"Design of Information structure for competitive productivity benchmarking for a large scale manufacturers in India "

Dr. B. Ravishankar[*]*(ravi36@gmail.com)*
Associate Dean – Placements
Professor - Industrial Engineering Management
BMS College of Engineering, Bangalore, India

*Commander Bhaskar Bhandarkar***
Chairman Indian Institution of Industrial Engineers
Navi Mumbai (bhandarkar29@gmail.com)

* *Corresponding Author* ** *Presenting Author*

Abstract

Companies spend good amount of time and money in making divisions work to the expectations of the stake holders. Often a question arises are we performing the best? Managers will necessarily conduct skin deep analyses on the balance sheet of the company and concludes about their effort. Upon reaching satisfactory positions at various levels of utilisation and growth, management will consider benchmarking their position amongst peers. At this moment an information structure will be of immense use, so that decision makers can utilise the available content and intelligence available on the internet to have meaningful information. Here an attempt is made by us to create such structures to help decision makers to create value by using the right information for an accurate decision.

Key words: Benchmarking, Information structure, Decision making, Competitive productivity.

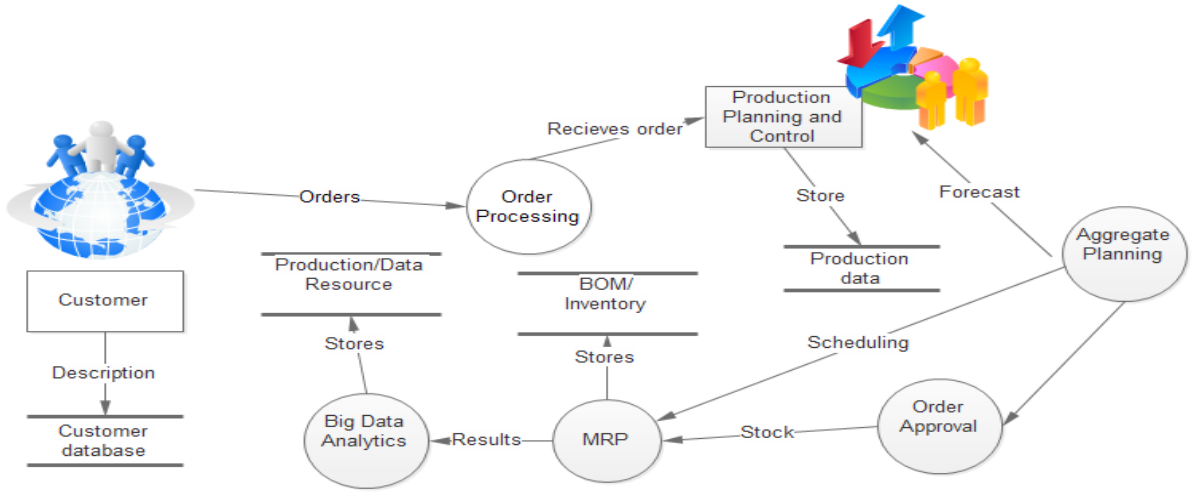
Introduction

Manufacturing process generate huge data while performing with their innovative operations. It becomes extremely challenging for managers to assess themselves with their competitors. The key challenges for executives will be to handle and manage the intangibles. This will call for the unstructured data which can be vital for productivity benchmark. Here an attempt is made to structure the unstructured and to use it for productivity evaluation. We have considered three companies and productivity process for a large scale manufacturer in an Indian scenario. We have considered hypothetical data to arrive at meaningful solutions.

Data Flow Diagram

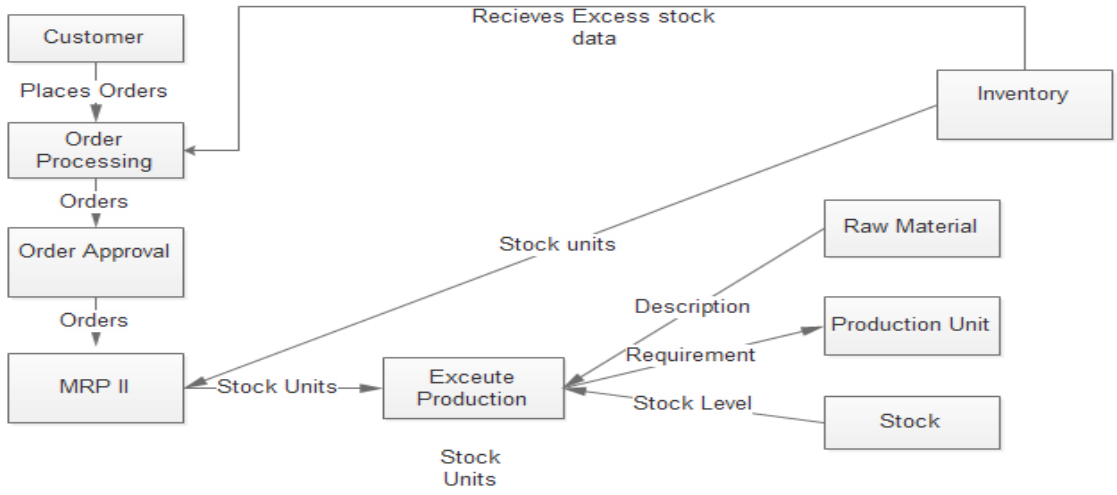
A Data Flow Diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design). DFD shows what kind of information

will be input to and output from the system, where the data will come from and go to, and where the data will be stored.



It is the business flow process which takes place in company. In this process the customer is the external entity parameter who places an order to a company. The customer details will be stored in the customer database which includes Customer name, Phone Number, Customer Id, Address etc.Then order process begins with an aggregate planning and checks the amount of production units required to be manufactured based on the customer requirements, inventory and also from the forecast point of view. It is also ensured that whether the materials are in stock or not. A detailed MRP planning is being made based on the bill of materials and inventory. Based on this MRP result production begins and takes to the next level of Big Data Analytics. Big data analytics refers to the process of collecting, organizing and analyzing to discover patterns and other useful information. This helps the organization in benchmarking the company

Information Flow Diagram



The information flow diagram is a process which flows through the entire business process from the scratch till the end of the project. This flow of information is a continuous

process. For a better benchmarking productivity improvement of an organization a proper information structure needs to be maintained. An example of information flow in an industry is being shown in the information flow diagram .In this process the Customer orders “X” amount of a specific product and then the order processing take place. This order is being processed and verified whether the products are readily available in the inventory, if yes then the order is being delivered to the customer on the specified date. If no then the production planning team passes the information to the production unit. Before that the production planning team ensures whether the raw materials are readily available in the storage sector if no then they refill them by ordering. Once the required raw materials are available then the production begins and later it is being delivered to the customer. Here the information flow is being passed at every stage .If there is any miscommunication in the information flow then there would be a huge loss to the company.

Tables Structure Example

Generally to store the data in the database tables the below syntax is followed

CUSTOMER_DETAILS
ORGANIZATION_DETAILS

Attribute	Datatype/width
Cust_name	Varchar(100)
Cust_Location	Varchar(100)
Cust_Phno	Number(20)
Cust_ID	Varchar(20)

Attribute	Datatype/width
Comp_Code	Number(100)
Comp_Desc	Number(100)
Division_Code	Number(100)
Region_Code	Number(100)

Product_Details

Attribute	Datatype/width
Prod_ID	Number(100)
Prod_Desc	Varchar(100)
Prod_Type	Varchar(100)
Prod_Group	Varchar(20)

Utility Resources

Attribute	Datatype/width
Prod_Capacity	Number(100)
Prod_Used	Number(100)
Resource_avail	Number(100)
Machine_utilization	Number(100)
Buffer_Stock	Number(100)

Material Utilization

Attribute	Datatype/width
Material usage	Number(100)
Material stock	Number(100)
Material turn over no	Number(100)
Material stock out	Number(100)
Material cost	Number(100)

Production Capacity

Attribute	Datatype/width
Machine Hour used	Number(100)
Machine Hour available	Number(100)
No of Machines	Number(100)
Machine Hour Down	Number(100)
Machine Hour cost	Number(100)

Inventory

Attribute	Datatype/width
Carrying cost	Number(100)
Buffer stock	Number(100)
EOQ	Number(100)
Level of inventory	Number(100)
Inv Turn over	Number(100)

Resource Availability

Attribute	Datatype/width
Material usage	Number(100)
Material stock	Number(100)
Material turn over no	Number(100)
Material stock out	Number(100)
Material cost	Number(100)

IT Utilization Index

Attribute	Datatype/width
No of computers	Number(100)
Networked terminals	Number(100)
No of e-processes	Number(100)
No of trained res	Number(100)
Avg Time taken Decisions	Number(100)
No of depts.	Number(100)
No of Loations	Number(100)

Production Cost

Attribute	Datatype/width
No of machines	Number(100)
No of Products	Number(100)
No of Persons	Number(100)
No of Engineers	Number(100)
Depreciation cost	Number(100)
Cost of Prod	Number(100)
Maintenance Cost	Number(100)
Quality Level	Varchar(20)
Motivation level	Varchar(20)
Customer satisfaction	Varchar(20)

Automation

Attribute	Datatype/width
No of machines	Number(100)
No of CNC's	Number(100)
No of Auto Processes	Number(100)
No of Engineers	Number(100)
Automation cost	Number(100)
Cost of Prod	Number(100)
Maintenance Cost	Number(100)

360degree Feedback

Attribute	Datatype/width
No of complaints	Number(100)
No of Products	Number(100)
No of Persons	Number(100)
No of Engineers	Number(100)
No of visits	Number(100)
No of revisits	Number(100)
Feedback Cost	Number(100)
Quality Level	Varchar(20)
Motivation level	Varchar(20)
Customer satisfaction	Varchar(20)

Maintenance

Attribute	Datatype/width
Pm Cost	Number(100)
Brk down cost	Number(100)
Level of Inv	Number(100)
Spares	Number(100)
Efficiency	Number(100,2)

Research & Development

Attribute	Datatype/width
No of Patents applied	Number(100)
No of Patents granted	Number(100)
NO of innovations	Number(100)
No of break troughs	Number(100)
R&D Budget	Number(100)

Delivery Index

Attribute	Datatype/width
No of delr	Number(100)
Avg delv time	Number(100)
No of missed delv	Number(100)
Avg Delay	Number(100)
Total hrs of delv	Number(100,2)

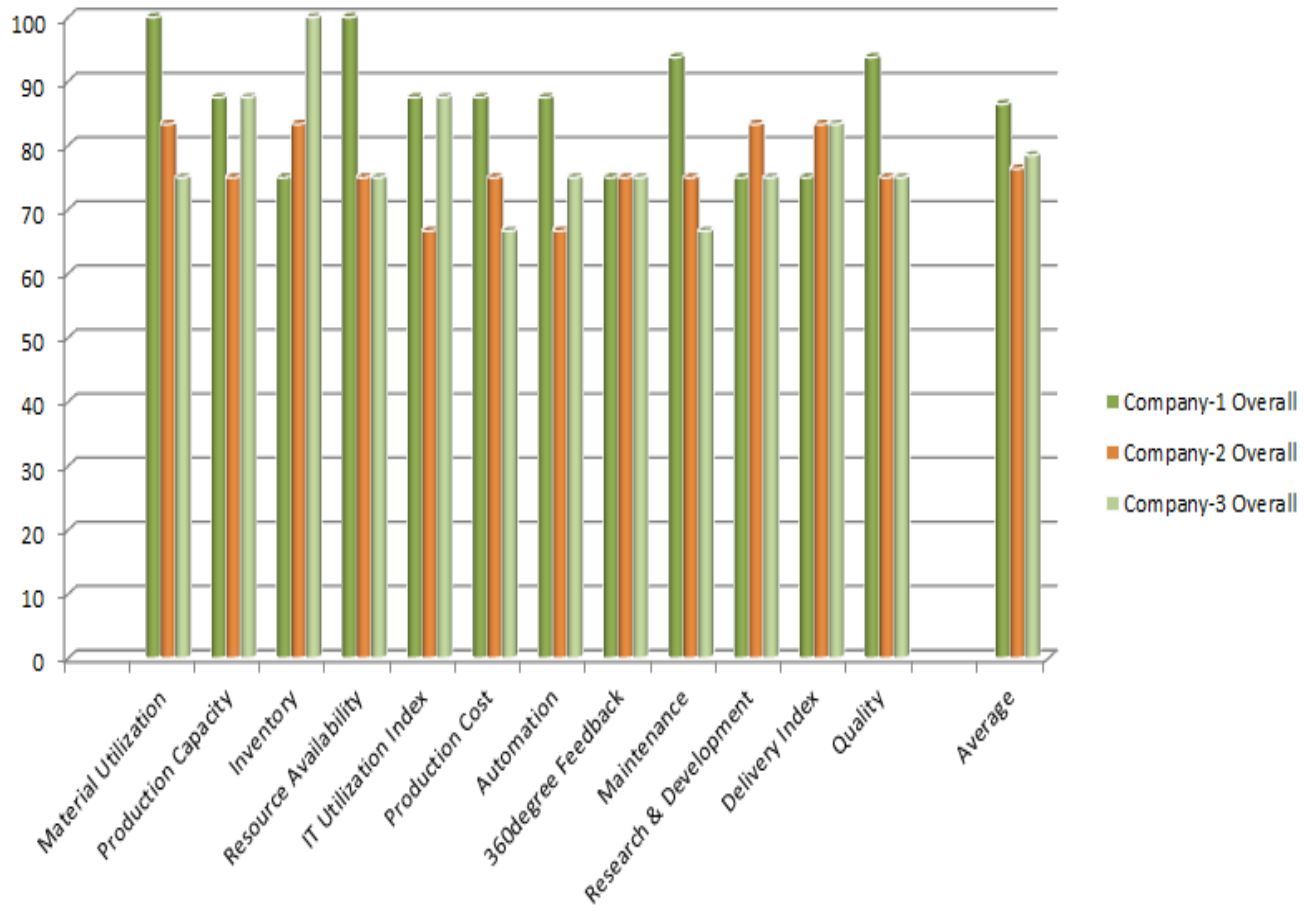
Quality

Attribute	Datatype/width
Cost of prod	Number(100)
Rejects	Number(100)
Reworks	Number(100)
Level of Q	Number(100,2)
Cust satis index	Number(100,2)
No of Black belts	Number(100)
No of certifications	Number(100)

Monitoring & measuring Efficiency

Parameters	**Company-1**			**Company-2**			**Company-3**		
	Units/ Scale	**Indicators**	**Overall**	**Units/ Scale**	**Indicators**	**Overall**	**Units/ Scale**	**Indicators**	**Overall**
Material Utilization	5	High	100	2.5	Low	83.33	3	medium	75
Production Capacity	3.5	Medium	87.5	3	medium	75	3.5	medium	87.5
Inventory	3	Medium	75	2.5	low	83.33	4	medium	100
Resource Availability	5	High	100	3	medium	75	3	medium	75
IT Utilization Index	3.5	Medium	87.5	2	low	66.66	3.5	medium	87.5
Production Cost	3.5	Medium	87.5	3	medium	75	2	medium	66.66
Automation	3.75	Medium	87.5	2	low	66.66	3	medium	75
360degree Feedback	3	Medium	75	3	medium	75	3	medium	75
Maintenance	3.75	Medium	93.75	3	medium	75	2	low	66.66
Research & Development	3	Medium	75	2.5	low	83.33	3	medium	75
Delivery Index	3	Medium	75	2.5	low	83.33	2.5	low	83.33

Quality	3.75	Medium	93.75	3	medium	75	3	medium	75
Average			86.46			76.38		78.47	



Evaluation Indices

Scale	Indicators
5	High
3 to 4	Medium
2 to 3	Low
0 to 1	Very low

Indicators	Rating
High	5
Medium	4
Low	3

Result:

From the above analysis table the information structure designed provides productivity data of three companies, the results being company 1 has a productivity index of 86.46, company 2 has a productivity index of 76.39, company 3 has a productivity index of 78.47. Based on the above analysis the information structure designed will be useful for managers to arrive at competitive productivity benchmark, which can be used by the industry to elevate their performance levels.

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Author Bibliographies

Dr. B. Ravishankar - Associate Dean – Placements and Professor - Industrial Engineering Management, BMS College of Engineering, Bangalore, India has interests in providing solutions to industry and is a ERP consultant too. He has produced a couple of Doctorates. He is an active publisher in POMS and enjoys being with POMS. He can be reached at *ravi36@gmail.com.*

Commander Bhaskar Bhandarkar - is a Chairman Indian Institution of Industrial Engineers Navi Mumbai India. He is active in promoting IE concepts in India. He is a recipient of many awards and enjoys performing to his best to promote IE concepts. He can be reached at bhandarkar29@gmail.com.