UNIVERSITI TEKNOLOGI MARA

MODELLING KNOWLEDGE IN EMBEDDED PRODUCT DESIGN - ELECTRONIC DESIGN ISSUES

MOHD NAZRI MUSTAFA

IT Project submitted in partial fulfillment of the requirements for the degree of

Master of Science (Information Technology)

Faculty of Computer and Mathematical Sciences

ABSTRACT

Corporate memory, known as corporate knowledge is an organizational memory. It is made up of the aggregate intellectual assets of organizations. Corporate knowledge is a combination of both explicit and tacit knowledge. Type of corporate knowledge is depends on the domain and nature of the organizations. In organizations that doing research and developments, electronics product designs knowledge regards as one of corporate knowledge. Knowledge sharing grows corporate memory by constantly adding new knowledge to the organizations. However, retrieval of knowledge becomes a complex process when knowledge was recorded manually with uncertain storing location. Thus, it is important to have a system that can capture, store and retrieve knowledge. In order to develop such system, knowledge need to be structure and model. Model is used to capture the essentials features of real systems by breaking them down into more manageable parts that are easy to understand and to manipulate. Models are very much associated with the domain they represent. Even though in tangible form, most of the knowledge was unstructured. In MIMOS, the corporate knowledge which is in tacit form is very much embedded in the employee skills. Therefore, the product design knowledge is more on tacit rather than explicit. In the process of product design, the tacit knowledge is actively transforms to explicit knowledge in form of documents such as issue list and root-cause analysis. Hence, this project will emphasize on modeling product design knowledge based on available documents.

ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and the Most Merciful

Alhamdulillah, all praises to Allah for the strengths and His blessing endowing me with health, patience, and knowledge to complete this work.

The project has been,made with the assistance of many individuals and I am grateful for their contribution and support. I wish to convey my deep appreciation and indebtedness to my supervisor, Associate Professor Dr. Haryani Haron, for her encouragement, support and guidance. Her expertise and invaluable comments helped greatly in the completion of this project.

My appreciation goes to the member of Product System Development Department, MIMOS Berhad, who had shared valuable experience, ideas, skills and wisdom. I would also like to further express my gratitude to all lecturers in FSKM, UITM Shah Alam for knowledge sharing and valuable advice; certainly it has changed me in many ways.

Sincere thanks are also extended to my friends especially Ajid, Azmir, Linda, Huda, Yati, Liza, Sham, and others for their kindness and moral support during my study, their warm friendship are most appreciated. I am also grateful to all those who helped in their own special ways to make this project possible.

Lastly, my most and deepest appreciation goes to my family especially my wife Siti Marina who gave her utmost enduring support during all this years, to my children Nurliyana, Muhaimin and Firas Iqbal for their hectic and courage.

Thank you.

TABLE OF CONTENTS

STU	UDENT	'S DECLAI	RATION			i				
ABSTRACT ACKNOWLEDGEMENT										
									TAI	TABLE OF CONTENTS
LIST OF FIGURES										
LIS'	T OF T	ABLES				viii				
CH	APTER	ONE: INT	RODUCTIO	N		1				
1 .0	Overv	iew				1				
1.1	Project	Project Background								
1.2	Project Objectives									
1.3	Problem Statement									
1.4	Research Question									
1.5	Project Scope									
1.6	Project	Project Significance								
1.7	Structu	ıre	of	the	Report	7				
CHA	APTER	TWO: LIT	ERATURE	REVIEW		8				
2.0	Overvi	iew				8				
2.1	Wireless Communication as Domain Knowledge									
	2.1.1 Radio Frequency Identification (RFID)									
	2.1.2 Bluetooth									
	2.1.3 Wibree									
	2.1.4 Zigbee									
	2.1.5 Ultra Wide Band (UWB)									
	2.1.6 Wireless Fidelity (Wi-Fi)									
	2.1.7	.1.7 IEEE 802.16 WiMAX								
	2.1.8 Cellular Technology									
	2.1.9 Long Term Evolution (LTE)									

	2.1.10	Ultra Mobile Bro	adband (UMB)			15		
	2.1.11	Wireless 4G							
2.2	Embedded Systems and Design								
2.3	Issues in Embedded Product Design								
2.4	Defining Knowledge								
2.5	Knowle	dge Management					20		
2.6	Corporate Memory								
	2.6.1	Organization	of	Cor	porate	Memory	24		
2.7	Knowledge Sharing System (KSS)								
	2.7.1 Knowledge Acquisition and Management								
	2.7.2 Knowledge Retrieval								
2.8	Types		of		KSS		28		
2.9	Knowle	dge Repository					30		
2.10	Knowl	edge		Represent	ati	on	31		
	2.10.1	Ontology					34		
	2.10.2 Ontology Construction								
2.11	Knowle	dge Modelling					36		
2.12	Protege	otege							
2.13	Summary						40		
СНА	PTER 1	HREE: RESEA	RCH MI	ETHODS			41		
3.0	Overvie	W					41		
3.1	Researc	h Approach					41		
3.2	Research Strategy								
3.3	Researc	h Design					43		
3.4	Research Instruments								
	3.4.1 Ontology Development Process								
	3.4.2 Knowledge Capture and Analysis								
	3.4.3 Taxonomies and Conceptualization								
	3.4.4 Modelling								
	3.4.5 Evaluation								
3.5	Summa	ry					49		