LB/DON 18/09

AWARENESS OF DATA WAREHOUSING AND DATA MINING IN THE COMMERCIAL BANKING SECTOR OF SRI LANKA

LITRARY

By

S.L Kulatilake



University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk Supervised By

> Dr. A.S. Perera University of Moratuwa

The Dissertation was submitted, to the Department of Computer Science & Engineering of the University of Moratuwa, in partial fulfilment of the requirement, for the Degree of Master of Business Administration.

Department of Computer Science & Engineering University of Moratuwa

December 2008

004 "08"

93340

TH

DECLARATION

"I certify that this thesis does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any university. To the best of my knowledge and belief, it does not contain any material previously published, written or orally communicated by any other person or me, except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organizations"

Birgingk

22nd Dec, 2008 Date

Signature of the Candidate



University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk.

i

To the best of my knowledge. the above particulars are correct.

UOM Verified Signature

22/12/08

Supervisor

ABSTRACT

Being a survivor in today's competitive business world, where information has become the most important asset, is indeed a colossal task, in itself. Many industries worldwide have taken forward strides by investing heavily in data technology. The banking industry in Sri Lanka is one industry which is highly information centric. This study is focused on measuring the awareness of Data Warehousing and Mining, within the local banking sector and finding out the factors that affect awareness. Data was initially gathered through interviews. A questionnaire was also given out to a sample of commercial bank employees from both the public and the private sectors. The questionnaire measures awareness levels in Data Warehousing and Mining as well as the factors that affect the awareness, which are Knowledge levels of employees, Business Requirements, Influence by higher management which affects the socio technical aspects and cross industry awareness, of Data Warehousing and Mining.

The results of this study indicate, that, in terms of business requirements, basic knowledge and industry knowledge, awareness in the local commercial banking sector is high. It was also found that business practices and management initiatives have a significant impact on the awareness. Socio-technical aspects affected awareness, only where there was a data warehouse already implemented. The study concludes with a list of recommendations that the researcher sees, as suitable for the commercial banking sector in Sri Lanka to adopt, in order to improve awareness and improve usage of Data Warehousing and Mining and thereby improve on the service provided.



ACKNOWLEDGEMENT

First I would like to thank my supervisor, Dr. Shehan Perera for accepting my proposal and always being receptive, supportive and flexible. His constant confidence in me was definitely a driving factor to make this endeavour a success.

I would also like to acknowledge the support and guidance provided by the staff of the Department of Computer Science and Engineering, our head of department, Mrs. Vishaka Nanayakara and Dr. Chandana Gamage, our co-ordinator for the programme. Your patience was invaluable when time was running out.

If not for the coorporation from the banking industry, this research would never have been in existence. I wish to thank all the senior officials who readily granted interviews and to all the employees who took time to fill in the questionnaire.

Special thanks go to my fellow batchmates, Sunari, Nuwan, Malanie and Jagath who helped me in obtaining interviews and in the distribution and collection of data while completing their own research. lib. mrt. ac.lk

There were times when the path was uphill. Thank you Duminda for unconditionally taking time to give advice and show that analysis is in itself an art.

Thank you Wickum, for all the valuable guidance and encouragement, as I travelled along the path of this research study.

A big thank you goes to my family and in-laws who were always receptive and tolerant of the sacrifices that had to be made, in order to make this, a reality.

And last but not least, I wish to thank Milindu, for had it not been for the constant support and encouragement from him, whilst doing his own research, this would not have materialized

TABLE OF CONTENTS

DECLARATIONI
ABSTRACT II
ACKNOWLEDGEMENT III
TABLE OF CONTENTS IV
LIST OF FIGURES VIII
LIST OF TABLES IX
CHAPTER 1: INTRODUCTION1
1.1 Background1
1.1.1 Introduction1
1.1.2 Motivation1
1.2 Research Topic
1.2.1 Problem Statement
1.2.2 Research Objectives ty. of. Moratuwa, Sri Lanka
1.2.3 Significance of the study heses & Dissertations 3
1.3 Research Methodology
1.4 Nature and Form of Results
CHAPTER 2: LITERATURE SURVEY
2.1 The Case for Data Warehousing and Mining
2.1.1 Improved decision making
2.1.2 Better quality of information
2.1.3 Ease of operations
2.1.4 Performance of systems
2.1.5 Better practicality
2.1.5.1 Improving Response Time
2.1.5.2 Improving data quality9
2.1.5.3 Archival reasons
2.1.5.4 Access Control purposes10
2.2 A brief Introduction to data warehousing, Data Marts and Data Mining10
2.2.1 The Data Warehouse11

2

.

`#

٠.

2.2	2.2 Building the Data Warehouse	12
2.2	2.2.1 Extracting Data	12
2.2	2.2.2 Cleaning and Transforming the data	13
2.2	2.2.3 Aggregation and Analysis	13
2.2	2.3 The Data Mart	13
2.2	2.4 The Difference between Data Warehouses and Data Marts	15
2.2	2.5 Data Mining	17
2.3	Data Warehousing and Mining Applied to Business Domains	18
2.4	Data Warehousing and Mining in Commercial Banking	21
2.4	4.1 Achieving Operational performance	21
2.4	4.2 Being customer centric	23
2.4	4.3 Moving towards multi-channel systems	23
2.4	4.4 Regulatory requirements	24
2.4	4.5 Other operational areas	25
2.5	Critical factors in Data Warehousing and Mining	25
СНАРТ	TER 3: METHODOLOGY of Woratuwa, Sri Lanka.	28
	Theoretical Background Theses & Dissertations	
3.1	www.lib.mrt.oc.lk	
3.1		
3.1	Research Approach	
3.2		
3.2	-	
3.2		
3.3		
3.3	3.2 Operationalising the variables Sampling Design	
3.4		
3.4 3.4	1	
3.4		
3.5	Data Collection	
3.5		
3.5		
3.5 3.6	Data Analysis	
5.0	Data Allalysis	

R

N.

ļ

-

14

1

v

3.6.1	Checking Reliability and Validity40
3.6.2	Descriptive Analysis40
3.6.3	Statistical Analysis40
CHAPTER	4: DATA ANALYSIS & RESULTS41
4.1 Rel	iability and Validity41
4.1.1	Reliability41
4.1.2	Validity42
4.2 Des	scriptive Analysis42
4.2.1	Composition of the Sample42
4.2.1.1	Composition by Sector of Bank42
4.2.1.2	Composition by Bank43
4.2.1.3	Composition by whether Data Warehousing and Mining is
	implemented or not43
4.2.2	Descriptive Analysis of Concept and Construct Variables43
4.2.2.1	Business Practices43
4.2.2.2	Management mitiativesf. Moratuwa, Sri Lanka45
4.2.2.3	Socio-technicarAspectsheses & Dissertations
4.2.2.4	Awareness of Business Practices for overall awareness of Data
	Warehousing and Mining49
4.2.2.5	Awareness of Industry practices for overall awareness on Data
	Warehousing and Mining50
4.2.2.6	Awareness of basic knowledge for overall awareness of Data
	Warehousing and Mining51
4.2.2.7	Overall Awareness of Data Warehousing and Mining52
4.2.3	Overall Summary of Research Constructs
4.3 Stat	tistical Analysis53
4.3.1	Awareness of Data Warehousing and Mining53
4.3.1.1	Awareness of Business Practices54
4.3.1.2	Awareness of Basic Knowledge on Data Warehousing and Mining .55
4.3.1.3	Awareness of Industrial Practices56
4.3.2	Relationship between Business Requirements and Awareness
4.3.3	Relationship between Management Initiatives and Awareness
4.3.4	Relationship between Socio-technical Aspects and Awareness

1

+

vi

4.3	3.4.1Relationship when data warehousing is implemented
4.3	Relationship when data warehousing is not implemented
4.3	8.5 Relationship between Skill levels and Awareness
4.3	Relationship between the fact that there is a Data Warehouse already
	implemented and Awareness of Data Warehousing and Mining61
4.4	Overall Results of the Study62
CHAP	FER 5: DISCUSSION & RECOMMENDATIONS63
5.1	Discussion on Awareness of Data Warehousing and Mining63
5.2	Discussion on Management Initiatives for Data Warehousing and Mining
	Awareness
5.3	Recommendations on Improving Management Initiatives
5.4	Discussion on Socio-Technical Aspects for Data Warehousing and Mining
	Awareness
5.5	Recommendations on Improving Socio-Technical aspects
5.6	Discussion on Data Warehousing and Mining Awareness with respect to
	Business Practicesiversity of Moratuwa, Sri Lanka
5.7	Recommendations on Improving Business Practices tions
5.8	Recommendations on Technical perspectives for Data Warehousing and
	Mining73
5.9	Recommendations on having Good Awareness Programs74
CHAP	FER 6: CONCLUSION
6.1 S	ignificance of the Study76
	esearch Findings
	imitations of this Study
	urther Research
REFER	RENCES
	A
AFFIN	1 J J A

1

vii

LIST OF FIGURES

Figure 2.1: Compliance and Regulatory issues that drove IT expenditure in 2007	.24
Figure 3.1: Framework adapted by the International benchmarking study	.30
Figure 3.2: Conceptual framework between Awareness on Data Warehousing &	
Mining and factors affecting awareness	.32



4

÷

University of Moratuwa, Sri Lanka. Electronic Theses & Dissertations www.lib.mrt.ac.lk

LIST OF TABLES

Table 1.1: Important statistics of the banking industry of Sri Lanka as at end 20072
Table 3.1: Break down of types of banks in Sri Lanka
Table 3.2: List of local commercial banks 38
Table 4.1: Reliability Analysis of constructs41
Table 4.2: Validity Analysis of awareness
Table 4.3: Summary table for sector wise frequency of respondents 42
Table 4.4: Summary table for bank wise frequency of respondents
Table 4.5: Summary table for bank wise frequency of respondents43
Table 4.6: Descriptive statistics of Business Practices 44
Table 4.7: Descriptive statistics of quality of information
Table 4.8: Descriptive statistics of churn analysis using historical data
Table 4.9: Descriptive statistics of profitability analysis using historical data45
Table 4.10: Descriptive statistics of Management Initiatives
Table 4.11: Descriptive statistics of importance of a Data Warehouse being stressed46
Table 4.12: Descriptive statistics of stressing the use of a warehouse against whether
there is a DWH amplemented as as . Dissertations
Table 4.13: Descriptive statistics of initiatives on providing training
Table 4.14: Descriptive statistics of importance of recognition 47
Table 4.14: Descriptive statistics of importance of recognition
Table 4.15: Frequencies on providing training on DWH&M
Table 4.15: Frequencies on providing training on DWH&M
Table 4.15: Frequencies on providing training on DWH&M
Table 4.15: Frequencies on providing training on DWH&M
Table 4.15: Frequencies on providing training on DWH&M
Table 4.15: Frequencies on providing training on DWH&M 47 Table 4.16: Frequencies on whether the provided training was related to day-to-day operations 48 Table 4.17: Frequencies on whether motivated to use the DWH solution 48 Table 4.18: Frequencies on whether comfortable and assured with the information. 48 Table 4.18: Frequencies on whether comfortable and assured with the information. 48
Table 4.15: Frequencies on providing training on DWH&M 47 Table 4.16: Frequencies on whether the provided training was related to day-to-day operations 48 Table 4.17: Frequencies on whether motivated to use the DWH solution 48 Table 4.18: Frequencies on whether comfortable and assured with the information from DWH 48 Table 4.19: Frequencies on whether awareness training was provided 48
Table 4.15: Frequencies on providing training on DWH&M 47 Table 4.16: Frequencies on whether the provided training was related to day-to-day operations 48 Table 4.17: Frequencies on whether motivated to use the DWH solution 48 Table 4.17: Frequencies on whether comfortable and assured with the information from DWH 48 Table 4.18: Frequencies on whether awareness training was provided 48 Table 4.19: Frequencies on whether awareness training was provided 48 Table 4.20: Frequencies on anticipation of a data warehousing solution 48
Table 4.15: Frequencies on providing training on DWH&M 47 Table 4.16: Frequencies on whether the provided training was related to day-to-day operations 48 Table 4.16: Frequencies on whether motivated to use the DWH solution 48 Table 4.17: Frequencies on whether motivated to use the DWH solution 48 Table 4.18: Frequencies on whether comfortable and assured with the information from DWH 48 Table 4.19: Frequencies on whether awareness training was provided 48 Table 4.20: Frequencies on anticipation of a data warehousing solution 48 Table 4.21: Descriptive statistics on Awareness of Business Practices 49
Table 4.15: Frequencies on providing training on DWH&M 47 Table 4.16: Frequencies on whether the provided training was related to day-to-day operations 48 Table 4.17: Frequencies on whether motivated to use the DWH solution 48 Table 4.17: Frequencies on whether comfortable and assured with the information from DWH. 48 Table 4.19: Frequencies on whether awareness training was provided 48 Table 4.20: Frequencies on anticipation of a data warehousing solution 48 Table 4.21: Descriptive statistics on Awareness of Business Practices 49 Table 4.22: Descriptive statistics on overall Awareness of Business Practices 49
 Table 4.15: Frequencies on providing training on DWH&M

Å.

banking industry50
Table 4.27: Descriptive statistics on overall awareness on industrial knowledge51
Table 4.28: Frequency on overall awareness on industrial knowledge
Table 4.29: Frequency on basic knowledge on data warehousing and mining52
Table 4.30: Descriptive statistics on overall basic knowledge on data warehousing and
mining52
Table 4.31 Descriptive statistics of research constructs
Table 4.32 One sample t-test results on awareness of business practices mean54
Table 4.33 One sample t-test results on awareness of basic knowledge mean
Table 4.34 One sample t-test results on awareness of industrial knowledge mean56
Table 4.35 Correlation results between Awareness and Business Requirements57
Table 4.36 Correlation results between Awareness and Management Initiatives58
Table 4.37 Correlation results between Awareness and Socio-technical Aspects in the
presence of Data Warehouse59
Table 4.38 Correlation results between Awareness and Socio-technical Aspects in the
absence of Data Warehouse
absence of Data Warehouse
Table 4.40 ANOVA results on awareness between skill definition groups
Table 4.41 ANOVA results on awareness between groups where there is a DWH and
there is no data warehouse62