

**DEVELOPMENT OF DISCIPLINES BASED
MANUFACTURING INFORMATION SYSTEM
FOR SHIP CONSTRUCTION COMPANY**

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ABSTRACT

New models and facilities are needed for the growing economy and the very hard competition that it brings with it. Among the many models of information systems two have been very strong: Workflow Management Systems (WFMS) and Enterprise Resource Planning (ERP) systems.

While both systems are very strong for integration and other management applications, a complete understanding of these methods is still lacking. This research first aims at the importance of organization integration and the structure of these two models is compared. Subsequently a comprehensive analogy of WFMS and ERP systems and the major difficulties in integration of the models in application is taken into account.

In the end a case study is performed on a major Iranian ship company called SADRA. The current workflow in this company is first evaluated and put under major scrutiny. In the end a new framework for the work flow of this company is developed based on the basic concepts of ERP and WFMS. This Frame work reduces a major amount of redundancy in the data patterns. The final result of this study is a Discipline-Based Manufacturing Information System for a Ship Construction Company.

ABSTRAK

Model dan kemudahan baru adalah diperlukan di dalam pembangunan ekonomi yang pesat sejajar dengan persaingan hangat yang searah dengannya. Antara kebanyakan model di dalam sistem maklumat yang kukuh dan stabil adalah Sistem Pengurusan Aliran Kerja (WFMS) dan Sistem Pengurusan Sumber Organisasi (ERP).

Meskipun kedua-dua system adalah kukuh dan stabil dari segi pengintegrasian dan aplikasi-aplikasi pengurusan yang lain, kefahaman yang mendalam dan menyeluruh berkaitan dengan kaedah-kaedah tersebut masih lagi di peringkat yang lemah. Sasaran utama kajian ini adalah mengkaji kepentingan integrasi organisasi dan mengkaji perbandingan struktur kedua-dua model. Sejurus itu, analisa yang komprehensif dan kekangan yang dihadapi di dalam mengintegrasikan kedua-dua model di dalam sesuatu aplikasi juga diambil kira.

Akhir sekali, kajian kes dijalankan ke atas sebuah syarikat perkapalan Iran, SADRA. Aliran kerja semasa organisasi tersebut terlebih dahulu dikaji dan dianalisa dengan teliti. Hasil akhir kajian ini adalah rangka kerja baru untuk aliran kerja organisasi tersebut yang dihasilkan berdasarkan kepada konsep ERP dan WFMS. Rangka kerja ini mengurangkan jumlah pengulangan yang besar di dalam data. Sistem Pengurusan Maklumat Pengeluaran untuk Syarikat Pembinaan Kapal.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	TITLE	i
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENTS	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xi
	LIST OF FIGURES	xii
1	Introduction	1
	1.1- Introduction	1
	1.2- Problem Statement	3
	1.3- Project Objectives	3
	1.4- Project Scope	3
	1.5- Research Assumptions	4
2	Literature Review	6
	2.1- Introduction	6
	2.2- The reason of enterprise integration	7
	2.3- Integration Requirements Infrastructure	8
	2.4- Role of information technology in the organization	10

2.5- Technology	10
2.6- Information technology	11
2.7- Information systems (IS)	14
2.8- Integration against Intermediary	16
2.9- The necessity of ERP utilization in advanced organizational application achievement	17
2.10- Required precautions for utilization of integrated systems	18
2.11- Workflow Management Systems (WFMS)	19
2.11.1- <i>WFMS Objectives</i>	21
2.11.2- <i>Abbreviated Expressions in WFMS systems</i>	22
2.12-Enterprise Resource Planning (ERP)	28
2.12.1- <i>ERP Concept</i>	29
2.12.2- <i>ERP systems objective</i>	29
2.12.3- <i>ERP Definitions</i>	30
2.12.4- <i>The procedure of Company's business performance improvement by ERP</i>	35
2.12.5- <i>Required time for an ERP project</i>	36
2.12.6- <i>Stages of ERP project</i>	37
2.12.7- <i>Fixed Part by ERP in Business</i>	37
2.12.8- <i>Principle Roles in ERP's project team</i>	38
2.12.9- <i>The Reasons for use ERP systems</i>	39
2.12.10- <i>Advantages of using ERP</i>	40
2.12.11- <i>Design of ERP</i>	40
2.12.12- <i>Interfaces</i>	40
2.12.13- <i>Data Exchange</i>	41

	<i>2.12.14- Go live and support</i>	42
	<i>2.12.15- Obstacles to success</i>	42
	<i>2.12.6- Fixed Part by ERP in Business</i>	42
2.13-	Case Study	46
	<i>2.13.1- Ship Construction Industry</i>	46
	<i>2.13.2- SADRA</i>	46
	<i>2.13.2.1-History of SADRA</i>	46
	<i>2.13.3- Problems statement of SADRA</i>	48
	<i>2.13.4 –Principals</i>	48
	<i>2.13.5- Organization chart of SADRA</i>	50
3	System Development Methodology	50
	3.1- Introduction	51
	3.2- Project Methodology	55
	3.2.1- Planning Phase	55
	3.2.2- Analysis Phase	56
	3.2.3- Design, Develop & Testing Phase	56
	3.3- Evolutionary Prototyping	57
	3.3.1- Planning Phase	58
	3.3.2- Analysis Phase	59
	3.3.3- Design, Develop & Testing	59
	3.3.4- Methodology Justification	
	3.4- Chapter Summary	60
4	System Analysis	61
	4.1- Introduction	61
	4.2- Current Stage of SADRA	62
	4.2.1- Task Description	62
	4.2.2- Structure	64
	4.2.3- Piping	65
	4.2.4- Electrical	65

4.2.5- Outfitting & Machinery	66
4.2.6- HVAC	66
4.2.7- Painting	66
4.2.8- Architecture	67
4.2.9-Resource Distribution of SADRA	67
4.3- Identification of the relationships between different disciplines and intermediary identification	69
4.4- Elaboration of the current (real-time) planning unit, Sadra Co.	72
4.5- General structure of Work Process at SADRA	73
4.6- Proposed New Framework	
4.7- System Analysis	78
4.7.1- Identification and Automation of linkage process between 7 disciplines	78
4.7.2- Data Flow Diagram (DFD) of Current System	80
4.7.2.1- SADRA DFD level 0	80
4.7.2.2.- SADRA DFD level 1	81
4.7.2.3- SADRA DFD level 2.3	82
4.7.2.4- SADRA DFD level2.4	84
4.7.3- SADRA current stage Work Flow	85
4.7.4- SADRA Schematic before use ERP	87
4.7.5- Automation	87
4.7.5.1- SADRA Schematic after use ERP	89
4.8- Propose the Conversion of Sadra work structure from project-centered to	90

	discipline centered	
	4.8.1- Reasons of work	91
	Structure modification from project oriented situation to discipline oriented situation	
	4.9- Design a New System of SADRA	94
	4.9.1- Explain Data Flow Diagram(DFD) of new System	95
	4.9.2- Work Flow of New System	98
	4.9.3- Database and Entity relationship Diagram (ERD)	100
	4.10- Calculate the progress Report	110
5	System Design, Implementation and Testing	112
	5.1- Introduction	117
	5.2- User Interface Design	
	5.3- Example of System Input & Output	118
	5.4- Database Development	120
	5.5- Program Development	
	5.6- System Testing and Evaluation	
	5.6.1 Integration Testing	
	5.6.2 User Satisfaction Test	
	5.7- Conclusions	
6	Conclusions	
	Future Work	
	References	

CHAPTER 1

INTRODUCTION

1.1 Introduction

Current organizations can not be managed by previous knowledge and view. This is the fact that today's developing management knowledge has achieved and believed both in academic and experimental or industrial areas.

In the information period which is several decades old, extensive major changes have been happened in the fields of organizations' management and administration. In the current situation, the global economy is based on information and communication and other parameters like: research and development, intense competitions and international markets put force on the producers to make their product or services in a more extensive, diverse range and with the lowest price and highest possible quality for the desired time of the customer.

Therefore, the main concern of the responsible managers is concentrated on optimized utilization by means of principal planning for available resources. Desirable and optimized usage of resources is the wish of each manager or planning expert for all periods of time. As these resources are in correlation with each other, therefore changing the condition of each of them can affect others conditions and this

is the point that preparation of an integrated and coordinated basis looks necessary for resource management. Enterprise resources have two physical and informative aspects that from a manager scope of view the informative scope of it is being used for planning.

In the current period and also current competitive market the role of computer based tools and techniques are obvious in managers' decision making process and in fact it becomes more considerable. As a matter of fact, as the real problems in industry are the problems that are related with regularity, coordination, integrity, education, understanding and communication not numerical and optimization problems, therefore such computer integrated systems have found a special position in managerial decision making process and dismissing such systems is a large gap in competitive environment of current global markets for enterprise managers.

Such related components with these computer systems are data and information, which are called Information Technology in the recent decades, provide competitive tools for managers. Indeed, in these competitive environments more successful managers are the one who have access to the true and accurate information in the necessary periods of time which requires integration and coordination between the achieved and received information to the managers. For this purpose, many systems have been found which have been tried to integrate the enterprises' information like Workflow Management System (WFMS) and Enterprise Resource Planning (ERP). Two mentioned systems, in their self extent of definition, can integrate enterprise information (existing work procedures and practical planning in enterprises) and also can be used to provide the information for each level of management and assist managers in decision making process.

It is worthy to mention that some phrases and sentences are repeated many times in this research and this is due to the importance and the key rule of them.

1.2 Problem Statement

Existing Business Structure of Ship construction company (SADRA) has some problems about integration data and some side costs and Delay in delivery of some phases of projects. If this structure and system become improve, it will help to managers of this company to increase the productivity of this company.

1.3 Project Objectives

- To study ERP and WFMS solutions for a ship construction company.
- To study the current work flow in the manufacturing department of a ship construction company.
- To propose a new business structure based on WFMS and ERP for ship construction company focusing on manufacturing department.
- To propose a new system based on the proposed business structure for the manufacturing department of a ship construction company.
- To develop a prototype of a Discipline-Based Manufacturing Information System for Ship Construction Company.

1.4 Project Scope

The project will be conducted within the below boundaries:

- The focus of this project will be on the current activities of the ship construction companies which generally include seven different

disciplines i.e. structure, piping, electrical, HVAC, outfitting and machinery, architectural, and painting. All these disciplines have two sub-divisions; engineering and execution.

- Productivity, cost reduction, and project accomplishment time reduction will be the tools for validation of the new design by comparison between the current and new systems.
- The proposed system will be focusing on the manufacturing department of the ship construction company.

1.5 Research Assumptions

a- Integration and coordination expressions in the managerial literature were discussed since 1930 until the current time and their definitions were changed during these years. Now a day, coordination, which is a more general expression, refers to people-oriented and also system-oriented subdivisions. However, integration is mostly used in discussions about the relations between software systems. As in this research the discussion is about enterprise and software aspects of integration, therefore these two expressions will be used interchangeably.

b- In this research, enterprise integration means enterprise information system integration that integrates operational procedures in workflow management systems (WFMS) and integrates enterprise application programs in enterprise resource planning (ERP) to integrate the whole enterprise (see Table 1).

c- In this research, enterprise integration refers to the enterprise itself and does not include the integration between enterprises. For more information, refer to reference 1.

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