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The Review of the De-Regulated Power Structure of India

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ABSTRACT: Deregulation is leading to a change in the structure of the power system by involving private investors and rising the role of customers in the energy pool market. The transition from a controlled to a deregulated market of power has both positive and negative effects. Deregulation has had a significant effect on the power market in the modern period. Electrical deregulation is the process of changing the laws and regulations regulating the electrical industry in order to give customers the choice of electric suppliers that, by promoting competition, are either distributors or traders. Encouraging trade in power generation and distribution. Over the last few decades, many national cities have embraced deregulated electricity. These reforms shift energy markets from regulated to deregulation in these countries, which will bring many benefits to consumers in those countries. This paper addresses the reform and deregulation of the Indian "power" system. This paper also covers the Indian electricity market, industry conditions, quality, causes and impacts of electricity policy and the current structure and performance improvement in the Indian electricity sector, as well as suggestions for measures to be taken to enhance 'deregulation'.

KEYWORDS: De-regulation, Restructuring, Indian power Sector, CERC, TSO, RLDC, Indian Electricity Market, Electricity Policy, and Improving Performance.

I. INTRODUCTION

In current time, because of ascend in power request and supply, it is a troublesome assignment to deal with the age and cost simultaneously for one single gathering. To diminish syndication of one association and to give quality and proceed with solid power supply at sensible cost, it is important to empower rivalry in power advertise. This can be conceivable by presenting rebuilding and deregulation in electrical power area. Power system operation is a difficult task for power utilities in developing countries due to a common situation of insufficient generation capacity and transmission capacity in line with demand growth. In this regard, the electrical energy industry is more concerned than ever before with the problem of ensuring the quality of energy supply within reasonable limits [1]. The limits placed on the operation of the device are basically frequency and voltage. In this setting, the maintenance of adequate system reserve margins and the cost of reliability have become key issues in the electricity sector.

Deregulation includes unbundling of various parts of "intensity" framework, accessibility of segments available to be purchased and furthermore shaping new arrangement of rules for activity and deals of power. A primary and significant part of deregulations rebuilding. Rebuilding implies deregulation of intensity framework into both even and vertical segments. Vertical incorporated utilities are chiefly separated into three fundamental segments, for example Age, Transmission and Distribution [2]. This presents rivalry in age, transmission open access with retail rivalry in appropriation. Rivalry in age diminishes cost of intensity, Transmission open access gives access to transmission matrix to the different ages, which improves unwavering quality of intensity supply. Retail rivalry in circulation gives decisions to purchasers to choose between power providers, which gives great nature of intensity. In India, till autonomy the whole power part was heavily influenced by private segment when contrasted with other created nations.



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Rebuilding in this way was felt as required alternative to fix. As needs be, the power age was opened up in 1991 followed by transmission in 1998. Power Regulatory Commissions Act was instituted in 1998 for setting up administrative commissions in different States. And afterward the Electricity Act 2003 has been advised by Government of India in June 2003. The target of this demonstration is to quicken the power division changes. Presently, The Government of India has been taking a few activities to welcome private area support in age and transmission. Understanding the troubles looked during the time spent changes, GOI in meeting with the States started measures to unblock the challenges.

II. DIFFERENCE BETWEEN REGULATED AND DEREGULATED MARKET STRUCTURE

The thing that matters is genuinely basic. In deregulated power structure, there is just a single primary organization, alluded as Utility. This Utility possesses whole framework including wires, links, transformers, shafts and so forth. It has two duties, initial one to buy power from creating organizations and the second is to sell and appropriate it to its purchasers. In deregulated showcase, barely any extra gatherings are included. The Utility despite everything possesses the foundation, however with the main duty to disperse power. Deregulated markets give section to power specialist organizations, who will contend among themselves and offer power to buyers legitimately. Two dimensional advantages of deregulated structure is that it supports the opposition among specialist co-ops, which thus prompts lower costs for shoppers and release the dormant interest which will urge more players to participate in rivalry and offer better rates and administrations to end customers. Be that as it may, the advantages rely on state to state and furthermore change with segment and geographic profile. Although deregulated electricity markets offer a wider range of renewable energy choices, there are still incentives for customers in regulated states to reap the environmental and economic benefits of green energy. For example, Power Purchase Agreements require investment in a project outside your country that provides benefits through renewable energy certificates (RECs). While renewables cannot be directly integrated into your electricity supply contract as in deregulated markets, there are growing green options for regulated markets.

III. INDIAN ELECTRICITY MARKET

Since India is a very large country, there are many independent electricity markets that coexist, with their operating areas clearly demarcated from each other. Regional national power markets developing in India, state power markets and at regional / national level. It is assumed that, in the near future, the prevailing conditions in the country are only suitable for wholesale competition and not for retail competition. Figure 1 demonstrates the general structure of the power system being deregulated [3].

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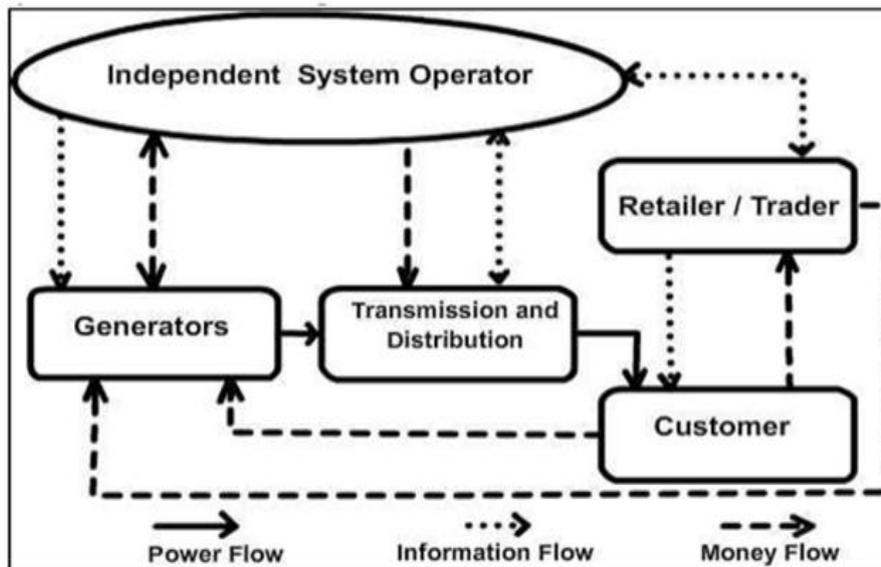


Figure 1: Block Diagram of De-Regulated Power System

IV. CONDITIONS AND PERFORMANCE OF INDUSTRY

Here, the dynamics of the business are starting out as a big determinant of the market structure (without government mediation). Changes in these conditions change the future execution of providers in the power sector. Mechanical innovation, request creation, data asymmetries, and business processes have an effect on the least-cost design of firms in the industry. Every one of the four factors [4] likewise impacts open arrangement regarding market structure. Consider how these variables impact the quantity of firms and passage conditions. Mechanical change, related to moderately low gaseous petrol costs, has made joined cycle gas turbines amazingly financially savvy. Scale economies are never again adequate defense for vertically coordinated imposing business model providers, and age is possibly serious. FERC Orders and state deregulation activities are reactions to this improvement. Besides, populaces and salaries rise, animating interest [5].

The Information Economy runs on electrons, so request development has been consistent. Firms' procedures are changing as organizations sort out the market portions and geographic districts that appear to be generally encouraging, given interior capacities and assumptions about what's to come. Notwithstanding the manners in which organic market conditions initiate change, it ought to be noticed the jobs of data and proprietorship as elements affecting markets. Organization supervisors have significantly more data about creation prospects and request designs than controllers. On the off chance that controllers attempt to smaller scale deal with the area, open doors for cost regulation and new administrations will be remembered fondly. Late decades have seen a significant move in monetary contemplating how motivations work under pace of-bring guideline back. Numerous industry eyewitnesses are persuaded that having controllers oversee age plant tasks start to finish can prompt wasteful aspects that are eventually borne by buyers. Organizations have solid motivators for finding better approaches to offer esteemed types of assistance to clients under tension of rivalry. The fourth fundamental condition that should be tended to by policymakers is the proprietorship structure of the business: open/private and coordinated/divided. Open versus private possession turns into a factor influencing arrangement improvement on the grounds that these various providers have distinctive expense structures and (somewhat) goals.

Any progress to another framework includes desires for policymakers to make a level playing field for what's to come. Vertical connections likewise muddle the circumstance. Exchanges between subsidiary firms bring up issues for



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policymakers, particularly as these influence serious conditions and motivating forces to put resources into transmission. In reality, such exchanges can sub for new creating limit specifically conditions. These four elements influence the advancement of change activities and present issues that should be comprehended and settled. Note that approach decision relies upon the loads given to various execution destinations. Regulatory action emerges from systemic conditions and lessons learned from the experiences of other policymakers. The demand for change will, of course, come from stakeholders who would benefit from changes in the way the sector works now. Big industrial candidates, for example, are also champions of customer choice. They will be able to reap the benefits of the new suppliers.

V. CAUSES AND IMPACTS OF THE ELECTRICITY STRATEGY

The assignment of an evaluation of the benefits of specific power management approaches is confounded by unforeseeable linkages between key factors. Open approaches have an effect on spotlight systems and corporate behavior. Supplier choices inevitably contribute to business results that affect various partners: financial analysts, customers, environmental conferences, and others [6]. In this way, the operation of the industry offers a scorecard for the assessment of the decisions taken by policy makers [7], regulators and supervisors. To start with, how well have policymakers acted regarding building up the essential laws under which the administration organizations work? Second, what has been the impact of controllers, who execute approaches, build up impetuses, and decide the "rules of the game"? Also, third, how powerful have chiefs been in distinguishing ventures that make esteemed new administrations or grow access to existing administrations, in raising monetary capital for new speculations, and in keeping creation costs down? Sifting through the jobs of these three gatherings is rarely simple, since each can highlight the different similar to the feeble connection in the chain that prompts solid part execution.

Given that errors will be settled on, leaders will attempt to commit errors that are hard to distinguish. This "law" catches the truth of dynamic and has significant ramifications for good arrangement determination. Since an unmistakable and conclusive strategy change may turn out, everything considered, to have unintended results or be conflicting with future monetary improvements, policymakers will in general dodge the unequivocal prioritization of results. Rather, change activities by and large incorporate a reiteration of esteemed results without loads put on them. Most choices to change an arrangement have numerous effects, so identification of an error is more uncertain if policymakers can highlight the result and distinguish its positive highlights as mirroring their proposed goals! Every one of us, regardless of whether investigators [8], controllers, government officials, or business administrators, will attempt to disguise our slip-ups. When all is said in done, business as usual can't to oust. All things considered, change for the purpose is change has neither rhyme nor reason. New strategies are problematic. The height of the state of affairs is justifiable for another explanation. Keeping up the current arrangement is generally protected. On the off chance that the choice to proceed with current approaches is really wrong, the expenses are not promptly obvious [7].

A case of setting various loads on sins of commission (change) versus sins of oversight is the FDA dismissal of a gainful medication. It is undeniably increasingly expensive to the administration to acknowledge what ends up being an unsafe medication than to dismiss a gainful one. The political punishments for the two sorts of blunders contrast. On account of open strategy for administrative change, a more prominent weight of evidence is required for an approach alteration even with changes in fundamental conditions, which makes it almost certain that business as usual will be kept up. Obviously, choosing a decent approach elective that warrants cautious assessment is a key factor in great strategy improvement, open or private. With power rebuilding, it is conceivable that the norm can't be enhanced, at any rate as far as the presentation result likely under the option legitimate administrative structure (e.g., the potential presentation of discount rivalry, alongside some rebuilding by vertically coordinated occupants). Building up a decent arrangement of strategy choices is unmistakably a significant job for government, which can fuse exercises from past understanding into change activities in different locales.



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VI. CONCERNING STRUCTURE AND ENHANCING EFFICIENCY

A small amount of age is being traded at the discount point either by or with the assistance of 'speed' brokers. In any case, exchanges are often restricted to clubs, e.g. SEBs and utilities. Power exchanging has created extensive enthusiasm among power players, as it is apparent from the energetic line-up for licenses at Central Electricity Regulatory Commission (CERC). By and by there are seventeen exchanging licensees to whom CERC has conceded permit for between state exchanging powers? These merchants apply for open access in the interest of providers and purchasers to the nodal RLDC relying on exchange necessity. CERC has made the guidelines for open access in between state transmission and between state exchanging. The market structure of flow Indian power industry, delineating vitality stream and cash stream independently. In any case, policymakers can fortify the institutional condition for change by;

- Setting a tone that advances reasonable desires among partners,
- Drawing on the exercises from activities in different purviews,
- Recognizing the job business conditions play in deciding the ideal setup of firms.
- Devising reasonable steady developments toward more noteworthy rivalry where conceivable,
- Promoting elective contest goals procedures for the production of approaches that have win-win results.
- Incorporating worries of every single key partner in the strategy advancement process.

These expectations derive from the fact that although the system is extremely complex, it cannot be fragile. The aim is to find a way to advance competition where possible, to monitor the impact of business model power in residual market areas, and to set up components to cope with natural effects in a financially sound manner. The craft of policymaking includes figuring out which approaches have low drawback hazard with generous upside potential. It likewise includes posing the correct inquiries, in light of the fact that nobody has all the appropriate responses. Some of issues in the activity of "intensity" framework progressively are recognized and arrangement procedures are proposed right now. Issues brought up in this proposal are required to be of down to earth centrality in the investigation of continuous power exchanging under deregulated condition.

VII. POLITICAL AND FINANCIAL TANGLE

Power producers sit on thousands of megawatts of underutilized plant, while consumers face frequent power cuts, both planned and unplanned. Financially troubled generators struggle to escape insolvency proceedings. The state-owned banks that have mostly financed power utilities fear that debts of troubled utilities totaling 1.74 trillion rupees will soon go bad. Aggressive bidding for supply contracts and slower-than-expected demand growth is the root cause. The problems are compounded by difficulties in securing coal and other fuels, high transmission losses, electricity theft and cash-starved distribution companies. But India's 36 state and union territory governments are contributing mightily to this financial and economic mess. They persist with populist cross-subsidies reducing charges for farmers and households at the cost of nonagricultural businesses, especially energy-intensive manufacturing sectors such as steel. The states refuse to let go of their control over how electricity is produced, distributed and consumed. And they are adamant that true markets, with freedom for large industrial users to buy power at market-determined rates from whichever utility they want at power exchanges -- will not become a reality in India.

State politicians are driven mainly by the electoral need to appease farmers, India's most important vote bank, who have grown used to decades of nearly-free power. New Delhi is therefore relying on short-term fixes instead of attempting to overhaul a defunct system. Users must pay the real cost of their electricity, as determined by a properly integrated national market free of state-level interference if India's power mess is to be really addressed. As of Aug. 31, the country's total installed production capacity was 344,689 MW. Out of that, thermal power comprising coal, gas and diesel accounted for 64%, hydropower 13% and renewables accounted for 20%. Commercial and industrial users accounted for 55% of consumption followed by households on 25% and the remaining 20% by agriculture. Coal-fired power generation, which contributes roughly 90% of thermal output and the bulk of the financially distressed



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generators, is the most troubled segment as it faces a secular decline in tariffs due to increasing competition from highly subsidized renewables (which also benefit from falling solar panel costs), coal shortages and weak demand. The Central Electricity Act (CEA) 2003 opened the gates of the country's power sector [9] for private players, who now account for 45% of generating capacity [10]. But easy credit, combined with an overconfident estimation of the risks involved, emboldened too many investors to pile in, without securing power purchase agreements (PPAs) with distribution companies.

As a result, power capacity grew at an annual compound rate of 11% compared to demand at 6% in the last decade leading to oversupply. This does not mean that the electricity market is saturated. Merely that there are not enough paying customers. Distributors have plenty of consumers who will not or cannot pay, even though they have connections. There is huge unmet demand for power. There are 32 million Indian homes roughly 13% of the total -- mostly rural and poor with no access to electricity. Moreover, consumption by those big commercial and industrial users which do not enjoy privileged rates is curbed by high prices, driven up by the cost of subsidizing others, extra charges on exchange-traded power and transmission and distribution losses (including theft) of 20-30%. Of course, cutting theft is central to making consumers pay their way. Government officials must stop turning a blind eye to theft, especially when such transmission and distribution losses average 20%. Such market-oriented reforms have long been blocked by state-level politicians, who now enjoy the influence born of operating subsidies and interfering in the sector.

VIII. THE ADVANTAGES OF DEREGULATION FOR BUSINESSES

Deregulation carries numerous focal points to organizations. Initially, the organizations are left to themselves to decide their operational procedures and vital objectives without the legislature meddling in their working. This implies they can dispatch new items, set costs as per request and flexibly, venture into more up to date domains and locales, secure land and other fixed resources without taking a thousand consents, lastly, the organizations associate and interface with the customers legitimately without the state setting the motivation or the activity plan. Further, deregulation in a developing business sector economy likewise implies that the state is finally giving full play to showcase powers rather than brought together arranging those outcomes in more noteworthy efficiencies for the organizations and more benefits too. This is the motivation behind why numerous organizations greet deregulation wholeheartedly and urge the administrations to decontrol and deregulate more parts so the privately owned businesses would get the opportunity to acquire efficiencies and realize cooperative energies prompting a success win circumstance for both the organizations and the customers. Aside from this, deregulation likewise implies that organizations can concentrate on their center capabilities without submitting themselves to steady investigation and consistent weight from the legislature.

IX. CONCLUSION

Power system activity is becoming a difficult task for power utilities in developing countries due to a common situation of insufficient generation capacity and transmission capacity in line with demand growth. In this regard, the electrical energy market is now more concerned than ever before with the problem of ensuring the quality of energy supply within reasonable limits. Frequency and voltage are essentially the constraints put on device service. In such a climate, the issues of maintaining adequate system reserve margins and the cost of reliability have become key issues in the electricity sector. The cycle of reforming electricity in India is already in practice but at a slow pace. Many state-owned electricity boards are unbundled into three different entities, including generation, transmission and distribution. The distribution network is broken down horizontally into manageable Discos with different oversight and privatized for improved metering, billing, and revenue collection efficiency. Regional / national network control functions can be with central transmission utility, while state transmission utilities can operate load dispatch centers as per TSO. The aim of this study is to inform public policy choices, or to help identify situations where additional regulation may be needed to reduce the external costs produced by an energy-related operation. When finding sources of high aggregate losses, it is necessary to examine the costs and benefits of raising the burdens that arise from such losses. This paper



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also discusses the factors that need to be taken into account when assessing the results of the evaluation, the general conclusions and the recommendations for the analysis to inform future consideration of the various issues.

REFERENCES

- [1] I. E. A. IEA, "India Energy Outlook," *World Energy Outlook Spec. Rep.*, 2015, doi: <https://www.iea.org/publications/freepublications/publication/africa-energy-outlook.html>.
- [2] G. Srinivasulu, B. Subramanyam, and M. Surya Kalavathi, "Multi-objective Transmission Expansion Planning for 133 Bus Tamilnadu Test System," in *Proceedings - AMS 2015: Asia Modelling Symposium 2015 - Asia 9th International Conference on Mathematical Modelling and Computer Simulation*, 2016, doi: 10.1109/AMS.2015.27.
- [3] G. D. Kamalapur and U. R. Y, "Rural Electrification in the Changing paradigm of Power Sector Reforms in India," *Int. J. Electr. Comput. Eng.*, 2011, doi: 10.11591/ijece.v2i2.149.
- [4] S. Ankit, "Factors Influencing Online Banking Customer Satisfaction and Their Importance in Improving Overall Retention Levels : An Indian Banking Perspective," *Inf. Knowl. Manag.*, 2011.
- [5] J. A. Roseline and B. L. Mathur, "Tamil Nadu power sector reform and restructuring - A case study," in *DRPT 2011 - 2011 4th International Conference on Electric Utility Deregulation and Restructuring and Power Technologies*, 2011, doi: 10.1109/DRPT.2011.5994078.
- [6] M. T. Khan and A. S. Siddiqui, "Congestion management in deregulated power system using FACTS device," *Int. J. Syst. Assur. Eng. Manag.*, 2017, doi: 10.1007/s13198-014-0258-x.
- [7] N. K. Sharma, P. K. Tiwari, and Y. R. Sood, "Current status, policies and future perspectives of Indian power sector moving towards deregulation," in *2012 IEEE Students' Conference on Electrical, Electronics and Computer Science: Innovation for Humanity, SCECS 2012*, 2012, doi: 10.1109/SCECS.2012.6184730.
- [8] P. C. Tewari and Arun Singh Negi, "Experimental Investigation of S.I. Engine on Gasoline and Ethanol-Gasoline Blend for Engine Performance Characteristics," *Int. J. Eng. Res.*, 2015, doi: 10.17577/ijertv4is070358.
- [9] S. Vijayalakshmi, G. P. Girish, and K. Singhania, "Role of Renewable Energy in Indian Power Sector," in *Energy Procedia*, 2017, doi: 10.1016/j.egypro.2017.10.117.
- [10] P. W. Pande and A. K. Sinha, "Total Transfer Capability calculation considering variation of ambient temperature - A case study," in *2015 IEEE Power, Communication and Information Technology Conference, PCITC 2015 - Proceedings*, 2016, doi: 10.1109/PCITC.2015.7438092.
- Balamurugan S, Visalakshi P, "Privacy-Preserving Data Mining of Query Logs with Multiple Log Subtables in Conditional Functional Dependencies", *Asian Journal of Research in Social Sciences and Humanities* Year : 2016, Volume : 6, Issue : 8, 2016
- Balamurugan S, Visalakshi P, "Boyce-Codd Normal Form Based Privacy Preserving Multiple Subtables with Conditional Functional Dependencies", *Asian Journal of Information Technology* Vol 15, Issue : 12, 2016
- Balamurugan S, Visalakshi P, "Proposing New Strategy for Privacy Preserving Microdata Publishing With Conditional Functional Dependencies", *Asian Journal of Information Technology* Vol 15, Issue : 12, 2016
- S Balamurugan, K Deepika, RS Venkatesh, R Poornima, Gokul Kruba Shanker, VS Kumar, "SUN Computing: Scalable Ubiquitous Nestle (SUN) Computing for Healing on the IoT", *Asian Journal of Research in Social Sciences and Humanities*, Volume : 6, Issue : 8, 2016
- Gagandeep Singh, Vishal Jain, Dr. Mayank Singh, " An Approach For Information Extraction using Jade: A Case Study", *Journal of Global Research in Computer Science (JGRCS)*, Vol.4 No. 4 April, 2013, page no. 186-191, having ISSN No. 2229-371X .
- Usha Yadav , Gagandeep Singh Narula, Neelam Duhan , Vishal Jain , B. K. Murthy, "Development and Visualization of Domain Specific Ontology using Protege ", *Indian Journal of Science and Technology*, Vol. 9, No. 16, April, 2016, page no. 1-7 having ISSN No. 0974-6846.
- Usha Yadav, B K Murthy, Gagandeep Singh Narula, Neelam Duhan and Vishal Jain, "EasyOnto: A Collaborative Semi Formal Ontology Development Platform", *CSI-2015; 50th Golden Jubilee Annual Convention on "Digital Life"*, held on 02nd to 05th December, 2015 at New Delhi, published by the Springer under Nature Inspired Computing, *Advances in Intelligent Systems and Computing* having ISBN 978-981-10-6746-4 page no. 1 to 11.
- Usha Yadav, Gagandeep Singh Narula, Neelam Duhan and Vishal Jain, "A Novel Approach for Precise Search Results Retrieval based on Semantic Web Technologies", *10th INDIACom; INDIACom-2016, 3rd 2016 International Conference on "Computing for Sustainable Global Development"*, 16th – 18th March, 2016 having ISBN No. 978-9-3805-4421-2/, page no. 1357 to 1362.



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- Usha Yadav, Gagandeep Singh Narula, Neelam Duhan, Vishal Jain, “Ontology Engineering and Development Aspects: A Survey”, International Journal of Education and Management Engineering (IJEME), Hongkong, Vol. 6, No. 3, May 2016, page no. 9 – 19 having ISSN No. 2305-3623.