

ISSN 0974-763X

# **SOUTH ASIAN JOURNAL OF MANAGEMENT RESEARCH (SAJMR)**

## **SPECIAL ISSUE**

Volume 13, No. 2

April, 2023



**Chhatrapati Shahu Institute of Business  
Education & Research (CSIBER)**

(An Autonomous Institute)

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

# SOUTH ASIAN JOURNAL OF MANGEMENT RESEARCH (SAJMR)

ISSN 0974-763X

(An International Peer Reviewed Research Journal)



Published by

**CSIBER Press, Central Library Building**

**Chhatrapati Shahu Institute of Business Education & Research (CSIBER)**

University Road, Kolhapur - 416 004, Maharashtra, India

Contact: 91-231-2535706/07 Fax: 91-231-2535708

Website : [www.siberindia.edu.in](http://www.siberindia.edu.in) Email : [sajmr@siberindia.edu.in](mailto:sajmr@siberindia.edu.in), [sibersajmr@gmail.com](mailto:sibersajmr@gmail.com)

## Chief Patron

**Late Dr. A.D. Shinde**

## Patrons

**Dr. R.A. Shinde**

Secretary & Managing Trustee

CSIBER, Kolhapur, India

**CA. H.R. Shinde**

Trustee Member

CSIBER, Kolhapur, India

## Editor

**Dr. R.S. Kamath**

CSIBER, Kolhapur, India

## Editorial Board Members

**Dr. S.P. Rath**

Director, CSIBER, Kolhapur

**Dr. Francisco J.L.S. Diniz**

CETRAD, Portugal

**Dr. Paul B. Carr**

Reent University, USA

**Dr. T.V.G. Sarma**

CSIBER, Kolhapur, India

**Dr. K. Lal Das**

RSSW, Hyderabad, India.

**Dr. Deribe Assefa Aga**

Ethiopian Civil Service University, Addis

Ababa, Ethiopia

**Dr. Biswajit Das**

KSOM, KIIT, Bhubaneswar

**Dr. Yashwant Singh Rawal**

Parul University, Vadodara, India

**Dr. Nandkumar Mekoth**

Goa University, Goa

**Dr. Gary Owens**

CERAR, Australia

**Dr. Rajendra Nargundkar**

IFIM, Bangalore, India

**Dr. Yogesh B. Patil**

Symboisis Inst. Of International Bsiness, Pune,

India

**Dr. R.M. Bhajracharya**

Kathmandu University, India

**Dr. K.V.M. Varambally**

Manipal Inst. Of Management, India.

**Dr. B.U. Dhandra**

Gulabarga University, India

**Dr. Pooja M. Patil**

CSIBER, Kolhapur, India

Type Setting & Formatting

**Mr. S.Y. Chougule**

# South Asian Journal of Management Research (SAJMR)

Volume 13, No. 2

Special Issue

April, 2023

## C O N T E N T

---

### Editorial Note

- Effects of Workplace Environment on employee Performance In The Ministry of Revenue**  
*Zewdie Zakie Koyira* 1 – 16  
*Consultant at Leadership, Policy & HR training Center  
Ethiopian Civil Service University, Addis Ababa, Africa*
- Customer's Perspective on Green Banking In Mauritius**  
*Eric V. Bindah* 17 – 29  
*University of Technology, Mauritius*  
*Leenshya Gunnoo*  
*University of Technology, Mauritius*
- Critical Review of The Citizens' Channel Preferences And Level of E-Participation In Municipal Governance Process In Mekelle City Tigray; Ethiopia**  
*Dr. Meresa Ataklty* 30 – 45  
*Ph.D in Urban Planning and Development from Ethiopian Civil Service University (ECSU), Addis Ababa, Ethiopia*  
*Dr. Kanchan Singh*  
*Department of Urban Planning and Development (UPD), College of Urban Development & Engineering at Ethiopian Civil Service University (ECSU), Addis Ababa, Ethiopia*
- Saving Practice Among Micro And Small Enterprise Operators In Addis Ababa: Inter Sector Comparison In Yeka Sub City**  
*Sofoniyas Mekonnen* 46 – 56  
*Consultant, Center for Public Financial Management Training and Consultancy Ethiopian Civil Service University, Research and Publication Coordination Office Addis Ababa, Ethiopia, Africa*
- Role of Artificial Intelligence (AI) In Hospitality Industry**  
*Seema Jaipurjar* 57 – 62  
*Research Scholar, Amity University, Rajasthan*  
*Prof. (Dr.) Sanjeeb Pal*  
*Professor and Director, Amity University, Rajasthan*  
*Dr. Yashwant Singh Rawal*  
*Associate Professor, Parul University, Gujarat.*
- Customer Behaviour towards Corporate Social Responsibility: A Study in the Banking Industry in Mauritius**  
*Eric V. Bindah* 63 – 77  
*University of Mauritius*  
*Leenshya Gunnoo*  
*University of Technology, Mauritius*
-

---

<b>Level of Continuous Quality Improvement and Factors Affecting the Implementations of CQI in Public Hospitals - Addis Ababa, Ethiopia</b> <i>Ketemaw Zewude</i> <i>Public Health Department in Reproductive Healths, at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia</i> <i>Dessie Abebaw</i> <i>Public Health Department of Reproductive Healths, Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia</i> <i>Baye Sisay</i> <i>Department of Public Management, Ethiopian Civil Service University, Addis Ababa, Africa</i> <i>Getabalew Endazenaw</i> <i>Public Health Department of Reproductive Healths, Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia</i>	<b>78 – 91</b>
<b>A Review of The Legal Framework on Money Laundering And Terrorism Financing In Mauritius In The Context of The Trade Relationship Between Mauritius And India</b> <i>Bhavana Mahadew</i> <i>Senior Lecturer</i> <i>School of Business Management &amp; Finance, University of Technology, Mauritius</i> <i>Bhavana.mahadew@utm.ac.mu</i>	<b>92 – 102</b>
<b>A Micro-Businesses Perspective on Factors Affecting the Adoption of Mobile Payment Services During The Covid-19 Pandemic In Mauritius</b> <i>Leenshya Gunnoo</i> <i>University of Technology Mauritius</i> <i>Eric V. Bindah</i> <i>University of Mauritius</i>	<b>103 – 114</b>
<b>Content Analysis of BYJU’s App Reviews: Data Analytics Approach</b> <i>S.S. Jadhav</i> <i>Student, MBA, CSIBER, Kolhapur, India</i> <i>R.S. Kamath</i> <i>Associate Professor, CSIBER, Kolhapur, India</i>	<b>115 – 129</b>
<b>Computerized Generic Model for Selection of Manufacturing Method Based on Multiple Objectives and Functions</b> <i>Girish R. Naik</i> <i>Dept of Mech. Engg., Gokul Shirgaon, Kolhapur – 416234 India</i> <i>Poornima G. Naik</i> <i>Dept of Computer Studies, CSIBER, Kolhapur – 416004, India</i>	<b>130 – 142</b>
<b>Technology's Impacts on Tourism Management: A Study</b> <i>Saurabh Dattatray Vichare</i> <i>Student, CSIBER, Kolhapur</i>	<b>143 - 149</b>
<b>A case study : Utilization of Boiler Fly Ash To Reduce The Parameters of Effluent Generated In Shree Datta S.S.S.K. Ltd., Shirol</b> <i>Deepa Bhandare</i> <i>Env. Officer, SDSSSK</i> <i>Varsha Kadam</i> <i>Field Officer, MPCB</i> <i>Vishwajit Shinde</i> <i>Prod. Manager, SDSSSK</i>	<b>150 – 166</b>

---

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

**Girish R. Naik**  
Dept of Mech.Engg.,  
Gokul Shirgaon,  
Kolhapur – 416234  
India

**Poornima G. Naik**  
Dept of Computer Studies,  
CSIBER, Kolhapur – 416004  
India

---

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

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

---

## Introduction

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

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

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

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

## Objective and Function Grading Table

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

Method No.	Class	Function																								Objective																	
		1						2						3						4						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
1	S	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6																		
2	M																																										
3	M																																										
.	X																																										
.	P	FUNCTION GRADES												METHOD GRADES																													
.	.																																										
.	.																																										
110																																											

**Fig. 1. Structure of Objective and Function Grading Table.**

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

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

## Literature Review

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

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

### Research Methodology

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

### Mathematical Formulation - Method Selection Matrix

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

### Multi Objective Multi Function Criterion for Manufacturing Method Selection

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

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

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

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

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

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

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

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

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

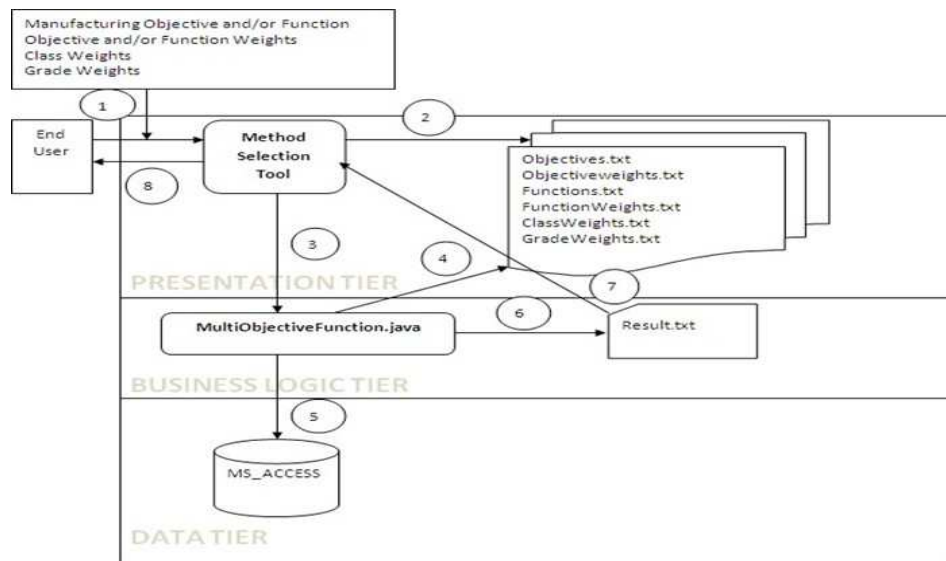
- Single Objective
- Single Function
- Single Objective and Single function
- Multi Objective
- Multi Function
- Multi Objective and Multi Function

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

**Table 1. No of Permutations for Selection of Manufacturing Method in various Scenarios**

Selection Type	No. of Permutations
Single objective	16
Single function	24
Single objective and single function	384
Multiobjective	${}^{16}C_1 + {}^{16}C_2 + {}^{16}C_3 + \dots + {}^{16}C_{16} = 2^{16} - 1 = 65,536$
Multi-function	${}^{24}C_1 + {}^{24}C_2 + {}^{24}C_3 + \dots + {}^{24}C_{24} = 2^{24} - 1 = 1,67,77,216$
Multi-objective and multi-function	$(2^{16} - 1) * (2^{24} - 1) = 10,99,51,16,27,776$

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

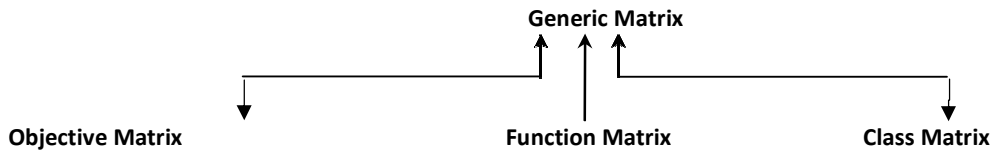


**Fig. 2. Work Flow of the Conceptual Model**

**Class Diagram for Implementation of Business Logic**

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





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

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

### Results and Experimental Work

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

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

**Objective 2**– Reduce Production costs

**Objective 3**– Rapid response to market demands – product design

**Objective 6** – Progress towards zero inventory – increase inventory turnaround

**Objective 7** – Improve management knowledge and information– enterprisecommunication

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

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

**Table 2.1 Objective Weights**

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

**Table 2.2 Class Weights**

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

**Table 2.3 Grade Weights**

Grade	Weight
a	6
b	4
c	3
d	1

### Solution :

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

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

Note : Matrix starts with zero index

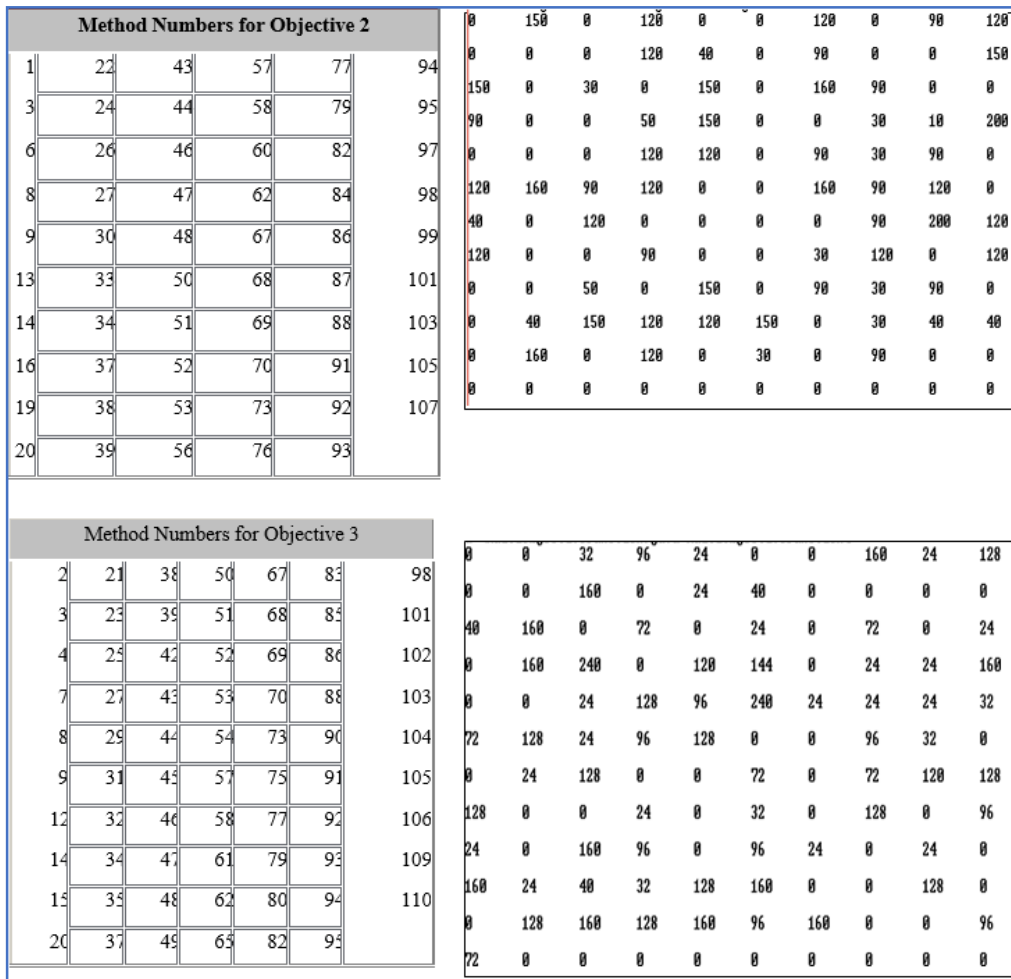


Fig. 4.  
Fig. 3.

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

**Objective 2 U Objective 3**

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

**Method Numbers for Objective 2 and Objective 3**

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

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

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

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

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

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

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

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

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

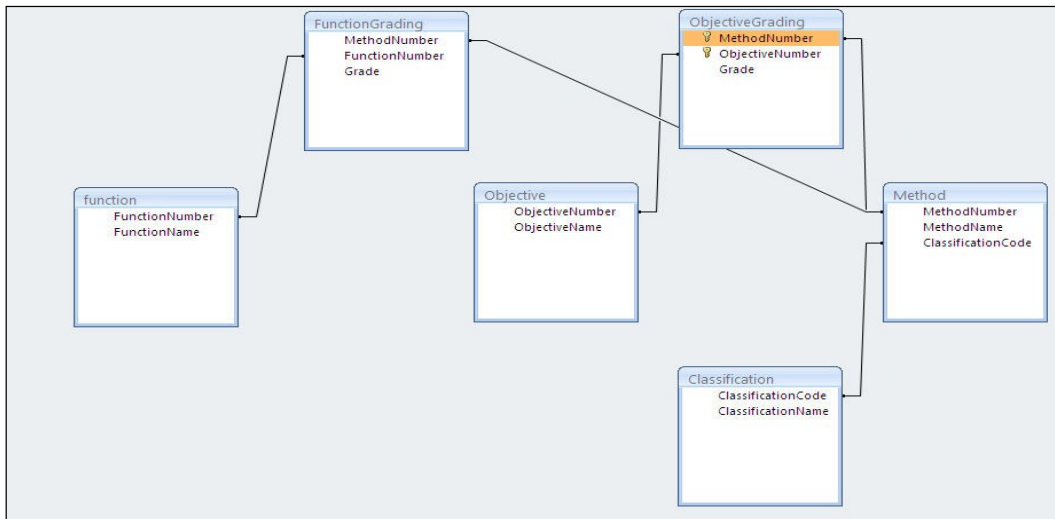


Fig. 6. Structure of Manufacturing Database



**Fig. 7. Graphical User Interface for Presentation Tier**

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



**Fig. 8 (a) Selection of Manufacturing Methods for a Single Objective (Objective 6) for all classes**

**Form2**  
**Single Objective Criteria for Selection of Manufacturing Method**

Class  
 Select All  
 M  
 P  
 S  
 T  
 X  
 Find Methods

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

Selected Methods :

- 9- Eorderless corporation
- 13- Cellular manufacturing
- 43- Extended enterprise
- 55- Just-in-time manufacturing
- 50- Kanban system
- 34- Supply chain management
- 28- Time base competition
- 105- Workflow management

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

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

**Form3**  
**Single Function Criteria for Selection of Manufacturing Method**

Class  
 Select All  
 M  
 P  
 S  
 T  
 X  
 Find Methods

+ 4. Focus on Management Functions

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

Selected Methods :

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

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

```

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

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

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

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

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

```

C:\WINDOWS\system32\cmd.exe

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

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

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

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

**Multi Objective Multi Function Criteria for Selection of Manufacturing Method**

**Weights**

Class

Select All

M 6

P 5

S 4

T 3

X 1

**Find Methods**

Grade

**Weights**

a 6

b 4

c 3

d 1

1]. Meeting Delivery dates - production planning and control

2]. Reduce Production costs 8

3]. Rapid response to market demands - product design 6

4]. Reduce lead time - production

5]. Progress towards zero defects - quality control

6]. Progress towards zero inventory - increase inventory turnaround 7

7]. Improve management knowledge and information - enterprise communication 7

8]. Improve and increase teamwork collaboration

9]. Improve and increase team work collaboration

10]. Improve procurement management and control

11]. Management strategic planning - competitiveness - globalization

12]. Improve human resources management

13]. Improve enterprise integration - improving supply chain globally 8

14]. Continuous improvement

15]. Environmental production

16]. Marketing - market share

**3. Focus on Performance Achievement**

3.1 Focus on Quality Functionality

3.2 Focus on Cost

3.3 Focus on Enterprise Flexibility

3.4 Focus on Customer Satisfaction

3.5 Focus on Meeting Delivery Dates 9

3.6 Focus on Lead-Time Duration

**Selected Methods :**

Method Number : 50

Method Name : Global manufacturing system

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

```

C:\Windows\SYSTEM32\cmd.exe
0 0 0 0 0 0 0 0 0 0
1360 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 777 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0

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

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



## Scope for Future Work

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

## References:

- Halevi, G (2003) *Handbook of Production Management Methods*, Butterworth Heinemann Publications, ISBN 0 7506 5088 5, pp. 2-16.
- Gardan, Y. and Minich, C. (1992), 'Feature-based models for CAD/CAM and their Limits', *Computers in Industry*, vol. 23, pp. 3-13.
- Co-Davies, B.J. (1986), 'Application of Expert Systems in Process Planning', *Annals of CIRP*, vol. 35, no.2, pp. 451-452.
- Coyne, R. D., Rosenman, M.A., Radford, A.D. (1989), *Knowledge-based Design Systems*, Addison-Wesley.
- Munro S. (1999), 'Lean Manufacturing Starts With Lean Design', *Automotive Manufacturing and Production*, vol. 111, no. 8, pp. 27.
- Goldratt E., 'The fundamental measurements', *Theory of Constraints Journal*, vol. 1, no. 3, 1988.
- Rao, A. and Scheraga, D. (1988), 'Moving from manufacturing resource planning to Just- In-Time manufacturing', *Production and inventory Management Journal*, vol. 29, no. 1, pp. 44-50.
- Turny, P.B. (1990), 'What is the scope of activity based costing? ', *Journal of Cost Management*, vol. 3, no. 4, pp. 40-42.
- Datz D. (1987), 'The Effect of Product Design on Product Quality and Product Cost', *Quality Progress*, vol. 20, no. 6, pp. 63-67.
- Becker and Gerhart, B. (1996), 'The impact of human resource management on organizational performance : Progress and Prospects', *Academy of Management Journal*, vol. 39, pp. 770-801.

\*\*\*\*\*