

"Information Systems in PSPCL: A Case Study"

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ABSTRACT

PSPCL was incorporated as enterprise on 16th April 2010 & was specified the accountability of functioning & upkeep of State's own breeding projects & distribution organisation. The business of generation of power of earlier PSEB was transported to PSPCL. We are existing in a digital sphere & maximum of the day-to-day work life is reliant on on information organization usefulness such as Internet/Intranet, Information Technology tools & services. However, Information Systems (IS) have transfigured the way, in which we animate & work. It has reformed all facets of our lifetime style. This study plays a major role in depicting all the business processes in the PSPCL, bringing forward the pitfalls in them, recommendations to remove these inefficiencies using Information Systems and the information obtained from the business processes which can be analysed for better decision-making. The innumerable facets how Information Systems can progress the power as a usefulness being delivered to the populace of Punjab is cited. The research paper is theoretical & is founded on qualitative research & composed data from secondary sources of information. With the assistance of Information Systems eminence & 24*7 power as usefulness can be delivered to the complete state & the same model can be replicated in all the states of INDIA to achieve the target of powered Nation.

Keywords: Information, Information Systems, power, business

INTRODUCTION TO PSPCL (POWERCOM)

History:

PSPCL was incorporated as establishment on 16th April 2010 & was specified the accountability of functioning & upkeep of State's possess producing projects & distribution system. The business of production of electricity of former PSEB was transported to PSPCL.

Milestone:

All the electricity Stations worked at their finest ever plant load factor since their installation. Net electricity produced through 2008-09 is 37222 Million units, which is additional than 2006-07 by 2238 Million Units consequential of 6.40% upsurge in 2 years. The 1980 Mega W (3x660) Talwandi Sabo Power Project bestowed to M/s Sterlite Energy Ltd. Mumbai on 4.7.08 & PPA contracted on 1.9.08. Power purchase contract with M/S GVK for fixing 2x270 MW thermal power station at Goindwal Sahib contracted on 26 May 2009. The basis stone has been laid & the firm has underway the construction.

4.76 lakh new-fangled connections comprising 61,849 No. tubewell connections were out through 2007-09. 24 Hrs City pattern stream made accessible to 12428 villages & 6158 Deras/ Dhanies with 5 or additional households. To aid SC and BPL users, free monthly eating up to 200 units permitted for connected capacity of 1000 watts w.e.f. 12th Oct 2006 in its place of previous 500 watts. Stern actions have been taken to diminish electricity theft. Punitive action taken against the blundering staffs & 5 numbers Anti-Power Robbery Police Stations have been established. New-fangled technologies alike electronic-meters, remote control of transformers, remote meter reading & HVDS system for AP/ Industries announced. 20.29 lakh meters out of 55.98 lakh General/ Industrial Users budged out of their buildings as on 31.3.09 to restrain theft of electric energy. All these procedures have abetted in plummeting losses by 4% from 23.92% (2006-07) to 19.91% (2008-09) / which stemmed in considerable upsurge in revenue. During 2007-09, 62 numbers New Grid substations instituted & capability at 132 number Grid substations amplified besides accumulation of 1070 circuit km. Transmission line & 149 MVAR shunt capacitors to State Grid.

Information Systems

We are alive in a digital sphere & utmost of the day-to-day work lifetime is reliant on on information system service such as Internet/Intranet, Information Technology tools & services. However, Information System (IS) have transfigured the approach, in which we animate & work. It has reformed all facets of our life style. The digital uprising has given manhood the capability, to spread it with great precision, to influence it, to treat the info per measured meticulousness tracked by valid opinions. These proficiencies are transporting into being, a entire sphere

inside the prevailing physical world. The expanse of calculation power (with exceptional mention to digital sphere) that is existing to manhood has augmented at a startling proportion & communication & Info Sys is becoming essential parts. At the organizational level, Info Sys should help in preparation of plans of the business & also in stipulating the mandatory purposes.

Info Sys should also backing in supporting & evolving of ends & processes to attain them. In business; at the dept level IS must safeguard a even drift of info transversely deptts in the business as well as at inter-business level & should monitor business to embrace the most apposite business practices. At key level, IS ripens & upholds an enterprise-eclectic database. The databank will jettison the necessity of the quarantined data islands that occurred & in apiece dept & create the organization's records available crossways the departmental borders to the other patrons. This enterprise-extensive division has numerous remunerations likes, quicker retort times, obtainability of extraordinary eminence info for enhanced decision making & automation of processes. IS has melodramatically swayed all the zones of the firm & all the segments of industry. In a concern be it finance, marketing, SC & Human Resource all of them use IS to addition a competitive brink in the market.

Due to the topical developments in the IS comprising Internet there have been cases where there have been noteworthy budget savings through the comprehensive supply chain. Also IS can be supportive for the strategic preparation by the patrons of the SCM to attain competitive gain.

In the bygone decade there has been emphasis on the consumption of the IS in the supply chain for the budget diminutions. These price reductions were slices of supply chain. But now due to conjunction of technologies of IS including Internet technology can be consumed in a new manner to encounter the Sustainability requisite of the business. Here the emphasis of usage of IS is not only the financial facet but also on the environmental performance of organisation & other patrons & also social show of organisation.

The following are different types of Information Systems:

ERP (Enterprise Resource Planning)

Enterprise Resource Planning (ERP) Systems are fundamentally Enterprise-extensive IS used for computerization of all tasks & actions of a corporate. These are assimilated crossways the entire corporate & are transaction-founded IS. They seizure data for the entire business into a single computer bundle which's a single source for all the vital business info actions, such as financials, punter orders & inventory.

WMS (Warehouse Management System)

Warehouse management systems are systems that regulate all the old-fashioned tasks & actions of warehouse operations. Zones enclosed by WMS comprise, distribution or recording of stowage positions, order harvesting, order assemblage & stock gyration, fabrication of picking directives or lists. Some systems are utilized in connotation with radio frequency comm apparatus. These are exceedingly classy & technically sound systems that regulate the operations of copiously automated granaries.

IMS (Inventory Management System)

The systems toil in a globular procedure, chasing of acquisition to observing of inventory to re-ordering & back round again. They have the capability to tracing of sales & existing inventory, converse with suppliers in proximate real-time & collect & include other data, such as seasonal plea. They should be bendable, permitting for a merchant's instinct. And, they should express a storeowner when it's phase to re-order & how copious to purchase.

TMS (Transport Management System)

Transportation Management Systems lead to distinguishability in cargos & orders. Arrangement disputes are elucidated on time with the assistance of TMS. Manifold conveyance choices can be used as a consequence of former distinguishability into the supply chain. Well-timed communiqué & status reports are also attained. By having regulation on its supply chain, firms can make proficient steering decisions. Application of the TMS system outcomes in goal sellers augmented speed & proficiency when they succumb the applicable carriage info electronically. The TMS results in condensed executive outlays, upgraded price controls & healthier workforce planning.

RFID (Radio Frequency Identification)

RFID in industrialized procedures leads to fewer physical work, fewer budgets, enriched distinguishability & upgraded planning. In warehouse procedures it leads to distinguishability of precise real-time info, quick finding of products, likelihood to record fatalities & capability to plot product locations tactically. In container running & tracing bids distinguishability of real-time load movement, progresses efficiency, upsurges precision & shrinks distribution prices.

EDI(Electronic Data Interchange)

EDI is valuable for effective & proficient supply chain for the reason that EDI shrinks lead time, saves documentation handling costs, illuminate inventory status info jettison obtaining errors & augment strategic coalitions through supply chain. EDI plays numerous vital roles in supply chain management. These roles are categorized as electronic amalgamation, electronic market, information dissemination & sharing.

DSS(Decision Support System)

Inter-organizational DSS may expedite pooled decision making amid two organizations, aid proliferation cooperation in a supply chain & backing decisions of a definite collection of individuals. An inter-organizational DSS may deliver patrons with access to a provider company's intranet & features to utilize certain capabilities.

GIS(Geographical Information System)

GIS mapping connexions many unlike data sources composed so instead of watching at spreadsheets, consumers can have a graphic picture of what is working on in the supply chain at their fingertips. GIS utilizes GPS technology for whereabouts purposes, but GIS supplements data in a way that permits the consumers to make intellectual strategic & tactical decisions. GIS is utilized for risk management & real-time planning.

Objective of Study

- The First objective of the study is to pitch light on PSPCL & IS.
- The Second objective of the study is to see “As-Is processes and the IT systems of PSPCL” in detail & all the aspects related with the same.
- The third objective of the study comprises of following sub-objectives:
 - a. To identify all the Business processes/sub processes in current system.
 - b. To capture the details about the workflow, missing links, associated persons and agents, information and its type and flow in the business processes.
 - c. To analyse the Business Processes for any scope of Inefficiency.
 - d. To recommend solution for the inefficiencies found in the processes and system after analysis.
 - e. To gather information about the IT Applications currently used by the PSPCL.
 - f. To find out Role played by IT Applications in Business Processes of PSPCL.
- The fourth objective of the study is to give the audience an idea about how Information Systems can play role in enabling IT Companies in effectively mapping of Business Function with IT framework and evolving a IT strategy to meet any functional changes and further suggesting a direction for future research in same.

Methodology of study

- The methodology of the research work is derived from the systematic and theoretical analysis of the methods to evaluate correct specific method for application. It constitutes qualitative techniques.
- This study is Qualitative in nature and is conducted based on the data collected from secondary sources of information such as published reports, journal articles, newspapers and magazines.

Case Study: “Information Systems & PSPCL”

In this case study we will be covering the following:

Business Processes

In this section of the study we will be covering:

- *List of major Business Processes*
- *Steps involved in Business Processes*
- *Key agents involved in Business Processes*
- *Inefficiencies/Gap in these business Processes*
- *Recommendations for addressing the gaps in business processes.*
- *Information Retrieved from Business Processes*

Following are the Critical Business Processes in PSPCL:

- Process for New Connection*
- Process for Meter reading*
- Process for Bill Generation, Verification and Distribution*
- Process for Cash Collection*
- Process for Complaint Handling*

Note: All the above business processes are handled at sub-division level.

Following are the other Business Processes in PSPCL:

- Management Information System
- Energy Auditing and Accounting
- Redressal of Consumer Grievances
- Accounts Finance and Accounts Audit
- SCADA System

Following is the Classification of Connections:

- General Service Connections
 - DS(Domestic Supply)
 - NRS (Non-Residential Supply)
- Industrial Connections
 - Small Supply
 - Medium Supply
 - Large Supply
 - Public Water Works
- Agricultural Connections
- Bulk Connections
 - Grid Supply
 - Railway Traction
 - Street Lighting

The following steps are involved in Business Process for General Service Connection:

- Step1:Applicant Fills A&A form and submits with CC along with the attachments.
 - Test Reports are submitted along with the A&A form itself which is being prepared by the Contractors/Shopkeepers itself.
 - No Separate field verification is done by the JE.
- Step 2:CC verifies the form is complete.
- Step 3:Photo is attested by SDO.
- Step 4:Payment is made at the cashier by applicant.
- Step 5:SDO issues Service Connection Order.
- Step 6:JE releases connection
- Step 7:New customer Master Details are send to the computer centre and entered in PSEB Database.

The following steps are involved in Business Process for Industrial Connections:

- Step1:Applicant Fills A&A form and submits with CC along with the attachments.
No Test Report is prepared and attached.
- Step 2:CC verifies the form is complete.
- Step 3:Photo is attested by SDO.
- Step 4:Payment is made at the cashier by applicant.
- Step 5:SDO issues Service Connection Order.
- Step 6:JE releases connection
- Step 7:New customer Master Details are send to the computer centre and entered in PSEB Database.

Following are the Business Processes similar to the New Connection Process:

- Process for Disconnection.
- Process for Transfer of connection.
- Process for Increase of Load.
- Process for Decrease of Load.
- Process for release of multiple connection.
- Process for change of type of connection from Single phase to Three phase.
- Process for Temporary connection.

The following steps are involved in Business Process for Disconnection:

- Step1:Applicant Fills and submits a simple application form for disconnection.
- Step 2:CC verifies the form is complete.
- Step 3:Field verification is done by the JE and the final reading is taken.
- Step 4:Final Bill is prepared by the Ledger Clerk
- Step 5:SDO issues Permanent Disconnection Order.

- Step 6: JE disconnects the connection.
- Step 7: New customer Master Details are sent to the computer centre and entered in PSEB Database

The following steps are involved in Business Process for Transfer of Connection:

Scenario 1: Transfer of connection in same sub-group

- Step 1: Applicant Fills and submits a simple application form for disconnection with the shifting charges and charges per load.
- Step 2: CC verifies the form is complete.

Scenario 2: Transfer of connect in different sub-group

- Step 1: Applicant Fills and submits a New application form along with the simple application for disconnection.
- Step 2: CC verifies the form is complete.

The following steps are involved in Business Process for Complaint Handling:

- One or more complaint centre at each sub-division.
- Complaint is registered after the applicant calls on phone.
- Complaint is Processed Priority wise.
- Hired line man along with the sub-station attendant is sent to site for fault detection and repair.

Key Agents in Business Processes:

The following are the Key Agents involved in Release of New Connection :

- SDO (Sub-divisional Officer)
- Revenue Accountant(RA)
- Junior Engineer(JE)
- Consumer Clerk(CC)
- Ledger Clerk(LC)
- Cashier

Others

- Applicant
- Contractors
- Data Entry Operator

Inefficiencies/Gap in Business Processes:

Inefficiencies in New Connection Process and other similar Business Processes are given below:

- High Probability of delay in release of connection.
- Process is time consuming.
- No provision for Application of release of New Connection online.
- No provision for Application status check for the applicant and PSEB employees.
- No provision for capturing the customer feedback.
- Paperwork is more, difficult to maintain, consolidate and finding the entries.
- Manual work is there so human dependency is more.

Inefficiencies in Complaint Handling Process and other similar Business Processes are given below:

- There are no established SLA's for complaint handling so there is high possibility of delay, customer dissatisfaction, poor service, lack of accountability.
- There is no provision for capturing the customer feedback.
- There is paperwork more, difficult to maintain records for reporting purpose, consolidate and finding the entries.
- Online Complaint Registration is not yet fully functional across all sub-divisions in Punjab.
- Call Center project also not fully implemented.

Recommendations:

Recommendations for addressing the inefficiencies in New Connection Process and other similar Business Processes are mentioned below:

- Process Automation with the help of deployment of IT Application and integration with the Intranet.
- IT Application should have feature to operate in Online mode.
- IT Application should incorporate feature of Customer feedback which will help in improving the service and customer satisfaction.
- SLA for Release of New Connection should be there and adhered and proper escalation procedure should be in place.
- IT Application should have visibility across the Board.
- When giving status update contact details about the concerned personnel involved should be sent to the applicant via SMS or email.
- Facility of update by SMS or e-mail to the Applicant about the status of the application can be provided.
- IT Application should incorporate real-time Reporting feature.
- IT Application should cover all Business Process New Connection, Disconnection) and should simplify and make Business functioning faster

Recommendations for addressing the inefficiencies in Complaint Handling process and other similar Business Processes are mentioned below:

- Consumer should be informed of the New options by which he can make payment through Email and SMS alerts. This should be applicable especially to the New consumers.
- Consumers should be regularly informed about the deadlines of the cash depositing through SMS and Auto generated E-mails.
- Also after successful transaction they should be updated and their feedback taken whether they faced any difficulty in their transaction. This should be helpful in improving the customer service on individual customer basis.
- Also the IT Application used to consolidate the cash collection related data should be automated to send the Reports thru E-Mail and SMS to Higher officials at the month end.
- Process Automation with the help of deployment of IT Application and integration with the Intranet.
- Application should have feature to operate in Online mode.
- Application should incorporate feature of Customer feedback which will help in improving the service and customer satisfaction
- SLA's should be prescribed and adhered to depending on the severity of complaints.
- Registration of complaints, notifications and status check also customer feedback through SMS should be there.

Information Retrieved:

Information Retrieved from the New Connection Process and other similar business processes is given below:

- No. of Connections Released
- Released Connected Load.
- No. of Lines added.
- No. of Pending Applications and Load
- Grid Sub-station.
- No. of Pending Test Reports.

Information Retrieved from the Complaint Handling Process and other similar business processes is given below:

- No. of complaints registered in the Sub-Division office in a month.
- No. of complaints which were disposed off.
- No. of complaints which were pending.
- No. of complaints which were sent to head of offices for disposal at their own level.

MIS(Management Information System)

All the Reports generated in PSEB are in .doc or .xls format e.g. the Quarterly Report generated from Accounts section.

Inefficiencies/Gap in the MIS:

- The entire process is manual.
- Lots of Paper work is involved.
- Enormous amount of paper is used as many places hard copies are required.
- Storage ,upkeep and maintenance of records is difficult.
- Poor visibility of Reports across the organization and consumers.
- Very few reports generated are online.
- Time taken is much more and Possibility of delay is always there.

- Analysis of Reports is difficult, time consuming and poor and leads to poor decision making and further revenue loss.

Recommendations for addressing the Inefficiencies in MIS :

- First of all a centralized database should be there.
- Paper work should be minimal and report generation should be automated wherever possible.
- Business Intelligence Tools should be employed for analysis, better and faster decision making.
- Online Report Generation and 24*7 availability of reports should be there.

Information Retrieved from MIS:

- Energy Availability**
 - Energy generated from own power house.
 - Energy received as share from common pool consumers.
 - Gross energy Available.
 - Less energy used at Power station Auxiliaries.
 - Energy sold to other state.
 - Net energy available for sale.
- Energy Consumption**
 - Total Energy used within the state of Punjab.
 - Energy export to common pool user.
 - Total Energy sold
- Balanced Unaccounted Energy**
- % T & D Losses**

Redressal of Consumer Grievances

PSEB has created a Grievances Cell to address the grievances of Public/employees.

Information Retrieved from the Grievance cell is below:

- No. of complaints pending at the beginning of the year.
- No. of complaints received during the year which were dealt by grievances cell.
- No. of complaints filed without action being an anonymous with in-complete address.
- No. of complaints/representations sent to various head offices such as Chief Engineer/superintending Engineers etc for investigation/disposal at their own level.
- No. of complaints regarding which reports were asked from the head offices
- No. of reports received in respect of complaints which were disposed off by competent authority.
- No. of complaints pending in grievances cell at the end of the year.

IT Applications

In this section of study we will be covering the following IT Applications:

- **Billing System**
- **Inventory Management System**
- **Customer Care System**
- **HR Database Project**
- **Revenue Monitoring System**
- **PSPCL on web**

Billing System:

- Developed & Maintained by M/s DOECC
- Based on COBOL and UNIX Operating System.
- Cash-collection & bill generation is computerized but it works in off-line mode
- Database is FoxPro
- It is Applicable to Business 5 Days*8 hrs.

Inventory Management System:

- Developed by M/s DOAECC & Maintained by IT Department of PSEB.
- Based on COBOL and Windows 2003 Operating System.
- Inventory Management is computerized for COS but it works in off-line mode.
- Database is FoxPro.
- It is Applicable to Business 5 Days*8 hrs.

Role of IMS in business Process:

- Currently the entire inventory management of Central Stores is using this application.
- PSEB has developed Online Inventory Management System based on Oracle.
- The Mohali circle of PSEB has implemented Online Inventory Management system across 46 locations with the help of VPN.
- This system is live on Sub-Division Offices as well as client outlets.
- PSEB plans to implement Online Inventory Management System across
- 766 locations throughout Punjab in future.

Customer Care System:

- PSEB has undertaken setting up of Customer Care and call centre on a Ludhiana and Bathinda cities.
- It is being developed by Jaipur based Data Infosys Ltd

Role of Customer Care System in business Process:

- Power outage complaints will be handled by the call centre.
- Customer care will cater to other requests of customers.

HR Database Project:

- Developed & Maintained by IT Department of PSEB.
- Oracle Based Solution.
- It Comprises of four Modules:
 - Personnel Module
 - Pension Accounting System
 - HR Data of Officers/Officials
 - Disciplinary cases of officers/Officials

Role of HR Database Project in Business Process:

- Processing and calculation of salary of PSEB employees.
The salary Processing of all the PSEB employees is not centralized. The processing Of salary of Gazetted officers is computerized and takes place at PSEB Head Office, Patiala and for Non-Gazetted officers it takes place at Division level or Sub-Division level.
- Processing of GPF
The processing of GPF of all the PSEB employees is centralized and computerized and takes place at PSEB Head Office, Patiala.
- Processing of Pension and Family Pension.

Revenue Monitoring System:

- Developed & Maintained by PSEB IT Department.
- Initially to be implemented in Patiala, Mohali and Ludhiana.
- It will be rolled out across Punjab after the replacement of old meters with AMR(Automatic Meter Reading) meters.

Role of Revenue Monitoring System in Business Process:

- Revenue Monitoring System is most important application for the business as it deals directly with the Revenue generation.
- The outgoing feeder of sub-station and the Meters installed at Consumer systems are linked and the data reading from the meters is remotely sent to the sub-station in real-time.
- It provides remote Real-Time Monitoring of the meter reading at consumer sites.
- The no. of units supplied from each of the sub-station and the no. of units billed are compared and after consolidation reports are prepared.
- If the data is not read from meters for specified time e.g 2min then alarm is signaled via SMS to concerned Sub-Division Officer and still if within specified time meter is still not taking reading SMS alarm is sent to the Chief Engineer (CE)of the Division.
- This helps in detecting in thefts, meter tampering etc and helps in plugging out Revenue Losses.
- In Agriculture sector subsidiary has to be provided but management of units is done by consumers on large scale leading to revenue losses for PSEB. This system is capable of detecting any such loss in real time.

PSPCL on web:

- URL of the Website :<http://www.psebindia.org>
Now after unbundling of PSEB into Powercom and Transcom

There will be two websites of PSEB

Powercom:www.pspcl.in Transcom :www.pstcl.in

- These are being developed, hosted and maintained by Phoenix IT Solutions Vishakhapatnam.
- The IT department of PSEB performs the task of maintaining and uploading.
- ❑ There are 28 departments of PSEB and 40 Nodal officers are associated with these departments on individual basis.
- ❑ Each department is allocated a web page on the website for which Nodal Officers are responsible for updating the data for each department.
- ❑ After the updation IT Department of PSEB is notified by the Nodal Officers.

Features:

Facilities being provided to the consumers/suppliers/employees/stakeholders:

- ❑ Consumer Related:
 - View Bill summary
 - Online Bill Payment (e-Payment)
 - Complaint Registration(Not fully functional)
- ❑ Supplier Related: Tender Information, Tender Bid Submission
 - e-Tendering to be operational by July1,2010.
 - Currently Each Department of PSEB follows the Tender Process individually and independently after that the tender information is sent to IT department of PSEB through e-mail and then the Tender information is uploaded by IT department.
 - Online Inventory Management System (e-Procurement)

CONCLUSIONS AND FUTURE SCOPE

This Research Paper presents PSPCL & IS. It elucidates the business processes in PSPCL in detail. It plays a main role in bringing forward the inefficiencies/gap in the business processes, key agents involved in business processes, recommendations to address the inefficiencies using Information Systems and the information retrieved from the business processes. The information obtained from the system can be used in decision-making and cutting of costs and the forecasting of demand of electricity in the coming future. This Research paper is theoretical in nature and data was collected from secondary sources such as thesis, research papers, magazines, reports etc In my viewpoint I would like to state that it depends on the government/administration how well it makes use of Information Systems in improving the efficiency of all the business processes of PSPCL which delivery of electricity as utility to the population of Punjab and making it a electricity rich state. The same model can be implemented across all the states of INDIA. The research approach followed in this research paper is qualitative. Further scope of research is also there where the theoretical framework can be proposed and tested by statistical tools and techniques.

REFERENCES

- [1]. Safari, H. (2003).Iran's Ministry of Commerce E-Government Maturity Model. Quarterly Journal of Knowledge Management. No. 63, 53-78.
- [2]. Tripathi, A.& Parihar, B.(2011).E-governance challenges and cloud benefit. VSRD International Journal of CS & IT. 1 (1), 29-35.
- [3]. Chanwick, A. & Mary, C. (2003).Interaction between states and citizens in the age of the Internet: E-Government and E-Governance. An International Journal of Policy, Administration & Institutions.16, 271-300, 2003.
- [4]. Grant, G. & Chau, D. (2005) Developing a generic framework for e-Government. Journal of global information management. 13, 1-30.
- [5]. Vats, K. & Sharma, S. (2012).A Review of Cloud Computing and E-Governance. International Journal of Advanced Research in Computer Science and Software Engineering, 2(2), 300-307.
- [6]. Rameshwar, R. & Narang, S.(2015).Prime and Prospective status of cloud computing in E-Governance: A Literature Review Approach. International Journal of Business Management. Vol.2, Issue 1,2015.
- [7]. Armstrong, C. & Sambamurthy, V. (1999). Information technology assimilation in firms: The influence of senior leadership and IT infrastructures. Inform. Systems Res. 10(4), 304-327.
- [8]. Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. Management 27(6), 643–650.
- [9]. Barua, A., Konana, P., Whinston, A.B., F. Yin. (2004). An empirical investigation of net-enabled business value: An exploratory investigation. MIS Quart. 28(4) 585–620.