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Prioritization of Green IT Parameters for Indian IT Industry Using Analytical Hierarchy Process

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Green IT which also referred as Green Computing, mean that IT practices those are environmental friendly with a zero or minimum adverse effect on environment in terms of carbon foot prints emission, e-wastage disposal, recycling, new technology implementation and power consumption. Even though Green IT is a buzz word in developed countries, India is towards embryonic stage in implementing those practices. Hence, it is imperative that countries develop their Green IT parameters and put them in practise to cover all areas like: Environmental, Internal Organization, Work culture, economical aspects, Infrastructure and customers concurrently with the spectacular growth of today's technology. The content analysis is used in this paper from appropriate literature review papers both national and international scenarios to prepare a hierarchical framework for sustainable IT parameters in Indian IT industry. Survey Questionnaire, prepared using Balance Scorecard method was circulated to get feedbacks from experts of IT Industry. Analytical Hierarchy Process is used to investigate priority ranking for Issues-Categories-Parameters for Sustainable IT assessment. From Analytical Hierarchy Process (AHP), most prioritized parameters are: International Organization, Innovation & Learning, Customer awareness, Environmental Effect and financial aspects. The results of this study can be useful to develop a comprehensive sustainable IT assessment model for a developing country like India. Technology inventors and IT marketers should concentrate on these parameters to achieve real sustainable development and influence the SME IT companies towards the same goal. It is to be noted that even though, India is in fast growth rate in technology, only few MNC IT companies are aware and putting the 'Green IT' concept in practise and still in the process of spreading it all over to other parts in nation. This paper shows an example to demonstrate how to empirically analyse and prioritise a set of influencing parameters as selection criteria in decision making for Indian Green IT practices.

Keywords: Sustainable IT, Green IT, Analytical hierarchy process, Green computing parameters.

JEL Codes: M14, M15, M16 and M31

1. Introduction

Green IT refers to the practice of using computing resources more efficiently while maintaining or increasing overall performance (Robert and Nora, 2009). To attain a sustainable impact, Indian IT industry needs to change their approach from 'Obligation' to 'Opportunity' in order to pro-actively take chance in "Green" business

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rather than only focusing on making IT infrastructure, services and products “Green”. The limited literature revealed that the principles of best Green IT practicing components like Environmental Objectives (IT life cycle management for green), Social Objectives (social impact with broad stakeholders), Financial and security Objectives (Maximizing ROI, reducing TCO and securing company assets), Product Compliance (advanced technology, product development & life cycle) requires prioritization for best decisions.

Green computing also includes the goals of controlling and reducing the environmental footprints of computing by minimizing the use and discharge of hazardous materials, and other scarce resources and reducing waste throughout the value chain. Green computing considers IT product use over its lifecycle, and the recycling, reuse, and bio degradability of obsolete products. These objectives help IT products and services for companies and their customers.

The focus of this paper is to explore awareness levels and selecting the best suitable criteria among the multiple criteria available with Green IT practices in Indian IT industry, using Analytical hierarchy process (AHP). The paper focuses to examine the preliminary research aimed at answering the following research questions:

- What is the future planning regarding issues concerning Green IT and what actions could be suggested for Indian IT industry in this regard?
- What are the appropriate weightages of various criterion associated with Green IT in the context of Indian IT industry.

In this paper, the literature review is carried related to different Green IT issues and parameters, where the factors driving the adoption of green IT practices in India and the benefits of implementing green IT practices are also discussed broadly. Further how preliminary field survey was conducted and use of Analytical Hierarchy Process (AHP) as a research methodology are explained. The pictorial representation of Green IT criterion is shown in a hierarchy model with weightages attached to each criterion and sub-criterion. The ranking of various criterion and sub-criterion found is portrayed by a separate chart. Further the conclusion and implications of the study are also explained.

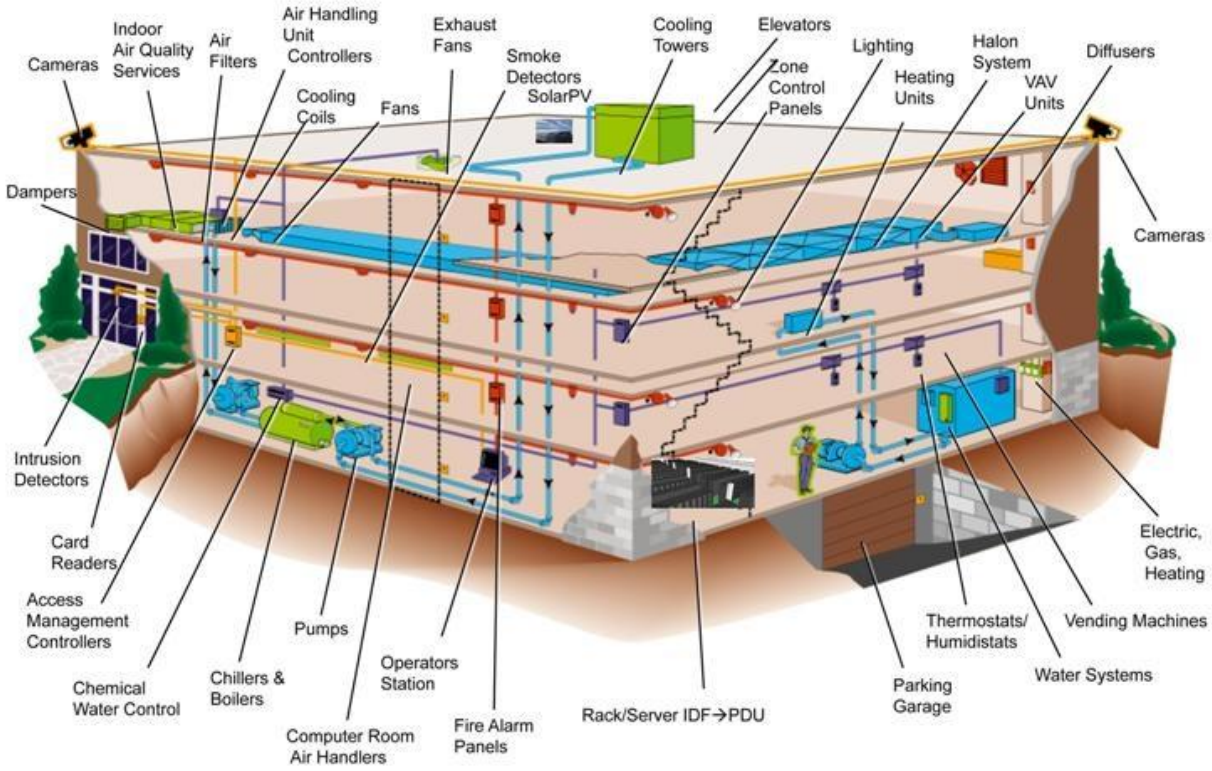
2. Literature Review

Green marketing must satisfy two objectives: improved environmental quality and customer satisfaction. In business, the terms “green product” and environmental product” are used commonly to describe those that strive to protect or enhance the natural environment by conserving energy and/or resources and reducing or eliminating use of toxic agents, pollution and waste (Jacquelyn et al, 2006). Green IT addresses environmental impacts of whole IT life cycle, ranging from designing of IT devices, to its use and its end-of life management (Houghton, 2009). The real impact of sustainable IT will be from the development of innovative uses of computing power and IT knowledge and also the key factors driving the adoption of green computing and green computing strategies (Robert and Haluk, 2010).

The ICT infrastructure energy consumption is estimated to grow 30% to over 31 trillion-watt hours (TWh) by 2014 where it stood at an estimated 24 TWh in 2009. With the rise in energy consumption, carbon emissions levels from Indian enterprise ICT infrastructure is also expected to rise to 25 million metric tonnes by 2014 from less than 20 million metric tonnes in 2009 (Economic Times, 2010). In 2009, the computing infrastructure like PCs and monitors accounted for nearly 62 per cent of total ICT energy consumption followed by enterprise communications infrastructure with 25 per cent (Gartner, 2010). The literature shows that the enterprises should invest in understanding the energy consumption pattern within their firms before implementing a formal energy reduction programme to achieve 'green goals'. A number of factors seem to be important in helping to explain that companies are looking to recognize the role of sustainability as an integral component of their business strategy. These include the need to comply with a growing volume of environmental and social legislation and regulation; concerns about the cost and scarcity of natural resources; greater public and shareholder awareness of the importance of socially responsible financial investments (Peter et al;) Numerous marketers expected to generate positive consumer response which could be translated into an increase in goodwill, market share from their act of Green marketing (Kaman Lee, 2008). Adopting green IT practices offers business and individuals financial and other benefits. IT operations achieve better energy efficiency through green initiatives, which financially benefit them, especially when electrical energy is at a premium and energy process are rising (Murugesan, 2008).Enterprise data centers can easily account for more than 50 percent of a company's energy bill and approximately half of the corporate carbon foot print (Forrest et al., 2008 and Mckeefry, 2008). In the US, the power consumption costs for data center computing and cooling doubled from 2000 to 2006 to $4.5 billion and expected to double again by 2011 (Hamm.S, 2008).

According to Nasscom, 2010, if a single entire corporate IT office is considered as a whole, the ICT related cost is really large which can be depicted in Figure 1. On an average, the approximate percentage of energy use for office building is like: 30% lighting, 25% space heating, 16% office equipment, 9% water heating, 9% space cooling, and 11% others. In 2007, the entire ICT sector was estimated to be responsible for roughly 2% of global carbon emissions with data centers accounting for 14% of ICT footprint. The ICT sector's own emissions are expected to increase from 0.53 billion tonnes (Gt) carbon dioxide equivalent (CO_2e) in 2002 to 1.43 Gt CO_2e in 2020 (Luis Neves, 2008).

Fig.1 Data rich systems and devices found in buildings



(Source: Nasscom Report, 2010)

The infrastructural components shown in fig.1 release a huge carbon emission which is not normally recognized by most of IT professionals and seldom ignored. Countries like India and China are regarded to be enormous use of rapidly depleting (and polluting) fossil energy sources. These countries are actually among the biggest investors in alternative energy sources such as solar energy and bio-fuels (Paul Budde, 2010).

The “green energy economy” to cap carbon emissions, increase energy costs, and holds companies more accountable for their impact on the environment (Tohmatsu, 2009). Although the first-wave activities are much involved in cost-reduction-based IT products and services being the deciding factor in terms of the intangible benefits of “greenness” to the customer. The consumers attitudinal and conative responses towards environmental advertising strategies need to be understood (Ricky, 2004). Anticipating the continuous uprising forces of consumerism, scholars started to call for “sustainability marketing” in the late-1990s (Charter and Polonsky, 1999). Sustainability marketing refers to the building and maintaining of sustainable relationships with customers, social environment and the natural environment (Charter and Polonsky, 1999 and Kaman Lee, 2008). Vendors are now able to position products and services in terms of energy consumption and lower costs, but the real benefit over time may be in positioning on environmental and social responsibility of the company itself (Murugesan, 2008, Pohle and Hittner, 2008, Senge et al, 2008). Few companies have developed a sustainable IT strategy rises to an enterprise level or focuses on social responsibility goals (Olson, 2008). Consumers’ purchasing activities equally match and reflect their perceptions of the

detrimental impact of products on the environment was studied (Yam and Chan, 1998).The second wave will encompass the adoption of ecological strategies that will integrate business models with environmental and social responsibility (Tohmatsu, 2009, Pohle and Hittner, 2008). To implement a sustainable IT orientation as identified would require a rethink of how IT organizations operate (Robert Harmon et al., 2010). More effort in terms of improving product and service design, rethinking the value chain and reengineering IT processes will be needed to enable the IT organization to align with overall corporate environmental and social responsibility efforts (Murugesan, 2008, Perry, 2008 and Senge, 2008). These changes are being driven by the evolving changes in customer requirements from a sole emphasis on the tangible cost-benefit of reduced energy usage to increasingly intangible green benefits and cultural issues motivated by concerns for global warming and climate change (Senge et al, 2008). Consumers have not generally given up their traditional brands and converted to the environmental alternative. Only a small group of people is consistent enough in its interest in the environment to allow this to express itself through actual purchasing behaviour (Grunert, 1993).

2.1 Factors Driving the Adoption of Green IT Practices in India

The literature has revealed that the rapid growth in technology, expected shortages of electric power in India, huge maintenance of data centers, e-wastages of IT hardware products are driving the adoption of Green IT practices in India. The main identified factors are summarised in the ensuing sections.

2.1.1 The Rapid Growth Rate of Internet Usage

India is the third largest Internet user- base in the world with 100 million people entangled in the digital web and first being China with 300 million users, then U.S. at 207 million (Rohan Naravane, 2010). Table 1 show the internet usage and population statistics of India. The GDP per capita is US$ 1,124 and India's broadband subscribers 5,280,000 broadband subscribers as of June, 2009 per ITU (Rohan Naravane, 2010)

Table 1: Internet Usage and Population Statistics of India

YEAR	Users	Population	% Pen.	Usage Source
1998	1,400,000	1,094,870,677	0.1 %	ITU
1999	2,800,000	1,094,870,677	0.3 %	ITU
2000	5,500,000	1,094,870,677	0.5 %	ITU
2001	7,000,000	1,094,870,677	0.7 %	ITU
2002	16,500,000	1,094,870,677	1.6 %	ITU
2003	22,500,000	1,094,870,677	2.1 %	ITU
2004	39,200,000	1,094,870,677	3.6 %	**C.I. Almanac**
2005	50,600,000	1,112,225,812	4.5 %	**C.I. Almanac**
2006	40,000,000	1,112,225,812	3.6 %	**IAMAI**
2007	42,000,000	1,129,667,528	3.7 %	**IWS**
2009	81,000,000	1,156,897,766	7.0 %	**ITU**
2010	81,000,000	1,173,108,018	6.9 %	**ITU**

2.1.2 Corporate Social Responsibility (CSR)

The industry has significantly contributed to empowering the diverse human assets and raising aspirations. Green IT project success factors has optimised and adequate use of resources through HR practices (Dinsmore, 2006). In order to allow efficient and responsible decision making during the project, the project HR Management team should be aware of environmental initiatives within the organisation (Nathalie and Larry, 2010). IT-BPO sector has enabled an environment for innovation and provided necessary impetus to IP creation. The industry has enhanced India's credibility as a business destination and put India on the global map. The industry has facilitated social development, contributing over US$50 million towards Corporate Social Responsibility (CSR) activities in 2008-2009 (Ministry of Communications and Information Technology, 2009-10).

2.1.3 Low Server Utilization Rates

Data center efficiency is a major problem in terms of energy use. The server utilization rates average 5-10 percent for large data centers (Forrest et al, 2008). Low server utilization means that companies are overpaying for energy, maintenance, operations support, while only using a small percentage of computing capacity (Tohmatsu, 2009). Virtualization has become a primary strategy for addressing growing business computing needs. It is fundamentally about IT optimization in terms energy efficiency and cost reduction. It improves the utilization of existing IT resources while reducing energy use, capital spending and human resources costs (Ou.G, 2006 and Ryder, 2008). As Internet-based computing centralizes in the data center, software technology has advanced to enable applications to be used where and when needed. Cloud computing enables developers to create, deploy and run easily scalable services that are high performance, reliable and free the user from location and infrastructure concerns (Perry, 2008).

2.1.4 Growing Awareness of IT's Impact on the Environment

Carbon emissions are proportional to energy usage. In 2007 there were approximately 44 million servers worldwide consuming 0.5% of all electricity. Data centers in the server dense U.S use more than 1% of all electricity (Dietrich and Schmidt, 2007). Their collective annual carbon emissions of 80 metric megatons of CO2 are approaching the carbon footprint of the Netherlands and Argentina (Forrest et al, 2008). In addition to corporate self interest, government regulations will increasingly drive the adoption of green computing and sustainable IT investment and Practices. The new administration in United States has stated intentions to endorse a "green energy economy" which will likely cap carbon emissions; increase energy cost, and holds companies more accountable for their impact on the environment (Deloitte, 2009). Carbon emissions from operations are expected to grow at more than 11% per year to 340 metric megatons by 2020. In addition, the carbon footprint of manufacturing the IT product is largely unaccounted for by IT organizations (Forrest et al, 2008).

2.1.5 Increasing Energy Cost and Restrictions on Energy Supply and access

As per the report of business week 2010, the power prices for households are increased by 2 percent, while those for industrial users raised by 5.8 percent, and the overnight delivery climbed up to 8 percent. It was also known that electricity prices were raised by an average 3.9 percent in India (Eunkyung and Shinhye, 2010). Keeping all in view it can be predicted that there will be power shortage in future. Even today 18,000 Indian Villages are operated without electricity for next 10 years (TERI)

2.1.6 E-wastage

According to a UN report, India is the second largest e-waste generator in Asia. In the year 2009, India generated 5.9 mn tonnes of hazardous waste, posing serious health issues. The UN study says that by 2020, e-wastes from old computers would jump by 500% from the 2007 levels in India, and by 200% to 400% in South Africa and China (Paul Budde, 2010). A recent report by the Delhi based Center for Science and Environment (CSE) says that apart from generating about 3, 50,000 tonnes of electronic waste every year, India imports another 50,000 tonnes. The study alleges that the unorganized sector recycles more than 90% of this; and instead of organizing this sector, government chooses to ignore it. The organization also says that Attero Recycling which has the only license in India to import e-waste is reselling e-waste instead of recycling it. As per the data, India generated 3, 30,000 tonnes of e-waste in 2007 which is equal to 110 mn laptops (Paul Budde, 2010). Desktop consumption could be optimised by user education (Nathalie and Larry, 2010). Increasing global warming and GHG emission assess the environment. Therefore the study and need for an environmental awareness assessment of the citizens in order to determine how critical thinking and problem solving skills on issues of environmental significance can be promoted (Constantina Skanavis and Evelina, 2002)

The goal should be to have zero impact on the environment in the disposal of assets. Strategies include product take back programs, waste management and recapture of critical materials and secure disposal (Hanselman and Pegah, 2007).

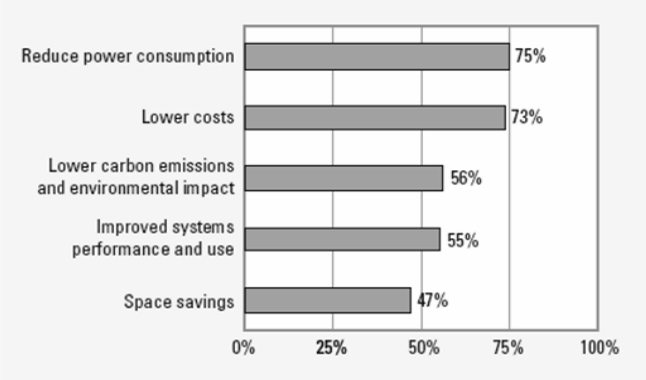
2.2 Benefits of implementing Green IT Practices

Green IT is the study and practice of designing, manufacturing, using and disposing of computers, servers, and associated subsystems such as monitors, printers, storage devices, and networking and communications systems efficiently and effectively with minimal or no impact on the environment (Murugesan, 2008).Thus, green IT includes the dimensions of environmental sustainability, the economics of energy efficiency, and the total cost of ownership, which includes the cost of disposal and recycling (Murugesan, 2008). Below Figure 2 shows the percentage of benefit by practicing green IT.

Green IT spans a number of focus areas and activities, including design for environmental sustainability; energy-efficient computing; power management; data center design, layout, and location; server virtualization; responsible disposal and recycling; regulatory compliance; green metrics, assessment tools, and

methodology; environment-related risk mitigation; use of renewable energy sources; and eco-labeling of IT products (Murugesan, 2008).

Fig. 2 Percentage of Benefits by adopting Green IT



(Source: San Murugesan, 2008)

By adopting Green IT practices, the benefits identified (Murugesan, 2008) are as follows:

- Minimizing energy consumption
- Data center design, layout, and location
- Server virtualization
- Regulatory compliance
- Methodology
- Environmental issues
- Eco-labeling of IT products
- Space maintenance
- Use of renewable energy sources

However the additional benefits have also been identified by the authors while conducting preliminary industrial survey and are as follows:

- Total Cost of Operations
- Reduces disposal and improves recycling system
- Maximum utilization of natural resources and raw materials
- Impact on environmental sustainability
- Presents opportunities for profitable business

3. Preliminary Field Survey and Research Methodology

A preliminary field survey has been conducted with a view to understand the degree of awareness and issues concerning Green IT practices amongst IT professionals (Senior and Middle level) in India by interviewing them in person. The various criterion obtained in the field survey have been classified under the Balance score card (BSC) perspectives for prioritizing them and also to understand the most important criterion to be implemented by the Indian IT industry. Towards prioritization, a multi-criterion decision method called Analytical Hierarchy process (AHP) has been used.

3.1 Preliminary Field Survey on Green IT Practices in India

The term ‘Green IT’ is even very unfamiliar to the population in IT industry. Though they can sense the concept is all about environment and eco friendly because of term ‘Green’. But they are not exactly aware of ‘Green IT’, its consequences and drawback on environmental resources and pollution, e-wastage, data centers, power consumptions, work station etc. On the other side, major IT companies in India like HCL, WIPRO have been introducing green IT products and green technologies in a remarkable way since past many years with the intension to introduce and stretch green IT concept for IT users. Despite this, there was not even a considerable rate in awareness of green IT practices in India.

After the review of literature and evaluating experts’ reports Analytic Hierarchy Process is observed to be the appropriate tool for identifying appropriate weightages of various criterions associated with green IT in the context of Indian IT industry. AHP is a structured technique for dealing with complex decisions (Lee and Chatt, 2008) and is very popular and widely applicable in various fields due to its simplicity, ease of use and flexibility (Taleai and Mansourian, 2008). Based on mathematics and psychology, the AHP was developed by Thomas L. Saaty in the 1980 (Saaty, 1980). AHP is a reliable tool to facilitate systematic and logical decision making processes and determine the significance of a set of criteria and sub-criteria. AHP helps in reducing bias in decision-making and it can minimize common pitfalls of team decision-making process, such as lack of focus, planning, participation or ownership, which ultimately are costly distractions that can prevent teams from making the right choice (Dweiri and Al-Oqla, 2006, Chang et al, 2005 and 2007).

3.2 Research Methodology: Analytic Hierarchy Process

In this paper, various identified multi criterion have been analyzed using AHP and its procedure is briefly outlined as follows:

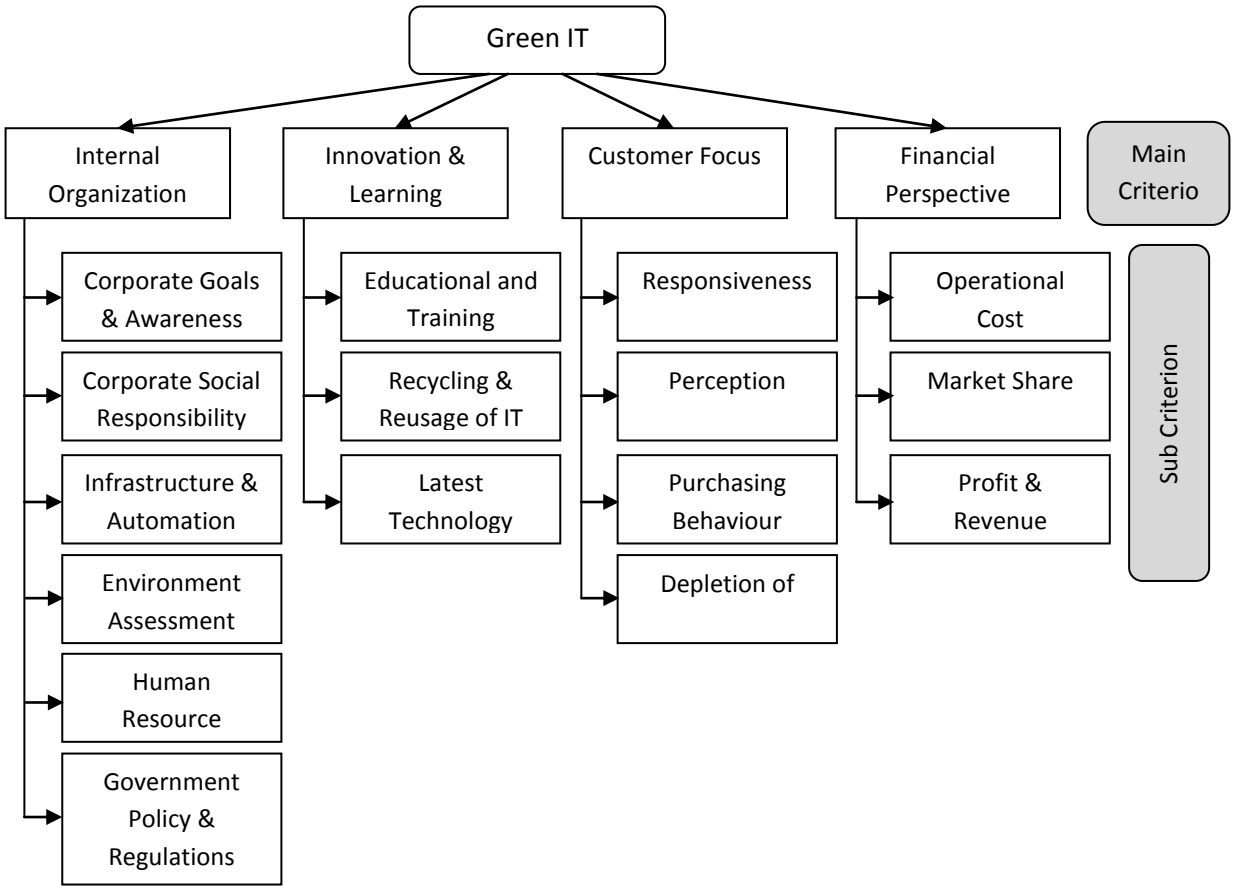
- Structure the problem in a hierarchical model by creating various levels of Main Criteria and Sub Criteria to achieve the desired goal.
- Compare each criteria on one-to-one basis at all levels of 1-9 scale as proposed by Thomas Saaty.
- Perform calculations to find maximum Eigen value, Consistency Index (CI) and Consistency Ratio (CR) and finally aggregated value of weights by Geometric Mean Method or by Arithmetic Mean Method (AMM).
- If CR=0.10, then results are considered as consistent, otherwise procedure is to be repeated till the desired CR value is achieved.

In multi-criterion problems, hierarchical model helps the evaluators to analyse the problem in a most systematic manner. The participants are allowed to give their suggestions to revise the hierarchical structure, if found necessary by them. The priority ranking to such complex problem like Green IT assessment is suitably handled by AHP.

3.3 Multi-criterion Hierarchical Framework

The objective is categorised into 4 main criteria as per Balance Scorecard perspectives: (A) Internal Organization, (B) Innovation and Learning, (C) Customer Focus, (D) Financial Perspective and each main criterion is further divided into a total of 16 sub-criterions. The hierarchical model is shown in figure 3.

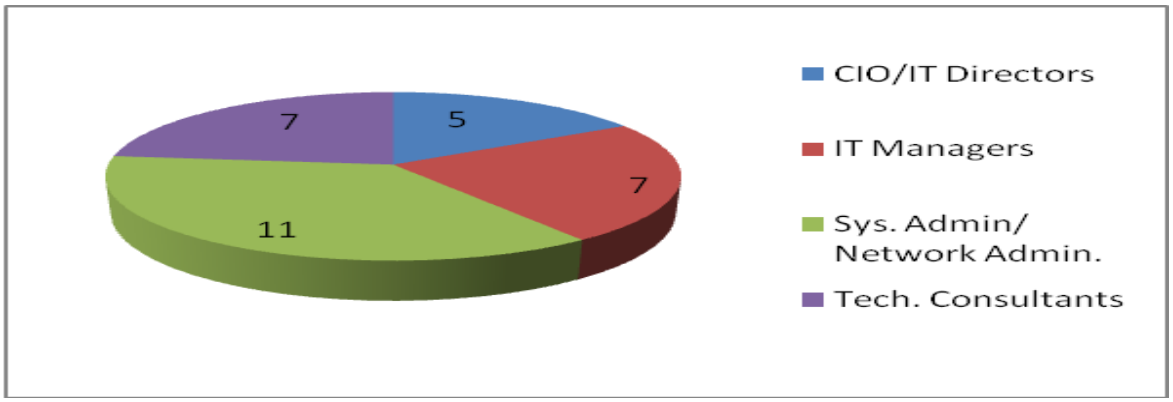
Figure 3: Green IT Multi-criterion Hierarchy model



3.4 Data Collection

The survey questionnaire based on AHP method was administered to experts in IT industries viz. CIO/IT Directors, IT Managers, System Administrators/ Network Administrators, Technical Consultants and IT Sales persons. The respondents were contacted by phone and e-mail and they were explained about the purpose of this survey. The questionnaire is sent to all persons randomly across the country. The questionnaire was sent to about 150 persons but only 30 responses were received back. Therefore the response rate is 20% all over. The profession wise distribution of the respondents is given in figure 4. Here the random sampling method is used for distributing the questionnaire to recipients across the country. The responses received from each respondent are transformed into a single respondent's sheet and the Geometric means are calculated to finally obtain aggregated pair wise comparison matrices (PCMs).

Figure 4: Distribution of Respondents Profession wise in IT Industry



3.5 Allocation of Weights

With the help of AHP approach, pair wise comparison is done from all the responses received from IT experts, weights for all criterion are calculated. Eigen vector method (EM) is used to derive local weights for each criterion. The preference weights given by each respondent is aggregated by Geometric mean method (GMM), as GMM is more consistent with the meanings of both judgment and priorities in AHP (Forman and Peniwati, 1998). When GMM is used as the prioritization procedure, the group inconsistency is at least as good as the worst individual inconsistency for aggregation approaches (Forman and Peniwati, 1998). Priorities from individual experts are synthesized into a single priority through geometric mean in order to get an overall estimate of the priorities for each criterion in every level of hierarchy. The geometric mean for synthesizing individual priorities is expressed in Eqns. (1) and (2).

The geometric mean of a data set $\{a_1, a_2, \ldots, a_n\}$ is given by:

$$(a_1, a_2, a_3, \ldots\ldots a_n) = [\prod_{i=1,n} a_n]^{1/n} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

$$\text{Thus, } G(a1, a2, a3 \ldots.an) = [(a_1)(a_2)(a_3)\ldots\ldots\ldots (a_n)]^{1/n} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Where, G = Geometric mean of individual priorities; a = Priority weight given by expert; n = Number of respondents
The Global weight of each parameter is calculated as per Eq. (3) (Pavlikakis and Tsihrintzis, 2003)

$$G.W_{p,i} = W_{l,i} \times W_{c,i} \times W_{p,i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

Where:

I = 1, 2, 3…….n = issue, Main criterion and Sub criterion at each level
At every level $\Sigma_{i=1,n} W_{m,i} = 1$, $\Sigma_{i=1,n} W_{s,i} = 1$.
Where W_m = Local Weight of main criteria; W_s = Local Weight of sub criteria

4. Results and Discussions

The weights calculated using AHP are all fractional. But these can easily be converted to integral weights by dividing them among 1000, which are shown in Table 2.

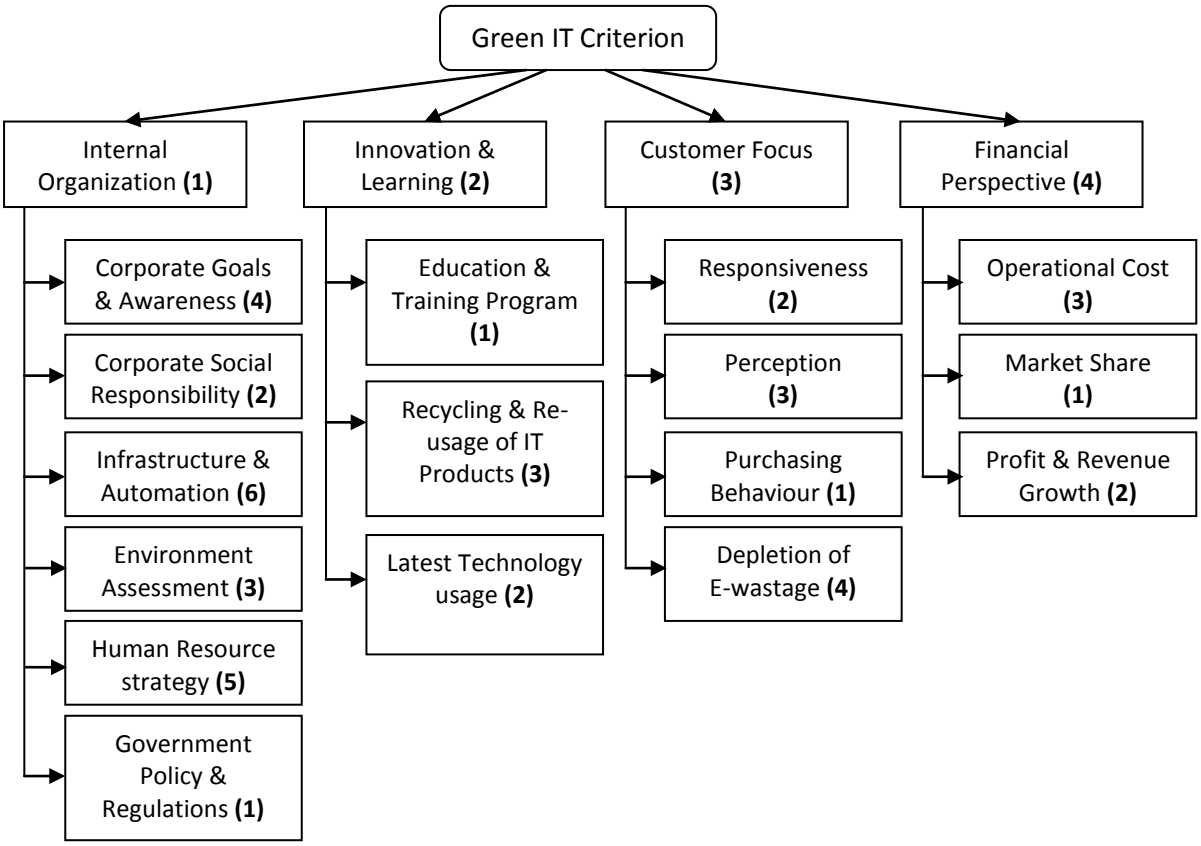
Table-2: Multi-Criterion Weightages Calculated Using AHP

MAIN CRITERIA		**1000**
INORG	Internal Organisation	**359**
INVL	Innovation & Learning	**237**
CUST	Customer Focus	**232**
FINP	Financial Perspective	**172**
SUB-CRITERION		
1-INORG		**359**
CGA	Corporate Goals & Green IT Awareness	41
GPR	Government Policy & Regulation	113
INFA	Infrastructure & Automation	27
ENVAS	Environmental Assessment	59
HRST	HR Strategy	39
CSR	Corporate Social Responsibility	80
2-INVL		**237**
ETP	Educational & Training Program	130
LTU	Latest Technology Usage	73
RRITP	Recycling & Reuse of IT Products	34
3-CUST		**232**
RES	Responsiveness	76
PER	Perception	43
PB	Purchasing Behaviour	84
DEW	Depletion of E-Wastage	29
4-FIN		**172**
OPC	Operational Cost	30
MS	Market Share	89
PRG	Profit & Revenue Growth	53

Towards implementing Green IT in Indian IT industry, it is found that amongst main criterion, ‘Internal organization’ is ranked first whereas ‘Financial perspective’ has been ranked last. Amongst sub-criterion under internal organization, ‘Government Policy and Regulations’ is ranked first whereas ‘Infrastructure and automation’ has received last priority. Similarly ‘Education and Training programme’ under Innovation and learning has received first priority whereas ‘Recycling and usage of IT products’ received last priority; ‘Purchasing behaviour’ under Customer focus ranked first whereas ‘Depletion of E-wastage’ received last priority; ‘Market share’ under Financial perspective received first priority whereas ‘operational cost’ received last priority.

The ranking of various criterion and sub-criterion are indicated in figure-5

Figure 5: Ranking of various criterion and sub-criterion



The other common findings amongst IT users are that they had not heard of the term 'Green IT' before the interview conducted. The respondents' comments are as below:

1. We are not aware because there isn't any awareness program or information about this.
2. There are other environmental issues we have heard, but environmental issues related to carbon footprints, e-wastage and disposals of IT hardware, data center maintenance are rarely discussed.
3. Few recipients working in IT department say, their management is promoting greener practices at work places, but the term Green IT was still unknown.
4. MNC IT companies and other international customers are trying to do business in green IT way, still it is difficult to deploy green IT practices in India at every level, due to huge investment and needs drastically change of entire IT infrastructure.

Rather getting aware of green practices, most of IT people in India ignore them by keeping their systems on, even in weekends and holidays for the ease of carrying out their workload. At the same time it is mandatory for them to recognize how developed countries are pretty much conscious and protecting themselves from global warming, irrespective of the same workload allotment.

5. Conclusion and Implications

This study has attempted to estimate appropriate weightages of various criterion associated with Green IT using a method called Analytical Hierarchy process (AHP). It has also facilitated to prioritise the criterion and enabled us to provide action oriented suggestions to Indian IT industry in adopting Green IT practices. Global Warming is one of the greatest environmental challenges that is being faced in today's world and it is found that IT is also contributing in GHG emission. The extent to which IT can have a positive impact is much a matter of discussion. The most important future step is for governments and policy makers need to encourage the adoption of research and programs that will enable "out of the box" thinking, of which some possibilities have been outlined here. Recycling helps in preventing land filling and allows them to use in different ways. Based on the key findings in this study, considering the present situation and possible future expected scenario of Green IT practices in India, it is recommended that the government of India could prevent such consequences by imposing strict regulations for those IT users, who are overlooking recommended Green IT practices. As an indicator towards this, it is found that more weightage is given to 'Corporate Social Responsibility (CSR)' and 'Government Policy and Regulations (GPR)' which together can make successful Green IT practices at this point of time. It is also found that 'Education and Training programme (ETP)', 'Purchasing Behaviour (PB)' and 'Market share (MS)' have a greater priority and a vital role to play in Green IT practices in Indian IT sector.

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