it would be beneficial if this research was repeated in another industry or in a government organization. Interviews or using critical incidents for focused groups would help to understand employees' decisions to take or not to take advantage of available WLBI.

Key References

Bardoel, E.A., Tharenou, P. and Moss, S.A., 1998. Organizational predictors of work-family practices. *Asia Pacific Journal of Human Resources*, *36*(3), pp.31-49.

Department of Trade and Industry, (2001). The Essential Guide to - Work-life Balance. London: DTI. Available from: http://www.flexibleworking.co.uk/Juggle%20Not%20Struggle.pdf

Felstead, A., Jewson, N., Phizacklea, A. and Walters, S., 2002. Opportunities to work at home in the context of work-life balance. *Human resource management journal*, *12*(1), pp.54-76.

Kirby, E. and Krone, K., 2002. " The policy exists but you can't really use it": communication and the structuration of work-family policies. *Journal of Applied Communication Research*, *30*(1), pp.50-77.

Kramar, R., 1997. Developing and implementing work and family policies: The implications for human resource policies. *Asia Pacific Journal of Human Resources*, *35*(3), pp.1-18.

Russell, G. and Bowman, L., 2000. *Work and Family: Current thinking, research and practice*. Department of Family and Community Services.

An Empirical Investigation on Training and Development Practices in Ceylon Electricity Board, Colombo City Division

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Background

In the 21st century the education and skills of the workforce will end up being the dominant competitive weapon. An educated and well-trained work force is considered essential to maintaining a business firm's ability to wining a competitive advantage in a global economy (Muhammed Nawaz, et.al, 2013). This can only be achieved through proper and systematic implementation of employee training and development practices in the organization. Organizations can buy skills through hiring, or they can develop skills through training and development activities (Thurow, 1992). It has been shown that the most successful and productive employees are those who have received extensive training and development. These groups of employees can be described as the "cream of the crop" that often has the strongest stake in an organization's future. For the public sector, it is argued that trained, knowledgeable, expert employees are the recipe for success (Srinivas, 2008). Effective management of training capture the problems, fills the gap between existing and required outcome and helps to remove negative outcomes by facilitating and providing information that is necessary to improve their performance level. (Opatha,2009).

In light of the above background, this study will be focused on investigating the employee training and development practices at Ceylon Electricity Board, Colombo City Division.

Methodology

The research design adopted qualitative (post positivistic) research design, descriptive in nature, which used observations and interviews to elicit information about the current training and development practices of CEB, Colombo City Division. This study's emphasis is laid on 'phenomenological study' as a make up to be the most significant aspects of training and development practices which was the central phenomenon of research. For purposes of this study, training and development practices of CEB were identified and as a core phenomenon of the research. Descriptive studies are undertaken to understand the characteristics of organizations that follow certain common practices (Sekaran ,2003).

According to the HR Manual of the Ceylon Electricity Board, Colombo City Division, as at 31st of March 2018, there are about 200 employees working in the Colombo City Division of the Ceylon Electricity Board. 60 of them are executives and this is considered as my population. For the purpose of the study, a sample of 6 executives were selected representing six subunits to carry out the research further. When selecting the sample, the purposive sampling technique was adopted. This technique was chosen because the sample size was quite small when compared to probability sampling (Sekaran 2003). Purposive sampling is a non-probability sampling in which the decision concerning the individuals to be included in the sample was taken by the researcher based on the fact that these individuals have been around long enough to have the knowledge of the research issue and also the willingness to participate in the research.

Qualitative data refers to information gathered in a narrative form through interviews and observations. (Sekaran,2003). For this research, the data collected through an interviewing and observation method. Information from these methods constituted the primary data for the research. The selected sample of employees were interviewed, in a formal and informal manner. Interviews were conducted with the selected five executive members of heads of departments. Each interview lasted about 20 -30 minutes and was tape recorded. After each interview, the researcher transcribed and wrote a detailed summary that followed the chronology of the interview and included some analysis. Using an inductive approach suggested by Tesch (1990) and Creswell (2007) text segments from each participant's interview and were coded and analyzed to narrow these into common themes.

To analyse the data, researcher used a simplified version of the Steviek-ColaizziKeen method discussed by Moustakas (1994). This approach followed the general guideline of analyzing the data of phenomenological study significant phrases, developing meanings and clustering them into themes, and presenting an exhaustive description of the phenomenon (Cresswell,2007).

- Data Managing – Create and organize files of data
- Memoing – Read through text, make margin notes.
- Describing – Describe the essence of phenomenon.

- Classifying – Develop significant statements.
- Interpreting – Develop the "essence".
- Representing experience in (Cresswell,2007). – Present the narration of the "essence" of the discussion

Findings

After analyzing all the interviewer's viewpoints/perceptions, was able to identify the answers for my main research question and sub research questions as follows.

The existing Training and Development policy of Ceylon Electricity Board, Colombo City Division was developing employees with the appropriate knowledge, skills and behaviors to meet organizational activities and objectives in both the short and longer term. With the purpose to outline principles and procedures to ensure that training and development opportunities are available fairly and consistently across the branch, using training and development resources effectively and efficiently. Allow the employees to achieve their potential and career aspirations both within the section/unit. And they further explain that the aim is to create a culture of learning throughout, where individuals take responsibility in partnership with the section/unit for their development. As per the training and development policy, the following categories of training and development practices were able to identify.

1. Staff Training Practices /Clerical Training Practices
2. Management Training Practices
3. Technical/System Training Practices
4. Safety Training Practices – Practicing only at CEB Plantations.

To overcome from several loopholes of existing practices, several recommendations can be identified. To eliminate misunderstandings in term training as a routine activity give a proper identification about what is the term training and its clear benefits to the employees to improve their career path. In terms of practice, it is essential that the management philosophy should include, inter alia, the importance of training and development on a continual basis and can provide incentive for employees who are attending to training practices.

Greater awareness about the objectives of the training and development practices must be created among the trainees. Employees need to consult their superiors before attending the training program to clarify their doubts. It will help employees to be made clear the purpose of the program and the output expected from them which could be quantified for the betterment and education of their status. At the end of the program, is essential to measure the assessment and evaluation of desire to apply at their normal workplace. A feedback from the workforce and the management should be placed in a structured form for further improvement of the design and delivery of the program.

Finally, all the recommendations reflect that, the training has to move from traditional training, to training of the latest technological upgrade.

Practical and Social Implications

The study results will help managers of various organizations to generate ideas and solve problems based on the best way to develop training and development practices in their organization, in order to achieve the desired goals and objectives.

The research would not only add to works that have been done in this area, but also will be beneficial to all service organizations such as, small scale business, large corporations, universities, college of education to establishments of efficient and effective training and development practices.

Also, this investigation would help the trainers to develop better training practices, design new training and development plans and thus, the training course can be amended in the light of these comments.

Key References

Armstrong, M. (2009), Handbook of Human Resource Management Practice, 11th ed., Kogan page, London.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage. Cromwell Press.

Moustakas, C. (1994). Phenomenological Research Methods. Thousand Oaks, CA: Sage Publications.

Muhammed Nawaz, (2013), The Professional Development of Employees in Banks of Pakistan: A comparative study of public and private banks in Punjab Pakistan, vol 3, No. 5.

Muhammad Zahid Iqbal, et.al., (2011). An Empirical Analysis of the Relationship between Characteristics and Formative Evaluation of Training. The International Journal of Business Research 4 (1): 273-86.

Opatha, HHDNP. (2009) Human Resource Management., Nugegoda: Department of Human Resource Management, University of Sri Jayewardenepura.

Sekaran, U (2003), Research Methods for Business, 4th edn, Malloy Lithographing, America.

Thurow, L. (1992). Head to head: The coming economic battle among Japan, Europe, and America (pp. 245-58). New York: William Morrow.

Expectation Gaps, Job Satisfaction and Organizational Commitment of Fresh Management Graduates in Sri Lanka: Roles of Graduates, Higher Learning Institutions and Employees

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Background

College students enter the corporate world with a lot of expectations hoping that they would obtain well paying, secured jobs, mainly on what they have been taught in their formal education. However, employers seem to have a different idea where they have been found to have high expectations including management experience, excellent communication and people skills, good grades, good presentation skills, positive attitude and even expecting entry level graduates to have done charity or volunteer work. Thus, it could be said that graduates may face actual work situations that are completely different from what they had initially expected. Taken together, there will be a conflict between the graduates' expectations and actual experience, which in turn would influence the satisfaction as well as their commitment to the organization they serve. In order to alleviate this situation, the fresh graduates would either try to adapt to the present organizational environment or seek alternatives elsewhere.
Hence, it is important for graduates to know the expectations of the employers' to be marketable in the labour market. On the other hand, such awareness' of graduate's abilities and preferences is considered equally critical on the part of the organization in order to craft effective recruitment strategies and address the employees' needs.
In between the graduates and the employers are the universities and colleges whose primary role is to groom young students for today's competitive corporate world either as employees or entrepreneurs. As such, a good grasp of students and employers' expectations can inform the higher learning institutions on how the gaps can be effectively bridged.

The main purpose of this research is to reveal what fresh management graduates in Sri Lanka expect and their actual experiences pertaining to the work environment.

Literature Review

Previous studies show that job satisfaction and dissatisfaction not only depend on the nature of the job, it also depends on the expectations of the job supply to an employee (Hussami, 2008). Lower convenience costs, higher organizational and social and intrinsic rewards will increase job satisfaction (Mulinge and Mullier, 1998).

Theories like Maslow's hierarchy of needs theory, equity theory, Herzberg's two factor theory, expectancy theory and all attempts to explain human behaviour and helps in the explanation of different forces that push us to work and how certain factors influence our decisions on work and careers. Each theory has its own explanation and data to support it. Various definitions of organisational commitment exist, but there is a common thread that organisational commitment is a psychological bond between the organisation and the employee (Ferreira, Basson & Coetzee, 2010).

Job Satisfaction and Organizational Commitment among employees are widely researched. Previous research attempts to show how organizational and job-related factors of organizational culture, leadership, communication, decision making, teamwork, motivation and development lead to job satisfaction and organizational commitment of employees across different industries.

Conceptual Framework

This study focuses on revealing what fresh management graduates in Sri Lanka expect and their actual experiences pertaining to the work environment. For the purpose of achieving the study objectives the following conceptual framework was designed. (see Figure 1)

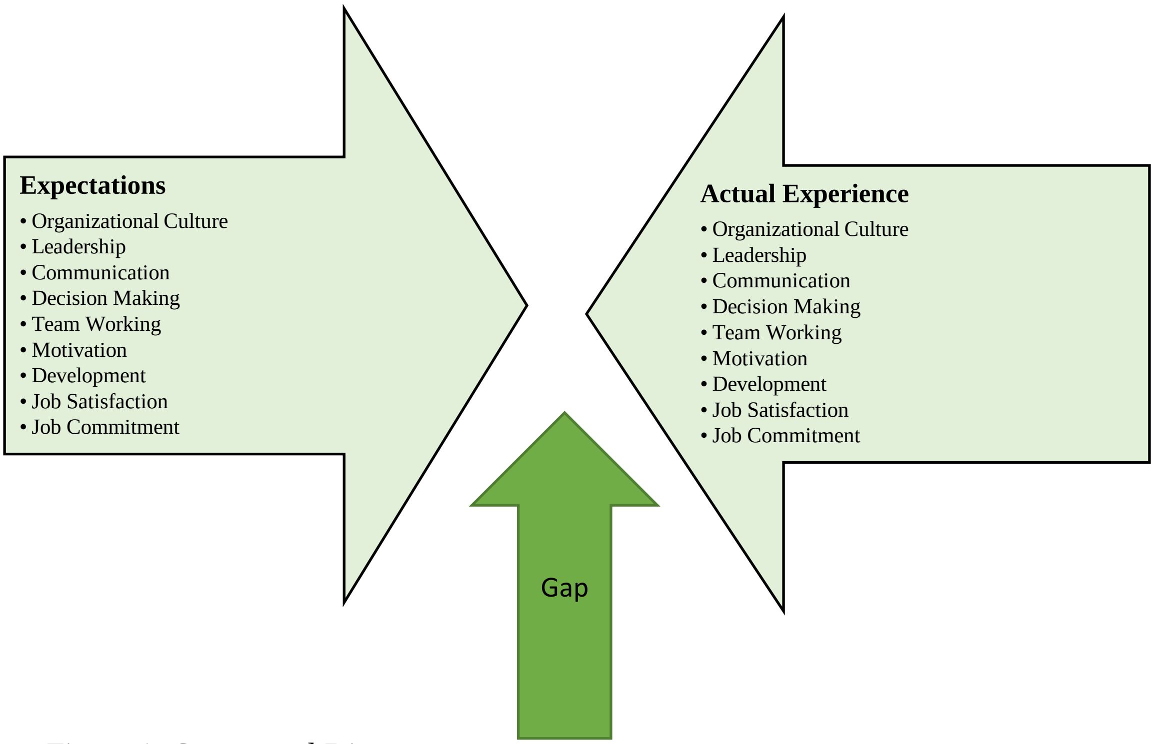

Figure 1: Conceptual Diagram

Methodology

The study was conducted based on a deductive approach and the target population consisted of management graduates from two local and two private universities in Sri Lanka. The total sample size was 200.

Stratified random sampling technique was used to select the target respondents. A Questionnaire was used to collect data for this study. Two questionnaires' that contain the same set of questions were distributed to identify the "Work Preference" and the "Actual Experience" of the fresh management graduates in Sri Lanka. The data was edited, coded, presented and analysed using the statistical tools such as percentage, frequency tables, correlation, paired sample T-tests etc. These tools were used to summarize and graphically represent the results obtained.

Findings

According to the survey, the majority of the respondents were females 63.00% and the remaining 37.00% were male respondents from all the four local and private universities that were selected. From the sample, 57.5 % or 115 were of the age category of 21- 24 and 41 and 41.5% or 83 were of the age category of 25 -28. According to the sample, 52.5% or 105 of the respondents have 6 -12 months' work experience and 49.5% or 99 are on temporary/ fixed term contract. Only 46% or 92 respondents have permanent jobs.

The next section contains the findings obtained by the Mean scores & Cronbach Alpha for Preference and Actual experience. Two means were calculated for each variable that is, the preference and the actual experience. All of the coefficient values were greater than 0.7 indicating a reasonably good internal consistency of the measurement scales. The aggregate means show that organizational culture receives the highest importance and team work was found to be the least important in the expectations of graduates.

According to table 1, the mean differences reflect the magnitude of graduates' expectation gaps. A higher value mean reflects a higher gap. Thus, it could be said that the highest mean is in development and the smallest gap is in communication. It should also be noted that all of the expectation gaps are statistically significant and hence, confirms the belief that the employers are not satisfying the graduates' expectations.

Table 1: Paired Samples T-test

Variable	Mean Difference (Preference – Actual)	*T*	Significance
Organizational	1.16542	15.923	.000
Culture	1.38917	19.143	.000
Leadership	0.94375	14.343	.000
Communication	1.18625	18.607	.000
Decision Making	1.48833	20.613	.000
Team Working	1.05833	15.605	.000
Motivation	1.69750	21.969	.000
Development	1.22500	18.813	.000
Job Satisfaction	1.17458	19.528	.000
Job Commitment			

The final analysis was to analyse the relationship between expectation gaps and job satisfaction and organizational commitment of management graduates in Sri Lanka.

Results obtained by the paired samples T-tests shows that the highest mean is in development and the smallest gap is in communication. All of the expectation gaps are statistically significant and hence confirms the belief that the employers are not satisfying the graduates' expectations

Practical and Social implications

Implications for graduates, higher learning institutions and employers

In order to reduce the expectation gaps, proposed are some of the actions that could be taken by graduates, higher educational institutes and employers during two time periods. That is, the study period and working period. The study period refers to the time when the students begin to decide the academic program that they are going to follow by enrolling into a university or college until they graduate. Whereas, the working period refers to the time when the students have completed their degree and become graduates, hunt for jobs and enter the business environment.

1. Study period
    - Recommendations for Decision Making

Selecting an academic program or career should be made under the basis of students' strengths and interests. In order to make the right selection, the students need to know the options available for them and the availability of jobs for the selected academic discipline, this is where higher educational institutes should come into play by helping young students who are just out of high school to choose the right area of studies. Career counselling as well as job interest assessments are value added services that could enhance the student's decision making process.

- Recommendations for Leadership

Exposure to extracurricular activities is a perk when entering the job market, involvement in such activities will gradually develop valuable human skills such as leadership, communication and decision making. In addition to this, students should consider working part time while attending university. To encourage part time jobs among student's, universities should facilitate them with regard to the study hours to avoid missing lectures (Robotham, 2009).

2. Working Period

Suffice to say, situations where the graduates find themselves lost, as a result of failure to find jobs, support from their university is not only seen positively but believed to be a life line. Therefore, universities should be in contact with their alumni through emails. These alumni could be invited by the institutions to share their experiences with the junior batches so that they would be able to get a better understanding in the students about reality.

- Recommendations for Development of graduates

The most important function after recruiting is to do the induction process. Therefore, when new employees join the organization they should be given a proper induction where the history of the organization, culture, performance, skill requirement and interpersonal relationships are made aware to them so that they will be able to get a better understanding of the organizational setup.

Future Research

Due to the limitations of the study, the findings should be interpreted carefully. First, the study was conducted on a relatively small sample in Sri Lanka by focusing only on management graduates from four well known universities (i.e. both local and private) and thus, limits the generalizability of the findings. A larger sample size on cross- cultural basis may yield different results. Second, only seven variables that influence job satisfaction and organizational commitment were included in this study. Hence, it is recommended that more variables that influence job satisfaction are included in future research.

Third, this study was conducted by focusing only on fresh management graduates in Sri Lanka regardless of the types of industry and company that they are working for. It is interesting to also to match and compare the graduates' academic qualifications and the type of company or industry that they are working for. Also, future studies can also be done by focusing on other academic disciplines so that we can better understand their job satisfaction and commitment.

Key References

Ariyawansa R. G. and Perera M. A. N. R. M. (2005), *Determinants of Graduates Employability*, Paper presented at the 10th International Conference of Sri Lankan Studies, University of Kelaniya, Sri Lanka.

Graham, C. and McKenzie, A. (1995), "Delivering the promise: developing new graduates", Education þ Training, Vol. 37 No. 1, pp. 4-11, (online emeraldinsight).

Jusoh, M., Simun, M. and Choy Chong, S. (2011). Expectation gaps, job satisfaction, and organizational commitment of fresh graduates. *Education + Training*, 53(6), pp.515-530, (online emeraldinsight).

Keenan, A. and Newton, T. (1986), "Work aspirations and experiences of young graduate engineers", Journal of Management Studies, Vol. 23 No. 2, pp. 224-37, (online emeraldinsight).

Meyer, JP & Allen, NJ. (1991). A three-component conceptualisation of organisational commitment. Human Resource Management Review, 1(1), 61-89

Study on User Experience of Online Purchasing Among "Y" Generation with Reference to the Aliexpress.com

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Background

With the development of the technology and the internet the whole world has become one village. Customers are more powerful, and the businesses are facing a huge competition to attract and retain customers. Online shopping is the fastest and efficient way for customers to purchase products and services (Dhanapal et al, 2015). Generation Y is a significant group that attends online purchasing than other generations and they are five times faster, emotional and strong loyal customers compared to all the other generations.

This study aims at empirically investigating the influencing power of customer trust, brand equity and e- loyalty towards the online purchasing user experience (flow experience, functional experience and hedonic experience) among generation Y. The objectives of the research are to identify factors affecting for user experience in online purchasing among Y generation consumers of Aliexpress and (ii) to analyze types of user experience in online purchasing among Y generation consumers of Aliexpress.

The conceptual framework demonstrates the relationship between the independent variables and the dependent variable.

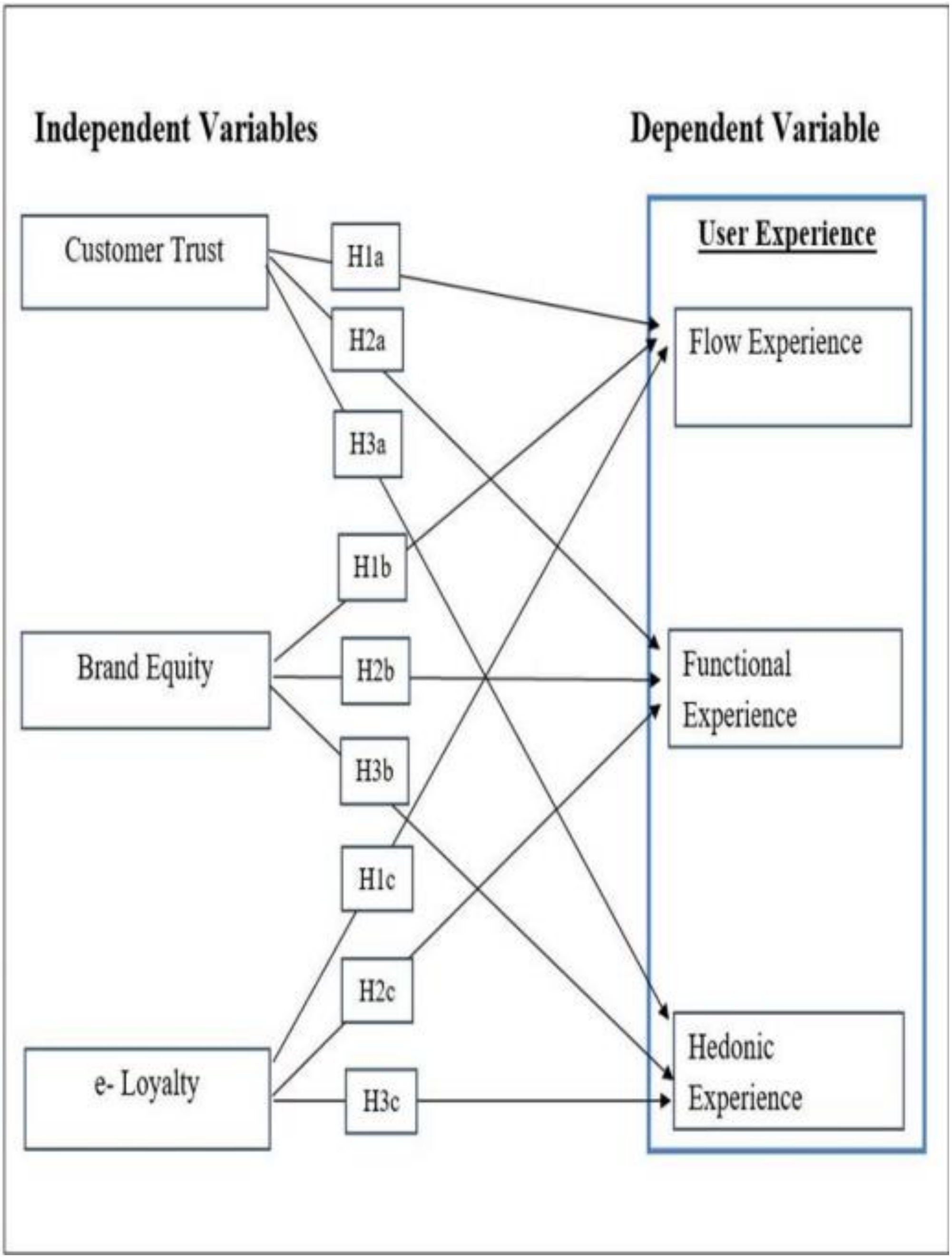

Figure 1: Conceptual framework
Source: Author constructed

The hypotheses are formulated based on the inter-relationship between the independent variables and dependent variable. The hypotheses of the research are,

H1a: Customer Trust has a significant positive relationship with Flow experience.

H1b: Customer Brand Equity has a significant positive relationship with Flow experience.

H1c: Customer e- Loyalty has a significant positive relationship with Flow experience

H2a: Customer Trust has a significant positive relationship with Functional experience.

H2b: Customer Brand Equity has a significant positive relationship with Functional experience.

H2c: Customer e- Loyalty has a significant positive relationship with Functional experience.

H3a: Customer Trust has a significant positive relationship with Hedonic experience.

H3b: Customer Brand Equity has a significant positive relationship with Hedonic experience.

H3c: Customer e- Loyalty has a significant positive relationship with Hedonic experience.

H4a: Customer Trust has a significant positive relationship with User experience.

H4b: Customer Brand Equity has a significant positive relationship with User experience.

H4c: Customer e- Loyalty has a significant positive relationship with User experience.

Methodology

The number of target respondents in the study is 156 who belong to generation Y and they are individuals whose age range is from 18 to 36 by 2018. A survey research questionnaire of 29 items has been adopted. The data of 156 respondents who are living in the western province in Sri Lanka were collected from the users of online purchasing through Aliexpress. The actual data collected will be analyzed using Statistical Package for Social Science (SPSS) version 21. Internal Reliability Test, Pearson Correlation and Multiple Regression Analysis are conducted.

Findings

The findings of this study highlight that pleasurable features of the websites are important for creating positive online customer experiences for generation Y.

The result shows that independent variables which are Customer Trust and customer e- Loyalty have a significant positive relationship with Online Purchasing user experience. On the other hand, Brand Equity has lesser impact towards Online Purchasing user experience.

Further, it indicates that although the generation Y age group is between 18-36), the ones who are between 22- 25 are highly addicted to online purchasing than other generation Y age groups. People in this age group usually do a job and most of those peoples are bachelors. Not only that, in Sri Lankan context most of them are single in the age of 22 to 25 and the research has found generation Y people usually purchase Electronic and related items, Fashion and appeal items.

Moreover, the findings of current research support that younger consumers pay special attention to websites' design.

Practical and Social Implications

Identifying Y generation's online purchasing behavior and their user experience on online purchasing is very important for marketers to change their strategies in order to establish a positive and lasting relationship with this new customer segment.

Enhancing the buying experience and gaining customer loyalty have been considered noteworthy marketing goals because the level of intrinsic enjoyment is correlated with the higher intention of returning to a website.

Marketers can do more on developing websites that provide positive shopping experience by focusing on the flow and hedonic aspect of the web design and pay special attention to gaining the trust of customers.

Sellers and online website can include signals on their website to reaffirm trust in the user and focus on establishing a trustworthy website. If not this can be a key issue for brands, as the consumers might tend to buy from another website. Customers always stay loyal to websites they could only trust.

Future Research

As there are many other local online purchasing websites that have emerged with the development of the technology in Sri Lanka, the future research can be developed not only based on one particular online purchasing website, but as a study which compares foreign trade online websites and local trade online websites.

Key References

Bilgihan, A. (2016). Gen Y customer loyalty in online shopping: An integrated model of trust, user experience and branding, Elsevier journal, Vol 61. P. 103-113.

Childersa T. L, Carrb C.L, Peckc J & Carsond S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior, Journal of Retailing, Vol 77, P. 511–535.

Dhanapal, S. Vashu, D. & Subramania, T. (2015). Perceptions on the challenges of online purchasing: a study from "baby boomers", generation "X" and generation "Y" point of views, Contaduria y Administracion, Vol 60 (S1), P.107-132.

Huang M, Ali R & Liao J. (2017). The effect of user experience in online games on word of mouth: A pleasure-arousal-dominance (PAD) model perspective, Elsevier journal, Vol. 75, pp.329-338.

Muda, M. Mohd, R. & Hassan, S. (2016). Online Purchase Behavior of Generation Y in Malaysia, Elsevier journal, Vol. 37, pp.292 – 298.

Tourism Development in Coastal Destinations and its Impact on the Host Community: A Case Study of Pasikudah, Sri Lanka

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Background

This dissertation is the end result of the research undertaken to analyze supply side perspetives on the present context of tourism development in Pasikudah and its impcat on the host community. With the cessation of the thirty year long civil war in Sri Lanka, the local tourism industry has seen a massive growth where tourism has become the third largest foreign exchange earner of the national economy within a span of just 9 years.

The Sri Lankan tourism industry and relevant authorities therefore have been addressing this opportunity in a 'Boosterism' related tourism approach generally where many coastal destinations across the island are subjected to swift tourism development. However, in the Sri Lankan context, although the tourism industry is growing and expected to continue to grow, poor planning and management of this growth in terms of tourism development is contributing to a large sum of negative impacts. Recent tourism development' in coastal destinations on host communities in Sri Lanka, have created unfavorable repercussions which have created a gap between the expected tourism growth and the actual tourism growth intended through development.

Relatively limited research has been conducted in the Sri Lankan context, on tourism development and its impact on the host community. On that account, this study is solely focused on filling the above-mentioned research gap, through critically understanding and evaluating the impact that tourism development in coastal destinations has on the host community across various domains: economic, socio-cultural and environmental.

Further it attempts to employ the findings to identify changes that need to be considered when it comes to tourism development planning, policy decisions and implementation to minimize negative impacts while maximizing the beneficial impacts in order to accomplish sustainable tourism industry growth with greater local community support, involvement and development.

Methodology

the study undertook a qualitative research approach under which fourteen in-depth interviews were conducted. The sample included senior industry professionals each representing few of the most prominent accommodation providers (hotels) and government authorities (SLTDA, Fisheries Department) that were considered to contribute to tourism development, as well as individuals engaged in tourism development-based initiatives in Pasikudah.

The collected data was then evaluated through a directed content analysis and constructive results were derived, with the aid of emerging raw data representing existing theories of tourism development and its impact on the host community. Finally, the research findings were compared against already existing literature and meaningful implications were produced. Based on the collected data and the significant findings derived upon analysis, a framework of suppliers' role and perspectives of tourism development in Pasikudah and its impact on the host community was then developed

What was found in the course of the work?

The research findings mainly suggest that tourism development in Pasikudah has not yet reached its full potential and the overall positive impacts of tourism development outweighs the negative impacts that tourism development has had within the region. Finally, the thesis discusses implications of the study and makes recommendations for future research as well. The lessons of this research are not limited to Pasikudah, but can be applied to other, similar destinations seeking to strengthen their tourism offering.

What outcomes and implications for practice, applications and consequences are identified?

The lessons of this research are not limited to Pasikudah, but could be applied to other similar

coastal destinations. It is believed that the findings presented within this research may prove to be beneficial to several parties related to tourism development in Sri Lanka. The government can use the findings to re-evaluate the policies they have undertaken regarding tourism development and its impacts and ensure that those policies are converted into practice in a much more effective manner. The tourism suppliers can use this information to identify development opportunities within the tourism industry through understanding their present context with regard to tourism development and re-vamp their strategies on maintaining corporate social responsibility by evaluating the impact they have had on the host community.

Interestingly, when it comes to the impact tourism development has had on the Pasikudah host community, the study results showed very high similarities to existing literature where it was understood that the impacts of tourism development in the Sri Lankan context was quite synonymous to that of the impacts in the global context as well. While economic negatives weren't recognized, limitations such as lack of interest, negative perception regarding tourism, lack of communication and job related skills were understood as limitations to positive impacts such as increased direct employment opportunities and additional sources of income. In socio- cultural impacts, it was identified that most of the parties involved with tourism at Pasikudah had been addressing these limitations with the intention of developing capacities and personalities of the host community while making them aware of the many benefits of tourism.

This has resulted in a positive change of values and beliefs of the community. Promotion of ethnic harmony through the employment of ethnic minorities and war affected locals is one other key positive which was identified during the research. However, amongst other negatives such as illegal prostitution, displacement of the local fishermen due to the usage of lands for tourism was recognized as the most prominent negative social impact, tourism development has had in Pasikudah. It was understood that, a permanent solution to the problem should be given as early as possible if not, it can have severe detrimental effects on future tourism growth. When it comes to environmental impacts, tourism development has played a dual role; while causing destruction and pollution it has provided and incentive to protect the natural and physical environment through hotels carrying out awareness building programmes aimed at enhancing environmental consciousness of the community and adopting green techniques such as recycling.

The findings of this research can be used by both the private and government sector to uplift the standards of tourism development in Sri Lanka. The results further show that, understanding and evaluating tourism development and its impacts on the host community is the way forward for the entire tourism industry in Sri Lanka and as a whole, rather than being continuously driven by the belief that tourism development is of automatic benefits. It is also likely that the findings may apply to other emerging coastal tourism destinations, both domestically and internationally.

However, the research also identifies the urgent need for the government and other private entities involved with tourism development in Pasikudah to pay more attention towards the identified negative socio-cultural impacts, with the intention of resolving them permanently as it would in return increase host community support towards tourism development. For tourism development to be sustainable in Pasikudah, it is also acknowledged that addressing these negative outcomes with the minor environmental negative impacts identified, will enable those involved with tourism development to achieve desired end results and develop Pasikudah as a well-established tourism destination while maintaining a mutually beneficial relationship with the host community.

Future Research

This research has several limitations. Firstly, the selected sample was considerably small which may have had an impact on the generalizability and the reliability of the research findings. Next, the individuals involved in the study represented a limited range of sectors when it comes to tourism suppliers in Pasikudah. Consequently, in order to gain more valid and holistic insight into the researched subject area, future studies should give prominence to conduct larger-scale inquiries involving individuals representing a wider range of tourism suppliers such as transportation providers, entertainment providers and etc.

Moreover, this research will allow to identify the way tourism development has impacted the tourism industry in the community of Pasikudah and Sri Lanka as a whole. On a similar note, the study produced findings from participants that were all local and who are a part of the tourism industry. Therefore, it is also suggested that future researchers should attempt to explore the role and perspectives of providers that may be foreign and also outside the industry in order to provide a more balanced argument. Nevertheless, the results of the study contribute valuable and original insights into the role and perspectives of accommodation providers, authorities involved with tourism planning and development as well as other individuals who contribute to tourism development in Pasikudah.

Furthermore, it was revealed that much of the existing literature concerning tourism development and its impacts on the host community are community focused and fails to adequately investigate supply side perspectives. In addition, it was identified that limited research had been conducted on the subject area within the Sri Lankan context and no research has been done on the study site. Consequently, this study attempts to fill a gap in research studies contributing a new theory to existing knowledge.

Key References

Fernando, S., Bandara, J. S., and Smith, C. (2016). 'Tourism in Sri Lanka', The Routledge

Handbook of Tourism in Asia (pp. 251-264). Abingdon, Oxon, UK: Routledge.

Government of Sri Lanka (1987a). Land Commission report 1987. Colombo: Government Press.

Gunarathna, K.M.L.M. (2014) 'Obstacles against the Tourism Development as an Instrument of

Poverty Alleviation'.71- 1. Available at:

http://repository.kln.ac.lk/bitstream/handle/123456789/12079/journal1%20%281%29.263-

274.pdf?sequence=1&isAllowed=y (Accessed: 10 February 2018).

Gunn, C.A. (1994) Tourism Planning, 3 rd edn, Taylor & Francis, Washington.

Gunn, C.A. and Var, T. (2002) Tourism Planning: Basics, Concepts, Cases, 4 th edn, Routledge,

New York.

Gursoy, D., and Rutherford, D. G. (2004). 'Host attitudes toward tourism: an improved

structural model'. Annals of Tourism Research, 31(3), pp. 495-516.

Hall, A., (2008) Tourism Planning: Policies, Planning and Relationships. 2nd Ed. Harlow: Prentice

Hall.

The Factors Affecting to the Brand Awareness of Fashion in Facebook Marketing among Sri Lankan Youth Fashion Consumers

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Background

Fashion industry is one of lucrative and lively industries in the world (Jayasuriya & Azam, 2017). Fashion reflects the society and the culture, likewise it reflects how people define themselves (Holmberg & Ohnfeldt, 2010). In this research the word 'fashion' will be used as a reference to clothing and accessories**.** According to the Roar.media website, many companies are striving to increase the quality of their activities on the Internet and improve the effectiveness of such activities. The rise of E-Commerce is especially relevant in the fashion industry. According to the Guardian (2015), Social networks are not to be neglected in the rise of E-Commerce, as fashion consumers tend to seek out user generated online content before making a purchase. Social media is used along the customer journey ahead of completing a purchase. Therefore, fashion brands should focus on social media.

Comparing to other social media sites, Facebook is more popular and also it has become the most powerful media as well (Ahmad, Salman & Ashiq, 2015). In the present society the youth clearly uses social media like Facebook to follow their favorite fashion brands in order to express their individual identities (Kjeldgaard, 2009). This study is going to emphasis the factors affecting the Facebook brand awareness of fashion among Sri Lankan youth fashion consumers as well as the strategies used to increase the brand awareness through Facebook among Sri Lankan youth fashion consumers. So Electronic Word of Mouth, Brand Exposure and Customer Engagement are the dimensions that use to examine the relationship on brand awareness. Those considered as independent variables and brand awareness is considered as the dependent variable.

Methodology

Since the study will analyze the factors affecting to the brand awareness of fashion in Facebook marketing among Sri Lankan youth fashion consumers, author has selected a deductive research approach (Quantitative approach) for this study and it moves from general to the specific. Documentary secondary data is collected through different types of research conducted within the topic, articles, and books that are written on brand awareness and the use of Facebook as a marketing tool. Primary data for this research will be collected through questionnaires. Questionnaire will be created using Google forms and data will be collected from 300 active Facebook users who is having an interest towards fashion. Both primary and secondary data will be used for the purpose of the research and data will be analyzed with assistance of SPSS.

Findings

The collected data presented and analyzed clearly by using SPSS. According to the reliability analysis, it has been proved that Brand Awareness, Electronic Word of Mouth, Brand Exposure and Customer Engagement are reliable under the Cronbach's standard as Cronbach's Alpha value for all the four variables are greater than 0.70. The correlation analysis of the independent and dependent variables proved that the significance value of all the independent variables towards the dependent variable is less than 0.05. So, it has been concluded that the association between Electronic Word of Mouth towards Brand Awareness, Brand Exposure towards Brand Awareness and Customer Engagement towards Brand Awareness are significant.

According to this study, the significance of the model value is 0.000 which is less than 0.05. Therefore, it is significant. The Adjusted R^2 value in this study, Electronic Word of Mouth, Brand Exposure and Customer Engagement explain the Brand Awareness by 81.5%. According to the regression analysis it has been proved that, since the sign has achieved the expected sign and the significance value is less than 0.05, the H1, H2 and H3 are accepted. It means Electronic Word of Mouth (E WOM), Brand Exposure and Customer Engagement are positively associated with brand awareness of fashion on Facebook among Sri Lankan youth fashion consumers.

This study recommends that brands will be profited from social media like Facebook if they are used to create and enhance brand awareness of fashion. The benefits will be mostly increased by using these type of medias' interactivity features to tie customers more closely to a brand. According to the study, brand exposure is having the highest level of correlation and the highest level of beta coefficient with the dependent variable (Brand awareness). Fashion brands can influence brand exposure in Facebook among target audiences by regularly posting brand posts and using the right frequency balance of the ads and celebrity endorsements. Electronic Word of Mouth is the next important variable. There are several actions that may influence to increase Electronic Word of Mouth. Fashion brands can influence Electronic Word of Mouth on Facebook among target audiences by encourage communication and incentives. Customer Engagement is the other variable. Fashion brands can influence customer engagement in Facebook among target audiences by the best use of Facebook content and incorporating Facebook messenger ads.

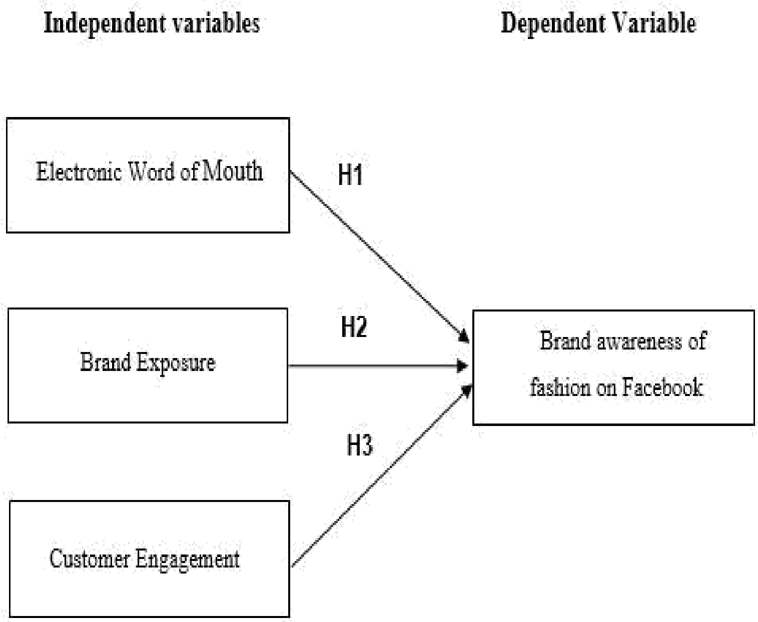

Figure 1: Conceptual diagram

Practical and social implications

Further researches can be carried out by looking at different perspectives, such as gender, different categories of age, income level, socio cultural factors, etc. Since this research has been done using Colombo district young active Facebook

users as the study sample, further researches can be done using other districts in Sri Lanka as well. Furthermore, more researches can be done by using different factors apart from electronic word of mouth, Brand Exposure and Customer Engagement. Such as the characteristics of fashion consumers in different countries that affects to the brand awareness of fashion in Facebook marketing. Also, the same factors can be analyzed in country wise as well. Apart from that, further researches can be carried out by using different social media platform such as Instagram, Twitter etc.

Key References

Ahmad, N Salman, A & Ashiq, R 2015, 'The impact of social media on fashion industry: Empirical investigation from karachiites', *Journal of Resources Development and Management*, vol.7, pp.1-7.

Jayasuriya, N & Azam, S 2017, 'The Impact of Social Media Marketing on Brand Equity: A Study of Fashion-Wear Retail in Sri Lanka', *International Review of Management and Marketing*, vol.60, no.7(5), pp.178-183.

Kjeldgaard, D 2009, The meaning of style? Style reflexivity among Danish high school youths. *Journal of Consumer Behaviour*, vol. 8, no.2(3), pp.71-83.

Kotler, P & Armstrong G 2012, *Principles of Marketing*. 14th edn. One Lake Street, Upper Saddle River, New Jersey: Pearson Prentice Hall.

Odhiambo, C 2012, *Social M edia as a Tool of Marketing and C reating Brand A wareness. Business Economics and Tourism*, pp.1-80. Viewed 17 May 2018
https://www.theseus.fi/bitstream/handle/10024/44591/Christine.A.Odhiambo.pdf?seq uen ce=1

The Factors Affecting the Entrepreneurial Intention of Undergraduates – Evidence from National School of Business Management

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Background

The study presents entrepreneurial intentions of undergraduates of National School of Business Management in Sri Lanka. Further, the study analyses the aspects of entrepreneurship in young generations. The selected aspects are; (i) educational support, (ii) relational support, (iii) personality factors that affects to the intention of entrepreneurship. The relationships of Hypotheses as follows: H1: There is a relationship between educational support and the entrepreneurial intention of undergraduates H2: There is a relationship between relational support and the entrepreneurial intention of undergraduates H3: There is a relationship between personality traits and the entrepreneurial intention of undergraduates. According to the conceptual framework, independent variables are educational support, relational support and personality factors. Dependent variable is the entreprenurial intention.

Methodology

The study uses a quantitative analysis. 450 undergraduates of National School of Business Management were the sample. A questionnaire was distributed including licket scale questions according to the three main variables. Statistical Package for Social Sciences is used as the analysis software. It helps to do reliability analysis, pearson correlation, regression, model summary, anova table, coefficient table to test the hypothesis.

Findings

Reliability analysis was done for testing whether the questionnair is reliable or not. Cornbach's alpha value, the factor which decides the reliability is above than 0.7 and the questionnair is reliable. Correlations help to determine the strength of relationships and direction of the relationships. It is tested with the value of pearson correlation and significance. Significance value should be less than 0.05 to have a relationship between independent variable and dependent variable. the correlation analysis of the study proves there are relationships between independent variables and dependent variable. There is a relationship between syllabus of the study and the entrepreneurial intention of undergraduate which is (0.632) 63.2% strong and the significant is 0.012. There is a relationship between extra curriculum activities and the entrepreneurial intention of undergraduate which is as (0.364) 36.4% strong because the significant is 0.000 which is less than 0.05. There is a relationship between resource persons and the entrepreneurial intention of undergraduate which is (0.457) 45.7% strong and the significant is 0.000. All the results of sub variables derive there is a relationship between educational support and entrepreneurial intention of undergraduates.

There is a relationship between financial support and the entrepreneurial intention of undergraduate which is (0.375) 37.5% strong and the significant is 0.006. There is a relationship between non – financial support and the entrepreneurial intention of undergraduate which is (0.442) 44.2 % strong because the significant is 0.000. As all sub variables comes under main variable of relational support. It derives as there is a relationship between relational support and entrepreneurial intention of undergraduates.

There is a relationship between risk taking tendency and the entrepreneurial intention of undergraduate which is (0.669) 66.9% strong because the significant is 0.023. There is a relationship between locus of control and the entrepreneurial intention of undergraduate which is (0.649) 64.9% strong and the significant is 0.000. There is a relationship between need for achievement and the entrepreneurial intention of undergraduate which is (0.552) 55.2% strong and the significant is 0.000. As all sub variables comes under main variable of personality traits. It derives as there is a relationship between personality traits and entrepreneurial intention of undergraduates.

In the regression analysis, Adjusted R square should be at least 50%. Here adjusted R square is 54.2% (0.542) this means that all the independent variables together explain dependant variable by 54.2%. Anova table's significance value should be less than 0.05. Here the significance value is 0.000 It means the conceptual diagram can be acceptable. The first sub variable, syllabus of degree has shown positive relationship with entrepreneurial intention,as the significance is 0.00. The second sub variable is extra curriculum activities. It has shown negative relationship with entrepreneurial intention since significance is 0.015. The third sub variable is resource person. It has shown positive relationship with entrepreneurial intention since significance is 0.036. It derives all the three relationships can be acceptable. The 4th sub variable is financial support. It has shown positive relationship with entrepreneurial intention. Since significance is 0.01. The fifth sub variable is non – financial support. It has shown negative relationship with entrepreneurial intention. Since significance is 0.01 It derives all the two relationships can be acceptable. The sixth sub variable is risk taking tendency. It has shown positive relationship with entrepreneurial intention. Since significance is 0.00. The seventh sub variable is locus of control. It has shown positive relationship with entrepreneurial intention,as the significance is 0.00. The eighth sub variable is need for achievement. It has shown negative relationship with entrepreneurial intention,as the significance is 0.00. It shows that all the three relationships can be accepted.

Practical and Social Implications

The policy makers and scholars are interested in field of entrepreneurship since they are mainly focusing on developing the country's economy with the help of entrepreneurs in Sri Lanka. Especially entrepreneurs are an emerging boom of economy as they create new ideas which can turn into profitable opportunities. Research findings will be the indicators of barriers in a entrepreneurial carrier life and the analyzed data will be a foundation of developing next generation of entrepreneurial society in Sri Lanka.

Key references

Achchuthan, S. & Nimalathasan, B.(2012 a). Level of entrepreneurial intention of the management undergraduates in the university of Jaffna, Sri Lanka: *Scholars and undergraduates perspective: South Asian Academic Research Journals*, 2(10) : 24-42.

Nishantha, B. (2008). Influence of personality traits and socio-demographic background of undergraduate students on motivation for entrepreneurial career: *The case of srilanka*: Doshisha Business School, Kyoto, Japan

Thrikawala,S. (2011). The determinants of entrepreneurial intention among acadamics in Srilanka : *International conference on economics and finance research*, LACSIT press, singapore, 4, 454-458.

Turker, D. and Selcuk, S. (2009). Which factors affect entrepreneurial intention of university students . *Journal of European Industrial Training*, 17(4), pp.1-32.

McStay, D. (2008).An investigation of undergraduate student self-employment intention and the impact of entrepreneurship education and previous entrepreneurial experience: School Of Business,Bond University,Australia.

The Impact of The Quality of Public Transportation on Passenger Satisfaction with Reference to Colombo District, Sri Lanka

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Background

Transportation is a necessary factor in our day to day life. 'Passenger transport is required to move people from one place to another, and requirements vary considerably between different places and between different social groups. Once former Mayor of Bogotá, Colombia, Enrique Penalosa stated that a developed country is where rich people use public transportation and not a place where poor people have cars (Kun, 2018). In Sri Lanka, traffic jams are frequent and increases day by day. The main factors for this can be shown as increasing traffic jams due to increasing usage of private vehicles and the lack of public transportation usage.

According to the statistics of the Ministry of Transport and Civil Aviation, vehicle population is increasing every year. Most of them are private vehicles. It can be shown as follows;

Table 1.1 -Vehicle population

	2015	2016	2017
Motor Cars	672, 502	717, 674	756, 856
Motor Tricycle	1, 059, 042	1,115, 987	1, 139, 524
Cycles	3, 359, 501	3, 699, 630	4, 044, 010
Buses	101, 419	104, 104	107, 435
Dual purpose vehicles	365 ,001	391, 888	408, 630
	5 456 046	5 925 179	6 349 020

Source: (Transport, 2017.)

Therefore, the research was intended to study the impact of the quality of public transportation on passenger satisfaction in the Colombo District in Sri Lanka, identifying perceived level of quality and perceived level of passenger satisfaction regarding public transport systems in the Colombo District, Sri Lanka.

Conceptual framework consists of independent variables of quality which impacts on the dependent variable, passenger satisfaction. The independent variables are Tangibility, Reliability, Responsiveness, Assurance, and Empathy. These variables are coming under the SERVQUAL Model and conceptual diagram can be shown as follows;

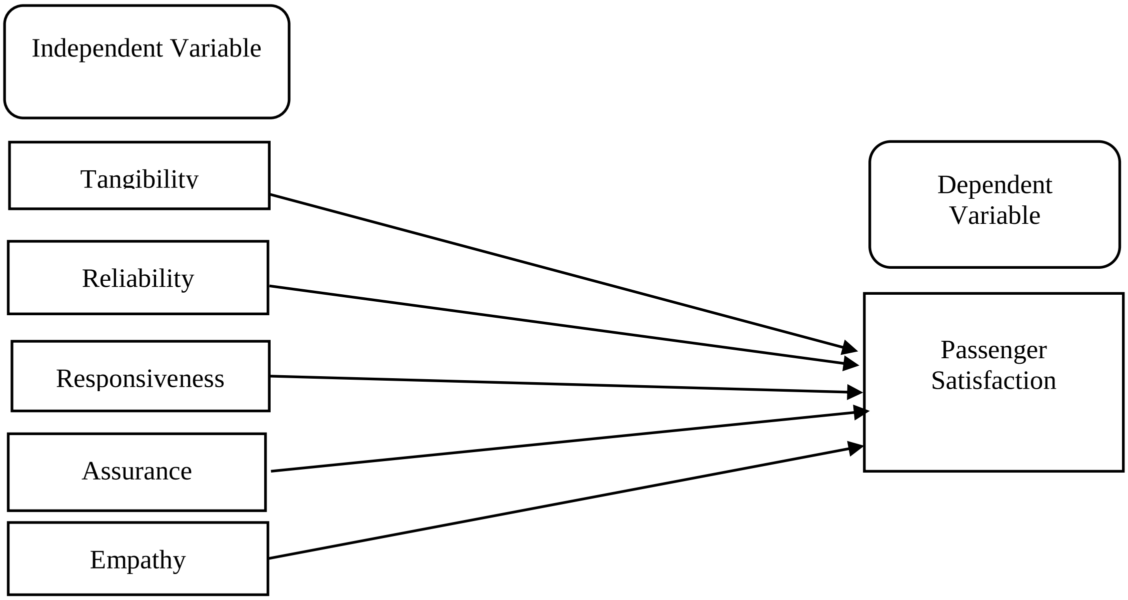

Figure 1-1: Conceptual Framework (Parasuraman et al, 1998)

Based on the conceptual framework there are five hypotheses. This can be shown as follows:

1. H1- There is a significant relationship between Tangibility and Passenger satisfaction.
2. H2- There is a significant relationship between Reliability and Passenger satisfaction.
3. H3- There is a significant relationship between Responsiveness and Passenger satisfaction.

4. H4 - There is a significant relationship between Assurance and Passenger satisfaction.
5. H5 - There is a significant relationship between empathy and passenger satisfaction.

Methodology

Basically, this research has been conducted in cross sectional design under the quantitative research manner. This mainly focuses on how to achieve research objectives. The population relevant to this research are all the people who are working inside the Colombo city limits of Sri Lanka. The sample size for this research is estimated to be a total of 150 individuals who are working inside the Colombo city limits. Convenience sampling is selected as the sampling technique for this research study. For the research to analyze and summarize the primary data, researcher used MS excel and software called software package for Social Science (SPSS).

Findings

According to research findings, descriptive statistics majority of the respondents used both public and private transport for daily transportation and it is 49% of the respondents. In reliability analysis each variable has been identified as reliable variables since each variable exceeds cronbach's Alpha value 7. This means the scale of the quality of public transportation has a relatively high reliability or good consistency between the questions which measure each variable. This means the scale of the quality of public transportation has a relatively high reliability or good consistency between the questions which measure each variable.
In the correlation analysis the independent variables have a positive relationship with the dependent variable.

In the correlation matrix, the Empathy variable has a strong relationship with passenger satisfaction. The Pearson correlation between Empathy and passenger satisfaction is 0.94 and as a percentage 94%.

This analysis was further validated by the regression analysis due to variables statistical significance. According to the regression analysis, adjusted R squared is 0.938 which means all the independent variables explaining the dependent variable by 93.8%. This means, the researcher has identified the greatest number of variables which will affect passenger satisfaction.

According to the coefficient highest standardized beta value has a strong relationship with the dependent variable passenger satisfaction. In coefficients, the Empathy variable has 1.074 beta value, which is the highest value that has a strong relationship with passenger satisfaction.

Practical and Social implications

According to the analysis of the research findings, Passenger satisfaction can be increased by managing Tangibility, Reliability, Responsiveness, Assurance and Empathy etc. Practical and social implications of these variables can be shown as follows.

- Tangibility

Tangibility has a positive impact on passenger satisfaction

1. Should provide real time information.
   In Singapore they use 'i-Transport platform' which integrates traffic information ITS measures and transit- based measures (Luk and Olszewski, 2003).
2. Position of the bell should be place in an appropriate and convenient manner which can be used by all the passengers without moving (Shi and Yang, 2013).
3. Introduce electronic rolling board above the billboard which shows the time of arrival of the next bus and also the electronic stop signs can be used which can predict the travel time by using ITS systems. These methods are used in Taiwan (Shi and Yang, 2013).

- Reliability

According to results there is no influence on this dimension but there is a need of some transport measures which can improve the different features of transport services.

1. Maintaining Priority bus lanes, increasing number of buses, allocating safe parking areas for vehicles near Railway Stations outside the Colombo city limits.

2. To maintain the reliability of the bus service, one should Introduce a Bus Management System (BMS) which uses advanced Intelligent transport system (ITS) technology and Global Positioning Systems (GPS) linked to the Electronic fare system to send relevant information to passengers. (Allen, 2013).
3. Passengers should be within a short walking distance from their residences to a transit stop (Allen, 2013).

- Responsiveness

Responsiveness means willingness to help customers in order to fulfill efficient service criteria. Which have a negative impact on passenger satisfaction, which means that, this is inversely related. This can happen because the thinking pattern of each individual is different. In the Sri Lankan context, most of the people were not satisfied with the above mentioned criteria. To improve responsiveness, recommendations can be shown as follows.

1. Introduce fully integrated Automatic fare collection system
2. Implement monorail systems.
3. Implement well planned fly overs for bottlenecks.

- Assurance

According to the findings, the standard coefficient beta value is -0.282, which have a negative impact on passenger satisfaction. To reduce the negative impact, recommendations can be shown as follows.

1. Sri Lanka should establish safety regulations for public transport and enforce strict policies.
   Public Transportation in Sri Lanka is poorly maintained and often overloaded, the drivers are very aggressive.
2. Detailed policies and procedures should be developed, and then the variability in customer treatment is reduced. There should be formalized training in the area of customer service. Recruitment and selection should take cognizance of the element of customer service.
3. There should be greater interaction with passengers with a view to understanding their needs more clearly. Should conduct regular surveys.

- Empathy

According to the findings, the standard coefficient beta value is 1.074. To further improve empathy criteria following recommendations can be forwarded.

1. Introduce buses fitted with wheel chair ramps (Shi and Yang, 2013).
2. Should have Special entrance for wheelchairs accessible toilets (Dutch Railways, n.d.).
3. Should maintain priority seats for elderly people.

Future Research

According to the regression analysis, Responsiveness and Assurance variables have negative relationship with passenger satisfaction. Future studies can tackle these by extending this research and analysis. Further studies can extend the geographical areas to get good results.

In this research cross sectional data was used. Hence, changes in the stability cannot be seen. Therefore, future research can use longitudinal research design and the increasing sample size will give better results further.

Key references

Barabino, B., Deiana, E. and Tilocca, P 2012, 'Measuring service quality in urban bus transport: a modified SERVQUAL approach', *International Journal of Quality and Service Sciences,* vol. 4 ,no 3, pp.238-252.

Donoso, P., Munizaga, M. and Rivera, J 2013, 'Measuring User Satisfaction in Transport Services: Methodology and Application', *Transport Survey Methods: Best Practice for Decision Making*, pp.603-624.

Parasuraman, A., Berry, L. and Zeithaml, V.A 1988, 'SERVQUAL: a multiple-item scale for measuring consumer perceptions of service quality', *Journal of Retailing,* Vol. 64 No. 1, pp. 12-40.

Subasinghe, M. 2015, Overview of traffic and transportation in Colombo, Accessed 21 September 2018, http://citynet-ap.org/wp-content/uploads/2015/07/Colombo.pdf

Sumaedi, S., Bakti, I., Rakhmawati, T., Astrini, N., Widianti, T. and Yarmen, M 2018, Factors influencing public transport passengers' satisfaction: a new model.

Determinants of Financial Performance of Listed Manufacturing Companies; Evidence from Colombo Stock Exchange.

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Background

As Sri Lanka is a developing country it is important to identify possibilities of having development sustainability with regard to market development. Most of the organizations consider the financial derivatives and their impact towards business development and sustainability. In this research, the researcher identified a research gap with regard to the determinants that will affect the financial performance of listed manufacturing companies in Sri Lanka.

There are very few researches done pertaining to the impact of financial performance in relation to the manufacturing sector in Sri Lanka. Authors like Habaragoda, (2018), Karunathne, (2017), Logavathani and Lingesiya, (2018) have done research related to the financial performance of Sri Lanka. Ranasinghe, Yashodhara and Pintoe, (2016), Perera and Perera, (2015), Dias, (2015) and Wickremasinghe and Fonseka, (2016) have done research related to the Manufacturing sector in Sri Lanka. However, even these researches do not cover how financial performance impacts towards the manufacturing sector. With the unstable economy and declining market share of the Manufacturing sector it is essential to focus on the impact of determinants of financial performance to the manufacturing sector in Sri Lanka.

As a result of contrasting factors of previous research there is no specific theory or concept regarding the measurement of financial performance of the Manufacturing sector. Generally, there are different indexes to measure but, in this case, there is no accurate or actual index to measure the performance in the manufacturing industry.

According to the (Ogebe, P. O., Ogebe, J. O., & Alewi, K. 2005), the research conducted a study regarding the Manufacturing sector in Nigeria related to 2000-2001. As per the comparative analysis it states that in the Manufacturing firms there is an impact of Liquidity solvency and leverage ratios for the Financial performance with more or less than of 10%. And in that study, they further

explained that the impact of the traditional capital theory is valid. It affirms against that these ratios are statistically significant and important to the determinants of Financial performance in the Manufacturing sector. But some researches state that there is a negative relationship with these Independent variables towards the impact of determinants of financial performance in the Manufacturing sector (Pratheepkanth, 2011).

Salehi, M, and Biglar, K. (2009), states that Financial decisions can be treated as one of the most important areas in Financial Management in order to increase the Shareholder's wealth and to measure the performance of the company in a critical way. This research basically conducted with the help of 117 companies in the Tehran stock exchange (TSE) by using 05 years evaluations from 2002 to 2007. Through this research, it demonstrated that the Organizational Characteristics, Financial indictors and Market share influences on Financial Performance.

According to (Pratheepkanth, P. 2011), a research has been conducted with the business companies in Sri Lanka from year 2005 to 2009. According to the findings of the Correlation analysis it explains that there is a weak positive relationship between the Gross profit and Capital structure, and the negative relationship between the net profit and the capital structure. And it states that there is a high financial cost of the firms and ROI and ROA has a negative relationship with the capital structure. With those negative relationships, the researcher concludes that there are Insignificant levels of business companies in Sri Lanka.

The researcher used 03 main theories inorder to identify the relationship between independent and dependent variables towards the reserch problem. Those are Modligliani and Miller Model, Product life cycle and BCG Matrix.

Methodology

There are 42 listed manufacturing companies available in Sri Lanka. But due to the limitations of the data collection only 22 companies are being taken for the evaluation purpose. The researcher used EViews software on behalf of analyzing the data as the data set comprises of Panel data. On behalf of the analysis, the researcher used data for the years from 2014-2017.

The independent variables which are being used for the thesis are Firm Age, Firm Size, Board size, Current Ratio, Debt to equity ratio and Market share. There are two dependent variables being used as Return on Assts and Return on

Equity. This research belongs to the secondary data which was gathered from the Annual report from 2014-2017.

Twelve hypotheses have been developed and there are positive and negative impacts towards the dependent and independent variables. On behalf of the findings, the statistical relationship the researcher used Analytical strategies such as Descriptive Statistics, Correlation Matrix and Panel Regression.

This study was generally based on "Secondary data Analysis". The data is collected through 22 listed manufacturing companies in the Colombo stock exchange.

Mainly the results of the quantitative analysis are commonly reported in the form of statistical tables or graphs. The presentation of the results mostly presented in terms of descriptive statistics which describes about the sample. By using this analysis, it can have univariate statistics such as frequency distribution, means and standard deviation. And simple graphs such as pie charts, bar charts and histograms. Where through this analysis it can have Bivariate results which commonly represent the facts like demographic distribution of key variables of interest, finally, results of the statistic models in which variables are presented and interpreted (Samii, C. 2016).

These models will help the researcher to understand the alternative explanations and to specify the conditions under which their hypotheses are upheld. The quantitative approach is being especially useful in questioning the well-defined phenomena such as "Current Ratio and Rate of Equity". On behalf of quantitative analysis, it requires high quality data which variables are measured well. It makes challenges when conducting research on complicated or understudied areas, where those data are not well measured by using specific variables (Samii, C. 2016).

As this study comprises with the deductive logic it can more easily be viewed as a "real science", where the quantitative approach more often provides the empirical findings evidence than other research approaches (Samii, C. 2016).

Findings

To evaluate these dependent and independent variables the researcher used three analytical strategies namely Descriptive statistics, Spearman Correlation and Panel Regression. Through the descriptive statistics the researcher analyses the overall knowledge regarding how independent and dependent variables related to the research problem.

Basically, through the results of the spearman rank correlation coefficient the researcher found out that all the independent and dependent variables are statistically significant ($p<0.05$) and those are predictors of Return on Assets and Return on Equity. By using the Panel data regression, the researcher found out the impact of independent variables towards the dependent variables (Justification of hypothesis by understanding the positive or negative relationship in between the dependent and independent variables).

The below figure explains the significance of independent and dependent variables which evaluated through Spearman Rank correlation coefficient.

Covariance Analysis: Spearman rank-order
Date: 04/13/19 Time: 20:16
Sample: 2014 2017
Included observations: 92

Correlation Probability	AGE	BOARD_SIZE	CURRENT...	DER	MARKET_S...	ROA	ROE	TURNOVER
AGE	1.000000							
SIGNIFICANCE	-----							
BOARD_SIZE	-0.147626	1.000000						
SIGNIFICANCE	0.1602	-----						
CURRENT_RATIO	-0.171216	-0.259081	1.000000					
SIGNIFICANCE	0.1027	0.0126	-----					
DER	0.262432	0.328559	-0.879089	1.000000				
SIGNIFICANCE	0.0115	0.0014	0.0000	-----				
MARKET_SHARE	-0.187364	0.010131	0.031465	0.101036	1.000000			
SIGNIFICANCE	0.0737	0.9236	0.7659	0.3379	-----			
ROA	-0.079819	-0.316662	-0.2798	-0.288243	-0.3562	1.000000		
SIGNIFICANCE	0.0494	0.0021	0.0069	0.0053	0.0005	-----		
ROE	0.232594	-0.151445	-0.078351	-0.070626	0.510367	0.870567	1.000000	
SIGNIFICANCE	0.0207	0.0495	0.0488	0.04199	0.0000	0.0000	-----	
TURNOVER	-0.014782	-0.020158	-0.081840	0.055361	0.381480	0.221167	0.340259	1.000000
SIGNIFICANCE	0.8888	0.8487	0.4380	0.6002	0.0002	0.0341	0.0009	-----

Figure 1 - Spearman Rank correlation coefficient.

Source – Complied by the Author.

When identifying the findings of the Descriptive statistics, the researcher clarifies that the total data set is being statistically significant and positive and

negative variances can be identified with the factors. Through the descriptive statistics the researcher found that the Firms Age impacts the Return on Asset with the percentage of 16%, Board Size impacts the Return on Asset with the percentage of 35%, Current Ratio impacts the Return on Asset with the percentage of 22%, Debt to Equity Ratio impacts the Return on Assets with the percentage of 0.5%, Market Share impacts the Return on Asset with the percentage of 31%, Firms Size impacts the Return on Asset with the percentage of 21%.

When considering the panel data regression findings, Firm Size and the Market Share has a positive impact towards the Return on Assets whereas Firms Age, Board size, Current Ratio, Debt to Equity Ratio creates a negative relationship regarding the Return on Assets. At the same time the researcher identifies that Firms Age, Firm Size Current Ratio, Debt to Equity Ratio and Market share provides a positive relationship to the Return on Equity. And Board size and debt to equity ratio provides a negative relationship towards the Return on Equity.

In general, to conclude the findings to have positive impact regarding to Negative relationships, the manufacturing industry needs to be developed in a proper hierarchical way. Most of the Asian countries face a common set of problems in developing their business towards sustainable development. Some of those problems are inflation, uncertainty in the government, higher taxes, political instability, fluctuation of interest rates, poor infrastructure and less capital investments.

Practical and Social Implications

The proposed research highlighting the factors which affect towards the Financial performance in the manufacturing sector in Sri Lanka. To measure the financial performance, it is important to consider the variables like Organizational Characteristics, Financial Indicators and Market share. And those data shall be extracted from the annual reports of 41 manufacturing companies which are registered in the Colombo stock exchange. And data needs to be considered regarding the rules that the Purchasing Manager's index (PMI) declared by the Central Bank of Sri Lanka.

Academically, there are no derived theories regarding the Financial Performance of Sri Lanka. But there are researches that declared regarding the Financial performance to overall business sectors. This research basically declares the impact of determinants of the Financial performance to the Manufacturing sector in Sri Lanka.

Future Research

According to the European researchers it can be understood that there is a positive impact regarding all of the independent variables towards the dependent variables. As they are keen regarding business development and assistance. With the uncertainties in the Asia market it is difficult to achieve the result up to the European market. But future researchers can evaluate how these factors can be improved in developing countries.

Key References

Anton, J., Brusco, S. and Lopomo, G. (2010). *Split-award procurement auctions with uncertain scale economies:* Theory and data. Games and Economic Behavior, 69(1), pp.24-41.

B. Camelia, B. Vasile (2009) *A company performance analysis based on value creation Metalurgia International*, 14 (7) (2009), pp. 180-185.

Bourlakis, M. et al. (2014) "Firm size and sustainable performance in food supply chains: Insights from Greek SMEs", *International Journal of Production Economics*, 152, pp. 112-130. doi: 10.1016/j.ijpe.2013.12.029.

Li, L.S., Yang, H.C. and Liu, J. (2014), *"Research on the overall development ability evaluation of the regional manufacturing industry in China-based on an empirical analysis of the eastern, central and western manufacturing industry"*, China Soft Science, No. 2, pp. 121-129.

Nyabwang, R.N., Dr. Djera, P. Otieno. S., & Nyakundi, F. N. (2013). An Empirical Analysis of liquidity, Solvency, and Financial Health of Small and Medium Sized Enterprises in Kissi Manicipality, Kenya. European Journal of business and Management, 5(8), 1-16.

Use of *Pseudomonas aeruginosa* for Hydrolysis of Alkaline Pretreated Rice straw in Bioethanol Production

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Background

The world is facing a severe energy crisis, which may result in many social and economic issues. Ethanol is an alternative energy solution for this issue. The production of bioethanol using environment-friendly lignocellulosic biomass, will replace fossil fuel combustion; which releases hazardous byproducts to the environment. Alkaline pretreatment is proven to be an efficient method for breaking ester bonds cross-linking lignin and xylan while avoiding the fragmentation of the polymers in the hemicelluloses (Saini, Saini, & Tewari, 2015).

Sri Lankan economy depends on the agro-based industries for a considerable extent. Therefore, the use of crop residues as feedstock will immensely benefit the countrymen and the environment via different facets. Mainly it will incorporate a symbiotic relationship between biofuel production, farmers and the business community.

Pseudomonas aeruginosa is a cellulolytic coliform that can be found in all biota where cellulose biomass accumulates. Lignin in the hemicellulose membrane is the most reluctant for delignification in pretreatment due to the presence of phenyl propanol units. (Haghighi Mood et al., 2013).

The primary objective of the study was to investigate the ability of Pseudomonas *aeruginosa* in hydrolysis of Cellulosic content for enhancing the production of bioethanol using rice straw. Furthermore the study also aims to:

i. Understand the appropriateness of alkaline pretreatment in rice straw for conversion of bioethanol to fermentable sugar by *Pseudomonas aeruginosa*.

ii. Understand the appropriateness of fermentation of biologically hydrolyzed rice straw by yeast.

Methodology

2.1. Biomass Preparation: rice straw was cut into small pieces and blended to make a fine powder. Rice Straw was blended using Oster (Classic) stainless steel 4 point ice crushing blade. Blended rice straw pieces were found to be in an average of approximately 0.4cm in length.

2.2. Alkali Pretreatment: Powdered rice straw was pretreated using 2% NaOH solution. 5g of rice straw was immersed in 100ml 2% NaOH for 30 hours at 55celcius and steeped, temperature and concentration were optimized according to a series of preparatory trials. After steeping, the hydrolysates were filtered through cheesecloth. The color intensity of the black liquor was reduced by using equal proportion of Hydrogen peroxide. Extracted black liquor was subjected to 3, 5-dinitrosalicylic acid (DNS) analysis for reducing sugars (Florendo, Rafael, Mateo, Taylan, & V. Sicat, 2018).

2.3 Optimization of *Pseudomonas aeruginosa*: A stock culture of *Pseudomonas aeruginosa* was obtained from Medical Research Institute (MRI), Colombo, Sri Lanka. This was inoculated into MacConkey agar and nutrient broth. (LaBauve, A.E. and Wargo, M.J., 2012).

2.4 Enzymatic Hydrolysis Procedure: Fresh bacterial culture from MacConkey agar was inculcated in to mixture of pretreated rice straw in a nutrient broth. The final preparation was incubated for 48 hours at 37 Celsius (parameters were optimized according to set of preparatory trials). Hydrolysis filtrate was obtained by centrifugation at 500rpm for 10 minutes (Florendo, Rafael, Mateo, Taylan, & V. Sicat, 2018). DNS analysis was done for hydrolysis filtrate.

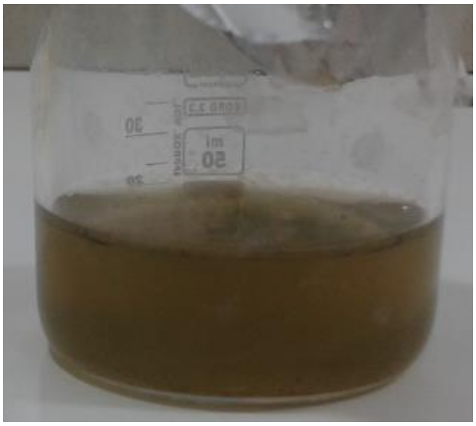

Figure 6 Enzymatic Hydrolyzates containing Pretreated Rice Straw, Nutrient Broth Medium, and culture of *P. aeruginosa*

2.5. Fermentation of Hydrolyzates: Enzyme hydrolyzates were centrifuged for 10 minutes at 12,000 rpm. The 6ml of the supernatant was transferred into a beaker which was aseptically inoculated with a fresh culture of *Saccharomyces cerevisiae* prepared using Potato Dextrose Broth *(*Florendo, Rafael, Mateo, Taylan, & V. Sicat, 2018). Beaker was crimped with aluminum foil and incubated for 48 hours at 32 Celsius, temperature and time duration was optimized by series of preparatory trails. Following which DNS test was done to calculate the theoretical conversion of glucose during the fermentation by measuring the amount of glucose remaining in the hydrolyzate.

2.6. Parameters Analyzed:

Reducing sugar content of black liquor, enzyme hydrolysates and yeast hydrolysates were analyzed and calculated by means of dinitrosalycilic acid (DNS) assay using the following formula:

RS =G x V x df (Florendo, Rafael, Mateo, Taylan, & V. Sicat, 2018)

Where:

RS = fermentable sugars released from cellulose and hemicelluloses after pretreatment, enzymatic hydrolysis, or fermentation (g)

G = the amount of glucose determined from the linear equation on the standard (g/L)

V = total volume of hydrolysates (L)

df = dilution factor

Ethanol yield was calculated using the following formula:

$$E = \frac{G \times 2 \text{ mols ethanol} \times MWe}{MWg}$$

(Florendo, Rafael, Mateo, Taylan, & V. Sicat, 2018)

Where:

E = calculated ethanol yield based on utilized glucose after fermentation (g)

G = gram glucose produce at maximum hydrolysis (g)

MWe = molecular weight of ethanol (46 g/mol)

MWg = molecular weight of glucose (180/mol)

Findings

Table 1 Reducing Sugar Content of Black Liquor, Hydrolyzed Filtrate, and Fermentation Hydrolysate

Material	**Average Reducing Sugar Content**
Black Liquor	5.46975g
Hydrolyzed Filtrate	4.5975 g
Fermentation Hydrolysate	3.18 g

Estimated ethanol yield depends on utilized glucose after fermentation = 2.3498 g

Therefore, estimated yield of ethanol from 5g of rice straw is 2.3498 g. Hence could argue that hydrolysis of alkali pretreated rice straw with *Pseudomonas aeruginos*a is an efficient method to obtain a high yield of bioethanol in an eco-friendly manner. However, it was found as; 46.996% of conversion yield had been obtained through this microbial hydrolysis. According to literature, yeast strain, *Saccharomyces cerevisiae* is capable only for fermentation of glucose released from holocelluloses of rice straw. Hence the glucose content of xylan and hemicelluloses may not attribute for the yield of ethanol.

Practical implications

Alkali pretreatment, using sodium hydroxide (NaOH) is a well-proven method resulting in a high amount of reducing sugar. Alkali pretreatment of rice straw has a significant advantage over untreated rice straw due to exposed cellulose complexes, xylan, and hemicelluloseare more prone to enzymatic hydrolysis.

Conventionally hydrolysis is done by commercially available hydrolyzing enzyme which is relatively expensive. Hence more cheap and eco-friendly hydrolysis methods are highly demanded. Even though rot fungi are widely used for the hydrolysis of rice straw in bioethanol production, major limitation is that cellobiose and glucose released may sometimes inhibit the cellulase activity (Manfredi, Perotti, & Martínez 2015). Hence hydrolysis of rice straw using *P. aeruginosa* bacterium appears as a more promising method. Limited literature is available on the use of *P.aerouginase* in the hydrolysis of the rice straw. Further, a compatible yield of ethanol compared to the commercial enzymes can be obtained through this method. According to literature, alkali pretreated rice straw with a single commercial enzyme complex generally results in 51.51% of ethanol conversion efficiency (Florendo, Rafael, Mateo, Taylan, & V. Sicat, 2018). Hence since the ethanol yield from microbial hydrolysis is 46.996%, it also proves to be an considerably efficient method.

Future Research

This study could have been more accurate and precise if distillation was performed to characterize the exact amount of bioethanol produced. Though the use of *P.aerouginase* is an efficient method for hydrolysis, it is categorized as a Biosafety Level 2 organism. Hence it is recommended to conduct further research to discover a user-friendly strain or to genetically modify of *P.aerouginase* to combat the risk. Further research is focused on optimization of selected vital parameters in pretreatment and hydrolysis of rice straw.

Key References

Florendo, P., Rafael, R., Mateo, W., Taylan, V., & V. Sicat, E. (2018). Alkali Pretreatment of Rice Straw to Enhance Enzymatic Hydrolysis for Bioethanol Production. *CLSU International Journal of Science & Technology*, *2*(1), 7–19. https://doi.org/10.22137/ijst.2017.v2n1.02

Haghighi Mood, S., Hossein Golfeshan, A., Tabatabaei, M., Salehi Jouzani, G., Najafi, G. H., Gholami, M., & Ardjmand, M. (2013). Lignocellulosic biomass to bioethanol, a comprehensive review with a focus on pretreatment.

Renewable and Sustainable Energy Reviews, *27*(November 2018), 77–93. https://doi.org/10.1016/j.rser.2013.06.033

LaBauve, A.E. and Wargo, M.J. (2012). Growth and laboratory maintenance of Pseudomonas aeruginosa. Current protocols in microbiology, 25(1), pp.6E-1.

Manfredi, A.P., Perotti, N.I. and Martínez, M.A.(2015). Cellulose degrading bacteria isolated from industrial samples and the gut of native insects from Northwest of Argentina. *Journal of basic microbiology*, *55*(12), pp.1384-1393.

Saini, J. K., Saini, R., & Tewari, L. (2015). Lignocellulosic agriculture wastes as biomass feedstocks for second-generation bioethanol production: concepts and recent developments. *3 Biotech*, *5*(4), 337–353. https://doi.org/10.1007/s13205-014-0246-5

Chronic Kidney Disease of Unknown Etiology in Sri Lanka; A Critical Review

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Background

In this article, the scientific literature written so far to identify a cause to the CKDu were critically reviewed. Based on the low socio-economic factors in the relevant affected areas, the causes were narrowed down to probably be that of environmental and is related to the farming practices that's prevalent in that region. Therefore, It was investigated more into the chronic exposure to heavy metals associated with agricultural activities

Apart from the above hypothesis, there are 4 others. They are: Are the adverse changes that took place to the ecosystem of the tank cascade system and new commercial practices of agriculture in CKDu prevalent areas became the reason for the spread of CKDu, the role of Leptospirosis and Hantavirus infections to causes of CKDu, Is the use of glycophosphate a cause for spreading of CKDu and if the kids in CKDu endemic regions show early renal damage?

Methodology

Here the methods used by in the referee literature are described with accurate data.

"**Are Cadmium like heavy metals a cause of CKDu?"**

Based on statistics from the Anuradhapura Teaching Hospital, subjects were selected from three divisional secretary areas namely, Medawachchiya and Padaviya which had the highest reported cases of CKDu and Rajanganaya which had a relatively low incidence of CKDu. From each of these divisions,3 grama niladari of 800-1000 population divisions were randomly selected. Next from each division 60 households were selected. All adults over 18 were requested to participate in the study.886 participants were recorded.

A clinic was conducted to each and every participant where their blood pressure measurements were taken and also a spot urine sample was taken. Urine microalbumin was found by precipitating with 25% sulphosalicylic acid using the Light Dependent Resister micro-albumin gel filtration method. This test detects albumin concentrations in the range of 10-200 mg/L with 83% sensitivity and 73% specificity (Peiris et al., 2003)**.** also, a pretested questionnaire was administered to obtain personal data and information on risk factors and past medical history. The farmers were questioned further to find out details regarding the use of pesticides. Positive results were then reconfirmed for microalbuminuria by the Micral strip test.

Data were double entered and analysed using SPSS. (Wanigasuriya, Peiris-John and Wickremasinghe, 2011).

"Are the adverse changes that took place to the ecosystem of the tank cascade system and new commercial practices of agriculture in CKDu prevalent areas became the reason for the spread of CKDu?"

Several samples were taken by teams of scientists of several randomly chosen reservoirs/tanks in CKDu prevalent regions and their mineral composition was tested in labs. (Abeysinghe, Dassanayake and Weerarathna, 2018).

"Are *Leptospirosis* and *Hantavirus* infections likely causes of CKDu? "

In regions of NCP where CKDu is prevalent, individuals with symptoms of CKDu were randomly selected and renal biopsy was done. The samples were then sent to the lab to further observation (Badurdeen et al., 2016). Also, the antibodies against leptospirosis was cross checked with the presence of CKDu in identified patients. (Gamage and Sarathkumara, 2016)

Findings

Hypothesis

"**Are Cadmium like heavy metals a cause of CKDu?"**

According to data collected1, Micro-albuminuria was detected in 6.1% of the females (n = 26) and 8.5% of the males (n = 39) who participated in the study. A significantly higher percentage of subjects with microalbuminuria consumed water from wells situated in fields as compared to those with no microalbuminuria.

Collected location	Fertilizer type	Al	Cr	Ni	Cd	Pb	U
Anuradhapura	Urea	37	3.9	1.4	0.4	3.8	6.0
	NPK	203	3.9	1.4	0.4	3.8	20.1
	TSP	9.949	52.9	35.2	3.6	50.7	107
Medawachchiya	Urea	32	3.9	1.4	0.4	3.8	6.0
	NPK	262	3.9	1.4	0.4	3.7	6.5
	TSP	9.405	43.6	27.1	4.0	79.2	75.9
Medirigiriya	Urea	25	210.3	1.4	0.4	3.7	28.3
	NPK	135	23.7	1.4	0.4	3.8	6.1
	TSP	8.563	59.5	22.3	46.1	41.1	5.8
Girandurukotte	Urea	54	19.6	1.4	0.4	6.0	25.3
	NPK	143	22.8	1.4	0.4	3.8	6.1
	TSP	9.016	65.9	24.2	39.8	58.2	64.1
Girandurukotte	Urea	27	Nd	1.6	Nd	4.0	Nd
	NPK	77	2.6	1.3	0.5	2.6	119
	TSP	5.177	19.2	10.6	2.3	67.2	364
Kandy	Urea	52	21.0	1.4	0.4	3.9	24.4
	NPK	140	22.1	1.4	0.6	3.8	6.1
	TSP	10,113	62.1	27.3	4.3	80.2	166

Table 01: Content of trace elements (mg/kg) in different fertilizers collected from study regions (Chandrajith et al., 2009)

Hypothesis

"Are the adverse changes that took place to the ecosystem of the tank cascade system and new commercial practices of agriculture in CKDu prevalent areas became the reason for the spread of CKDu?"

Higher concentrations of Cd in some tanks in NCP such as Kumbichchankulama (0.05 mg/l), Thuruwila (0.06 mg/l) Karapikkada (0.06 mg/l) were reported. (Bandara et al., 2010).

However, some researches [(Chandrajith et al., 2011) and (Diyabalanage et al., 2015)] found very low levels of Cd concentration (average 0.004µg/l and 0.216µg/l respectively) in reservoirs outside the CKDu prevalent regions.

Hypothesis

"Is the use of glycophosphate a cause for spreading of CKDu?"

Scientists have described changes in proximal tubular cells of Nile Tilapia exposed to glyphosate (Jiraungkoorskul et al., 2003) and the development of hematopoietic necrosis and severe pyknotic nuclei, dilatation of bowman's space, accumulation hyaline droplets in tubular epithelial cells in the proximal tubule and degenerated tubules in juvenile African catfish exposed to glyphosate (Erhunmwunse et al., 2014)

Discussion and Conclusion

Cd content in lotus rhizomes was 253.82 mg/kg. This is a extremely high value. Rice, the staple food, fish and lotus rhizomes are frequently consumed by the local community. This could be a reason for the increase of CKDu (Bandara et al., 2008)

it was found out that about 97% of the CKDu patients drink from the field wells rather than the water supply from the water board. A greater water treatment system to be made available to these well water so as to get rid of the excessive levels of minerals like Cd, As, etc. is proposed.

it was found out that kids living in these areas show early renal damage. It should be looked into if this can also affect their genetics so that it could one day become a genetical disorder.

Until the surface water is fee of toxic metals like Cd, As, etc. clean drinking water should be provided. In this regard Reverse Osmosis plants, Rainwater harvesting should be used.

Should Ensure the availability of drugs and consumables for free/cheap prices. And also should Discourage smoking, betel chewing and use of alcohol

Implementation of a "dialysis for all" policy to ensure access to treatment for all patients with end-stage renal disease (ESRD)should be pushed through.

Last but not least, public forums should be held to educate the farmers and others in these regions the correct ways to handle agrochemicals properly and about CKDu. Also It would be ideal if further investigation on this topic is done in the future.

Key References

Ramirez-Rubio, O., McClean, M., Amador, J. and Brooks, D. (2013). An epidemic of chronic kidney disease in Central America: an overview. *Postgraduate Medical Journal*, 89(1049), pp.123-125.

Jayasumana, C., Gunatilake, S. and Senanayake, P. (2014). Glyphosate, Hard Water and Nephrotoxic Metals: Are They the Culprits Behind the Epidemic of Chronic Kidney Disease of Unknown Etiology in Sri Lanka?. *International Journal of Environmental Research and Public Health*, 11(2), pp.2125-2147.

Wickremasinghe, A., Peiris-John, R. and Wanigasuriya, K. (2011). Chronic kidney disease of unknown aetiology in the North Central Province of Sri Lanka: trying to unravel the mystery. *Ceylon Medical Journal*, 56(4), p.143.

Gunatilake, S., Samaratunga, S. and Rubasinghe, R. (2015). Chronic Kidney Disease (CKD) in Sri Lanka - Current Research Evidence Justification: A Review. *Sabaragamuwa University Journal*, 13(2), p.31.

Wanigasuriya, K., Peiris-John, R. and Wickremasinghe, R. (2011). Chronic kidney disease of unknown aetiology in Sri Lanka: is cadmium a likely cause? *BMC Nephrology*, 12(1).

Production and Analysis of Different Flavored Tea Pellets Made from Big Bulk in Tea Processing

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Background

Tea pellet produced from big bulk is the soluble solid of different flavored tea. In tea manufacturing during olden days, waste tea produced was about 6-8%. This was because the industry was able to get good quality succulent leaf (2 leaves and a bud) for processing because there was plenty of labor available at that time. With the current shortage of labor in the tea industry the quality of leaf has gone down increasing the big bulk % to 10-12% and sometimes as high as 14-15%. Big bulk consist of fibrous tissue that is yellowish to reddish brown color.

In tea manufacturing the largest amount of energy is utilized for withering and drying. Therefore, big bulk at present account for 10-12% of this energy utilization which adds to the cost of production. In view of the above identification of alternative uses of big bulk will be helpful to minimize the big bulk cost of production. It could be used as a medium for mushroom cultivation, as fertilizer etc. Currently most researchers concentrate on the impact of big bulk on made tea yield. Even though there are various alternative methods to dispose big bulk from the industry during tea processing this study was focused on adding value to big bulk by preparation of different flavored quality tea pellets by mixing big bulk with flavor compounds.

This research is to evaluate the possibility of adding value to big bulk by pressing it to different flavored pellets and to determine the suitability of big bulk as a medium for quality tea pellet production.

Methodology

The various processes involved in the production of tea pellets include oven drying, blending and sieving of big bulk and black tea, flavor addition, and molding. An envisaged process has been developed to produce tea pellets from the powdered big bulk. A sample of big bulk was oven dried, ground and sieved (sieve size 75 μm) to obtain powdered big bulk. Similarly, a sample of black tea was also ground, sieved (sieve size 75 μm) and made into powder. Different flavor materials were dried, ground and sieved (sieve size 75 μm) and made into powder. The powdered big bulk, black tea and flavor materials were mixed in different ratios for seven treatments to form pellets. Pellets were pressed using a mold and the dynamometer. Finally, the prepared tea pellets were undergone sensory, statistical and chemical analysis.

Findings

The TF:TR ratio for soluble tea is between 0.08 to 0.1. Total polyphenols ranged from minimum 9-11 for a quality tea. According to the results obtained, the highest moisture content is 6.5% and with acceptable range of TF, TR and total polyphenols. The process is economical as both refuse tea remaining from tea processing and black tea were combined in order to be converted into value added tablet form with different flavors. Statistical analysis of sensory data using a tasting panel showed that best ratios of refuse tea: Black Tea: Flavor material for Ginger and Cardamom 7:2:2 and 7:3:1respectively.

Practical and social implications

This study shows the possibility of producing different flavored tea pellets using big bulk as the medium. The liquor produced by the tea pellets is of good color, pungency and other liquoring characteristics.TF, TR and polyphenol contents are also in the acceptable range.

The tea pellets produced is Soluble in hot water with minimal suspended particles. The tea pellets made from big bulk which is comparable to market tea in quality and liquoring characteristics. Thus, a value-added product can be developed as pellets using big bulk as a medium with different proportions of flavoring material and black tea with satisfactory consumer appeal.

It is possible to develop value added products in the form of pellets using big bulk and flavor material to generate additional income from material which otherwise considered as a waste problem.

Future research

It is necessary to evaluate the economic feasibility of the technology involved in preparation of tea pellets and also should identify suitable packaging for extended shelf life. And also it is suggested to study the economics of industrial production for a marketable product.

Key References

Sinija, V.R., Mishra, H.N. and Bal, S., 2007. Process technology for production of soluble tea powder. Journal of Food Engineering, 82(3), pp.276-283

Abesinghe, S.B. and Shyamalee, H.W. (2017). Current status and advances in tea sector of Sri Lanka: Proceedings of International Conference on Advances in Tea, Sri Lanka, 12-13 August, 2017, pp.52-64.

Someswararao CH, Srivastav PP. A novel technology for production of instant tea powder from the existing black tea manufacturing process. Innovative Food Science and Emerging Technology. 2012; 16:143–147

Roberts,E.A.H. & Smith,R.F. (1963). The phenolic substances of manufactured tea. IX. The spectrophotometric evaluation of tea liquors. Journal of the Science of Food and Agriculture, 14, 689–700.

A Comparative Study on Customer Satisfaction of Traditional Banking and Online Banking

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Background

In today's information age, people, business and institutions focus more on speed and scope of activities. Thus, the current society is turning into a "network society" which is a product of digital revolution caused by the increasing use of technology to ease the work and save time (Castells, 2014). The digital revolution has fundamentally affected the banking industry which is one of the main service sectors in Sri Lanka. According to emarketer (2007), 80 million adults conduct banking services online. Shih (2008) believed that banks are using e-banking to achieve the objectives of high customer acceptance and satisfaction, high profitability and competitive advantage (Yang, Cheng, & Luo, 2009). Prior to e-banking, people used to obtain services of the banks by visiting the bank called as Traditional Banking. They had to spend their time, money and effort to go to the banks. Eventually, people started to experience flaws in Traditional Banking. They had to wait in long queues, spend money and time for bank visits.

At present, people find it very difficult to find time to physically visit the bank to undertake regular transactions due to their busy life styles. As a solution, banks are exploring alternative ways to provide a better service for the people by providing online banking facility.

According to Patil (2014), online banking is also known as e-banking or internet banking or web banking which is about carrying out bank transactions via internet. Investopedia (2018) defines Online banking as the user's ability to do the financial transactions with the internet including every service which is obtainable traditionally through a local branch, for e.g. deposits, which is done online or through the mail, and online bill payment through the internet etc. Online banking facilities were emerged in New York in 1981 with the institution of home banking facilities using Videotex system (Cronin, 1997). The term "online" became famous in 1990's and with that internet banking grew tremendously in Europe and USA. In 2000, 80% of the banks provided online banking facility and in the year 2012, 423.5 million individuals were using online banking globally (Sharma, 2016). With the growth of online banking around the world, almost all the banks in Sri Lanka also tried to adopt this facility for better utilization of resources and to provide a better and convenient banking service for their customers. So, as a leading commercial bank in Sri Lanka, ABC bank introduced online banking system to their customers. The current study is about customer satisfaction on traditional banking and online banking of ABC Bank PLC, which is one of Sri Lanka's fastest growing bank in banking industry. It is providing value added services and products to the customers. Since both the banking aspects have advantages as well as disadvantages, this study mainly focus on customer satisfaction of traditional banking vs online banking and the significant differences among the e-banking users and non e-banking users.

Methodology

The sample was 50 customers from ABC Bank in Nugegoda, Sri Lanka which was selected using the Convenience sampling method due to convenient accessibility and proximity. The study was mainly based on primary and secondary data. The current study is a descriptive and cross sectional whereas study setting is a field study. The unit of analysis of the study was individuals as well as dyads. Investigation was conducted in non-contrived setting with a minimal interference of the researchers.

A standard questionnaire and interview methods were used to collect the information from the respondents. Questionnaire used to gather data was prepared based on the review of literature and included 17 questions with 100% response rate from the sample. Individual questions were analyzed by using measures of central tendency and measures of dispersion and further adapted univariate and bivariate analysis to analyze the data evocatively.

Findings

According to the information gathered from the respondents it can be noted that respondents over 26 years of age are using online banking more frequently than respondents' age below 26 years old. As per the analysis 64% of the respondents are using online banking to do their day to day transaction. And 69%of the customers are using online banking to do their transaction at ABC Bank compared to other banks. When it comes to Online Banking Experience of Respondents, majority of them are using online banking to do their transactions, which is 64%. 36% of the respondents mentioned that they are not using online banking because majority of them prefer to have a human contact and 11% of them mentioned that they are reluctant to use online banking because they have security concerns. According to the findings, majority of customers which is 62% agree with Online Banking being more convenient than Traditional Banking. Most of the respondents mentioned easiness to handle their banking transactions, security and safety, and convenience are the most important reasons for them to have an online bank account. According to the findings based on Trustworthiness of Online banking system, most of ABC bank customers said "Yes". Further, majority of the respondents who's using online banking facility are rarely visiting the bank or visiting the bank once a month only. It can be noted that most of the online banking respondents are using online banking facility to pay their utility bills, to transfer money, to pay insurance premiums or installments and to check the balance. When it comes to overall analysis, respondents prefer online banking more than traditional banking at ABC Bank.

Practical and Social Implications

Banks need to develop more user-friendly interfaces on their online banking platforms for people who are not fluent with technology or internet so that it reduces the complexity. Further, if the bank can give their online banking services for free of charge to the customers, they will be motivated to do every transaction with online banking facility without visiting the bank.
According to the suggestions given by ABC Bank customers', bank needs to take further steps to tighten the security of online banking. Bank should provide more information regarding online banking system highlighting the importance and usage, and how it will save time and add value to the customers.
If banks can use the new methods and technology, it will ease their customers' lifestyle and also it will enable them to adopt more environmentally friendly methods to do their transactions.

Future Research

As for future work, we are planning to use a large sample size to get more accurate and reliable information's when conducting the primary data analysis. Adopting more than one method to collect primary data such as Interviews to get more insights from customers will also be beneficial. Further, this study can be expanded by investigating on the other factors such as customer satisfaction on Traditional Banking, Green banking and Job satisfaction of banking employees.

Keywords: *Online Banking, Traditional Banking, Customer Satisfaction*

Key References

Castells, M. (2014). The Impact of the Internet on Society: A Global Perspective [Online]. https://www.technologyreview.com/s/530566/the-impact-of-the-internet-on-society-a-global-perspective/: MIT Technology Review. [Accessed 02.07. 2018].

Dineshkumar V. S. (2012). Impact of E-Banking on Traditional Banking Services. International Journal of Computer Science and Communication Networks.

Lemma, E. (2017). A Comparative Study of Customer Satisfaction on E-Banking Products in Addis Ababa and Trivandrum. International Journal of Business Management & Research. 7. pp:53-60. 10.24247/ijbmraug20176.

Patil, A. (2014). Customer Satisfaction of Online Banking A Comparative Study in public sector bank and private sector bank w.r.t. SBI and ICICI in Pune (Chinchwad) City. International Journal of Management and Commerce Innovations. 2(1). pp: (71-78)

Sharma, S. (2016). A detail comparative study on e- banking VS traditional banking. International Journal of Applied Research. 2(7). pp: 302-307

Yang, J., Cheng, L. and Luo, X. (2009) 'A comparative study on e-banking services between China and USA', Int. J. Electronic Finance. pp: 235-252

The Impact of Job Stress on Job Satisfaction: A Study Among Nursing Staff of Selected Private Hospitals in the Matara District

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Background

Hospitals play an important role in the development of a country. The main purpose of a hospital is to keep society healthy and happy. Government hospitals, as well as private hospitals, play a major role in keeping society healthy. To achieve these targets nurses should have the skill and should be mentally fit. If it is not so, the society has to undergo various difficulties and harassment as a result of misconduct of hospital staff. As a society, we Sri Lankans have experience in even losing lives of patients as a consequence of the negligence of the responsibilities of the hospitals' staff. These kinds of situations may give a bad image to the whole health sector and it will decrease the confidence of the society. These situations mainly affect private hospitals as they are business oriented.

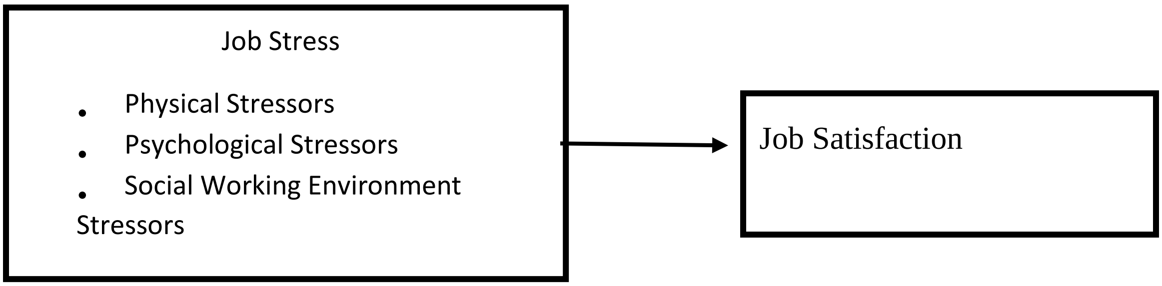
Customers of private hospitals want to get faster recovery from diseases and effective service from hospitals. As services of private hospitals are effective and rapid than that of the government, this led to attracting patients to receive treatment from private sector hospitals. Hence, this gave the opportunity to establish more private hospitals throughout Sri Lanka. To supply better service for the customers, the staff of the private hospitals has to work longer hours and to be punctual than government hospitals staff. Therefore, sometimes the staff of private hospitals must sacrifice the interests in their lives and also their family members. This may lead them to become stressed.

Hospital staff, especially nurses have more responsibility to do work better. Nurses have duty about caring patient mental and physical health properly and prevention of diseases, it indirectly creates a job stress among nurses. Because nurses always work with human life, and they always struggle to protect or reclaim a patient's life. It has created a more stressful working environment than the other sector employees. But the nursing staff in the hospitals have to work more efficiently to fulfill all the requirements of the patient.

Gulavani & Shind (2014) mention that variety of stressors relating to nurses, which include poor working relationships between nurses and doctors and other healthcare professionals, demanding communication and relationships with patients and relatives, emergency cases, high workload, understaffing and lack of support or positive feedback from senior nursing staff, role conflict and home-work imbalance. Further, French et al. (2000), the nine major sources of stress of nurses categorized under three dimensions. Such as, physical stressor which includes workload, psychological stressor which includes dealing with death and dying, inadequate emotional preparation and uncertainty concerning treatment, social working environment stressor which includes conflict with physicians, problem with peers, problem with supervisors, discrimination, patients and their families (Dayrit & Jabonete 2017).

Nurses who work with high stress do not possess job satisfaction and as a result of that they do not provide a better service. To earn the high level of goodwill and profit in private hospitals should make sure that the employees are satisfied with their jobs or not. Hence, nurses job satisfaction is necessary for the hospitals.

As discussed above, physical, psychological and social working environment stressors are very important predictors of determining the level of the job satisfaction of nurses as well as job stress of nurses. It illustrates that those variables are interconnected with each other. Figure 1.1: Conceptual Framework



Based on these previous studies following hypotheses were developed for testing.

Hypothesis 1 (H_1): There is a negative impact of physical stressors on job satisfaction of nursing staff of the selected private hospitals in Matara District.

Hypothesis 2 (H_2): There is a negative impact of psychological stressors on job satisfaction of nursing staff of the selected private hospitals in Matara District.

Hypothesis 3 (H_3): There is a negative impact of social working environment stressors on job satisfaction of nursing staff of the selected private hospitals in Matara District.

Hypothesis 4 (H_4): Physical stressors, psychological stressors and social working environment stressors will jointly explain the negative impact of job satisfaction of nursing staff of the selected private hospitals in Matara District.

Methodology

The total population of the study was all nurses in the selected private hospitals in Matara District. The sample included 103 randomly selected nurses in the population. The structured questionnaire was used to collect the primary data and univariate and bivariate analysis were used to analyze the data using the SPSS version 22.

Table 1: Correlation analysis and simple regression analysis

Variables / Dimension	Physical Stressors	Psychological Stressors	Social Working Stressors	Job Stress
Pearson Correlation	-.747**	-.793**	-.750**	-.792**
Method	Linear	Linear	Linear	Linear
R Square	0.559	0.628	0.562	0.627
Adjustment R Square	0.554	0.625	0.558	0. 623
F	127.832	170.802	129.555	169.614
Significance	0.000	0.000	0.000	0.000
B- constant	2.780	3.155	2.887	3.047
b- value	-0.319	-0.671	-0.669	-0.378

Findings

The result of correlation analysis and simple regression analysis of the independent variable against the dependent variable is given in the Table 1.1.

According to the findings, it is substantiated that there is a strong negative impact of job stress and its dimensions of physical stressors, psychological stressors and social working stressors on job satisfaction in private hospitals.

Practical and Social Implications

The study discovered that the job stress affects to the job satisfaction of nursing staff in the private hospitals. The findings of this research study shall be important on the theoretical as well as practical scenario and it is important to improve the job satisfaction of nurses for the physical, mental and emotional well-being.

Following recommendations were made to improve the level of job satisfaction more than current level and mitigate the level of job stress of the private hospitals' nurses.

- Recruit qualified and skilled nurses and reducing the turnover of the nurses.
- Provide opportunity to enhance the current knowledge, skills and attitudes.
- Ensure the pleasant working environment.
- Amplification of current pay schedules for nursing personal.

Further Research

Further research studies are suggested to increase sample size of the study and increase the participants from the sample in the selected private hospitals to be involved, consider other dimensions affect to the job stress and job satisfaction of nurses and needs to consider the mixed methods approach to measure the variables.

Key References

AbuRuz, ME 2014, 'A comparative study about the impact of stress on job satisfaction between Jordanian and Saudi nurses', *European Scientific Journal*, vol. 10, no. 17, pp. 162-172.

Dayrit, A & Jabonete, FG 2017, 'Reported work-related stressors among staff nurses in Metro Manila', *Journal of Science, Technology and Art,* vol. 3, pp.69-85.

Mansoor, M, Fida, S, Nasir, S & Ahmad, Z 2011, 'The impact of job stress on employee job satisfaction a study on telecommunication sector of Pakistan', *Journal of Business Studies Quarterly,* vol. 2, no. 3, pp. 50-56.

Mathew, NA 2013, 'Effect of Stress on job satisfaction among nurses in central Kerala', *IOSR Journal of Business and Management*, vol. 7, no. 2, pp. 47-51.

Riaz, M, Ahmad, N, Riaz, M, Murtaza, G, Khan, T & Firdous, H 2016, 'Impact of Job Stress on Employee Job Satisfaction', *International Review of Management and Business Research*, vol. 5 no.4, pp. 1370-1382.

Online purchasing web-platform for a supermarket

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Background

The current scenario of Sri Lanka in the industry of supermarkets is flourishing thereby making ample of room for a number of competitors. As the number of customers are also increasing day by day drastically, the queues are increasing at cashiers and at car parks. Therefore each and every competitor of the super market industry is looking for new ways that would enable them to provide all customers with a more quality service thereby increase the customer satisfaction. Studies such as onsite observations as well as questionaries' and interviews were conducted to analyze the scenario. The questionnaires were performed using Google forms and was very successful.

Many objectives and requirements were identified. Each and every customer must be uniquely identified and recorded within the system. There must be features to facilitate online bill payments, online pharmacy purchasing, online item purchasing. The supermarket must be able to enter data into the system as well as view and manage all orders as pickup and delivery.

Methodology

To develop the new system, I choose the incremental approach methodology. I deemed this because I could benefit a lot by using this approach as my project consists many steps and upgrading such as the front end development, back end development, database connection and configuration, unique account features and facilities, special features, etc. I mainly divided my project into two to three increments.

Findings

The new system facilitates online purchasing via a web-based platform. This platform considers each customer into a unique account. Customers would purchase items online for either pick-up of delivery. Payment will be done via credit/debit card, and cash-on-hand (only for delivery). Customers are being categorized mainly into supermarket loyalty members and those who aren't. The loyalty members have a special privilege to get a personalized staff member and get him/her to select the list of requirements of the customer while having and maintaining an ongoing video chat with the customer. All customers can use the pharmacy by uploading a picture of the prescription and the process can be monitored as well. The customer can pay his electricity/water/telephone bills via this platform. The customer must enter the bill details to the respective data entry form in the web platform and use any of the payment method options supplied in the platform.

In the creation of the whole project, I chose to use the NetBeans IDE as the development environment. The project is java J2ee based. To create the front end, I used html, css, and javascript. To create the back end and other functionalities, I used jsp as well as servlets. Database is implemented using MySQL. To ensure user password security, encryption has been used within the database implementation system thereby only the creator of the password would know what it is. To implement the video call feature, I have used the Skype API. To function it I had to create a bot using the Microsoft Bot Framework. Video call is facilitated through the use of these two. I just had to integrate the project with the Skype API.

Practical and Social Implications

When it comes to implementation, as I have suggested the parallel method, the issues that came up is minimal because for the first time period of the implementation process; both the old system as well as the new system run together. Although there is a bit difficulty in adjusting with the new system features and facilities that the staff employees have to fulfill and work with.

As for the future research purposes this project can be further optimized using the same technologies and many more together as well. There is room for further development within this system both from the customer perspective as well as from the supermarket perspective. The customers can be given new features to search out anything by entering name or a number of the item. Customers can also be given access to modify their profiles which would make the environment more personalized. When it comes to the supermarket side the employee profile accounts and the jobs, they have can be divided into account categories which would then give access to employees who are under that job category and restrict others to their job criteria only.

Key references:

Azure, M., 2019. *Azure Bot Service Documentation.* [Online] Available at: https://docs.microsoft.com/en-us/azure/bot-service/?view=azure-bot-service-4.0 [Accessed 04 May 2019].

Corporation, M., © 2019 Skype and/or Microsoft. *SKYPE for developers.* [Online] Available at:https://dev.skype.com/ [Accessed 04 May 2019].

Corporation, O., © 2019, Oracle Corporation and/or its affiliates . *12.13 Encryption and Compression Functions.*[Online] Available at: https://dev.mysql.com/doc/refman/5.5/en/encryption-functions.html [Accessed 04 May 2019].