

A hybrid Inbound traditional trade orders automation with data validation and analysis

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Abstract

ERP applications enable mid-sized organizations to increase efficiency, enhance best practices and efficiently work with their suppliers and partners. Due to the size and complexity of business activities along with their resource constraints (time, budget and skills); it was difficult for mid-size organizations to consider introducing ERP applications. Some of the difficulties mid-size organizations face when implementing ERP are publicity about deficiencies in ERP implementation, business process standardization standards (with possible consequences for change management) and fear of unknown with limited skills and experience to rationally evaluate the suitability of ERP applications. The main issue in the existing model is inbound automation on the historical and real-time data. In this work, an automation of inbound traditional trade orders with data analysis operation is performed on the Oracle JD-EDWARDS data. Experimental results proved that the present automation has better data analysis in terms of time and cost as parameters.

Keywords: supply chain data, automation, inbound.

1.Introduction

In the early eighties J.D. Edwards started to concentrate on writing applications for the IBM System. This program offered the mainframe computers a less costly option: it provided small and medium-sized businesses with capabilities for flexible disk drives. This evolution of ERP is simply pursuing the technology's capabilities, as it wasn't as powerful and common as it is today, not so long ago. Only the richest businesses could have purchased computers a few decades ago and those machines could only have performed small operations. It suggests that there has been a need to automate an enterprise's operation ever since it was first feasible. Iadwaniet.al, further indicated that approaches can be classified across organizational, technological and human realms for the effective implementation of an ERP program in a company. Indeed, within the mid-size market setting, these three techniques are tangibly visible and less difficult to examine if the analysis would concentrate solely on business processes[1].

Accordingly, the ERP strategies defined in shaping and guiding the factors that form part of the ERP portion in the adoption model[2]. The first was an application for JD Edwards Financials, replacing their old management framework for Finance and the second was an application for Microsoft Dynamics Customer Relationship Management (CRM), replacing a Sales Force program. The implementation of JD Edward was outsourced to a service provider for implementation, which was completed in six months. The MS Dynamics CRM project was outsourced by 60 per cent-introduced at home by 40 per cent. The development was carried out mainly to ensure successful execution of the information transfer and processes of change management. The CRM project had two stages; the organisation's basic principles for the CRM framework were introduced in the first stage[3]. It was done within three months. The second stage consisted of extending the CRM program to replace the entire Sales Force system. Making it done in six months was expected. The second stage of the project was under way at the time of interview[4-7]. The estimated cost of implementing JD Edward was \$100,000, and the cost of implementing CRM expected to be \$150,000. The organization relied on the project manager of the implementation partner for the first project execution and the chosen implementation approach of the vendors (Oracle and Microsoft) was used for both projects. It was reported that due to poor experience of the parent (automotive manufacturing) business with the implementation of ERP (JD Edwards), the case organization was affected by the parent company to The case organization had essential functional and data integration criteria for products and services with the parent company; thus, their selection decision was to be approved by the foreign head office of the parent company in Japan. The agency has been conducting industry surveys evaluating available applications and products for several weeks, and has conducted a closed tender. The company was involved only in an ERP system which was intended to suit its business needs[8][9]. The overall implementation budget was about \$2million, and the project was completed under the scope of the budget. The approach for implementing the vendor based implementation was implemented. The SCM is concerned with problems and aspects of some of an organization's interrelated variables and operations, such as demand forecasting, sourcing, production, distribution, inventory, transport and customer support. The key dimensions covered by SCM are Inventory, Knowledge Sharing & Technology, Transportation, Warehousing, Confidence, Collaboration, Partner Cooperation, Quality Management etc. The supply chain concept's prominence emanates due to quality management. Quality management activities in SC lead to product offerings, overall firm performance, cost savings, and ultimately to competitive advantage.

2.Related works

Quality is a significant factor in the process of value addition involved in manufacturing and distributing goods along the supply chain. Therefore, by making quality control an integral part of the supply chain, businesses can avoid being merely reactive to their supply chain customers' requirements and can aim to more proactively fulfil their demands[10]. SCM's success depends on adopters developing unique skills, including designing agile organisations, establishing a trusting relationship with their suppliers, pursuing full supply chain cooperation, improving coordination to minimize volatility and inventory rates, outsourcing non-core competencies, introducing order-to-order output, reducing inventory. A successful and efficient way to achieve competitive advantage is to improve consumer satisfaction with product quality[11-14]. It is a business philosophy that directs companies and business partners in the right direction between interacting networks of distribution and internal resources and production capabilities[15-18].

Wisner and Tan studied the effect of supply chain management on a wide spectrum of procurement practices and SCM related issues. The problematic problems they enticed were about information systems, cooperation in information exchange and trust[19]. SCM includes not just the focus firm's activities but also the alignment of the activities of all channel participants. In addition, SCM has an integrative role, connecting the key roles, processes and resources across channel members and within them[20]. Although literature on provider growth and supply incentives has been established to inspire suppliers to implement environmentally friendly schemes, empirical evidence remains to validate the efficacy and appropriateness of these approaches. In addition, instead of focusing solely on waste management, most studies take a broader view of the world at large. Although in some studies the proposed systems have proved feasible and effective, it is understood that implementation difficulties exist[21]. One problem is that suppliers could provide green goods but not themselves be green. Whether to prevent this form of 'window-dressing' or prevention activity and encourage genuine reciprocal interaction remain topics to be studied in depth. Some challenges include working with vendors. Second, the introduction of external chain partners makes the supply chain more complicated due to the multitude of systems, languages, individuals and boundaries involved. Second, supplier integration involves a large capital commitment, arising from legislation, technical requirements, lack of trained expertise, inefficient processes and general barrier. Third, either the fear or the real danger of opportunistic behaviour, will hamper SCI. In that situation, it is believed that the partners' economic self-interest will adversely affect the company of the focal firm. Fourth, ways of incorporation are forbidden by an asymmetry of social and cultural history, beliefs, priorities and understandings[22]. Finally, a lack of willingness or motivation by a partner can impede the effective transfer of knowledge, information and technology. SCM requires such functions that are vital to the supply chain's survival as it increases the end-customer final product. Such activities include ensuring that supplies flow constantly to provide supply chain partners with potential production capacity as well as addressing the supply chain's complexity. Nevertheless, SCM has become increasingly important as the scope and geography of manufacturing-related operations, such as procurement and sourcing, are growing [23][24]. The higher the level of integration within a supply chain, the more complex the process of communication between the chain members and the more regular the exchange of information. In addition, the SCI decreases awareness of organizational boundaries. Internal obstacles include conflicting goals, cultural differences, lack of confidence, limited resources and communication deficiencies. Thus supply chain management practice has become an important part of a company's performance. Managing all the processes within the supply chain, from the procurement of raw materials to the provision of post-purchase services for the customer, is a complex matter[25]. This means that the supply chain and its network must be sufficiently versatile to respond to the rapidly evolving customer demand, as well as ensuring enhanced coordination and visibility among the supply chain entities. They argue that a long-term outlook is required at this level, as decisions taken with a focus on short-term profitability and market share can have significant consequences for the company in the future as the product advances in the life cycle. They also point out that price pressure may escalate at this level due to the less competitive growth in sales volumes. A challenge for a successful M&A is to consider a young company with a lack of historical data and performance records, as well as to combine the two businesses that could have different cultures and values. Today's organizations are dealing with more complex business processes and are facing some serious challenges as they try to standardize their processes. Business Intelligence (BI) and Business Analytics (BA) are often mixed and used interchangeably and synonymously. It is important to remember that BI is a core component of BA in analytics. The above is not a technology but a collection of methods, processes, and resources that organizations can use to obtain knowledge, forecast results, or provide troubleshooting solutions. BDA refers to the systematic process of applying advanced analytical skills, such as data mining, statistical analysis to establish patterns, associations, trends and other useful knowledge that can be strategically used to improve operating efficiency and company profits.

3.Proposed Model

Business Process: Salesman sends the end of day sales information to MOBIS.

MOBIS sends these details to JDE through IIB and corresponding traditional trade (TT) sales orders are created in JDE. End Customer PO is captured in RORN field of staging table. The same customer PO is captured in JDE sales order F47011.VR01 and F4211.VR01 fields for tracking purpose.

When Sales order comparison is done between MOBIS and JDE orders, this Customer PO is used as a common entity to compare both systems.

Flowchart:

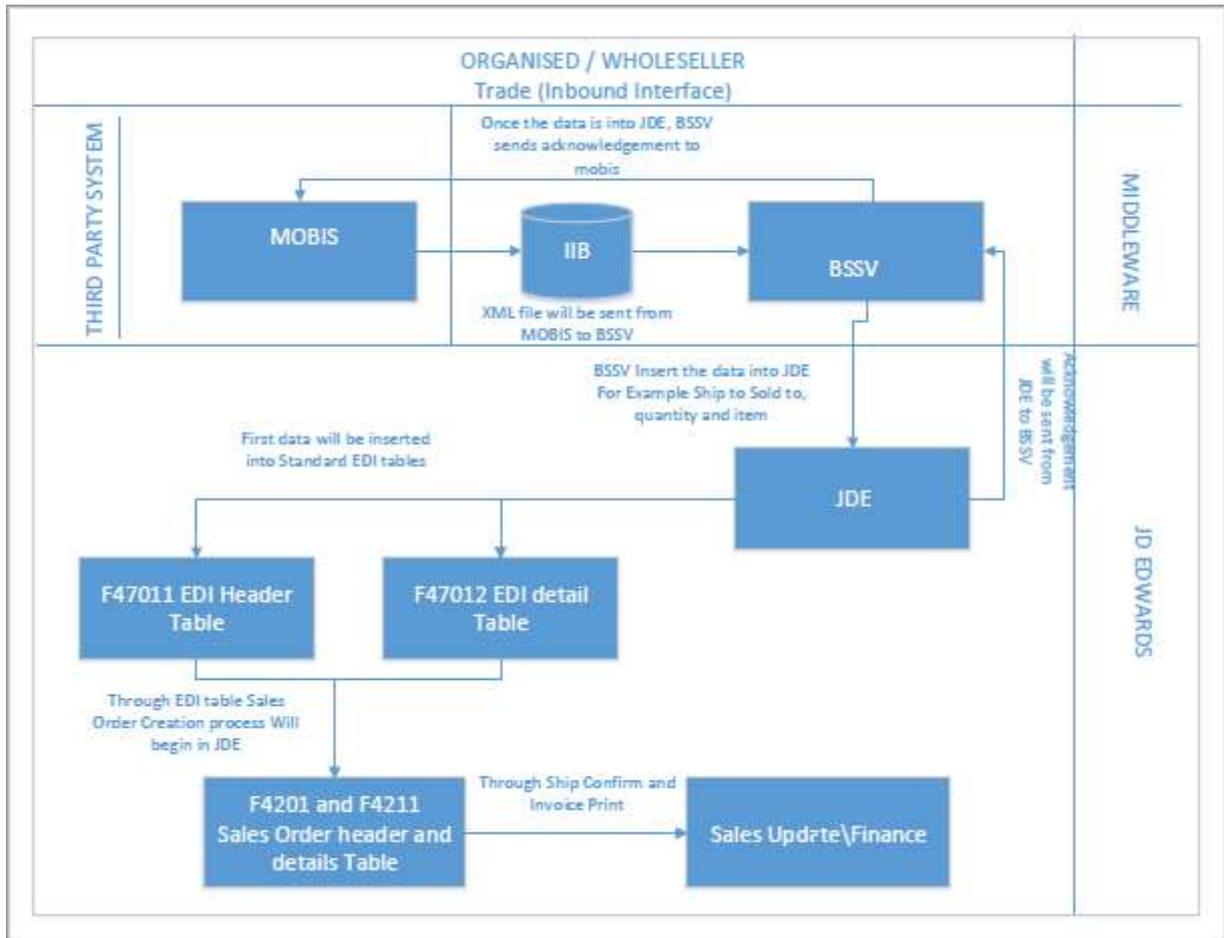


Figure 1: Proposed Automation Framework

Interface:

1.1 Activity Details

Salesman sends sales information through handheld device. This information is sent to JDE by MOBIS via IIB.

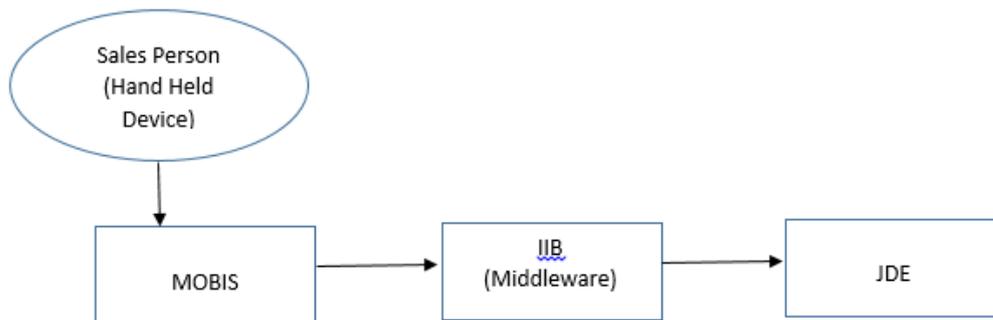


Figure 2: Interaction of Sales person to JDE

Technical Details needed to automate the Process:

Create JDE Business services (BSSV) J5504702, JP554702 (Sales Orders Processor)

1. Create tables F554701C (Header – Sales Order INBOUND) and
2. F554702C (Detail – Sales Order INBOUND)
3. Create N554701B (Sales Order NER)
4. Use R47011 - EDI Product Activity Data Edit/Create to process records in JDE.

Mapping/Validation Document:



1. UDC 55/CO – Company codes in JDE are configured according to MOBIS Code
2. UDC 55/BP - All JDE Branch plants are configured according to MOBIS Code. (DL01 – Manufacturing Plants, DL02 – Distribution Plants).
3. JDE Business services(BSSV) **J5504701,JP554701** (Stock Request Processor) reads XML data and load the data into Staging table
F554701C (Header – Sales order Creation INBOUND) and **F554702C** (Detail - Sales order Creation INBOUND)
4. NER **N5547011** performs data validation and inserts data into EDI tables F47011 and F47012. Validations,
 - Verify Firm ID with UDC 55/BP for company details
 - Verify Dealer ID with UDC 55/BP for branch plant details
 - Verify Salesman in JDE customer cross ref (F554104) and Also pick up the location from F554104.DL01
 - Item Number and UOM are verified in F4101 and F41002
5. **R47011** picks these data and creates the sales order (TT) in F4201 and F4211

This is how Inbound TT order transaction is automated in JDE.

In this automation process, exceptions are validated using the following procedure:

Step 1: In the first step xml file is imported into the automation program.
Step 2: XML data values are feed to the header sales and detail sales tables i.e f57011 and f57012.
Step 3: Validating XML data using the master data and then update EDI tables i.e EDI header(f47011) and EDI detail(F47012). A new processed flag (E: Error, P:Processed , N: not processed) is added to the EDI tables for status verification.
Step 4: Process error reports and update flags in the EDI tables.
Step 5: Process EDI data to standard JDE tables(process only those records with flag value =N) and once the data is processed update F47011 and F47012 tables with flag as P.

4. Experimental results

Experimental results are executed in Oracle JD-EDWARDS tool and java programming. Here, inbound data is taken as input for automation and data analysis.

Figure 3: Sample Exception report for the inbound data validations

```
report - Notepad
File Edit Format View Help
#Order No 2605
=====
Company ID Exist 1195
Dealer ID Exist MMAKKAH
Unit of Measurement Not Exist
```

Table 1: Sample F57011 data in inbound automation

FirmID	DealerID	CustomerID	AgentID	OrderID	OrderDate	ShippingDate	Total
Order Co/firm id	Dealerid	customerid	agentid	Order Number	Order Date	Actual Ship Date	agentid
1195	MMAKKAH	235133	436	119	20/12/2016	17/01/2017	32342
1195	MMAKKAH	235134	437	155	30/01/2017	30/01/2017	437
1195	MMAKKAH	235135	438	1085	18/07/2017	18/07/2017	454
1195	MMAKKAH	235136	439	1085	18/07/2017	18/07/2017	3233
1195	MMAKKAH	235137	440	2252	14/02/2017	14/05/2017	440
1195	MMAKKAH	235138	441	2464	18/03/2018	18/03/2018	64545
1195	MMAKKAH	235139	442	2464	18/03/2018	18/03/2018	5444
1195	MMAKKAH	235140	443	2464	18/03/2018	18/03/2018	7454
1195	MMAKKAH	235141	444	2481	21/03/2018	21/03/2018	444
1195	MMAKKAH	235142	445	2513	31/01/2017	31/03/2017	445
1195	MMAKKAH	235143	446	2605	23/04/2018	23/04/2018	446
1195	MMAKKAH	235144	447	2605	23/04/2018	23/04/2018	447
1195	MMAKKAH	235145	448	2605	23/04/2018	23/04/2018	448
1195	MMAKKAH	235146	449	2605	23/04/2018	23/04/2018	449
1195	MMAKKAH	235147	450	2605	23/04/2018	23/04/2018	450
1195	MMAKKAH	235133	436	119	20/12/2016	17/01/2017	32342
1195	MMAKKAH	235134	437	155	30/01/2017	30/01/2017	437
1195	MMAKKAH	235135	438	1085	18/07/2017	18/07/2017	454
1195	MMAKKAH	235136	439	1085	18/07/2017	18/07/2017	3233
1195	MMAKKAH	235137	440	2252	14/02/2017	14/05/2017	440
1195	MMAKKAH	235138	441	2464	18/03/2018	18/03/2018	64545
1195	MMAKKAH	235139	442	2464	18/03/2018	18/03/2018	5444
1195	MMAKKAH	235140	443	2464	18/03/2018	18/03/2018	7454
1195	MMAKKAH	235141	444	2481	21/03/2018	21/03/2018	444
1195	MMAKKAH	235142	445	2513	31/01/2017	31/03/2017	445
1195	MMAKKAH	235143	446	2605	23/04/2018	23/04/2018	446
1195	MMAKKAH	235144	447	2605	23/04/2018	23/04/2018	447
1195	MMAKKAH	235145	448	2605	23/04/2018	23/04/2018	448
1195	MMAKKAH	235146	449	2605	23/04/2018	23/04/2018	449
1195	MMAKKAH	235147	450	2605	23/04/2018	23/04/2018	450

Table 2: Sample F57012 data in inbound automation

CompanyID	OrderDetailID	ProductNo	Unit	Quantityord	QuantityShip	Price	Rowno	CreateDate	DocumentInvoice	RefNo
Order Co/firm id	Order Number	Item Number	UM	Quantity Ordered	Quantity Shipped	Price	Line Number/row no	Invoice Date	Document Number	Reference
1195	119	FPULK215	CR	-700	-700	3800	1	30/12/2016	55	852311
1195	155	FPULK189	CR	-216.67	-216.67	3801	2	30/01/2017	57	852225
1195	1085	FFMVC20	CR	-300	-300	3802	1	28/02/2018	1517	851481
1195	1085	FFMVC21	CR	-300	-300	3803	2	28/02/2018	1517	851483
1195	2252	FPULK214	CR	200	200	3804	1	14/02/2018	1673	851485
1195	2464	FPULK237	CR	-25	-25	3805	1	31/03/2018	1586	851486
1195	2464	FPULK238	CR	-25	-25	3806	2	31/03/2018	1586	851488
1195	2464	FPULK182	CR	-50	-50	3807	3	31/03/2018	1586	851489
1195	2481	FPULK239	CR	-100	-100	3808	1	31/03/2018	1587	851490
1195	2513	FPULK141	CR	100	100	3809	1	31/03/2017	1793	851491
1195	2605	FFMVC19	CR	-75	-75	3810	2	31/08/2018	1972	852225
1195	2605	FPULK267	CR	-22.33	-22.33	3811	3	31/08/2018	1972	852311
1195	2605	FPULK245	CR	-18	-18	3812	4	31/08/2018	1972	852311
1195	2605	FFMVC26	CR	-10	-10	3813	5	31/08/2018	1972	852225
1195	2605	FFMVC28	CR	-5	-5	3434	6	31/08/2018	1972	851481
1195	119	FPULK215	CR	-700	-700	3800	1	30/12/2016	55	852311
1195	155	FPULK189	CR	-216.67	-216.67	3801	2	30/01/2017	57	852225
1195	1085	FFMVC20	CR	-300	-300	3802	1	28/02/2018	1517	851481
1195	1085	FFMVC21	CR	-300	-300	3803	2	28/02/2018	1517	851483
1195	2252	FPULK214	CR	200	200	3804	1	14/02/2018	1673	851485
1195	2464	FPULK237	CR	-25	-25	3805	1	31/03/2018	1586	851486
1195	2464	FPULK238	CR	-25	-25	3806	2	31/03/2018	1586	851488
1195	2464	FPULK182	CR	-50	-50	3807	3	31/03/2018	1586	851489
1195	2481	FPULK239	CR	-100	-100	3808	1	31/03/2018	1587	851490
1195	2513	FPULK141	CR	100	100	3809	1	31/03/2017	1793	851491
1195	2605	FFMVC19	CR	-75	-75	3810	2	31/08/2018	1972	852225
1195	2605	FPULK267	CR	-22.33	-22.33	3811	3	31/08/2018	1972	852311
1195	2605	FPULK245	CR	-18	-18	3812	4	31/08/2018	1972	852311
1195	2605	FFMVC26	CR	-10	-10	3813	5	31/08/2018	1972	852225
1195	2605	FFMVC28	CR	-5	-5	3434	6	31/08/2018	1972	851481

Table 3: Sample F47011 data in inbound automation

FirmID	DealerID	CustomerID	AgentID	OrderID	OrderDate	ShippingDate	Total	ProcessedFlg
1195	MMAKKAH	235134	437	155	30/01/2017	30/01/2017	437	N
1195	MMAKKAH	235137	440	2252	14/02/2017	14/05/2017	440	N
1195	MMAKKAH	235134	437	155	30/01/2017	30/01/2017	437	N
1195	MMAKKAH	235137	440	2252	14/02/2017	14/05/2017	440	N

Table 4: Sample F47012 data in inbound automation

CompanyID	OrderDetailID	ProductNo	Unit	Quantityord	QuantityShip	Price	Rowno	CreateDate	DocumentInvoice	Refpo	ProcessedFlg
1195	155	FPULK109	CR	-216.67	-216.67	3001	2	30/01/2017	57	852225	N
1195	2252	FPULK214	CR	200	200	3004	1	14/02/2018	1673	851485	N
1195	155	FPULK109	CR	-216.67	-216.67	3001	2	30/01/2017	57	852225	N
1195	2252	FPULK214	CR	200	200	3004	1	14/02/2018	1673	851485	N

Table 5: Sample F4201 data in inbound automation

FirmID	DealerID	CustomerID	AgentID	OrderID	OrderDate	ShippingDate	Total
1195	MMAKKAH	235134	437	155	30/01/2017	30/01/2017	437
1195	MMAKKAH	235137	440	2252	14/02/2017	14/05/2017	440
1195	MMAKKAH	235134	437	155	30/01/2017	30/01/2017	437
1195	MMAKKAH	235137	440	2252	14/02/2017	14/05/2017	440

Table6: Sample F4202 data in inbound automation

CompanyID	OrderDetailID	ProductNo	Unit	Quantityord	QuantityShip	Price	Rowno	CreateDate	DocumentInvoice	Refpo
1195	155	FPULK109	CR	-216.67	-216.67	3001	2	30/01/2017	57	852225
1195	2252	FPULK214	CR	200	200	3004	1	14/02/2018	1673	851485
1195	155	FPULK109	CR	-216.67	-216.67	3001	2	30/01/2017	57	852225
1195	2252	FPULK214	CR	200	200	3004	1	14/02/2018	1673	851485

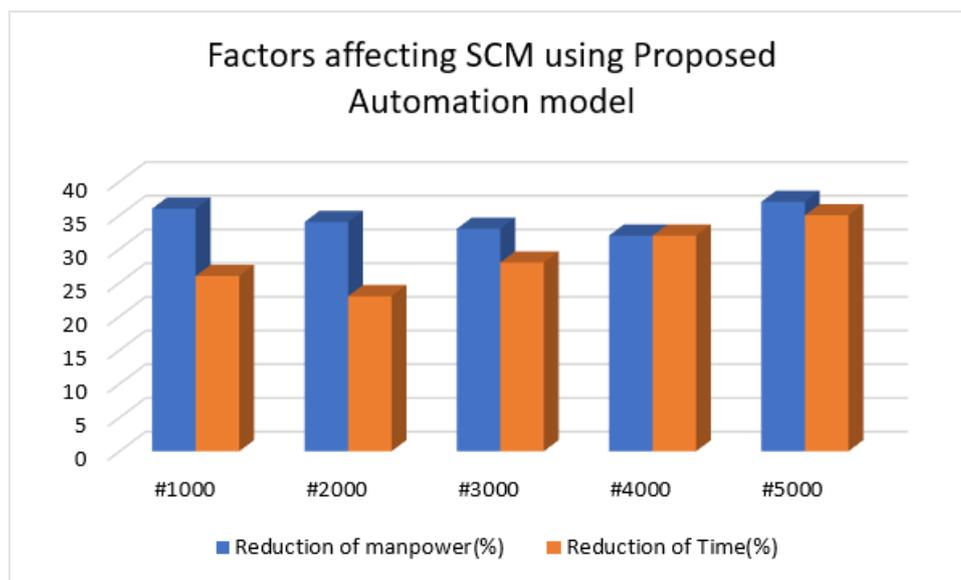


Figure 4: Proposed model performance on different sizes of product units.

Figure 4, illustrates the reduction of manpower and time for different types of units. In the above graph, as the size of the units increases proposed automation tool effectively minimizes the time and manpower for verification process. Here, #1000, #2000... #5000 represents the supply chain products size for computing the manpower and time in the proposed model.

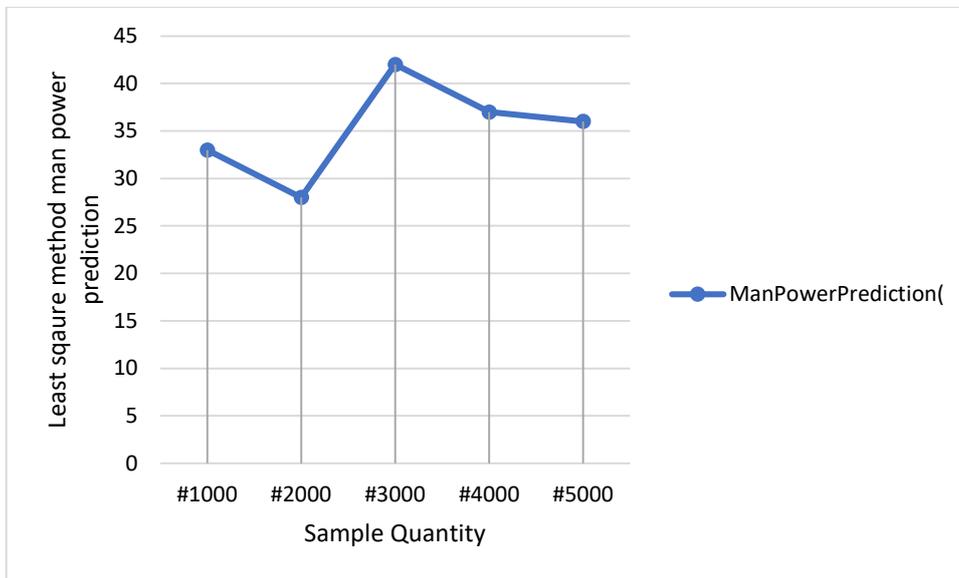


Figure 5: Man power prediction based on the least square estimation method.

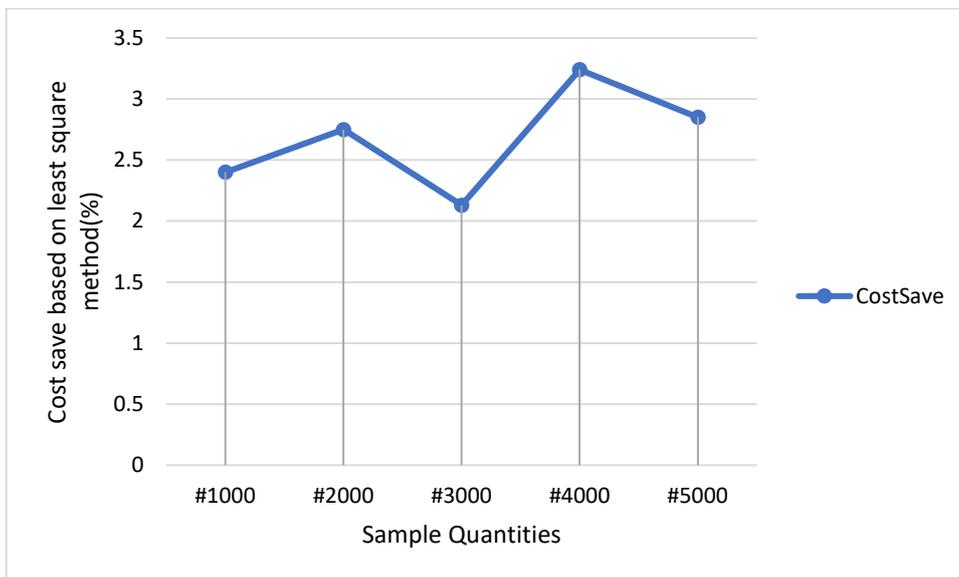


Figure 6: Cost saving based on the least square estimation method

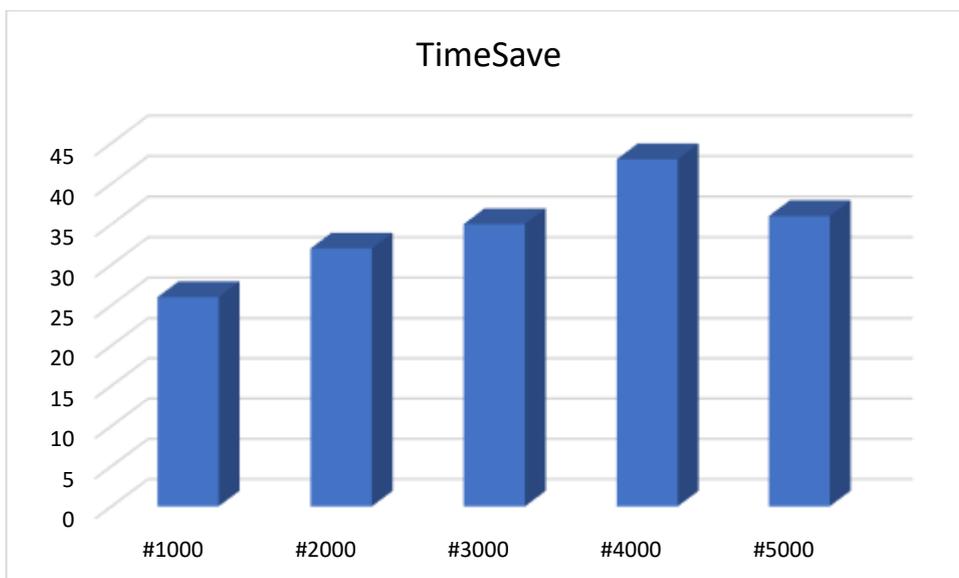


Figure 7: Time saving based on the least square estimation method

Table 7: Month wise CR and SAR data

Month	Qty in CR	Amt in SAR
Sep'17	632,984	13,028,985
Oct'17	493,536	10,040,812
Nov'17	504,110	10,173,277
Dec'17	485,808	9,927,209
Jan'18	410,092	8,534,651
Feb'18	429,587	9,291,329
Mar'18	350,733	6,863,226
Apr'18	268,044	5,694,438
May'18	501,232	9,514,469
Jun'18	492,036	9,918,658
Jul'18	455,288	9,985,932
Aug'18	391,630	8,877,515
Sep'18	379,676	8,964,768
Oct'18	293,922	7,145,894
Nov'18	276,030	6,839,288
Dec'18	262,061	6,701,277
Jan'19	46,021	5,334,394
Average	350,488	7,974,296

- SAR - Saudi Arabia Riya
- CR – Quantity Differences between MOBIS and JDEdwards ERP

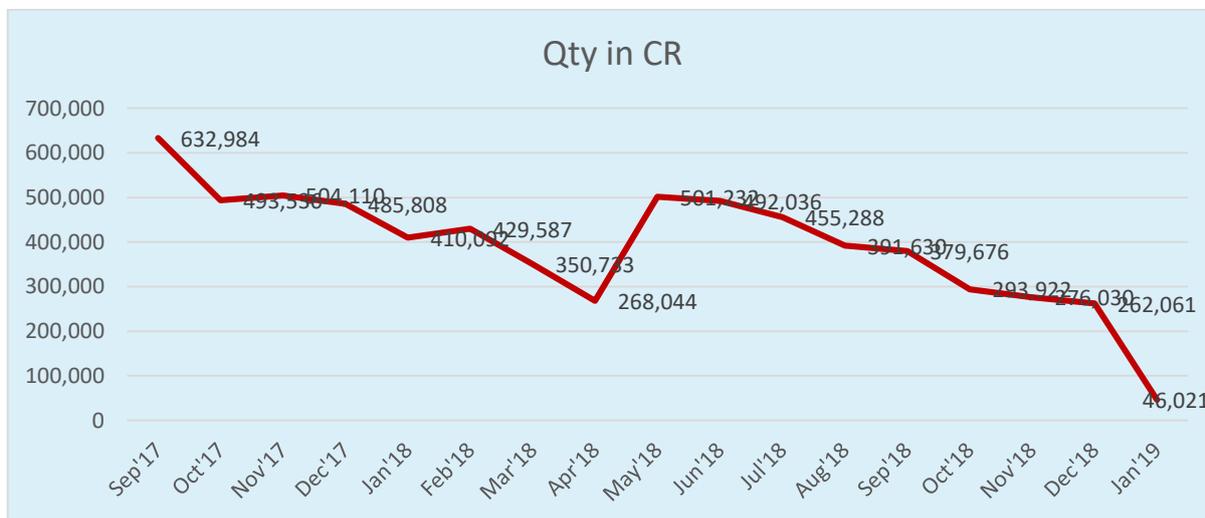


Figure 8: Month wise CR data in visualization form.



Figure 9: Month wise SAR data in visualization form.

5. Conclusion

ERP systems can incorporate business processes and will provide process efficiencies. Using ERP application monitoring tools, reliable and timely information could be readily available about customers and suppliers. Some of the difficulties mid-size organizations face when implementing ERP are publicity about deficiencies in ERP implementation, business process standardization standards (with possible consequences for change management) and fear of unknown with limited skills and experience to rationally evaluate the suitability of ERP applications. The main issue in the existing model is inbound automation on the historical and real-time data. Furthermore, some multinationals have pressured their mid-sized counterparts to adopt compatible ERP devices. In this proposed model, an inbound traditional trade automation framework is designed and implemented for real-time applications in order to reduce the cost and manual verification time. In this paper, a statistical least square estimation model is used to predict the cost, time and man power on the input data.

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