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AN EMPIRICAL METHOD OF METADATA MANAGEMENT IN MULTI-GRIDS AND MULTI-CLOUDS

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ABSTRACT

Grid computing and cloud computing are two related paradigms used to access and use vast amounts of computational resources. The resources are often owned and managed by a third party, relieving the users from the costs and burdens of acquiring and managing a considerably large infrastructure themselves. Commonly, the resources are either contributed by different stakeholders participating in shared projects (grids), or owned and managed by a single entity and made available to its users with charging based on actual resource consumption (clouds). Individual grid or cloud sites can form collaborations with other sites, giving each site access to more resources that can be used to execute tasks submitted by users. There are several different models of collaborations between sites, each suitable for different scenarios and each posing additional requirements on the underlying technologies.

Metadata concerning the status and resource consumption of tasks are created during the execution of the task on the infrastructure. This metadata is used as the primary input in many core management processes, e.g., as a base for accounting and billing, as input when prioritizing and placing incoming task, and as a base for managing the amount of resources allocated to different tasks. The results and experiences from these systems are both theoretical and practical, as full scale implementations of each system has been developed and analyzed as a part of this work.

- The LUTSfed approach provides a lean and optional mechanism for filtering and management of usage data between grid or cloud sites.
- An accounting and billing system natively designed to support cross-site clouds demonstrates usage data management despite unknown placement and dynamic task resource allocation.
- The FSGrid system enables fairshare job prioritization across different grid sites, mitigating the problems of heterogeneous scheduling software and local management policies.

KEYWORDS

Third Party, Resource Consumption, Metadata, Resource Allocation etc.

INTRODUCTION

Computing capacity available as a utility similar to water or electricity has been a vision for a very long time, with the predictions of John McCarty dating from the early sixties often seen as the starting point. Fifty years later, there have been several incarnations of this paradigm, with the same underlying goal of computing capacity as a utility. Most often, the new paradigm does not entirely overlap with the previous paradigms in scope, leaving niches for several generations of paradigms to coexist.

Two of the most recent paradigms for computing as a utility are grid computing and cloud computing. We refer to the paradigms at large simply as grids and clouds, and use the terms site or provider to emphasize a single supplier in either paradigm. Work units sent to a grid are usually denoted jobs while those sent to a cloud are called services[1]. As cloud computing is a quite wide term, a cloud service can denote several different things. Grids and clouds are both fundamentally ways to group existing (heterogeneous) computer resources into an abstract pool of resources, and making those resources available to users as a virtual coherent infrastructure. Starting out with similar objectives, grids have evolved into reliable, high performing platforms mostly used for large-scale scientific computing while clouds has emerged as a remote hosting and execution option for many different kinds of software.

Other relevant paradigms are, e.g., High Performance Computing (HPC) and High Throughput Computing (HTC). HPC systems focus on running parallel jobs on centralized, dedicated hardware with very high performance in terms of, e.g., computational speed and network latency. HTC on the other hand focuses on maximizing the use of distributed, widely heterogeneous, and unreliable resources not for the sake of a single job but for the general system as a whole. Even though, from a management perspective, HPC and HTC avoids many of the challenges of grids and clouds covered in this paper, concepts such as those in accounting data management and decentralized fairshare scheduling can be applied to HPC and HTC environments as well.

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Individual grids and clouds can be joined into even bigger pools of resources through collaborations. These multi-grid and multi-cloud environments pose additional challenges for the management of submitted tasks, and several different collaboration models with unique challenges exists. One such collaboration model is federations of grids or clouds, where a single grid or cloud may utilize resources from other sites, commonly as part of bilateral resource exchange agreements. For grids, large projects such as the Large Hadron Collider (LHC) have outgrown the capacity of any single grid and require cross-grid solutions to cope with the high resource demand. Similarly, clouds form collaborations to cope with surges in demand when local resources are not sufficient, giving the impression of clouds as endless pools of resources.

In some cases, the collaborating cloud may in turn outsource the execution to a third cloud site, creating a chain of delegation from the originating site to the site where the task is finally executed. Clients for grids and clouds should be kept unaware and unconcerned about whether the infrastructure is part of a collaboration or not, and will normally not be aware of on which collaborating site a submitted task is finally executed (as long as the job does not have explicit restrictions on placement).

Metadata concerning, e.g., the resource consumption or duration of a task are collected during (or after) the execution of a task. This metadata has to be collected and managed equally regardless of if the task executes locally or at a collaborating site, as the data is commonly used as basis for many internal processes in both grids and clouds. The process of collecting, sharing, and managing run time information about a task is called monitoring. Grids normally only use monitoring information regarding the state of physical resources, and utilize job metadata generated upon job completion for tasks such as accounting, billing, and job scheduling. Clouds typically rely solely on run time monitoring data for internal management processes, as cloud services does not have a fixed execution time.

The focus of paper is how to collect, manage, and utilize task metadata in different collaboration models of grids and clouds and investigates how these fundamental tasks are affected by the barriers imposed by collaborations such as federations, e.g., technical heterogeneity, distributed and (site-wise) self-centric decision making.

GRID COMPUTING

The foundation of an open networking structure that would later emerge into the Internet was laid by the National Science Foundation (NSF) back in 1986, when the NFSNET backbone was built to connect five supercomputers in the U.S. Twenty five years later the Internet has evolved into a general utility used by more than two billion people. Meanwhile, grid computing has emerged as a technology and paradigm focusing on the original intent of the Internet – interconnecting resources to form supercomputers.

Grid computing as a concept has grown vast enough to encompass many different tools for many different tasks, becoming a group of related technologies rather than a single unified utility. The fact that there is no absolute definition distinguishing grids from other distributed environments, leads to some confusion on what should be considered a grid. Among many definitions, the most commonly used definition by Foster comes in the form of a three point checklist, defining grids as systems that: "coordinates resources that are not subject to centralized control ...", "using standard, open, general-purpose protocols and interfaces ...", "to deliver nontrivial qualities of service".

Foster's definition is widely accepted but not standardized, and there are major grid efforts (such as the LHC Computing Grid (LCG)) that group's resources under centralized control while still being referred to as a grid. The view on grids underlying the work presented in this paper is very similar to Foster's definition, with emphasis on decentralized control of resources and autonomy of participating sites.

Since the initial vision of offering general-purpose computational capacity as a utility, grid computing has evolved into a tool mostly used to enable infrastructure for large-scale scientific projects, such as the Large Hadron Collider (LHC)], the World-wide Telescope, and the Biomedical Informatics Research Network. In many cases, grids are not only means to share raw computational resources but also make it possible to share data from important scientific instruments.

Grid as an Infrastructure

The overall purpose of grid computing is to interconnect resources which may be owned by different actors in different countries, have different physical characteristics (CPU frequency, CPU architecture, network bandwidth, disk space, etc.) and run different operating systems and software stacks. Users commonly organized in collaborating scientific communities, Virtual Organizations, consume these resources. A wide variety of grid middlewares including are used as intermediate software layers for job submission and job management in grids. The vast set of different middlewares has created interoperability problems between the middlewares themselves, creating an additional niche for software to ease the burden to work with different middlewares.

Grid jobs can normally be seen as a self-contained bundle of computational jobs and input data, which can be executed independently across different nodes to generate a set of output data. The jobs are batch-oriented and normally no user interaction with the job is required or even possible during execution time, which limits the scope of applications suitable for execution on grids. For non-trivial jobs, however, there are commonly considerable amounts of interprocess communication required during job

execution. The Job Submission Description Language (JSDL) is a widely accepted standard for specifying job configuration properties such as hardware requirements, execution deadlines, and sets of input and output file required or generated by the computations.

When running a job on a grid, the first step is to select which of the available resources to execute on. This can be done either manually by the user, or by the support of a resource broker. Once a suitable resource has been selected, the job is submitted for execution to the local scheduler of that resource. Common technologies for local resource scheduling include Maui and SLURM. In contrast to the local scheduler, the broker does not have full control over the resources and must rely on best effort scheduling of jobs.

Backfilling techniques are commonly used to increase resource utilization, and may be used to mitigate the loss of utilization caused by reservations. There are many different strategies to grid job scheduling, some focusing on, e.g., scheduling for the benefit of a single application, optimizing the job wait time, optimizing the total system throughput, avoiding starvation1, or to offer advance reservations.

Another parameter commonly used in scheduling is fairness. The concept, originating from, is commonly used in scheduling to take previous consumption and user shares into account, prioritizing jobs for users higher if that user has a lot of unspent shares. There are several approaches to fairshare scheduling in grids, e.g., the definition of fairness varies between the different approaches, some measuring the total resource utilization, others the number of accepted jobs or the number of missed deadlines per user. All approaches use some historical utilization data as input in the scheduling process. A modern batch system scheduler can be configured in many ways to strive towards one or more objectives, normally using weighed combinations of several parameters. The scheduler prioritizes the jobs dynamically and submits jobs for execution on the local resources. After job completion, a usage record is generated with metadata concerning the job.

Federated Grids

As mentioned in the Internet analogy at the start of the, grids emerged as isolated islands similarly to the early isolated networks now made a part of the unified Internet. The initial vision of grid was a wide spanning resource network functioning as a utility, and there are several efforts to create federations of grids, where grids unifies (parts of) their resources for common use while retaining full control over the local infrastructure. For example, the Swedish and Norwegian national grids are two of the actors contributing resources to the Nordic Data Grid Facility (NDGF) consortium. Even though the resources are acquired, owned, and managed by each national grid, a subset of the jobs executed on these resources are run on the behalf of NDGF. In a federation of grids, each site must remain a fully functional autonomous grid in itself, unlike regular computational resources constituting a normal grid, which may rely on common grid functionality in order to function. The motivations behind federations of grids are not only technical, but also often economical or political to consolidate resources and promote collaborations. For instance, EGEE (originally Enabling Grids for E-science in Europe) project is a series of projects initiated by the European Union to create a wide spanning computational grid infrastructure based mainly on the gLite middleware.

European Grid Initiative (EGI) is a substantial European initiative to further unify national grids across Europe, largely continuing on the EGEE effort but with a significant focus on seamless interoperability and integration of several different underlying technologies.

Interoperability between different grid deployments is a considerable challenge. *Field et al.*, present a comprehensive overview of challenges in grid collaborations, based on their experiences from work on the EGEE project and co-chairing the Grid Interoperation Now (GIN) efforts. Field et al. also emphasize the need to not only consider technical difficulties, but also the differences in operational processes, which may prevent seamless interoperability. Task metadata management and compatible monitoring are two of the challenges highlighted by Field et al. The TeraGyroid project also presents experiences from federated resource usage. In this project, they execute tasks on resources belonging to the US TeraGrid and the UK e-Science Grid. They found that they had to port and configure the application to each resource on the grids on which it should be run, and had to spend considerable efforts to persuade site administrators in both grids to accept certificates issued by the other party.

Boghosian et al. provide invaluable insights on the challenges and advantages of grid federations. In this project, the efforts off three different groups are united to create a federated environment to execute applications, which are not embarrassingly parallel. Similarly to the TeraGyriod project, these groups spent large efforts on interoperability at the user and middleware layers, saying that the"...the probability of success is likely to decrease exponentially with every additional independent grid". They also state that "Interoperation between Grids today requires much more than just tedious manual effort; it requires almost heroic effort.", Boghosian et al. found that the primary barrier was not technical, but rather "... the varying levels of evolution and maturity of the constituent Grids." as a result of differences in purposes, priorities, and expertise of the collaborating sites.

One of the biggest challenges in federated grids is scheduling, especially of non-trivial jobs as the correct execution of a parallel job often means that the job has to be executed in parallel across different sites. The way in which jobs are shared between a set of grids decides the structure and relations of grids within a federation. Fundamental work on distributed scheduling for independent tasks is presented in, using meta-schedulers to schedule a common queue of jobs in and between different grids.

Other solutions are based on hierarchically organizing grids. Here, a local grid can regard another grid as a very large local resource with special characteristics, and outsource job execution to another grid using standard interfaces. De Assun¸c˜ao et al. outline the InterGrid, a solution based on inter-grid routing analogous to connecting different ISP networks, and provides a good overview on the challenges associated with a unified grid.

CLOUD COMPUTING

Cloud computing has emerged as a broad concept for remote hosting and management of applications, platforms, or server infrastructure, while still offering interactions with remote resources as if they were provisioned locally. The term cloud computing originates from the custom of representing computer (or telephone) networks using a drawing of a cloud, hiding the exact location of where things are located or how they are connected. The same analogy applies to computational clouds; the location and other underlying details of remote resources are abstracted and hidden from the user, and the resources are available "on the cloud". Similarly to grids, cloud computing lacks a crisp and commonly accepted definition and there are many different views as to what constitutes a cloud, and what differs a cloud from a grid. Two of the most commonly used definitions originate from the National Institute of Standards and Technology (NIST), and Vaquero et al. NIST defines cloud computing as:

> **"... a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."**

This definition is general enough to encompass practically all different cloud approaches, while the one by Vaquero et al. has additional (non-strict) conditions of Service Level Agreements (SLAs) that guarantees capacity to consumers:

> "**Clouds are a large pool of easily usable and accessible virtualized resources (such as hardware, development platforms and/or services). These resources can be dynamically reconfigured to adjust to a variable load (scale), allowing also for an optimum resource utilization. This pool of resources is typically exploited by a pay-per-use model in which guarantees are offered by the Infrastructure Provider by means of customized SLAs**."

Infrastructure as Service (IaaS) In IaaS solutions, hardware-computing resources are made available to consumers as if they were running on dedicated, local machines. The impression of dedicated hardware is commonly achieved by utilizing hardware virtualization techniques, making it possible to host several virtualized system on the same physical host. Some examples of IaaS providers include Amazon Elastic Compute Cloud (EC2), Rackspace, and VMware vCloud Express.

Platform as a Service (PaaS) Instead of offering access to (virtualized) hardware resources, PaaS systems offers deployment of applications or systems designed for a specific platform, such as a programming language or a custom software environment PaaS systems include Google App Engine, Saleforce's Force.com environment, and upcoming projects such as 4Caast, CumuloNimbo, and Contrail, all supported by the European Seventh Framework Programme.

Software as a Service (SaaS)

Web-based applications including, e.g., Microsoft Office Live, Google Apps (not to be confused with App Engine), and the gaming platform OnLive are available to consumers online without the need to install and manage the software locally. The software is instead hosted and managed on remote machines, making it possible to run software (including graphic intensive computer games) on remote servers instead of the local machine.

Virtualization

Hardware virtualization techniques provide means of dynamically segmenting the physical hardware, making it possible to run several different Virtual Machines (VMs) on the same physical hardware at the same time. Each VM is a self-contained unit, including an operating system, and booting a VM is very much like powering on a normal desktop computer. The physical resources are subdivided, managed, and made available to the executing VMs through a Hypervisor (also called VM Monitor). The concept of virtualization dates from the late 1960s but has been largely unused for quite some time, until it gained renewed interest in the late 1990s. The oft cited reason is that the widespread x86 processor technologies was cumbersome and impractical to virtualize compared to its predecessors, and also became cheap enough to increase the number of computers instead of focusing on virtualization. Virtualization is the underlying packaging and abstraction technology for all IaaS clouds, and there are several initiatives for using virtualization in HPC and grid computing.

There are several different technologies for virtualization, which Walters et al. present and organize into four different categories:

Full Virtualization uses a hypervisor to fully emulate system hardware, making it possible to run unmodified guest operating systems at the expense of performance. Native Virtualization Native virtualization makes use of hardware support in processors to

make the costly translations of instructions from full virtualization in hardware instead of software. Known technologies includes KVM, Xen, and VMware.

Para virtualization in Para virtualization, the operating system in the virtual machine is modified to make use of an API provided by the hypervisor to achieve better performance than full virtualization. Xen and VMware are two well-established technologies supporting Para virtualization.

Operating System-level Virtualization Unix based virtualization systems such as OpenVZ can provide operating system-level virtualization without hypervisors by running several user instances sharing a single kernel.

Virtualization techniques in different categories are generally incompatible, and for Para virtualization, there might be interoperability issues even between different versions of the same hypervisor technology. The hardware support makes native virtualization perform almost at the same level as Para virtualization, keeping the losses imposed by virtualization at a couple of percent. There are several benefits of using virtualization in system management, but the most important ones in the context of this paper are: VMs are self-contained systems, making it possible to execute the VM on all compatible hypervisors; VMs can be paused and resumed; and VMs can be migrated (moved) either by pausing them and resuming them on another host or by moving them without suspending them. Migration a VM without (nonneglectable) downtime is known as live migration. There are several schemes for optimizing the migration process, and live migration of VMs can be done with marginal downtime.

Cloud as an Infrastructure

The starting point of cloud computing as an infrastructure is arguably Amazon offering the provisioning of their resources to anyone, without the need of any application process or long-term commitments, and charging users only for the resources they actually consume.

The quick provisioning of resources makes it possible for consumers to adapt their current resource requirements with very short delays by starting up or stopping VMs according to their needs. To avoid having to customize large amounts of VMs individually, a VM template (or type) is often used to start up several identical instances.

When starting several instances of VMs it is the responsibility of the software running inside each VM to synchronize with the other running instances, for example by registering with a load balancer. Some configuration settings, such as the IP of the load balancer, cannot be encoded into the template itself, either because it is not available until run time or because it needs to be unique for each VM instance. The process of configuring each instance automatically is called contextualization. Contextualization is usually performed just prior to booting a VM, and pausing or resuming (or migrating) a VM does not cause another round of contextualization.

There are three main actors involved in cloud infrastructures, illustrated in Figure 1. The Infrastructure Provider (IP) owns and manages the physical resources and any supporting software that is required for infrastructure management. The Service Provider (SP) is responsible for the contents the service itself, installing and managing the software running inside the VMs. End users are the consumers of the service offered by the SP.

Even though the actors are conceptually separate, the same organization may of course own the infrastructure, host services on the infrastructure, and be the end users of their own service. There is also a many-to-many relation between the SPs and IPs, and a single IP normally hosts services from many SPs in a multitenant manner (using the isolation of VMs to keep them from interfering each other). Similarly, a single SP may run services (or even parts of services) on several IPs.

Figure 1 shows three main actors for cloud IaaS: the Infrastructure Provider(s) make resources available to Service Provider(s), who in turn offer a software service to End Users.

Figure-1
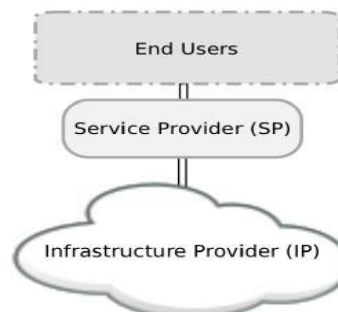
Sources: Authors Compilation

The IaaS service model is normally offered by the IP, but may have supporting functionality running in the SP. The software running inside the service managed by the SP may consist any type of software, which may (or may not) be other flexible platforms such as PaaS or SaaS solutions. Notably, PaaS or SaaS systems are not required to be hosted on underlying IaaS infrastructures by the service providers, but the variation in resource requirements of PaaS or SaaS systems lends itself well to such solutions. Similarly, SaaS systems may (or may not) be hosted with the support of an underlying PaaS system.

From a resource management perspective, deploying a service to an IP is very much like starting a normal computer application – its lifetime and usage patterns are unknown to the underlying operating system, but the system is still responsible for managing and multitasking different applications without detailed instructions from the user. In an operating system, less prioritized tasks are often neglected in favor of higher prioritized ones, mitigating the problem of insufficient available resources. Similarly, some cloud vendors makes use of less prioritized instances (such as Amazon's Spot Instances) to increase the utilization when the system is not under heavy load. When resources are running low, the IP can may free up resources either by stopping less prioritized services or by outsourcing the executions of some VMs to other IPs. Security and privacy concerns are commonly seen as the main limiting factor of clouds as a general utility. Compared to grids, where face-to-face identity validations and certificate generation, clouds usually precede access has a relaxed security model reminiscent of regular Internet sites, using Web based forms for sign up and management, and emails for password retrievals. This relaxed security is a great benefit in terms of usability, but limits the trust of major companies considering using clouds for business-sensitive applications. While the ongoing work on cloud security is progressing, privately hosted and managed clouds has become an option for dealing with sensitive data while still gaining some benefits from the cloud-computing paradigm.

Early results of scientific computing using clouds are presented in, although most of the results are based on "clouds" where a user has to apply by email for the free execution of a VM during short period of time (hours). The lack of quick on-demand provisioning, the need for manual interactions with the providers prior to execution, and the lack of a utility based business model makes it highly debatable whether the systems used in should be considered clouds at all, or rather an extension of the authors earlier published work on Virtual Workspaces in grids.

Grids and Clouds Compared

While both technologies can be seen as enabling technologies to utilize all kinds of computational infrastructure, the main differences are primarily not about technical solutions; as already mentioned: the utilization of virtualized environments to ease deployment and execution for tasks was known in grids before the cloud era. Instead, clouds and grids have emerged as two different paradigms due to approaching the vision of computing capacity as a utility from different angles.

- Grids are designed to support sharing of pooled resources (normally high performing parallel computers) owned and administered by different organizations, primarily targeting users with hardware requirements surpassing the capacity of commodity hardware (e.g. thousands of processor cores or hundreds of terabytes of storage).

- The development of clouds as a technology is driven by economies of scale, where the increased utilization of existing (often commodity) hardware resources offers lower operational expenses for the infrastructure providers, which in turn makes it possible for such providers to offer hardware leasing at prices comparable to in-house hosting.

The differences in scope between the paradigms cause considerable differences in e.g. business models, architecture, and resource management. In the context of this paper, the most interesting differences are those between grid jobs and cloud services, including how resources are provisioned to the supplied tasks. More in-depth comparisons between clouds and grids can be found in, e.g., Grid jobs by nature are computational jobs executed on infrastructures with very high (combined) performance, granting exclusive access to resources for the job until it is completed before assigning the resources to the next job in the queue. The capacity requirements and execution time of grid jobs are normally known beforehand, and used as input in job scheduling. Cloud services, on the other hand, are expected to start almost immediately after they are submitted and to run without a fixed execution time until the service is explicitly cancelled.

The service runs on its assigned share of resources, which may increase or decrease during service execution. Conceptually, the way resources are managed is analogous to time-sharing (grids) vs. space sharing (clouds) in operating systems.

The extensive use of VMs in cloud computing also means that the delays for starting up and terminating jobs are greater than those of grid computing, as VMs adds quite a bit of overhead in data transfer and start-up times. To generalize, grids are inherently more suitable for applications with high demands on stability and performance by guaranteeing them exclusive access to resources over a short period. The boundaries between grids and clouds are not absolute and generous definitions of either term create a large potential overlap. The technologies can also be used in combination. For example, deployment of the Sun Grid Engine (SGE) in a cloud infrastructure is one of the use cases of the RESERVOIR project, showing the plausibility of utilizing the flexibility of clouds to host a grid middleware. To make use of the flexibility of the infrastructure, the SGE was deployed using a master VM for job distribution and several instances of worker VMs for job execution, adapting the amount of worker nodes according to the amount of jobs waiting to be executed.

Another effort to run cluster software on IaaS infrastructure presented by Keahey et al. is called Sky Computing. In this approach, resources from three different Universities are combined into "Virtual Clusters". Hadoop and Message Passing Interface (MPI) cluster software is hosted on the different VMs, creating a cluster utilizing resources from three university sites.

Cloud Collaborations

Similarly, to federations of grids, clouds can be joined together in different collaboration models to take advantage of the joint infrastructure. While the main advantage of federated grids is the increased capacity, clouds may also take advantage of collaborations to, e.g., offer geographical redundancy or execute services at geographically advantageous locations otherwise outside the available infrastructure. The economic model of clouds gives rise to several different forms of collaborations. In some scenarios, a cloud may provision resources from one or more remote cloud(s) using the regular client interfaces, removing the need for prior resource exchange agreements.

In the basic case, the SP interacts with a single IP and is kept unaware of whether the IP uses resources as a part of collaboration or not. In collaborative cases, the original IP site where the service was submitted is referred to as the primary site, while any collaborating sites are the remote sites. The control of the service and responsibility towards the SP remains in the primary site regardless of where the service is actually executed, and the primary site is responsible for ensuring that SLAs are maintained or compensated for. To be able to utilize remote resources, the use of resources between IP sites may be governed by separate SLAs or framework agreements, stipulating the terms of resource exchange between IPs.

As with grid computing, the use of several clouds introduces many heterogeneity problems that ultimately only can be resolved using standardization efforts. Native (hardware) virtualization is a first major step to standardization on the lowest hardware level. There are also efforts to create standardized and general formats for specifying virtual machines and virtual hard drives and general cloud APIs, but neither standard has yet emerged as a generally accepted candidate.

VM incompatibility issues aside, there are a number of operational challenges imposed by the used of collaborative clouds. Since each site retains its full autonomy, and its own policies and objectives, the internal workings of each site are largely obscured to other sites in the collaborations. This means each site only has details available regarding local resources, and at best incomplete information regarding the state in other sites. Service provisioning across clouds therefore has to be based on probabilities and statistics rather than complete information. Another challenge not present in single clouds is that sites participating in collaborations may have external events affecting the state of a service and resource availability of the infrastructure.

The RESERVOIR (Resources and Services Virtualization without Barriers) project focus on creating and validating the concept of cloud federations across several infrastructure providers through several use cases, including running SGE and SAP applications on the federated infrastructure. One of the results of the project is the design and creation of Virtual Application Networks (VANs). These overlay networks, extending previous work from e.g., offers one solution to allow VMs being a part of internal private networks to be migrated to other sites in the federation without being disconnected. These VANs can be used to manage monitoring information for services spanning several cloud sites. The OPTIMIS project targets the creation of a toolkit of components able to (among other things) support multiple cloud scenarios without extensive changes to the software itself.

Cloud Computing Scenarios

The relation between different clouds in collaboration is commonly modeled as different deployment scenarios, depending on the type of interactions between the different sites in the collaboration. We divide the scenarios into three main categories, federated clouds, multi-clouds, and private clouds, each described and illustrated in the coming subsections. Different scenarios can also be combined into hybrid clouds, with busted private clouds commonly used as an example. Note that all collaboration scenarios are multi-clouds in the sense that they span more than one cloud. The term is used in this more general sense in the title of this paper, but used in a more specific case in this subsection to describe a specific collaboration scenario.

Figure 2a shows a simplified model of a standard cloud which is used as the starting point when describing the other deployment scenarios. As previously mentioned in 3, a single IP normally hosts the services of several SPs, although only a single SP is shown in the illustrations.

Federated Clouds

Federations of clouds (Figure 2b) are formed at the IP level, making it possible for infrastructure providers to make use of remote resources without involving or notifying the SP owning the service. Gaining access to more resources is not the only potential benefit of placing VMs in a remote cloud. Other reasons include fault tolerance, economical incentives, or the ability to meet technical or non-technical constraints, which would not be possible within the local infrastructure.

Provisioning of remote resources through federations can be done with several remote sites at the same time, using factors such as cost, energy efficiency, and previous performance to decide which resources to use. In some cases, a service may be passed along from a remote site for execution at a third party site, creating a chain of federations. As each participant in the chain is only aware of the closest collaborating sites, special care has to be taken in the VM management and information flow in such scenarios.

Figure-2 shows the illustration on the left shows a standard cloud scenario, where one or more SPs are using the resources of a single IP. In the federated case, shown on the right, an IP may employ other IPs to host (parts of) the running services without involving the SP.

Figure-2(a): A standard Cloud Deployment   **Figure-2(b): Two Cloud IPs Form a federation**
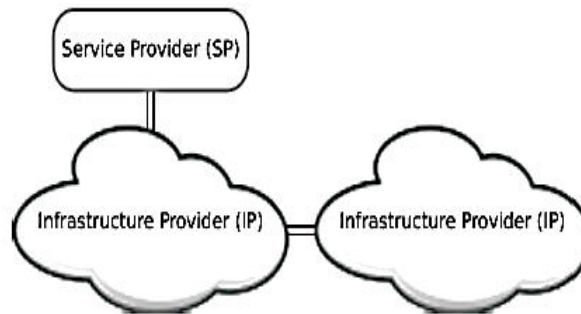
Sources: Authors Compilation

Multi-Clouds

The scenario where the SP itself is involved in moving and prioritizing between different IP offerings is called a Multi-cloud scenario. In this case, illustrated in Figure 3, the SP is responsible for planning, initiating, and monitoring the execution of services running on different IPs. Any interoperability issues have to be detected and managed by the SP, affecting the set of sites, which can be used for multi-cloud deployments.

The automatic selection and management of different alternatives using brokers is a well-known approach for, e.g., grid computing. As shown in, brokers can also be used as an intermediate component in multicloud scenarios. In this case, illustrated in Figure 4, the broker is placed between the SP and the IP. The broker may act as an SP to the IP and as an IP to the SP, containing a lot of the complexity of multi-cloud deployments within the broker itself.
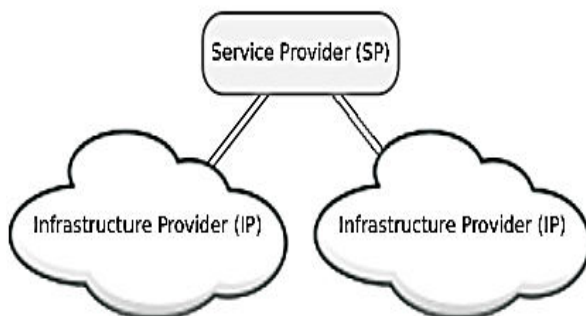
Private Clouds

Private clouds, shown in Figure 5a are cloud deployments hosted within the domain of an organization or a company not made available for use by the public. Such deployments circumvents many of the security concerns related to hosting services in public clouds by keeping the execution within the same security domain, while still offering a computational infrastructure to internal users.

Figure-3 shows the multi-cloud scenarios, the SP itself may control and decide the deployment of a service using several different IPs.
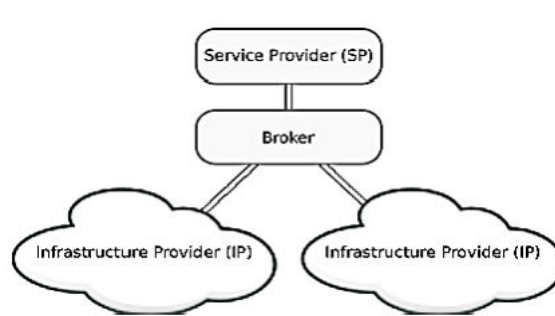
Figure-4 shows the in-brokered multi-cloud the SP to simplify the deployment and management process uses a dedicated broker component.

Figure-3   **Figure-4**

Sources: Authors Compilation   **Sources:** Authors Compilation

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Similarly, to grids, private clouds only have a finite set of resources and therefore the infrastructure must at some point, prioritize, enqueue, or reject service requests in order to satisfy SLA agreements. It is also likely that private clouds are based on collaboration models between peers rather than pay-per-use alternatives. This creates a need for a service model closer to that of grids than public clouds, and so far, there has been little focus in literature on the specific challenges of private clouds.

Hybrid Clouds

Hybrids between different scenarios can be used to overcome limitations of single usage scenarios. For example, to avoid the problem of finite resources in private clouds, such clouds may temporarily employ the resources of external public cloud providers. These bursted private clouds offers a combination of the security and control advantages of private clouds and the seemingly endless scalability of public clouds, but requires very sophisticated placement policies to guarantee the integrity of the system. The relation between private and busted private clouds is illustrated in Figure-5. Sotomayor *et al.*, outline the general concepts of hybrid clouds and provides an overview of different cloud technologies and their support for hybrid models.

Figure-5 shows the private clouds offer stronger guarantees on control and security as the whole infrastructure can be administered within the same security domain. If needed, private clouds may have less sensitive tasks be executed on a public cloud instead, forming a hybrid cloud scenario commonly referred to as busted private cloud.
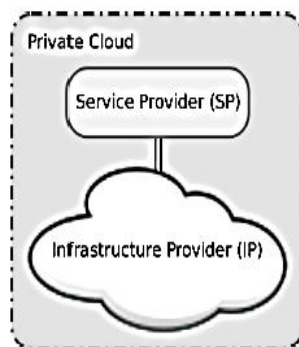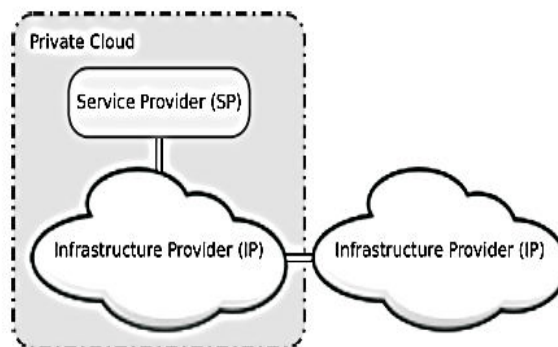
Figure-5a: Private Cloud   **Figure-5b: Busted Private Cloud (Hybrid)**

Sources: Authors Compilation

TASK METADATA MANAGEMENT

The primary focus of this paper is the collection, management, and use of task metadata in distributed and multi-provider infrastructures such as grids and clouds. Previous s have introduced the fundamental concepts of the main paradigms, including different collaboration models, and this outlines internal infrastructure procedures related to task metadata. The task metadata contains information about, e.g., the duration, status, and resource consumption of a running task, and forms the primary source of feedback for different internal procedures in the infrastructure.

Monitoring

Monitoring is the process of gathering information about infrastructure or a service during run time. In grid systems, the focus of monitoring lies on the health, performance, and status of the infrastructure resources]. This information is subsequently used for fault detection and recovery, prediction of resource performance, and to tune the system for better performance. Grid monitoring is slightly out of scope regarding task metadata management, as monitoring is normally not performed regarding the grid jobs themselves. Instead, metadata concerning the result and status of a grid job is collected once the job has terminated (in the shape of usage records), regardless of if the job succeeded to complete successfully or not. Monitoring of running services is fundamental in clouds, as monitoring data is the primary input used in most internal management procedures.

- Infrastructure specific measurements showing the health and utilization of physical resources. Monitoring the state of infrastructure resources is not a specific problem for cloud computing, and the same tools used for general purpose system monitoring can be used in these contexts.
- Data concerning the resource consumption of individual VMs running on the hardware can be obtained by communicating with the VM hypervisor, or by using tools that are capable of operating across several different hypervisors. The VM information is commonly used to perform the fulfillments of SLAs or as input to elasticity and service profiling.
- Service specific Key Performance Indicators (KPIs) are used to measure and manage monitoring values specific to the service.

These values are normally only available from inside the service software itself, and might constitute values such as the current number of active sessions to a Web based application or the number of concurrent transactions in a database system. These values can be used to perform, e.g., elasticity. Measuring and managing monitoring KPIs from inside the service, an interesting problem is not yet well studied. Some cloud solutions (such as RESERVOIR) have a strong separation between service management and the VM itself, in the sense that the VM is unaware of the location of the management components, and the management components are unaware of the location of the VM. An important factor to consider in cloud collaborations is that more than one site might be interested in the monitoring data produced for a given service.

The Lattice framework presents a solution for service level monitoring based on customized virtual networks (VANs) to pass measurements from inside the VMs to the infrastructure on the outside without external network   access. In this solution, the functionality of the network broadcast directive is overridden and used for monitoring tasks instead. However, without the customized virtual networks, this solution would not be possible, and so this is not a generally applicable alternative.

An alternative based on File System in User Space (FUSE) is outlined in. In this solution, FUSE is used to create a small application that simulates a hard drive partition. File system calls (such as writes) result in a normal programmer controlled method call in the application, and the complexity of externalizing the data can be hidden inside the FUSE based application.

Accounting and Billing

Accounting systems are responsible for metering and managing records on resource consumption by users in grids or clouds. In grids, a Usage Record for a job is usually created once the job has finished executing. The usage record contains a lot of general metadata about the job, such as when it was started and finished, and may contain a summary of the combined resource consumption of a job in terms of, e.g., amount of data transferred on the network. Cloud systems normally rely on run time monitoring of service resource consumption as a basis for accounting.

In federations of grids, the accounting data generated upon job completion is usually important both for the originating grid site, the executing grid site, and possibly any consortium or organization linking these resources together. For cross-site cloud computing, the aggregation of data from different site is usually managed by the underlying monitoring system, as accounting is not the only internal cloud process depending on the aggregated raw monitoring data. One of the major differences between grids and clouds is the underlying economical model, which can be clearly linked to the origins of each paradigm and to the niches they occupy today. For grids, the most common solutions are based collaborative sharing models where the usage data is converted to abstract currencies. Abstract credits are normally awarded to users through an out-of-band application procedure, in which a steering committee allocates credits to different projects based on scientific merit. These credits can then be exchanged for computing time on the infrastructure. Many grid accounting systems also support converting the abstract currencies to real monetary units (at least by easily extending the core mechanisms), but real economical models for grid usage has never been widely adopted. One reason could be that the allocation of abstract credits means that stakeholders can partly affect the utilization of the infrastructure. The use of real money could mean that other consumers, preventing them from utilizing the common infrastructure, could constantly outbid smaller projects. In public clouds, users are free to request as much resources as they require on the short term, and paying only for the resources they are currently requesting.

In such systems, the accounting data (based on monitoring) is used as input in the billing process, converting the hardware measurements to real monetary bills using different pricing schemes. The two major payment models used in clouds are prepaid and postpaid, used in the same manner as in the mobile-phone industry. Prepaid, where credits are purchased in advance and consumed in accordance with resource consumption, offers greater control over the maximum costs but running out of credits may cause the service to stop executing. Postpaid, where the consumer is billed at regular intervals for the previous usage, is more sensitive to unexpected amounts of resource consumption, but does not risk running out and hence disturbing the service execution.

Many cloud providers employ overbooking strategies and sell more resources than is actually available, relying on probabilistic models that not all resources are be requested at the same time. However, overbooking strategies ultimately leads to increased amounts of broken SLAs, and each broken SLA generates compensations to the SP. Birkenheuer et al. show that overbooking schemes are valid options and can achieve a 20% increase in profit even when considering compensations for broken SLAs.

Deployment scenarios such as bursted private clouds or cloud federations offers seemingly unlimited hardware resources, as there may always be resources available at collaborating sites. In theory, this means that also the amount of accounting (and monitoring) data generated by services in the cloud is unlimited. Accounting data is commonly considered financial data, with means there are high demands on storing and managing such data over a long period of time (at least ten years in some jurisdictions). This creates a resource-provisioning problem for the management of accounting data similar to the problem addressed by cloud computing itself.

Scheduling and Placement

The process of assigning incoming tasks to available resources, usually denoted Scheduling for grids and Placement for clouds (although scheduling is sometimes used also for cloud services), is one of the internal processes often relying on task metadata for future decisions.

In grid computing, fairshare scheduling is a widespread approach where the scheduler tries to distribute computational resources according to predefined usage shares. The scheduler normally operate on aggregated task metadata for each user and compares the previous usage to the users predefined allocation of resources, using the difference between promised and utilized resources as a factor for prioritizing incoming jobs. The data used in the fairshare process is usually based on usage records, obtained either by querying the underlying accounting system or by receiving such records straight from the infrastructure. The accuracy and availability of usage records and the delay before the data is made available to the fairshare scheduler directly affects the performance and convergence time in the system. Preliminary results in quantifying the relation between task metadata management and job convergence is presented and further evaluation of these factors are part of future work.

Similarly, to grid scheduling, cloud placement can be focused on several objectives and the objectives of each autonomous site may be different. Even within a single site, there might be several conditions to consider, and there is often a trade-off between multiple factors such as maximizing the utilization of the infrastructure while minimizing the risk of breaking SLAs. Currently, the amount of broken SLAs seems to be the primary means of measuring the suitability of a cloud deployment. The placement problem takes very different forms in different cloud scenarios. The limited resources in private clouds creates a need for similar solutions as employed in grid computing, as the total amount of requested capacity will be larger than the available resources at some point. In public clouds, the resources are seemingly unlimited and solutions of the placement problem for an IP can focus on optimizing the revenue while minimizing the risk of breaking SLAs. Hybrid scenarios such as bursted private clouds have different challenges as the utilization of the limited local resources must be balanced with the higher costs (and insecurity) of the public resources. As shown by Van den Bossche et al., approaches which perform very well in public clouds may perform drastically worse in busted private cloud settings due to very large differences in the required time to find an optimal solution when considering also the internal resources.

Elasticity

The ability to quickly request or release resources in response to the current load of a service is one of the most prominent features of cloud computing. Elasticity is the process of automating the decisions for when to scale up or down and transfer the decision making from human administrators to processes running in SP or in the infrastructure. By specifying a set of Elasticity Rules and include the rules in the service manifest, the rules for scaling a service becomes an integral part of the service itself. The rules can be used to specify, e.g., how many users can be served by each VM instance, which may be used in combination with reactive or predictive models to calculate the number of required instances. There are two types of elasticity, horizontal elasticity and vertical elasticity. In horizontal elasticity, the number of VM instances of a certain type is increased or decreased to correlate with the current load. In vertical elasticity, the amount of hardware resources assigned to one or more VM(s) (such as the amount of RAM or number of CPUs) is dynamically increased or decreased. Horizontal elasticity puts additional strain on the application running inside the VMs, as the system itself must synchronize the tasks between the different instances. Vertical elasticity, on the other hand, requires that the operating system and application running inside the VM is capable of making efficient use of, e.g., a dynamic amount of available RAM.

FUTURE WORK

As discussed in this paper, task metadata management is a fundamental task in both grids and clouds and the data is used as the primary input to many different processes. The problem of monitoring of internal service data is an open but important problem in cloud computing. The data extracted from the application running in the VM is commonly used in, e.g., accounting and elasticity, and data extraction must be coherent and with low delays regardless of if the site is participating in a collaboration or not.

A general solution for extracting information from inside the VM and making it available to the cloud infrastructure is one potential area for future work, possibly considering the aid of the hypervisor software itself by employing specific system calls similar to those used in Para virtualization. Research on accounting and billing is so far focused on IaaS clouds, quantifying resource consumption in similar ways as in grid computing.

Future work on fair share scheduling in grids includes more in-depth analysis of different algorithms for calculating fairness based on the historical usage and user allocations. Different algorithms and different settings of parameters such as the amount of historical data to consider are likely to have a large impact on the behavior of the system.

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NEW MEDIA MANAGEMENT IN INDIA: AN EMPIRICAL STUDY

Dr. B. P. Mahesh Chandra Guru[4] S. V. Manjappa[5] C. A. Radhika[6] M. Dileepkumar[7]

ABSTRACT

The world has witnessed commendable new media revolution, knowledge expansion and interactive communication. The new media have also created the 'virtual communities' and transcended the geographical boundaries thus eliminating social restrictions. Truly, information technology is the common denominator that links people regardless of region, religion, caste, color, creed, race or political alignments. The media convergence became a reality in the far end of 20th century. India is heading in the right direction with the development and application of new media in all walks of life. The basis of the information revolution in India is the technological revolution in telecommunications, computers and electronic media. The impact of globalization on the new media management in India has been examined systematically in the present study.

KEYWORDS

New Media, Virtual Communities, Technological Revolution, Globalization, Profit Making etc.

NEW MEDIA IN INDIA

India also achieved commendable progress in the field of communication science and technology. The new media have grown considerably in India. The new media have been rightly considered as the instruments of development by the scholars all over the world. The Government of India has formulated the new media policy in order to facilitate expansion, decentralization and democratization of new media in the Indian Republic. The policy makers have realized that active participation of underprivileged, marginalized, underserved and under-represented segments of society, including women and weaker sections is very crucial from the point of view of inclusive development. India is heading in the right direction with the development of new media in modern society. The telecommunication, satellite communication and computer communication technological applications constitute the gamut of 'new media' in modern society. Modern government and non-government organizations have utilized the new media for developmental endeavors in all spheres of human life.

The liberalization of Indian economy in 1991 under the dynamic leadership of P. V. Narasimha Rao and Manmohan Singh brought about remarkable economic growth of over 6% annually during 1993-2002. The economic reforms were driven in part by significant application of new media in India. The National Democratic Alliance Government led by Atal Bihari Vajpayee accorded high priority for the development of new media in India. The Government formed the Indian National Task Force on Information Technology and Software Development in 1996. India achieved series of developments in the fields of telecommunication, satellite communication and computer communication by the end of the 20th century. The BSNL, Bharti Airtel, Reliance Communications, Vodafone and other organizations became the prominent institutions, which played a crucial role in the telecom revolution in India.

India has become a prominent nation in the world for the development and application of new communication technologies, which have become effective instruments of education and development. Eminent communication scholars and scientists have prepared grounds for the conduction of new media experiments in the country. India is in the forefront in the field of new media management in the world and conducted several experiments in the field of application of new media for various developmental endeavors during the last quarter of 20th century. In the present times, the social media have also become prominent tools of multi-faceted development of the country based on interactive and democratized communication in urban and rural areas. The communication and information specialists have adopted the best strategies for the effective management of new media for various developmental activities in the age of globalization.

Guru and Mariswamy (2014:18) comment: "The new media have grown commendably in India over a period of time. The Government of India have formulated the new media policy to facilitate expansion, decentralization, democratization and localization of new media services which have brought about participatory governance and development in Indian sub-continent. The central government and provincial governments have worked together to herald a new era of active people's participation in the process of development at various levels. India is in the forefront in the field of new media management in the world and

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conducted several experiments in the field of application of new media for various developmental endeavors in the country". The central government also prepared solid grounds for the development of e-governance in the country through several initiatives towards ICT at various stages of development/ implementation of central government which includes - India Portal, National Institute of e-governance, central repository of data, dissemination of information relating to best practices/ innovations in e-governance, awards for best websites and innovative use of IT in the delivery of public services. The citizen service centers were set up for one stop and non-stop delivery of services to the public. The India Portal is a user- friendly portal of all government web sites for providing information and delivery of services on the policies and programmes of the government. Several state governments also launched innovative steps to promote e-governance across the country. Andhra Pradesh, Madhya Pradesh, Rajasthan and Karnataka emerged as model states in the application of new media for development purposes.

SIGNIFICANCE OF STUDY

The empirical and longitudinal studies conducted by the past researchers also revealed that globalization of economy and globalization of media have adversely affected the public interest since the market forces are not committed to socially responsible mass communication. Major studies concerning the impact of globalization and media include - Ganley and Ganley (1992:14), Bhatt (1994:05), Limburg (1994:21), Splichal and Sparks (1994:27), Calabrese and Redal (1995:09), Morley and Robins (1995:22), Tebin and Estabrooks (1995:28), Albrow (1996:01), Bonchek (1997:06), Alterman (1998:02), Ariff and Goh (1998:04), Poster (1999:25), Warnken (1999:34), Castells (2000:10), Laudon and Laudon (2000:19), Ono and Vallath (2000:23), Thomas (2000:29), Veermani (2000:31), Cairncross (2001:08), Grant and Meadows (2002:16), Archibugi and Pietrobelli (2003:03), Gross (2003:17), Walravens (2004:32), Friedman (2005:13), Gershon (2005:15), Pavlik and Intosh (2005:24), Tisch (2005:30), Colinmooers (2006:12), Boyd and Ellison (2007:07), Lewin (2007:20), Cohen (2009:11), Ravi (2012:26), Wang et.al.(2012:33) and Guru and Mariswamy (2014:18). The review of literature clearly indicates that adequate scientific investigations were not carried out in India with a focus on impact of globalization on new media management in India.

A substantial amount of research has been carried out on the impact of globalization on new media management in general and new media applications in particular in India and abroad. However, adequate scientific investigations are not carried out in India on the impact of globalization on new media management in India. Hence, it was decided to systematically evaluate the impact of globalization on new media management in India.

STATEMENT OF PROBLEM

The study assumes profound professional significance because:

- The Government of India has formulated new media policy to strengthen the foundations of participatory governance and development processes.
- The economic reform was driven in part by significant new media application in the country.
- New media applications have brought about remarkable progress in e-governance, e-development, e-commerce, e-education, e-health management, e-content management, and other processes.
- The communication and information scientists have facilitated best practices in the field of new media management in the country.
- Constant and continued research on the application of tested and tried principles and techniques of scientific new media management are imperative in India.

OBJECTIVES OF STUDY

With the impact of globalization on media management and operations in India being the thrust area, the research proposed to:

- Study the attitude of Indian new media owners, professionals, policy makers, activists and other stakeholders in the age of globalization.
- Analyze the ownership pattern of Indian new media in the age of globalization.
- Assess the Indian new media priorities in the age of globalization.
- Examine the new media contents in the age of globalization.
- Evaluate the effects of globalization on the management of Indian new media.
- Explore the impact of globalization on the Indian new media operations, and
- Suggest appropriate strategies for better new media management and application in India.

RESEARCH DESIGN

The present study approaches the problem through a systematic survey method, which is very popular in the field of communication as well as social science research. A structured and pre-tested interview schedule was administered to the policy makers, intellectuals, media owners and media professionals in India. Primary data were collected through questionnaire and interview tools personally by the researcher.

Table-1: Distribution of Study Areas and Sample

Sl. No.	Name of the States	Name of the Cities	Number of Respondents
1	Uttar Pradesh	Lucknow	18
2	Assam	Gowhati	18
3	Maharashtra	Pune	18
4	Kerala	Tiruvananthapuram	18
5	Union Territory	Goa	18
Total	**05 States**	**05 Cities**	**90**

Sources: Authors Compilation

FINDINGS OF STUDY

Impact of Globalization on New Media in India

- A majority of the respondents (66.86%) have stated that the process of globalization had brought about revolutionary expansion of new media in India.
- A majority of the respondents (94.38%) have stated that the process of globalization had ensured the effective management of new media for various developmental activities in India.
- A majority of the respondents (100%) have stated that the globalization of media had created a new generation of media executives rather than socially committed media professionals.
- A majority of the respondents (94.38%) have stated that the process of globalization had brought about commendable progress in the field of telecommunication in India.
- A majority of the respondents (60.06%) have stated that the process of globalization had brought about commendable progress in the field of satellite communication in India.
- A majority of the respondents (77.22%) have stated that the process of globalization had brought about commendable progress in the field of computer communication in India.
- A majority of the respondents (53.55%) have stated that the process of globalization had influenced the new media policy formulation in India.
- A majority of the respondents (58.88%) have stated that the process of globalization had motivated the central and state governments to implement several innovative programmes for the development of nation in India.
- A majority of the respondents (71.60%) have stated that the process of globalization had brought about the market-based approach, which is known for investment de-licensing and free entry of media conglomerates in India.
- A majority of the respondents (65.68%) have stated that the process of globalization had brought about the natural monopoly position in new media management, which has urban and rural utility in India.
- A majority of the respondents (73.08%) have stated that the process of globalization had facilitated greater potential benefit of information and communication technologies in India.
- A majority of the respondents (52.07%) have stated that the process of globalization had created new opportunities for expansion of content development and management in India.

Testing of Hypotheses

H_1- *The globalization of media has not influenced the new media policy formulation and brought about the market based approach, which is known for investment de-licensing and free entry of media conglomerates.*

The data analysis indicate that the globalization of media had influenced the new media policy formulation and brought about the market based approach which is known for investment de-licensing and free entry of media conglomerates. Hence, the hypothesis stands disproved according to data analysis.

IMPLICATIONS OF STUDY

The implications of the findings of the study with special reference to new media management in India in the age of globalization in general terms are given below. The investigation reveals that it is imperative to formulate a national new media policy at this juncture of globalization of media. The central and state governments are required to work together to widen the base of new media, promote new media literacy, enlist active participation of people in development activities, check corruption in development projects and empower the information have not in the country. The new communication technologies should be judiciously used as instruments of participatory communication and development in India. The intelligent and active application of new media including the social media for various developmental endeavors should be ensured by the government and other stakeholders of sustainable, integrated and inclusive development across the country.

SUGGESTIONS FOR FUTURE RESEARCH

An attempt was made by the researcher to examine the impact of globalization on new media in India. However, during the course of the study, it is understood that there are many areas, which warrant serious research interest in this important branch of media management. The future generation of researchers should seriously examine the expansion of new media, democratization of new media, decentralization of new media, localization of new media, promotion of new media literacy, media convergence and empowerment of marginalized sections of society through new media intervention in India.

CONCLUSION

New media have explored new possibilities and vistas from the point of view of participatory governance and development in India and other developing nations. India is heading in the right direction with the expansion of new media and application of new media. The telecommunication, satellite communication and computer communication applications have become highly relevant and useful in the new millennium. The Indian National Tasks Force on Information Technology and Software Development should be equipped with the state of the art facilities, financial resources, manpower, functional autonomy and other privileges to enrich the process of participatory development in the country. The incidence of cybercrimes should be checked in order to protect public interest and national sovereignty in the present times.

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EFFECTIVENESS OF PBTS SCHEDULING ALGORITHM FOR MOBILE SYSTEM: DETERMINISTIC APPROACH

Dr. Aruna Deoskar[8]

ABSTRACT

Processor is a very crucial part of any system. Any operating system is assessed by its efficiency of managing various system activities. Processor scheduling and resource management are main functionalities done by operating system. Many algorithms are in existence for managing the processor scheduling.

This paper proposes a new algorithm PBTS (Priority Based Time Slice Algorithm) which is based on priority preemptive and non-preemptive along with Round robin scheduling algorithm. The performance of this algorithm is compared with existing scheduling algorithms Priority (preemptive, nonpreemptive) and Round Robin algorithms in deterministic approach. These algorithms are compared on average waiting time, average turnaround time, CPU utilization and number of context switching. Paper also highlights the applications where PBTS algorithm would be beneficial.

KEYWORDS

Processor Scheduling, PBTS, Waiting Time, Turnaround Time, Context Switching, Priority & Time Slice etc.

INTRODUCTION

Operating system creates an environment where user can interact with machine. Operating system works as a manager to manage processor and process. Processor scheduling is one of the major tasks performed by the system. In multiprogramming environment, multiple processes are sharing a single processor. Operating system does the scheduling of processor to switch over quickly between multiple processes that are in ready queue. Ready queue is the buffer where all those processes waits for the processor having all other desired resources and as soon as processor is available the processor scheduler assigns one of such process from this buffer to processor for execution.

Proper scheduling mechanisms are required for utilizing the processor and to improve the degree of multiprogramming handled by an Operating system. Processes keep coming continuously in ready queue in some particular fashion from job queue. Different scheduling techniques are used by system to expand the system efficiency for handling multiple processes in faster way. This can be possible by reducing the average waiting time of processes who are waiting for the processor for actual execution, Each process has five process states: New (a newly created process), Waiting (Process in ready queue waiting for processor), Running (A process actually busy with processor), Terminate (Process execution is over and process is terminated).

Several existing scheduling algorithms are there which are broadly classified in to two categories: Preemptive and non-preemptive scheduling algorithms. These algorithms are briefly discussed in section III under existing scheduling algorithm.

The paper proposes a new algorithm based on priority concept and time sharing concept of resources so that a processor could be made available to every process up to certain extent uniformly and so this will minimize the average waiting time of processes waiting in ready queue for the availability of processor.

PROCESSOR SCHEDULING

Operating system follows various Processor scheduling algorithms, which are assessed against five common scheduling criteria's. Scheduling criteria is a base for the selection of processor scheduling algorithms. Five different scheduling criteria's are there to measure the performance of scheduling algorithms.

- CPU Utilization: CPU should be busy for as much as possible time.
  It should be maximum

- Throughput: It is the amount of work done by the CPU during the given period.
  It should be maximum

- Turnaround Time: a process the total time takes it from its submission to its completion.
  It should be minimum

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- Waiting Time: It is the amount of time a process spends in ready queue waiting for CPU.
  It should be minimum

- Response Time: It is the minimum time in which, process has given the first response after executing with CPU.
  It should be minimum

Deterministic approach is one of the processor scheduling evaluation strategy, which calculates the average waiting time, average turnaround time and CPU utilization for different processes arriving in ready queue at various time intervals and having different burst time.

EXISTING SCHEDULING ALGORITHMS

Processor scheduling is classified into two broad categories: Preemptive and Non-preemptive scheduling algorithms. In Non-preemptive scheduling algorithm, system will interrupt the CPU to leave the running job only: a) When job is finished, and/or b) An I/O request appears and so interrupt occurs. Preemptive scheduling is a forceful termination and in such case system will interrupt the processor to leave the running job forcefully in case if a) a higher priority job enter in ready queue compared to the priority of running job or b) When job execution is not over but time allotted for CPU is over.

1. **FCFS (First Come First Serve) (Non-preemptive)**: This is a non-preemptive scheduling algorithm. In this approach, the process who requests for CPU first will be allocated first. Since it is a non-preemptive scheduling algorithm, as once the job is assigned to CPU, it will leave the CPU only when an I/O request is there or process is terminated. FCFS algorithm is implemented by FIFO Queue. When a process enters the ready queue, then its PCB is linked on to the tail of the queue. Whenever CPU is free, the scheduler will assign CPU to that job of Ready Q, which is the on top of ready Q. (Advantage) its implementation is very simple But (Disadvantage) waiting time for a job is quite large. In addition, not suitable for timesharing system.

2. **SJF (Shortest Job First) (Non Preemptive):** This algorithm is based on the processor time each process requires for actual execution. This time is called as CPU Burst (the time when CPU is busy with a particular process. Here the CPU is assigned to that job from ready queue, which is having the smallest CPU Burst time. If the two jobs have the same (next & smallest) CPU burst then FCFS is used. This algorithm is also called as shortest-next CPU burst, because here the scheduling is done by examining the length of the next CPU burst of a process, rather than its own total length. (Advantage) SJF algorithm gives minimum average waiting time for a given set of process. However, (Disadvantage) the practical difficulty is the calculation of next CPU burst /request in SJF algorithm. SJF is frequently used in Long Term Scheduling.

3. **Priority Based Non-Preemptive**: This scheduling is based on the priority associated with processes. A priority is associated with each job whenever it is created. Higher priority jobs are selected first by the scheduler compared to lower priority jobs. Equal priority jobs are scheduled as FCFS. Priorities can be defined either internally or externally. Internally defined priorities use some measurable quantity or quantities to compute the priority of a process like time limits, memory requirements. External priorities are set by external criteria to OS such as importance of process, its type, amount of funds being paid for computer use & other political factors. A non-preemptive priority algorithm simply checks the priority of available processes in Q waiting for CPU. Put this highest priority job on the top of Q. Then ask the scheduler to assign CPU to the job, which is on the top of the Q whenever CPU will become free.

4. **Priority Based Preemptive**: This is a preemptive algorithm, which will compare the priorities of incoming jobs in ready Q with the priority of currently running job. If the incoming job in Q is having higher priority compared to the running job then scheduler will ask the CPU to preempt the running job. Now the CPU will leave the running job, Scheduler will send this running job back to the tail of ready Q. CPU will be assigned now to the highest priority job available in Ready Q for its execution. Each time when a job enters in ready Q, scheduler compares its priority with currently executing job.

5. **Round Robin (Time Slice):** This is a preemptive algorithm. Specifically designed for time-sharing system. Here each job is assigned to CPU for a fixed predefined time quantum. When the time quantum of a job is over & job execution is not finished then scheduler will preempt the running job & send it back to ready Q. A time quantum is nothing but a unit of time & is called as a Time Slice. In this case, the ready queue is treated as a circular queue. If CPU burst is less than time quantum then the job itself will leave the CPU & Scheduler will assign the next job in Q to processor along with resetting the timer. If the CPU burst of running job is larger than time quantum, then as soon as the allocated time is over the timer will go off & causes an interrupt to OS. With this OS performs the context switching for interrupted process and sends that process back to the ready Q. CPU scheduler then selects the next job which is on the top of Q, set its next time quantum by resetting the timer & assigns it to CPU for execution. In this algorithm, no job can be busy with CPU for more than the defined time quantum at a time.

Table-1

S. No.	Processor Scheduling Algorithm	Advantages	Limitations	Practical Application
1	First Come First Serve (FCFS)	Very Simple	Low Throughput	Suitable for Smaller Number of Processes.
2	Shortest Job First (SJF)	Minimum Average Waiting Time	Prediction of CPU Burst is Difficult	Used for Long Term Scheduling
3	Priority Based Preemptive and Non-preemptive	Minimum Waiting Time	Starvation of Low Priority Processes	Useful for Large Number of Processes
4	Round Robin Algorithm (RR)	Optimum Availability of Processor to Every Process	Performance of RR depends Upon Time Quantum	Useful for Time Sharing System

Sources: Authors Compilation

PROPOSED ALGORITHM

PBTS – Priority Based Time Slice Scheduling Algorithm

The proposed algorithm PBTS – Priority Based Time Slice Algorithm is both preemptive and non-preemptive in nature. This algorithm combines the priority concept with time quantum concept. In this algorithm, all processes will be associated with an internally or externally defined priority. CPU scheduler will select one of the processes from ready having highest priority and assign it to the processor. At the same time CPU scheduler will set a fix time quantum to that process. Now CPU will be busy with that process. If the CPU burst time for that process is less than the set time quantum then its execution will get over and process state will be changed to terminate. If the set time quantum for currently running process is smaller than its CPU burst time then scheduler will preempt the job and will send it back to the tail of ready queue. CPU scheduler will now again select one process form ready queue having highest priority, set the fixed time quantum for that process and assign it to CPU.

Advantage: This algorithm works with preemptive priority as well as non-preemptive priority algorithms. Section VI gives the comparative analysis of this proposed algorithm with existing one by following the deterministic modeling approach of processor scheduling evaluation technique.

The working procedure for PBTS Preemptive and Non Preemptive scheduling is as given below:

• Read the list of processes along with their CPU burst time and arrival time in ready queue.

• Draw the Gantt chart to understand the CPU utilization for different processes depending upon scheduling algorithmic logic.

• Calculate the waiting time for each process by taking into consideration their respective arrival time. Waiting time is calculated by adding the entire time slot from Gantt chart when process was waiting for CPU in queue and then subtracting the arrival time of that process.

• Calculate Turnaround time for each process by taking into consideration their respective arrival time. This is calculated by adding the time when a process is actually busy with CPU with the time process has spent in waiting for CPU and by subtracting the arrival time of that process.

• Calculate average waiting and average turnaround time for different scheduling algorithms by dividing total waiting time and total turnaround time by the number of processes.

Table-2: Gives 6 Different Processes Arriving in Ready Queue with their Burst Time and Process Priority

Process	Arrival Time	CPU Burst time	Process Priority
P1	0	10	3
P2	0	5	4
P3	1	8	1
P4	2	4	2
P5	2	8	2
P6	18	3	1

Sources: Authors Compilation

Figure given below shows processes in ready queue as per their arrival time given in Table-2

Figure-1

Sources: Authors Compilation
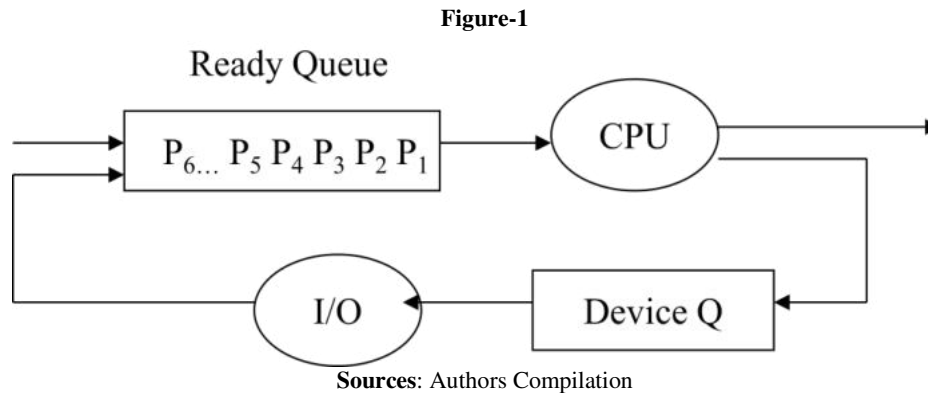
PBTS Non-Preemptive Scheduling Algorithm

This algorithm is based on Priority Based Time Slice algorithm and so considers process priority as well as the defined time quantum for CPU. In this algorithm CPU scheduler will search the queue and select a process Pi to assign it to CPU who is having the highest priority at that particular time interval. At the same time, scheduler set a defined time quantum q for process Pi to be busy with CPU for execution. Now CPU starts execution with Process Pi. If Pi burst time bi is less than q then Pi process will be terminated and scheduler will then select another process from queue having highest priority and will assign it to CPU with resetting the timer for time quantum q. If Pi burst time is larger than q then as soon as the allocated time for Pi with CPU is over, scheduler will send the Pi to the tail of ready queue and will select a higher priority job from queue, will reset the timer for time quantum q and restart the process.

This is a non-preemptive priority based algorithm and so even if a higher priority job (compared to the priority of currently running job) enters in queue, the scheduler will not preempt the running process before completing the execution as per the set time quantum. Table-3 gives the calculated waiting and turnaround time for processes.

Table-3: Waiting and Turnaround Time of Processes with PBTS Nonpreemptive Algorithm

Process	Arrival Time	CPU Burst Time	Process Priority	Waiting Time (W)	Turnaround Time (T)
P1	0	10	3	23	33
P2	0	5	4	33	38
P3	1	8	1	4	12
P4	2	4	2	11	15
P5	2	8	2	18	26
P6	18	3	1	4	7

Sources: Authors Compilation

CPU Utilization Using Gantt Chart

$$\text{Average waiting time for n processes} = \frac{\sum_{i=1 \text{ to } 6} w_i}{n} = 15.21$$

$$\text{Average Turnaround time for n processes} = \frac{\sum_{i=1 \text{ to } 6} T_i}{n} = 21.83$$

PBTS Preemptive Scheduling Algorithm

This algorithm is based on Preemptive Priority Based Time Slice algorithm. In this algorithm CPU scheduler will search the queue and selects a process Pi to assign it to CPU who is having the highest priority at that particular time interval and sets the timer for CPU with a defined time quantum q for process Pi to be busy with CPU for execution. Scheduler keeps on comparing the running job priority against the priority of processes in queue.

This is a preemptive priority based algorithm and so if a higher priority job (compared to the priority of currently running job) enters in queue, then scheduler will preempt the running process immediately and will send it to the tail of ready queue and a new process having highest priority will be assigned immediately to CPU for execution along with the new time quantum.

Table-4: Waiting and Turnaround Time of Processes with PBTS Preemptive Algorithm

Process	Arrival Time	CPU Burst time	Process Priority	Waiting Time (W)	Turnaround time (T)
P1	0	10	3	23	33
P2	0	5	4	33	38
P3	1	8	1	0	8
P4	2	4	2	7	11
P5	2	8	2	14	22
P6	18	3	1	0	3

Sources: Authors Compilation

CPU Utilization Using Gantt Chart

P1 (1)	P3 (5)	P3 (3)	P4 (4)	P5 (5)	P6 (3)	P5(3)	P1 (5)	P1 (4)	P2 (5)

0   1   6   9   13   18   21   24   29   33   38
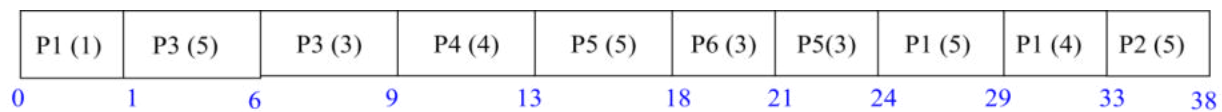
$$\text{Average waiting time for n processes} = \frac{\sum_{i=1 \text{ to } 6} W_i}{n} = 12.82$$

$$\text{Average Turnaround time for n processes} = \frac{\sum_{i=1 \text{ to } 6} T_i}{n} = 19.16$$

Comparison of PBTS results

Proposed PBTS algorithm results are compared with Priority preemptive and non-preemptive scheduling algorithms and Time Slice Scheduling Algorithm. Table-5 shows that PBTS Preemptive scheduling algorithm provides lowest average waiting time and turnaround time. Though it is increasing the number of context switching compared to other existing algorithm but this approach uses time-sharing of resources and so CPU would be available to every process uniformly for the defined time quantum.

Table-5

Processes		P_1	P_2	P_3	P_4	P_5	P_6	Average (WT & TAT)		CS
Priority		3	4	1	2	2	1			
Arrival Time		0	0	1	2	2	18			
Burst Time		10	5	8	4	8	3			
Priority Non Preemptive	WT	0	33	9	19	23	0	84/6	14	5
	TAT	10	38	17	23	31	3	122/6	20.33	
Priority Preemptive	WT	23	33	0	7	17	0	80/6	13	7
	TAT	33	38	8	11	22	3	115/6	19.16	
Time Slice (RR)	WT	23	5	23	13	28	14	106/6	17.66	8
	TAT	29	10	31	17	36	17	140/6	23.33	
PBTS Non preemptive priority	WT	23	33	4	11	18	4	93/6	15.21	8
	TAT	33	38	12	15	26	7	131/6	21.83	
PBTS Preemptive priority	WT	23	33	0	7	14	0	77/6	12.82	9
	TAT	33	38	8	11	22	3	115/6	19.16	

Sources: Authors Compilation

- This proposed algorithm would be beneficial for large number for processes having different priorities and running concurrently.
- Sharable resources like processor could be utilized in optimum way and uniformly among multiple numbers of processes. This could be achieved by providing the time quantum for processor.

- The approach could be used practically for mobile application where even priorities could be assigned to various registered users. If a higher priority user call comes in, then system should preempt the running call (once the set time quantum is over), that running could join in waiting queue and user could attend highest priority call immediately.

CONCLUSION

Resource management is one of the main tasks of operating system. System efficiency and performance is compared by the utilization of available processor among multiple processes. This also increases the degree of multiprogramming. Several existing scheduling algorithms are used by operating system to schedule process execution. However, system should work on to minimize the waiting time of processes that are waiting for CPU for execution.

The performance of proposed PBTS non-preemptive scheduling algorithm is better than time slice algorithm but poor than Priority algorithm. PBTS Preemptive scheduling algorithm provides the optimum solution compared to existing processor scheduling algorithms. This proposed algorithm would bring fairness among the waiting time of all processes and so reduces the chances of any process for starvation.

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PEZZOTTAITE JOURNALS

THE FOURTH WAVE, DATA DRIVEN JOURNALISM: SEARCHING FOR HIDDEN STORIES

Dr. M. Rabindranath[9]

ABSTRACT

The field of journalism has taken leaps and bounds during the last two decades. Of late Data Driven Journalism is one of the modern trends in Journalism. I personally give a place to Data Driven Journalism as the Fourth wave or the Next generation of journalism or Future journalism. It is very much helpful for the modern journalists for searching the hidden stories from the databases with the help of new communication technologies. In the west, the practice of this sort of journalism has already begun during the last four years. Journalists across the world are searching for stories, probing deep into the stories and investigating the data by using open software sources, different other mechanisms and also by many other techniques which are available with the help of new communication technologies.

This paper examines critically about data driven journalism. And it also enlighten the upcoming and budding journalists how the data driven journalism helps to search, clean, visualize, verify, publish and to analyses meticulously news stories. This paper also gives greater insights into the techniques used for this type of journalism in the modern era with recent examples.

KEYWORDS

Computer Assisted Reporting, Open Source Software, Investigative Journalism, Verify Data, Social Media Platforms, Visualization, New Media Communication Technologies etc.

INTRODUCTION

Journalists have been using data in their stories for as long as the profession has existed. A revolution in computing in the 20th century created opportunities for data integration into investigations, as journalists began to bring technology into their work. In the 21st century, a revolution in connectivity is leading the media towards new horizons. The Internet, cloud computing, agile development, mobile devices, and open source software have transformed the practice of journalism, leading to the emergence of a new term: data journalism.

Decades after early pioneers successfully applied computer-assisted reporting and social science to investigative journalism, journalists are creating news apps and interactive features that help people understand data, explore it, and act upon the insights derived from it. New business models are emerging in which data is a raw material for profit, impact, and insight, co-created with an audience that was formerly reduced to passive consumption. Journalists around the world are grappling with the excitement and the challenge of telling compelling stories by harnessing the vast quantity of data that our increasingly networked lives, devices, businesses, and governments produce every day.

The pitfalls and challenges to its adoption throughout the media are similarly significant, from digital literacy to competition for scarce resources in newsrooms. Global threats to press freedom, digital security, and limited access to data create difficult working conditions for journalists in many countries. A combination of peer-to-peer learning, mentorship, online training, open data initiatives, and new programs at journalism schools rising to the challenge, however, offer reasons to be optimistic about more journalists learning to treat data as a source.

Data-driven Journalism, often shortened to *"ddj",* is a term in use since 2009/2010, to describe a journalistic process based on analyzing and filtering large data sets for creating a news story.

Available resources such as *"open source"* software and *"open data"* are main drivers for this purpose. This approach to journalism builds on older practices, most notably on *CAR "computer-assisted reporting"* a label used in the US for decades.

Similar approaches are *"precision journalism",* based on a book by Philipp Meyer, published in 1972, where he advocated the use of techniques from social sciences in researching stories. Data-driven journalism has wider approach.

Figure-1
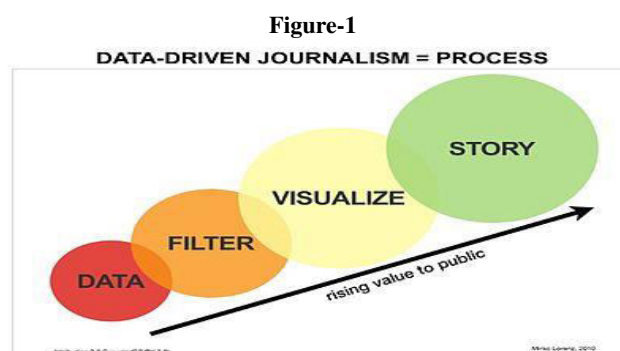
Sources: Authors Compilation

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The process builds on the growing availability of open data that is freely available online and analyzed with open source tools. This type of journalism strives to reach new levels of service for the public, helping consumers, managers, politicians to understand patterns and make decisions based on the findings. Data driven journalism will help to put journalists into a role relevant for society in a new way. It assumes an investigative role, projects like the *MP Expense Scandal* (2009) and the 2013 release of the *"Offshore leaks"* demonstrate the role of this journalism.

According to information architect and multimedia journalist Mirko Lorenz, data-driven journalism is primarily a *workflow* that consists of the following elements: *digging deep* into data by *scraping, cleansing* and *structuring* it, *filtering* by mining for specific information, *visualizing* and *making a story*. This process can be extended to provide information results that cater to individual interests and the broader public. Data journalism trainer and writer *Mr. Paul Bradshaw* describes the process of data-driven journalism in a similar manner: data must be *found*, which may require specialized skills like MySQL or Python, then *interrogated*, for which understanding of jargon and statistics is necessary, and finally *visualized* and *mashed* with the aid of open source tools.

"Data-driven journalism enables reporters to tell untold stories, find new angles or complete stories via a workflow of finding, processing and presenting significant amounts of data (in any given form) with or without open source tools." Van Ess an eminent personality among the pioneers of data driven journalism claims that some of the data-driven workflow leads to products that *"are not in orbit with the laws of good story telling"* because the result emphases on showing the problem, not explaining the problem. *"A good data driven production has different layers. It allows you to find personalized details that are only important for you, by drilling down to relevant details but also enables you to zoom out to get the big picture".*

In 2013, *Mr. Van Ess* came with a shorter definition in that does not involve visualization per se: *"Data journalism is journalism based on data that has to be processed first with tools before a relevant story is possible."* Data-driven journalism is a process whereby journalists build stories using numerical data or databases as a primary material. In contrast, *database journalism* is an organizational structure for content. It focuses on the constitution and maintenance of the database upon which web or mobile applications can be built, and from which journalists can extract data to carry out data-driven stories.

Reporting based on Data: The primary goal is preparing stories based on the data. The findings from data can be transformed into any form of journalistic writing. Visualizations can be used to create a clear understanding of a complex situation. Elements of storytelling can be used to illustrate what the findings actually mean, from the perspective of someone who is affected by a development. This connection between data and story can be viewed as a *"new arc"* trying to span the gap between developments that are relevant, but poorly understood, to a story that is verifiable, trustworthy, relevant and easy to remember.

Data Quality: In many investigations, the data that can be found might have omissions or is misleading. A critical examination of the data quality is important. In other cases, the data might not be public or is not in the right format for further analysis.

Value of Trust: Based on the perspective of looking deeper into facts and drivers of events, there is a suggested change in media strategies: In this view, the idea is to move *"from attention to trust"*. The creation of attention, which has been a pillar of media business models, has lost its relevance because reports of new events are often faster distributed via new platforms such as *Twitter, Facebook* and other social media platforms than through traditional media channels. On the other hand, trust can be understood as a scarce resource. While distributing information is much easier and faster via the web, the abundance of offerings creates costs to verify and check the content of any story creates an opportunity.

Data driven journalism allows scrutinizing and examining information better than ever before. For example, if we analyze the data and if we study the results of research and analyze it before the interview then we can ask questions about the anomalies that we found or questions on procedure that we understand than before.

Ms. Sarah Cohen (Editor of Computer Assisted Reporter at New York Times) said, *"That every good story starts with an idea, a question or an observation and then, we look for data or document that helps us to extent the impact of these observations."* That is how one particular *Pulitzer-Prize* winning series of stories, that was reported by *Ms. Sarah* and her colleagues at *The Washington Post* was born.

The big secret of data driven journalism was never keep secrets from the team you are working with. Share all your findings, drafts and data. Another great benefit of data-driven journalism is how it improves the quality of journalism and the engagement with audiences through visualization and interactive databases. It depends upon how much we nurture it with others' feedback.

INVERTED PYRAMID OF DATA JOURNALISM

In 2011, *Mr. Paul Bradshaw* introduced a model, "The Inverted Pyramid of Data Journalism". http://onlinejournalismblog.com/2011/07/07/the-inverted-pyramid-of-data-journalism/

Process of Data-Driven Journalism

The process to transform raw data into stories is taking to a refinement and transformation. The main goal is to extract information recipients can act upon. The task of a data journalist is to extract and identify what is hidden. This approach can be applied to almost any context, such as finances, health, misappropriation, governance, legal, environment or other areas of public interest.

STEPS OF PROCESS

In order to achieve this, the process should be split up into several steps. A basic distinction can be made by looking at six phases:

- **Clean:** Process to filter and transform data, preparation for visualization,
- **Visualize**: Displaying the pattern, either as a static or animated visual,
- **Publish**: Integrating the visuals, attaching data to stories,
- **Distribute**: Enabling access on a variety of devices, such as the web, tablets and mobile,
- **Measure:** Tracking usage of data stories over time and across the spectrum of uses.

Description of these Steps

Find Data

Data can be obtained directly from governmental databases such as ministries websites, organizations websites, institutional reports, corporations websites, municipalities, metropolitan information, UN databases, WHO data information, World Bank Data API but also by placing Right to Information on specific information and also from government agencies. There is a worldwide trend towards opening data. If the data is in a webpage, scrapers are used to generate a spreadsheet. Examples of scrapers are ScraperWiki, Firefox plugin, OutWit Hub. In other cases, OCR-Software can be used to get data from PDFs. In March 2012, at the Data Journalism Conference in Hamburg by Mr. Henk Van Ess, showed how the public through crowd sourcing can also create data.

Clean Data

Usually data is not in a format that is easy to visualize. Example: sometimes there are too many data points or that the rows and columns need to be sorted differently. Another issue is that once investigated many datasets need to be cleaned, structured and transformed. Various open source tools like *Google Refine, Data Wrangler and Google Spreadsheets* allow uploading, extracting or formatting data.

Visualize Data

To visualize data in the form of graphs and charts, applications such as Many Eyes or Tableau Public are available. Yahoo! Pipes and Open Heat Map are examples of tools that enable the creation of maps based on data spreadsheets. The number of options and platforms is expanding. Some new offerings provide options to search display and embed data, an example being Timetric. To create meaningful and relevant visualizations, journalists use a growing number of tools.

Publish Data Story

There are different options to publish data and visualizations. A basic approach is to attach the data to single stories, similar to embedding web videos. More advanced concepts allow to create single dossiers, e.g. to display a number of visualizations, articles and links to the data on one page. Often such specials have to be coded individually, as many Content Management Systems are designed to display single posts based on the date of publication.

Distribute Data

Providing access to existing data is another phase, which is gaining importance. Especially of the insights for an article where gained from Open Data, journalists should provide a link to the data they used for others to investigate, potentially starting another cycle of interrogation, and leading to new insights. Providing access to data and enabling groups to discuss what information could be extracted is the main idea behind Buzzdata, a site using the concepts of social media such as sharing and following to create a community for data investigations. To name, other platforms which can be used both to gather and to distribute data: Help me Investigate - created by Mr. Paul Bradshaw and Timetric.

Measuring the Impact of Data Stories

The final step of the process is to measure how often a dataset or visualization is viewed. In this context, the extent of such tracking, such as collecting user data or any other information that could be used for marketing reasons or other uses beyond the

control of the user, should be viewed as problematic. One newer, non-intrusive option to measure usage is a lightweight tracker called *Pixel Ping*. The tracker is the result of a project by *ProPublica* and *DocumentCloud*. There is a corresponding back-end solution to collect the data. The software is open source and can be downloaded via *GitHub*. Examples: There is a growing list of examples how data-driven journalism can be applied: *The Guardian*, is one of the pioneering media organizations in this space (Data: What is it and how do we do it?) has compiled an extensive list of data stories.

Other prominent uses of data driven journalism is related to the release by whistle-blower organization *WikiLeaks* of the *Afghan War Diary*, a compendium of 91,000 secret military reports covering the war in Afghanistan from 2004 to 2010. Three global broadsheets, namely *The Guardian*, *The New York Times* and *Der Spiegel*, dedicated extensive sections to the documents; *The Guardian's* reporting included an interactive map pointing out the type, location and casualties caused by 16,000 *IED* attacks, *The New York Times* published a selection of reports that permits rolling over underlined text to reveal explanations of military terms, while *Der Spiegel* provided hybrid visualizations-containing both graphs and maps, on topics like the number deaths related to insurgent bomb attacks. For the Iraq War logs release, *The Guardian* used *Google Fusion Tables* to create an interactive map of every incident where someone died, a technique it used again in the *England riots* of 2011.

MOST COMMON SUGGESTIONS AND PREDICTIONS

The following are the suggestions and predictions
Data will become even more of a strategic resource for media; better tools will emerge, to democratize data skills. News apps will explode as a primary way for people to consume data journalism, being data-centric and mobile-friendly, expect more robo-journalism, but know that human relationships and storytelling still matter, more journalists will need to study social science and statistics, it will be held to higher standards for accuracy and corrections, competency in security and data protection will become more important, audiences will demand more transparency on reader data collection and use, conflicts will emerge over public records, data scraping and ethics, collaboration will arise with libraries and universities as archives, hosts and educators, expect data-driven personalization and predictive news in wearable interfaces, more diverse newsrooms will produce better data journalism, be mindful of data-ism and bad data.

Generation Next

Of late, this trend has started in India also, after getting the basic clue from a source the investigative journalists will dig the information through the data or through Right to information and can file an investigative story. *Prof. Nagaraj Karkada*, a respected statistician and head of the research wing at the Asian College of Journalism in Chennai said, *"As far as the availability of data goes, India will be ahead of any of the developing countries in the world."* *Prof. C.P. Chandrasekar* of the Centre for Economic Studies and Planning at the JNU, Delhi said *"When data journalism as a form of journalism was gaining respectability, the Indian media was undergoing a transition away from serious informational and critical journalism to one with a greater focus on soft stories needing less reader or viewer attention."* Among the notable outlets for Indian data, journalism is the *Economic and Political Weekly*, an intellectual journal covering the social sciences *"They make it a point to draw reader attention to the latest surveys and studies that are available,"* says *Prof. Karkada*, who feels the magazine is among the best in India in terms of telling stories with numbers. With the help of new media, the journalists are introduced to the latest, often free tools that help with visualization such as *Google Fusion Tables, Tableau Public*, and mapping tools such as *Carto DB* and *Datawrapper*. They are also introduced to coding. With mobile and internet platforms growing at impressive rates, market forces will propel media firms to take data more seriously.

Mr. Nasr Ul Hadi, a data driven journalism expert and Vice-President at *iamWire,* a media and technology start-up based in Delhi, has been working in this area. *Mr. Hadi*, who is also actively involved with the New Delhi wing of *Hacks Hackers*, a global collective of people interested in the intersection between news and technology, says that groups like this help both journalists and technical experts. *Mr. Ravi Bajpai,* multimedia editor of the Hindustan Times, also working in this area, in an earlier role with *Down to Earth*, a science and technology publication, *Bajpai* routinely found himself using free data visualization tools. While he is optimistic about the prospects for digital data journalism, he is quite critical of the quality of open data. Indian media needs to acknowledge this big opportunity in data. This is one of the modern trends and next generation of journalism or future journalism and this practice is possible with the support of applications of new media communication technologies.

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CLOUD COMPUTING TECHNOLOGY IN HUMAN RESOURCE MANAGEMENT: A COMPREHENSIVE REVIEW

Dr. P. C. Reddy[10] V. Padmasri[11]

ABSTRACT

Human Resource Management Technology have been rapidly developing and changing over the past few years. These technology tools are using in all aspects like employee life cycle to forecast and scenario plans. Along with these changes, Human Resources Information System (HRIS) are moving for one-premise to the cloud. That is allowing the executives to developed new business model to enhance time to market, create operational efficiency, and customers in new way. This paper is going to highlight the HRIS and cloud computing technology application, and its benefits while implanting of the system.

KEYWORDS

HRIS, Technology, Cloud Computing, Could Solution, Cloud Technology, Information System, Decision,-making, On-premises, Off-premises etc.

INTRODUCTION

HRIS is integrated system for providing information used by human resource management in decision-making. There are many numbers of decisions often taken at the human resource management level and therefore, the HRIS has given the appropriate solution to those problems. Through the HRIS, one can track the information about all if an organization's employees, usually in a database or a service of interrelated database. The people (human resources) are the largest part of the operational cost for most the organizations. The HRIS, however, is the possible application with support of information technology that used in managing of the critical resources like human resource. One big challenge in today's modern organization is collection, managing and reporting data about the employees. Therefore, a good HRIS will make this simple process. Let us see some of the capabilities of high performance HRIS from the following paragraphs.

CAPABILITIES OF HRIS

The following re the capabilities of high performance HRIS activities:

- Management of all employee data as well as information.
- Means for reporting and analysis of employees information, such as, calculation of data and customized reporting.
- Hosting of company related documents such as employee handbooks, procedure, and safety guidelines.
- Supporting in administration, including enrollment, status changes, and personal information updating etc.
- Complete integration with attendance, payroll, performance, reward systems and so on.
- Reporting system and sharing the information among the key personnel.

The above activities of HRIS can be designed as a system such a way by using the standard technology, which is often known as on-premises HR Technology system. See the Figure1, which shows the general model of HRIS.

Figure-1: Model of HRIS (On-Premises)
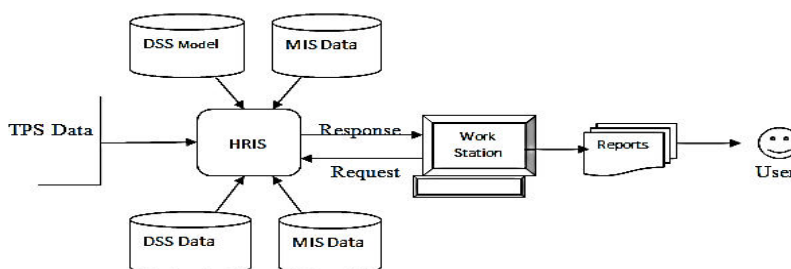
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CLOUD COMPUTING TECHNOLOGY IN HR

The jobs of the managers are changing. These days' it is not only about running IT efficiently, but also about supporting core business strategies and helping in creation of strategic advantages by reducing cost and driving innovation. Because, today's management (especially Human resource) are under pressure to build infrastructure that can move and adopt the same rapid pace as the rest of the business. They need to support global expansions, mergers, and product or service innovation while at the same time reducing costs. In order to reach the above things the present organization are adopting outsource and cloud solutions primarily to reduce the cost and preserve resources for strategic initiatives. Let us review the models of cloud solutions and its design for Human resource management. See Fig.2 of cloud technology and HRIS.

Figure-2: Cloud Technology and HRIS
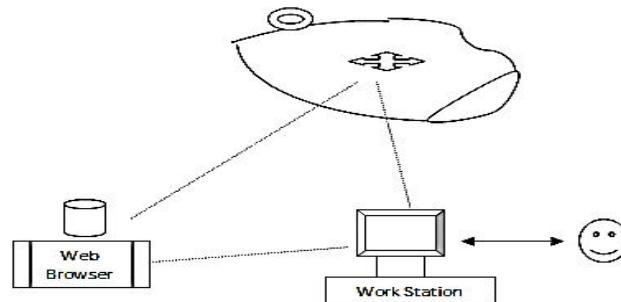
Sources: Authors Compilation

PROCESS TO DEVELOP THE CLOUD SOLUTIONS IN HRM

The following steps in the organization can develop the cloud solution in HR activities. See the Figure-3 of flow-chart of Cloud Solution system.

Figure-3: Process of Could Solution Development
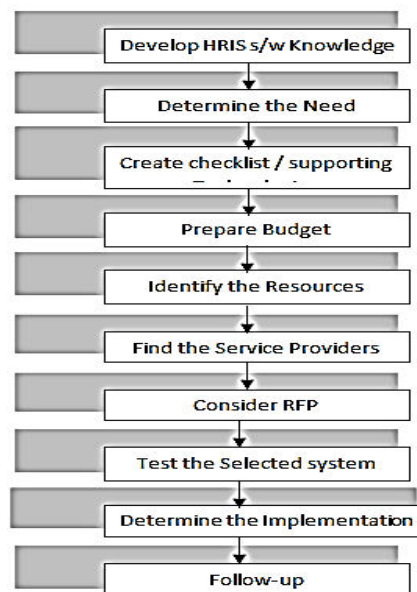
Sources: Authors Compilation

BENEFITS OF CLOUD SOLUTIONS

Business application running the cloud differs from rational "on-premises" application, because they are located and operated within the premises. The Cloud system is operated at remote location, and "off-premises" from the companies that use them most effectively. The Cloud system is benefited in the following aspects:

- Supporting strategic agility,
- Access to features, which are not available on "on-premises",
- Lower cost of ownership,
- Absence of cumbersome re-implementation and updates,
- Faster time to value,
- Better user interfaces,
- Higher security,
- Lower risk associates with subscribing to rather than buying software,
- With these benefits, the clouding offers the 5x faster than the conventional package of software.

CONCLUSION

Although everyone is talking about the cloud computing solution for business, it is in the orbit at the beginning. However, its need is more in human capital management, as it is vital area in the managerial activities. The cloud solutions are being an essential to the strategic management plans and reduce the cost in utilization of technology. That is the reason why the cloud solution is being a big deal in the business.

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PEZZOTTAITE JOURNALS

MOST POPULAR IN THE WORLD: SUPERIOR INTERNET AND IT'S TECHNOLOGIES

Dr. Ramandeep Kaur[12]

ABSTRACT

In the world, every person gains the internet facility. It was developed in 1980's in U.S. The internet includes various types of technologies like dialup connection, broadband connections, wireless connections etc. It is use in many areas like coffee shops, libraries, government department, medical line, school-colleges-universities, shopping malls, and so on. In this time internet is a feed of people. The internet subscribers are mostly related to China, U.S., and India. These are three top positions in the world for used internet. There are many technologies which are used in internet such as Wi-Fi, satellite, by cable, DSL etc. These technologies are biased on broadband connections. Internet is useful in real life also.

KEYWORDS

Internet, Broadband, Wireless Connections, Dialup Connections, Wi-Fi etc.

INTRODUCTION

Internet access connection connects with computer terminals, mobile phones or devices, computer network etc. The internet service provider offers to access the internet through various types of technologies. These technologies offer the speed, bandwidth, range etc. for fast access of internet. Internet is divided into two types- dialup connections, broadband connections.

The dialup connections were made for computer terminal to terminal attached with telephone lines. These connections do not support end to end users. The dialup connect has one limitation- lower data rate available for access the data. The broadband connection is also known as high speed internet. Broadband is always faster than dialup connection the new technologies being developed for fixed and mobile broadband. Broadband is access from the home, school and workplaces. In the 21st century, many users used faster technologies of internet.

HISTORY

In the very beginning, internet was accessed in 1980's. The internet began as a network founded by U.S. Government. They were used internet in schools, universities, research laboratories, government sectors etc. First internet accessed by the dialup connection through modem and telephone lines. The dialup connection is very slow by speed, it was its limitation. The broadband connection was founded in 1990. The broadband was used with high speed than dialup connection.

The mobile broadband developed in 2006. It was advanced technology of broadband. Mobile broadband used by 3G and 4G technologies.

TECHNICAL DIFFERENCES

Table-1: Comparisons between Dialup and Broadband

| Dialup Connection	Broadband Connection
Services by telephone lines	Services by cables, satellite and using telephone line.
Speed of 56 kbps	Speed 256 kbps or more
Pay local calls in every time when we dial the internet	No charges
May be phone calls engaged while we are used internet	This connection still working while we used internet as well as calls.
This connection is slow for download	Broadband is faster than dialup connection
It was developed in 1980's	It was developed in 1990's
It is not applicable in 3G or 4G.	It is used in 3G and 4G wireless technologies.

Sources: Authors Compilation

BY TECHNOLOGIES

In the latest news, broadband Tech. India in 2013 offers very latest technologies and applications for communications. Some technologies are given below:

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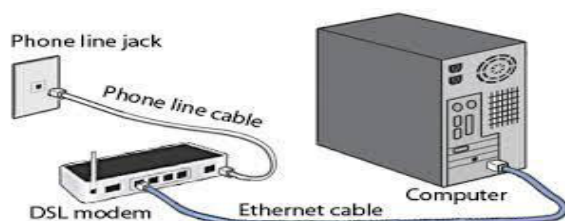
Figure-1: Dialup Access Connections
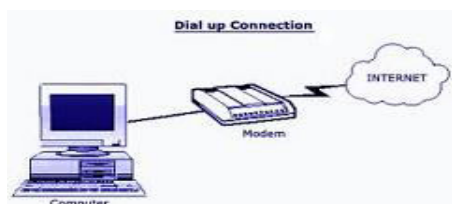
Sources: Authors Compilation

- This connection is used via telephone lines.
- It can be internal or external.
- The average transmission rate is 150kbit/s.
- This is use PSTN (public switched telephone network).
- It is lower speed technology.
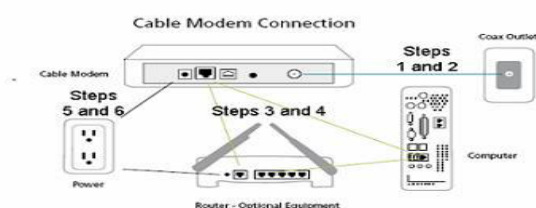
Figure-2: DSL (Digital Subscriber Line)

Sources: Authors Compilation

- It's used for high speed internet.
- This connection is used via ISP through telephone network.
- It is used high frequency network.
- The average transmission rate is 8mbit/s.
- The distance range of DSL is more than 2K.M.
- Types of DSL- ADSL and SDSL.
- It is cheaper option.

Figure-3: Cable Modem

Sources: Authors Compilation

- Cable operators to provide broadband using coaxial cables and fibre optics cable.
- These cables provide the pictures and sounds.
- Transmission speed is 1.5mbps or more.
- It takes high bandwidth.
- It is also called internet cable.
- It is most common high speed internet.

Figure-4: Satellite Communication

Sources: Authors Compilation

- It provides the communication links between various points of earth and sea.
- It provides digital and analog signals for voice, videos and data.
- It is used microwave radio relay technology.
- Satellite is helpful for radio broad casting for mobile applications.
- Satellite is useful in remote areas.
- High speed satellite for WINDS, 6222mbps for data transferring.
- It is 10 times faster than dialup connection.

Figure-5: Wireless Communication

Sources: Authors Compilation

- WLAN provides wireless broadband access.
- It provides telecommunications.
- It transfer data without wires
- It makes remote management.
- Speed is 5GHz and 2.4GHz.
- It is useful to link portable.
- It takes low battery consumptions.
- Bandwidth up to 1300mbps.
- It is useful to tablets, Smartphones

APPLICATIONSOF INTERNET

Figure-6

Sources: Authors Compilation

In the every field, Internet is very useful. In present time from child to old person all is access internet. The main applications are given:

E-Commerce: The E-commerce is very powerful tool for online shopping, online business connections, online purchasing the software's, online books, etc. it makes easier to purchase and see everything online, even you sit at home. No need to go and purchase anything which you want. It can reduce the cost to manage the product and order. Flipkart, naaptol, snapdeal, myntra are some companies which promote the E-Commerce.

Social Networking- social media network is very successful in the world. It gains continuously promotion in India as well as in world. Social network is related to that people who want to share their interest, to link some people. The social network provides the web based services like email, instant messaging, etc. According to the survey in 2017, 70% marketers are used social network for promote the products. Facebook is most popular in the world, twitter, linkedin, google plus+, my space etc.

Table-2: Shows Social Networks with Number of Users

Social Network	Number of Users Per Month
Facebook	900,000,000
Twitter	310,000,000
LinkedIn	250,000,000
Pinterest	150,000,000
Google Plus+	120,000,000

Sources: Authors Compilation

Search Engines- search engine is application software which is useful for search the web pages, according to web page ranks. We can search the information about images, web, maps, videos, news, and books and may more application. The world most famous search engine is Google. Bing, Yahoo, Ask, AOL search, WoW etc. are other search engines.

Web Portal: Web portal refers to websites, web portal is main point of internet which services the website in specific field interest. Mostly web portal is used as search engine, which can access the data from data base of websites. It is useful for government websites, public websites etc.

TV over Internet: Internet television is digital distribution of TV contents over internet. It covers the TV shows like news, sports, music, cartoons, etc. it is used by the internet protocol television. At present, in the internet television used various technologies to provide the services such as peer-to-peer technologies, VoD system and live streaming

Voice over Internet Protocol: VOIP is related to hardware and software. The people enable to medium for telephone calls by to transmit the voice data through packets using IP. VoIP is referred to internet telephony, IP telephony, or voice over the internet (VoI). VoIP can allow you to make a call directly from a computer, a special VoIP phone, or a traditional phone connected to a special adapter.

GROWTH IN NUMBER OF USERS

There are so many users for access the internet time to time. In every year millions of people are increased to access the internet. According to the survey, current status of internet assessors in the world first 10 positions is give below:

Table-3: Comparisons Countries between Internet Users

Country	Users	Rank	% used	Country	Users	Rank	% used
China	568,192,066	1	22.4%	Russia	75,926,004	6	2.8%
U.S.	254,295,536	2	10.2%	Germany	68,296,919	7	2.8%
India	200,598,536	3	5.7%	Nigeria	55,93,391	8	2.3%
Japan	100,684,474	4	4.2%	U.K.	54,861,245	9	2.2%
Brazil	99,357,737	5	3.7%	France	54,473,474	10	2.2%

Sources: Authors Compilation

India is third highest county by use the internet. In 2013, it was on fourth position

Table-4: Internet Users in India

Users of India	2013	2014
Web from mobile device	73.4	79.1
Mobile phone webs	44.1	48.9

Sources: Authors Compilation

CONCLUSION

Internet can be big and powerful toll in the world. The growth of internet users is always grown up in every year in the world. According to the changes in technology, the internet assessors are increased with the high services becomes the time saver and reduce the cost and easy to find the topics related to anything.

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AN ANALYSIS OF ICT APPLICATION IN THE HOTEL INDUSTRY WITH A SPECIAL REFERENCE TO ODISHA

Rasmita Pradhan[13] P. P. Mohanty[14]

ABSTRACT

The Information Communications Technologies (ICT) plays a major role in almost every sector. In the last 20 years, the impact of ICT has been huge in the hospitality sectors of Odisha. With the advent of internet; online booking, internet banking and mobile apps have started to play a crucial role in easing out transactions and reaching lot of people across globe. As the new way of communicating with the guests, the role of ICT in hotel industry has been recognized as one of the major changes in last decades.

Hotel industry is growing exponentially with the growth of Odisha tourism. In this paper, the influence of ICT in the hotel industry of Odisha is analyzed and the gaps between hotel and ICT influences are studied. Few measures are highlighted to fill the gaps between them. An endeavour has been made to focus the applicability of ICT in the field of hotel industry of this place for smooth functioning of it. The study is purely based on descriptive methods and survey.

KEYWORDS

ICT, Hotel Industry, Communications, Exponentially, Influence etc.

INTRODUCTION

The State Odisha has tremendous potential in the field of tourism and hospitality. It is rich in religion, culture, spirituality, nature and art. Odisha bears several monuments and temples, which attracts tourists from different parts of World. Jagarnath Dham Puri is famous for its holiness, spirituality, golden beach and unique culture all over the world. Bhubaneswar the capital of Odisha is worldwide known as a Temple City. The fact that Odisha is a popular tourist destination is also visible from the fact that over the years the revenue earned from tourism has increased considerably. There is an increasing trend in spending an average of a trip to Odisha for both domestic and foreign investors. The Trade and Hotel industry sector has been growing consistently since 1950-51.

The share of this sector in State domestic product increased from 4.85percent in 1950-51to 12.7percent in 2008-09 in 1999-00 base. The share of the trade and hotel industry sector in real GDP has increased from 10.83 percent in 2004-05 to 12.58 percent in 2009-2010 at 2004-05 prices. Over the last 20 years, the number of hotels has increased significantly with a compound annual growth of 5.4 percent. Some of the popular brands of hotel industry present in Odisha are Hotel Kalinga Ashok, Hotel Sishmo, The Trident, The Swosti Group, The Mayfair, Kamat Hotel, Toshali Sands and Resorts etc.

There are some major upcoming hotel projects in the State of Odisha. Firstly, the Welcome Heritage, which is a joint venture between ITC Hotels and Maharaja of Jodhpur, plans to set up a hotel in Odisha. Secondly, the BMR Group's INR 1 billion plan is looking forward to set up two boutique hotels in Odisha. Hotel Radission is about to start. The hotel industry usually depends on the new emerging, faster and more user-friendly technologies. The evidence of these advances in technology in recent years is many folds. Since they have introduced into the market they have been modified, speed up and much more improved than before.

Hotel industry has to adopt new technological advances for the growth of it. Businesses that fail to adopt new technological advances have sure shot chances of failing or closing down. Failing to do what their successful competitors are doing they will start declining. Which indicates they are unfit for the e-business of today, but sadly they are not adopting to the fast enough technology and after a slow death, they may shut their door? The reasons behind it may be many like as lack of knowledge or management skills but the result will be always same. If the drastic change in implementation of new technology will not be conducted then it may be shut down before long. These hotels may be criticized for their old fashioned and backward thinking of business operations in the present trend of social networking. While their successful competitors may be criticized for the same approach for being ahead of the competition.

The hospitality industry is known to be one of the largest Industries with earning substantial foreign exchange and generating employment for lakhs of people across the globe (Hotel Housekeeping, pg. 1). It has a tremendous contribution towards the national economy.

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This industry is acknowledged very information intensive. The exchange of information is very important in every stage of the hotel products and services. Information need to be pass on quickly and accurately between the clients, staff and each and every individual involving in the servicing of the client's needs. By which ICT has become an integral feature of the hotel industry, which enable the communication system instant and effective. Thus, it has a major effect on the method of operation of hotel industry. There was a time when organizations would depend on using for effective BPOs; also known as, call-centre is to reach out to the consumers, but now the use of the internet has changed the whole scenario. Information communication technologies (ICT) have been transforming hospitality globally. From social media to smart phones and automatic check-ins, Information and communication Technology affects even the smallest areas of the industry.

ICT applications are evolving at an ever-quicker pace and industries have to adapt quickly to keep ahead of the curve, or else risk falling behind the competition. In particular, social media has become a big player in a variety of industries in recent years. With the growth of Facebook, Twitter and clouds, many companies have found it an ideal way to promote and sell their wares. Products such as iPhones and tablet computers have quickly been adapted for flight and hotel bookings, as well as getting up-to-the-minute information on many different locations. Smart phone applications are the new trendsetters in the hospitality industry. Applications providing ranking of restaurants, hotels in almost all locality across the globe makes it easier for all kind of users to pick their compatible hotels. These applications also provide consumers with real-time reviews of destinations, hotels, airlines and anything to do with the tourism industry.

The applications allow users to share their trip experiences on the application itself and on social networking sites such as Facebook and Google plus. This also provides a new challenge for the industry as it is impossible to manage or filter what people are saying about the establishment on these sites. Therefore, restaurants etc. must ensure that their service is always to the highest standard. One bad review from the wrong person can be eliminated. For example, if on a particular website two reviews of a particular restaurant have an entirely different say on the quality of the restaurant, then the reviewer will always go with the negative feedback. This kind of situation makes the complete system highly competitive and risky.

LITERATURE REVIEW

Parsons and Oja (2013) mention online reservations systems as one of the greatest impacts of ICT on tourism and hospitality sector. According to Mihalic and Buhalis (2013), while the majority of businesses in tourism and hospitality sector have adopted various components of ICT to certain extent, there are substantial differences between businesses in terms of extent and nature of adoption of those components.

Mihalic and Buhalis (2013) perceive ICT as a potential source of competitive advantage to tourism and hospitality businesses regardless of their sizes. Mihalic and Buhalis (2013) specify that ICT-based competitive advantages can be achieved by small hospitality companies through unique viral marketing campaigns, maintaining effective communication with various organisational stakeholders and in a number of other ways.

According to Bajaj and Nag (2005), a range of advanced ICT systems such as Decision Support System (DSS) can be applied to gain substantial benefits on practical levels not only by large organizations, but also by small and medium-sized business organizations as well. Bajaj and Nag (2005) argue that DSS integration by small and medium-sized organizations can assist management by generating a set of alternative solution options to management problems of various levels complexities.

Mohapatra (2013) convincingly argues that ICT can offer substantial benefits to hospitality firms of small sizes as well, and these benefits may relate to marketing and communication practices. This opinion is also shared by Mihalic and Buhalis (2013) and Thomas (2013). *Adoption of ICT in relation to various organizational processes by hospitality companies can be associated with funding difficulties*. In other words, according to Mohapatra (2013), even when managers of small hospitality firms do understand substantial benefits to various business processes to be gained from ICT adoption, the implementation of ICT adoption at full scale may prove to be challenging due to financial factors.

OBJECTIVES OF STUDY

- To identify the role of ICT in Hotel Industry of Odisha.
- Managing recourses of ICT efficiently and effectively by ensuring compliance with the set of budgetary levels and cost saving operations.
- For the growth of the ICT centers and its resources to enhance the productivity to procure ICT equipment in order to improve employee satisfaction.
- Enhancing competitiveness and meet the corporate goals by improving the ranking and customer satisfaction.
- Impact of ICT applications on guests.
- To suggest measures to improve the profitability by implementing ICTs in Hotel industry.
- Future expectations of ICT in Hotels of Odisha.

USES OF ICT IN HOTEL INDUSTRY

The geographical location of a hotel has a great contribution towards its economy and operation. Because the geographical location of a hotel determines the profile of the visitor, the size of market and the competition it has to face (Namasivayam, K., Enz, C. A., & Siguaw, J. A., 2000). These three factors have a great impact on the role of ICT in hotel industry. By which hotel can meet the expectations of guests and meet the challenges of competitive market. ICT uses in the accommodation sector are varied and the extent to which ICT is used and the form of its application are linked to the type of accommodation provider (luxury hotel, budget hotel, bed and breakfast, backpacker hostel), the size of the operation, its ownership and its location.

Typical, uses of ICT within the accommodation are concentrated in the rooms division or front office area like:

- Reservations;
- Check-in/check-out;
- Guest histories;
- Guest billing and related applications;
- Room status information.

Larger accommodation providers have integrated ICT systems, which permit links to all other areas of activity in the property, particularly in terms of availability and billing. ICT is also widely used by accommodation providers in support of their marketing and advance reservations. This may be through the use of a website, either property-specific or linked into a central corporate website and reservations system. This is accessible by travel agents and by consumers, which are frequently used by different portals and pricing structures. Increasingly, websites are the 'front door' to hotels in terms of information provision, including virtual reality representation of facilities and environment. Direct enquiry and booking facilities are widely available on the web.

Websites are not exclusive to larger or chain accommodation providers. They are now readily constructed at low cost and are used by even the smallest bed and breakfast or guest house in remote areas, permitting direct access to consumers in a manner previously unheard of. ICT plays a great role in the field of restaurant management of a hotel to need the global competition in effective way. In restaurants, ICT functions in three main areas, as shown below with their applications:

Figure-1
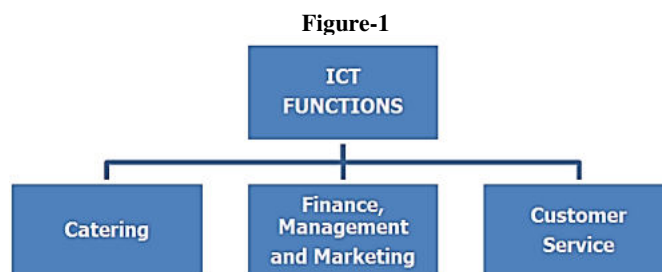
Sources: Authors Compilation

Catering
- Menu management,
- Recipe costing and development,
- Nutritional analysis,
- Hazard analysis critical control points (HACCP) monitoring,
- Stock control,
- Purchasing,
- Beverage control and security,
- Electronic point-of-sales (EPOS).

Finance, Management and Marketing
- Management information,
- Guest billing,
- Marketing including the use of websites and reservations systems.

Customer Service
- Guest histories,
- EPOS for rapid and accurate information on ordering.

CURRENT ICT APPLICATIONS IN HOTEL INDUSTRY

After a survey in Odisha, it has found that around 90% of the hotels are adopting technologies. Hotel Ginger is the first hotel is the first known hotel introducing modern ICT technologies. The existing ICT methods used in hotel industry normally focused on revenue and productivity enhancing technology. While the technology adoption has increased since from 1997 and mainly operated by Management Information System (MIS). However, it was limited to operational and administrative areas of the hotel. It has been observed that the senior decision makers or the senior level managers were not using the information or data recorded in the MIS in planning and decision-making.

The factors influencing the adoption of a particular technology by a hotel are the market they serve, the level of competition and the age of the property. Hotels expecting more number of foreign tourists are likely to adopt more ICT technologies in a competitive market rather than the older properties, because of their already established market and having initial technologies which are easier to try and are integrated well with the existing system and having a good effect on financial factors. So, the older properties normally reluctant to adopt new technologies and they are having difficulties of adopting new technologies. In both the cases, it is necessary to integrate the new technology with the existing system and in the building. For example wiring the entire building for internet facilities.

In each individual hotel the Property Management System(PMS) regulate both technology and hotel operations like as produce billing information, record guest information, inventories, food and beverage point of sale, telephone systems etc. The chain hotels normally have a Central Reservation Systems (CRS), which normally allows online booking between hotels as well as the acceptance of direct bookings from a Central Reservation Office (CRO). This technology has a direct access to the PMS so that room availability will have a same view both in front desk and at the Central Reservation Office; whereas, the Global Distribution System (GDS) does not allow to update the bookings in PMS and need to be updated manually. Each of these channels has their own cost associated with the hotel. So the hotels who are having very little difference between room rent and distribution costs normally they include distribution cost in their revenue management system separately.

The hotels are also using technology for marketing and advertising purpose. In the smaller properties, the front office and booking processes may still not be computerized. With the uptake of internet access, the internet business is growing up. Chain properties are using better uses of internet than the independent hotels. Chain hotels are having their own web page design and they do not rely upon outside service providers.

It has been found that the small hotels that do not have a computer even have their web page design for marketing and advertising purpose because there may be no requirement of a computer for business or may be the capital cost was very high. Many of these kinds of hotels have their computer for accounting and data processing. There was limited use of PMS packages. If the hotels are willing to adopt new technology, they expect an immediate payback on investment with low or nil risk factors.

EFFECT OF ICT APPLICATIONS ON THE HOTEL INDUSTRY

The use of technology in hotel industry is more effective. This sophistication of technology has allowed the move from management of reservations to yield management. Reservation management is about the process of handling reservation while yield management defines sell its product to right customer at right time and at right price. Yield Management has moved from single property level to the chain or group level by utilizing technology like internet and private networks because the information's could be shared broadly by utilizing the technology. By which different customer could be treated differently by emphasizing their individual needs.

The increasing complexity of ICT allows for capturing of additional information to facilitate management of revenue rather than solely per room yield Vinod, B. (2004). However, this ability is constrained by factors beyond the technology, such as the fragmentation of the industry particularly in the way it interacts with a range of available booking channels (Mainzer, 2004).

ICT service delivery is providing systems for effective internal service support from support persons and systems. If there will be no such support systems then the most customer oriented and service-minded employees will feel frustrated and loose their interest for being a part time service marketers as they create value for customers like delivery, service process, service and maintenance, customer training, sales, etc. while implementing such systems in organization they should not exclude the importance of train the staff to operate the system and put it in place.

Technology needs should be seen as benefits of customer and not only for the business. The benefits do not necessarily to be financial. The maximization of the benefits of ICT in an organization depends upon the culture of the organization and management practices. It should allow maximizing the profits from the benefits of technology especially when there is a balance between the need of employees, customers and other stakeholders.

SUGGESTIVE MEASURES

- The Hotel websites should be upgraded and updated with the latest technologies in order to enhance business potentiality.
- The hotels should encourage and train the employees to utilize the ICT equipment's in order to increase productivity.
- The high-speed Internet availability and affordability to reach out every guest.
- Power failures should be checked and regulated.
- Integration of all departments of hotels should be done with ICT.

CONCLUSION

It has been observed in the last 20 years that the hotel industry of Odisha is rising up with the growth and development of Odisha tourism. As the State Odisha has a rich potential in the field of tourism, it attracts a large volume of tourists from all most all corners of the globe. So, to meet the stringent competition now, the role of ICT for the hotel industry became inevitable. ICT could be able to create a conducive approach for the foreign guests as well as for the domestic tourist of high profile group.

According to the findings of this research, it has been found that the contribution of ICT is not only confined with the entrepreneur but also towards the customer benefits. Because of which the Hotel Meghdoot has changed its name as The Triumph Residency, Hotel Oberoi became 'The Trident' (into the International Hotel Chains). Therefore, their business has emerged into a new horizon, which has a tremendous potential to meet the international competition in respect of quality service and guest satisfaction.

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DIGITAL STORYTELLING: THE EMERGING MARKETING STRATEGY

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ABSTRACT

This essay explores a growing marketing strategy on the World Wide Web - digital storytelling. In recent months, it has become more and more common for companies, especially of consumer products, to want to involve their consumers in the selling of their products, to increase brand appeal and in all-round promoting to other consumers. Personal stories are becoming highly sought after, be it in text or video format, through social networks and online video contests.

Currently, there is insufficient research on the use and impact of digital storytelling in business. However, in this analysis I consider the case of Toyota Motor Corporation, whose marketing campaign uses a specific form of digital storytelling and social networking. As a campaign employing this specific digital storytelling strategy, the personal story is intended to endorse a product but also implicitly claim the hero/heroine of the story represents and is endorsed by a significant social networking group on the Internet.

KEYWORDS

Marketing, Digital Storytelling, New Media, Online Advertising, Personal Stories, Branding etc.

BACKGROUND

In November 2009, Toyota Motor Corporation began a massive recall campaign in North America. The problems were a sticky accelerator and a problematic car floor mat. It was a problem that affected several models of the Toyota fleet. On top of the recalls, Toyota temporarily stopped production and sales of several models of its vehicles, and was forced to pay a hefty fine of $16.4 million for its mistake of not going public about the defects immediately ("Toyota", 2010). Prior to the recent problems, Toyota was famed for the quality and safety of its vehicles. Needless to say, the stellar reputation that the Japanese automobile manufacturing company had built was now blemished (Isidore, 2010).

Toyota Motor Corporation was left staring at a mammoth task ahead; to try to rebound and rebuild from the predicament it was in. The task was especially difficult as some accidents allegedly related to the sticky accelerator and problematic floor mats were fatal. To make matters worse, it was discovered that Toyota may have been aware of several safety issues related to their vehicles but had turned a blind eye on them and even withheld evidence in certain cases where lawsuits were filed against the company. Instead of admitting the problem and sending out an immediate recall, Toyota conveniently concealed the problem (Clifford, 2010).

On February 24, 2010, Chief Executive Officer, Akio Toyoda as well as president and Chief Operating Officer, Yoshimi Inaba represented Toyota before the House Committee on Oversight and Government Reform. Toyoda apologized to customers and expressed sympathy to the bereaved families. He outlined Toyota's plans to ensure the soundness of its fleet and increase responsiveness to complaints. Furthermore, Toyoda reaffirmed the corporation's commitment to public. safety ("Toyota president testifies", 2010). Unfortunately, the damage had already been done. As Taylor III (2010) reported, "according to a confidential market research study reviewed by Fortune, the recalls have battered Toyota's reputation in every specific to Toyota's target markets, particularly first-time car buyers and families (Lacy, 2010). The stories used still images, video, first-person narration, and music but most importantly, they were all personal stories, thus satisfying all the elements of digital storytelling. Moreover, because these stories occur within a Facebook context, these personal stories are particularly appropriate in this digital context. In all, then, I am suggesting that this form of personal storytelling within a Facebook context can be perceived, characterized, and assessed as a marketing and campaign strategy. Thus, with some sense of how we will be using it as a strategy, let us be more precise in what we mean by 'digital storytelling' as a genre.

What is Digital Storytelling?

"Digital Storytelling" has been used to describe various forms of narrative that appear in digital format, from multimedia storytelling to video games, as well as digital news articles, YouTube videos and digital films. The precise definition adopted for the purpose of this paper is that of the Center for Digital Storytelling in Berkeley, California. Digital Storytelling is defined as "a short, first person video-narrative created by combining recorded voice, still and moving images, and music or other sounds" (Center for Digital Storytelling [CDS], (n.d.)a) These video stories are usually short; on average, no longer than three minutes. They are also very focused on the personal aspect of the storytelling. Technology, while undeniably a powerful tool to facilitate the production of these stories, is secondary to the storytelling process (Lambert, 2006).

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To date, most of Digital Storytelling programs that are active today are housed within educational institutions. Therefore, it is not surprising that its utility has mainly been for educational purposes. However, community-based programs are also realizing the power and benefits of this new media technology.

Digital Storytelling can cater to any of the historical, aspiring or recuperative agendas that are common among community-based programs (McWilliam, 2009) and in fact, it has, judging from the number of non-profit organizations that the Center for Digital Storytelling works with (CDS, (n.d.)b). Yet, in spite of its relative success in these segments and having been in existence for more than 15 years, Digital Storytelling has yet to find a way to sell itself to the business segment. Until now. It begs the question of what makes digital storytelling particularly compelling as a strategy?

DIGITAL STORYTELLING STIRS EMOTIONS

In the summer of 2010, the present author observed that the Digital Storytelling workshop conducted by the Center for Digital Storytelling is typically three days long. On the first day was a process called "Story Circle" (Lambert, 2006, p. 93). During this session, everyone in the room sat in a circle without any distractions such as computers. Those who had soft copies of their script were only allowed to use the computer when it came to their turn. The session began with a round of introductions. Then, each workshop participant shared their story or the idea for their story. The facilitator's task was to provide feedback and encouragement to the participants to share their opinions. This was done in a very sensitive manner because the stories were of very personal natures. The participants then further developed their scripts to its final form and they each recorded a narration of their stories. The recorded voiceovers were matched with still and moving images as well as sounds using video editing software. The facilitators assisted in every aspect; from the scriptwriting process to the voice recording, software and other technical problems as well as the creative edits to enhance the digital stories. The workshop finale was a screening of all the digital stories produced.

In this workshop model, two parts stood out to the present author — the story circle and the finale. These were the only points when the literal storytelling process was involved. These were also the only parts of the workshop where you saw people being emotionally affected, either in a joyous or moving way. As Lambert (2006, p. 95) has directly maintained, by its very nature, digital storytelling culminates in "emotional and spiritual consequence." As we might expect, the emotional and spiritual consequence of digital storytelling 'works on' people, creating a reaction, and ultimately creating a social bond.

DIGITAL STORYTELLING CREATES CONNECTION

When Digital Storytelling came to light, skeptics pounced on it as an over!: "sentimental, individualistic and naively self-conscious" form of expression. I really don't reject this characterization, but I also want to ask how it might function and what uses might be made of these reactions within a marketing and campaign context. Moreover, what is also compelling about digital storytelling is, as Harley and McWilliam (2009) have convincingly argued, "combines the direct, emotional charge of confessional disclosure, the authenticity of the documentary, and the simple elegance of the format." In essence, Digital Storytelling is an activity that is borne by real experiences of the storyteller. Hence, we can derive one of our first conclusions: An intimate connection can exist between the storyteller and the object of the marketing campaign, and, indeed, this connection potentially can be perceived as both genuine and authentic (Kaare & Lundby, 2008). With this powerful emotional association established, the digital storytelling strategy begins to do its magic. Simmons (2006, p. 3) has explicitly argued that people want to trust and to be confident in someone instead of just receiving information. As a corporate storyteller, Simmons (2006) adds that storytelling helps achieve that. She believes that:

> Telling a meaningful story means inspiring your listeners … to reach the same conclusions you have reached and decide for themselves to believe what you say and do what you want them to do. People value their own conclusions more highly than yours. They will only have faith in a story that has become real for them personally. Once people make your story, their story, you have tapped into the powerful force of faith. Future influence will require very little follow-up energy from you and may even expand as people recall and retell your story to others.

While the power of digital storytelling seems explicit, we might also consider some of its potential limitations.

DIGITAL STORYTELLING INFRASTRUCTURE

Digital Storytelling was perceived by some as too pedantic or too heavily reliant on a teacher figure, incapable of spreading or distributing itself, and a media form that was not developed enough for any other purpose than storytelling (Hartley & McWilliam, 2009). It is true that when Digital Storytelling first came to be, the infrastructure and resources for aspiring digital storytellers were not available. Electronics were not as affordable as they are today. Not many people had cell phones, let alone video cameras and digital cameras. Fewer still could afford the expensive professional video editing software that was used by media professionals. Internet speeds were not fast enough for video sharing to be smooth but more importantly, there was no freely available platform to enable video sharing.

Today, in the United States, cell phone penetration rate is at 91% ("List of mobile", 2010), as of October 2010, the cheapest camcorders on Amazon.com are less than $100, Internet penetration rate stands at more than 77% ("Top 58 countries," 2010) and online video sharing sites such as YouTube and Vimeo are available and accessible to consumers for free or a small fee. To top it off, social media networks such as Facebook and Twitter have soared in popularity ("Facebook growth dramatically," 2010) and basic video editing software comes free with new computers. In short, the infrastructure has been laid down and the necessary platforms primed to facilitate the efficient use of the available resources.

It is no surprise then that the millennials have taken to the moving image so quickly. But what is it that differentiates the millennials, who are increasingly referred to as digital natives, from the earlier generations?

DIGITAL NATIVES AND DIGITAL IMMIGRANTS

Prensky (2001) defines "digital natives" as "native speakers of the digital language of computers, video games and the Internet". On the other end of the spectrum is the "digital immigrant", who have adapted and adopted new technology. The line that divides the two is known as the digital divide and Prensky defines that as the year 1985 ("The rise of," 2009).

The differences between digital natives and immigrants are stark. One of the few important ones for businesses to be aware of is that digital natives are very comfortable in an online environment and would choose multimedia formats over text, compared with digital immigrants. Furthermore, digital natives are more likely to use online reviews from peers, social networks or crowdsourcing options when deliberating on something, including their purchase intention. When it comes to branding, digital natives and digital immigrants are not unlike each other, in the sense that both have an affinity to building relationships with brands. However, digital natives prefer experiential branding because they want to be part of the creation of a brand. Digital natives also use social networks to seek opinions, either through personal contact on Facebook or via polling on Twitter. Either way, it is common for digital natives to seek answers even publicly. Digital immigrants, on the other hand, prefer to seek opinions in more traditional ways such as personal contact or via email ("The rise of," 2009). In the last few years though, it seems as if the digital divide has shrunk a little.

Madden (2010) found that older adults, aged 50 and above, were increasingly joining social networks. The numbers almost doubled in April 2010, compared with April 2009, and these numbers are expected to continue increasing. Further to that, despite the gap, Jansen (2010) found those aged 50 and above actively research products online, even if they are not reviewing products as actively. Meanwhile, in an earlier study, Pew Research Center's Internet & American Life Project [Pew Research] (2007) showed that as at December 2007, there was a 45% increase year-to-year, from 33% to 48%, of internet users who had visited a video-sharing site. In that same year, Pew Internet surveyed teenagers and "found that 64% of online teens ages 12-17 have participated in one or more among a wide range of content-creating activities on the internet, up from 57% of online teens in a similar survey at the end of 2004. The same study found that digital images posted online sparked conversation among teenagers. Close to 89% of respondents agreed that their digital still or moving images posts occasionally, or often, elicited feedback from other people (Lenhart, Madden, Macgill & Smith, 2007). It is clear that the attraction of multimedia among consumers is growing rapidly.

DIGITAL STORYTELLING AS A CONSUMER-CENTERED JOURNEY

Technology has run riot in the world of business and the field of marketing has had to grapple with the growth of social media and related technologies. Thus, it is imperative for companies to learn to address and manage these changes in a timely fashion to ensure, at the very least, financial stability and sustainability.

If at one time marketers could call the shots and marketing was product-centric, now it is the consumers who have the upper hand and marketing has shifted to a consumer-centric focus. Prior to the advent of social networking, the traditional "funnel" model was widely accepted by the marketing fraternity. Consumers had a pool of brands to choose from, which they would sieve through until they settled for one particular brand (Court, Elzinga, Mulder & Vetvik, 2009).

The introduction of social media and a larger market from which to purchase from has forced the need to reexamine the funnel model. Court et al. (2009) found that the introduction of interactivity between buyer and seller demands marketers to engage customers in new ways. Hence the conception of the consumer decision journey, which is non-linear and has four phases — "initial consideration; active evaluation; closure and postpurchase". The funnel model is still applicable when measuring a brand's strength. However, consumers are adding to that by becoming increasingly knowledge-savvy. They research what they want to buy, they ask questions and they compare ratings from online reviewers (Edelman, 2010a, p. 2). Thus, the difference with the funnel model — consumers continue to interact with the product postpurchase through online reviews, video reports, and other user-generated content, in praise, or otherwise, of the product.

An interesting finding by Court et al. (2009) is that consumers who have a positive postpurchase experience bonds with and fall under one of two types of loyalty to the brand. The first is an active loyalty, whereby a consumer may forego the first two phases in future purchases. The second is a passive loyalty, whereby consumers may consider other brands but if the playing field is level, the consumer will go with the current brand. Consequently, Edelman (2010b) recommends marketers consider

phase marketing, whereby investments are made in specific phases of the consumer decision journey. Needless to say, at present time, the biggest returns on investment are assumed to be in the initial consideration and postpurchase phases.

THE TIME IS RIPE

Digital Storytelling has existed for more than 15 years and while the Center for Digital Storytelling has propagated it as a tool for "emotional branding" (Lambert, 2006), Digital Storytelling has not yet taken the world by storm. In the May 15, 2000 issue of Businessweek Online, Stepanek (2000) observed that before 1995, great advertising campaigns helped propel a brand but the Internet age has changed the advertising landscape. It demands "far deeper, interactive connections with customers if you hope to keep them," according to Almquist (as quoted in Stepanek, 2000). And the benefits of engaging customers this way was not lost on businesspeople at the time, as Laybourne said, "By listening and sharing with your customers, you're essentially having them co-write your brand. And they're doing it for nothing, or next to nothing" (as quoted in Stepanek, 2000). Digital Storytelling is a marvelous tool for consumers to share and businesses to listen as well as vice versa but the higher costs during that time probably influenced marketers, who certainly did not pounce on the idea. However, in the year 2010 with Toyota, which was in the midst of one of the largest recalls in the United States (Reuters, 2010) and suffering a battered reputation, it immediately engaged its audience. Toyota struck up "conversations" with old, new and potential customers (Guynn, 2010). Rao (2010) observed, "... it's definitely interesting to see such a high-profile company taking to Twitter to try to reform its image by engaging directly in a dialogue with consumers." But Toyota did not stop there. With the help of Saatchi & Saatchi, the Toyota USA Auto-Biography Facebook campaign was launched to engage Toyota loyalists. Toyota's media strategist, Kyaw said that the Auto-Biography program has collected more than 8,000 stories between June and November, 2010 (Greenberg, 2010). Some of these stories were professionally produced into commercials and broadcast on television, online video service providers such as Hulu as well as on YouTube.

Let me offer these final substantive words. When we return to our Toyota case study, the differentiation in Toyota's redemption campaign was the ability to connect with its loyal customers through personal stories. Realizing the power of brand loyalty, Toyota engaged the right human resource to run the marketing strategy befitting of the day and age that we live in today. Toyota's Auto-Biography Facebook campaign exploited all the tenets of good Digital Storytelling - personal story told in first-person narrative, still and moving images to support what the storyteller is narrating, and with music accompaniment (CDS, (n.d.)a). As a result, these stories will have inherited the consequence of Digital Storytelling - stirring emotions and creating connections with the audience. Over and above the stories being personal, they were authentic. The value of authenticity in advertising cannot be taken lightly. People do not like to be deceived by advertising gimmicks. Case in point is Sony's PlayStation Portable (PSP) marketing strategy. Towards the end of 2006, it was uncovered that Sony and its marketing agency, Zipatoni had been maintaining a fake blog [flog] and a fake YouTube account. Both mediums were used to advertise the Sony PSP as a gift for Christmas (Weaver, 2006). After being found out, Sony removed the flog and the YouTube videos. It posted an apology on the flog but it was too late - Sony's holiday shipments in 2006 fell by 75% year-on-year (Barwise & Meehan, 2010). With all of this in mind, let me offer a four point summary as my conclusion of this analysis. In Conclusion Building upon the knowledge we have, four things stand out. First and foremost, Digital Storytelling puts the consumer at the forefront, in line with the consumer-centric marketing model. The storytelling aspect encourages engagement of the participant in the product or service.

Escalas (2004) said that mental simulation through storytelling can result in the consumer's greater affinity towards said product or service because it removes the consumer from being critical, thus generating a positive attitude towards the evaluation of a brand. Second, Digital Storytelling humanizes a product or service by giving a voice to consumers. As Erstad & Silseth (2008) contemplate, "By producing digital stories, the subject goes from having solely a consumer role to having a role of a producer of mediated content." While this argument was made for the use of Digital Storytelling in education, its propriety in business remains valid.

Similarly, Swaminathan (2009) recommends brand ambassadors from the community to represent the brand on the Internet and generate conversations about the brand, whether it be good or bad. This helps to keep the brand real and adds credibility. Third, Digital Storytelling builds community. Achieving this would have been a tad harder through traditional storytelling methods, such as oral and textual storytelling. For one, oral storytelling requires at least two people to be in a synchronous space and time while textual storytelling is one-way communication. Digitization of stories is important because it is immediate and uniquely borderless (Bratteteig, 2008). It is also dynamic, allows for transmission to the masses and can be archived in multiple places simultaneously. This will facilitate the development of a community dedicated to a product or service. Fourth, Digital Storytelling uses video to disseminate information. This is in line with today's trend leaning towards video. Purcell's (2010) research found that 69% of people that use the Internet watch or download video, compared with 57% of people in 2007 (Madden, 2007). Digital natives especially, are also more inclined to video than text-based information.

Adapting these findings to a visual structure, the case for Digital Storytelling in business becomes clearer. Digital Storytelling is the consumer's voice that humanizes products and services by spreading information (content) about the product or service via the use of new media technology. Digital Storytelling creates a dialogical relationship between consumer and business organization because it takes advantage of advances in technology, particularly online video sharing platforms, to initiate communication. Business organizations that adopt Digital Storytelling as a marketing strategy inadvertently create a

competitive advantage for themselves among consumers because people feel a deeper connection with the brand that they further interact with. This could possibly influence future purchase intentions. In short, Digital Storytelling helps to sell brands, which is more lucrative in the long term than waging price wars on competitors.

LOOKING AHEAD

Admittedly, Digital Storytelling has its limitations: no one story can touch every single person in an audience. As in Toyota's case, the corporation cleverly maneuvered around this problem by selecting several personal stories, told by different people from different perspectives, but all with two pre-determined unifying themes, which are "first-time buyer" and the "family pass along" (Lacy, 2010) themes. Digital Storytelling is also limited in that it can very easily be abused. In order to preserve authenticity, it is imperative that the brand take full responsibility and hence the risk of liability in the event of perjury. One may also opt to draft a code of ethics for the use of Digital Storytelling in business.

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CLOUD SOLUTIONS IN BUSINESS: A COST-BENEFIT ANALYSIS

V. Padmasri[16] Dr. P. C. Reddy[17]

ABSTRACT
The modern business organization is in the ever-changing environment. These changes are forced to adopt the new strategies in the core business, implementation and adoption of up-to-date IT, driving innovation and reducing cost. However, the organizations are not sufficient to combat the situations without supporting of out-sourcing and cloud solutions. It is identified that Cloud solution is the most suitable tool to the today's business organizations to achieve e and survive in the global environment. This paper is bringing the insight about the cloud computing technology and its implementation in the organization, apart from the cost-benefit analysis of the system.

KEYWORDS
Cloud Computing Technology, Cloud Solution, Information Technology, Cost Reduction, Strategic Advantage, On-Premise, Off-Premise, C-B Analysis etc.

INTRODUCTION

The business organizations activities' are changing. These days it is not only the matter to running the information technology and systems more efficiently and effectively, but also looks into the supporting tools in core business strategies and helping create strategic advantages by reducing the cost and innovating ideas. This means, the business organizations today are in under pressure to build competitive edge over the rest of business units, in all aspects such as geographical expansion, mergers, product or service innovation and reducing the operating expenditures.

Initially, to overcome these problems, many of the business organizations adapted the out-sourcing tools. It has done excellent job in the performance of the organization in the competitive world. However, due to certain difficulties the out-scouring got its own limitation in the adoption of the technology-based support to the modern business system. Therefore, today with the advent of new technologies the concept of the Cloud Solutions has emerged and available to the organization easily and with less cost to connect their system with latest technology and innovative system.

The Cloud solutions primarily to recue cost and preserve resources strategic initiatives. More recently, however, Cloud application has been using to support the strategic agility that today's business needs. In addition, having one single code-base across all their customers allows modern Cloud application vendors to very quickly leverage innovations and distribute product improvements across their entire customer base. Application of these cloud solutions is growing 5x faster than conventional packages software. This can be a challenge since the operational business models of Cloud solutions differs significantly from those of on-premise IT solutions.

Another implementation aspect in the Cloud computing technology adapted by the organization is the benefit gain out of this system over the on-premise system. These benefits are:

- Supporting, storage agility,
- Access to many advantages, which is not in the on-premise,
- Lower cost of ownership,
- Avoiding of the re-implementation and updating the system,
- Fast time to value,
- Better user interface, and
- Lower risk in subscribing the software.

STEP FOR CLOUD SOLUTION IMPLEMENTATION DECISION

Understanding of the cloud solutions need and importance is not only the matter, but also one must be carefully follow up the steps for evaluating and implementation of the Cloud solution for their respective organizations. See the Figure-1, which shows the steps for implantation of cloud solution.

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Figure-1: Cloud Solution Implantation Decision
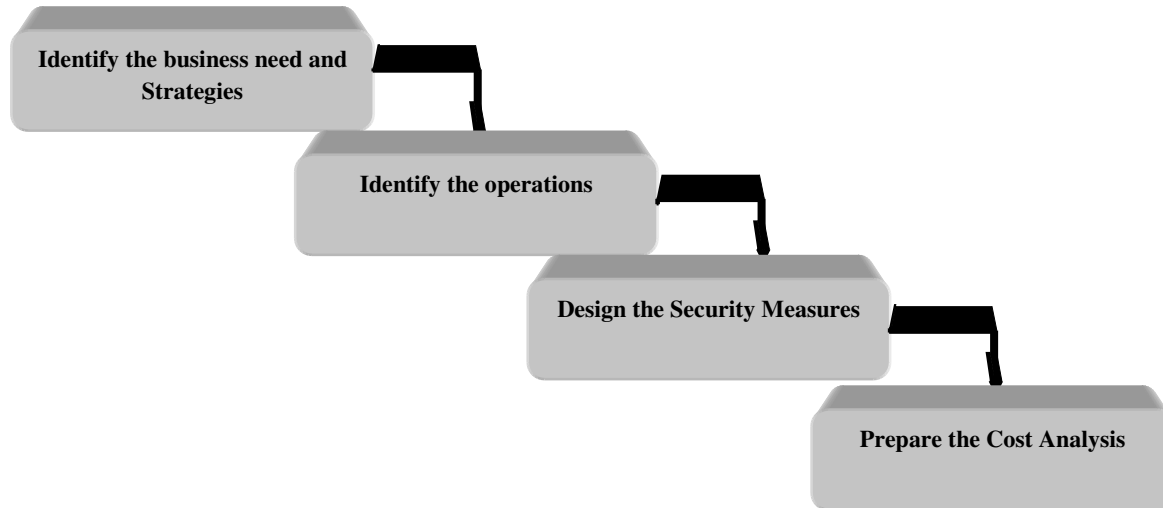
Sources: Authors Compilation

Identification of business needs and strategies not only includes the ability to execute on the current strategy, but also to react to unforeseen changes in the business environment that always occur. Considerations related to operations include implementation, developing, managing and maintain the chosen system. Security factor includes general intrusion, protection, prevention of data and regulatory compliance.

Cost analysis need to not to capture total cost, but also the balance between fixed and variable cost and the sensitivity to changes in assumption.

COST-BENEFIT ANALYSIS OF CLOUD SOLUTION

The organizations have to conduct the cost-benefit analysis while implementing the new system. Through this, the management can find the benefits over the new system and then the organization has to prepare the plan of effective implantation and the cost incurred to the system,, so that the management can able to generate the necessary budget.

Regarding the cloud system implementation, the organizations may go with different methods of cost benefit analysis; however, this paper will take the commonly used total cost of ownership (TCO) application.

Many factors affect the costs of a software solution to a business beyond the cost of licensing. In fact, even when the licensing cost of on-premise software is free, the total cost may still exceeds that of Could solutions.

To explain the above discussion let we compare the cost of an on-premise and cloud solutions impletion in the business organization.
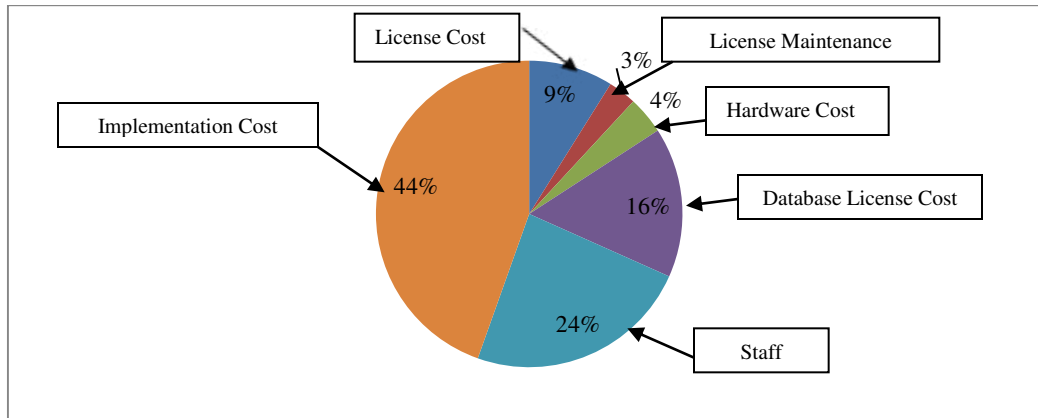
Cost of On-Premise Solution

On-premise solution is the worn system; that developed with the support of vendor. It required initial investment in software licenses, database licenses, hardware and external implementation consultant. Most of these costs are increased with the following:

- Licenses Cost, License Maintenance,
- Hardware Costs, and Database Licensing Cost,
- Staff, and
- Implementation cost.

Addition to that ongoing cost, including licenses renewal, hardware maintenances, and salaries to the staff etc., are benign as expenditure. See the Figure-2, which shows the break-up of the cost for different heads.

Figure-2: Cost for on-Premise Solution

Sources: Authors Compilation

Cost for Cloud based Business Solution

In comparison to on-premise solutions, the cost of Cloud solution is simple, more transparent and easier to analyze. The business agreement is typical structured as a subscription with the responsibility for maintenance and operating the infrastructure falling in the vendor not with the organization.

The cost element of the cloud solution is (1) Subscription and (2) Implementation. See Figure-2, which shows the cost structure of Cloud Solution.

The Cloud systems completely work with the support of vendor infrastructure. Therefore, the cost of the cloud solutions is lesser than the on-premise solution

Cost Differences

Both the systems cost comparison shows that the Cloud solution is the most benefit to the organization. Because the Cloud based system implantation cost are 20-30 percent lesser than the on-premise solution. In addition, there is no need to re-implementation of the solution for 4-5 years.

CONCLUSION

In summary, it is found that the cloud computing technology typically prove the same or better functionality at a significant lower cost, and having more benefits to the business organizations.

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THE INTERPLAY OF MARKET ENVIRONMENT AND GREEN MARKETING

Vedava P.[18]

ABSTRACT

Environmental or green marketing has been seen as a tool towards sustainable development and satisfaction of different stakeholders. The essence of environmental marketing is the strategic product and customer decisions in which environmental issues are emphasized and environmental strengths are used as a competitive advantage.

The literature points out that, in context of green marketing, firm / product greening may either motivate consumers to purchase a given product (preference for a product is an increasing function of the greening level) or the absence of firm/product greening may bother consumers but, after a low threshold of greening, the preference for a product is not an increasing function of the greening level (hygiene factors). Thus, most of the greening strategies are customer-focused. It is important to note, however, that, other elements in the market environment also create incentives for firms to adopt green marketing strategies in addition to consumer pressure (especially if green attributes are viewed as motivating factors). For example, investors and suppliers could also vote with their money to reward or to punish firms for their environmental performance. Thus, it appears that all types of consumers, both individual and industrial, and other elements in the market environment are becoming more concerned and aware about the natural environment and can be assumed that firms marketing goods with environmental characteristics will have a competitive advantage over firms marketing non-environmentally responsible alternatives.

KEYWORDS

Green Marketing, Green Washing, Hygiene Factors etc.

INTRODUCTION

The field of business, the world over, has been seeing a change in dynamics. Firms are keenly aware of need for a heightened appreciation of environmental protection and, as required, examination of environmental issues within its own rank. Marketing bridges the company and its markets in a societal context. Satisfying the needs of customers in a profitable way and managing stakeholder relationships in ways that benefit the organization and its stakeholders is the essence of marketing ideology and in turn is a core of the market economy. Environmental or green marketing has been seen as a tool towards sustainable development and satisfaction of different stakeholders.

The sources of influences on green marketing subsume market and nonmarket environments. As Baron (1995) has argued, the impact of market and nonmarket environments is mutual. Thus, firms need to adopt a coordinated approach to their market (in the context of household consumers in the discussion below) and nonmarket strategies. It is more important to have a general acquaintance with the concept of green marketing itself to understand the idea of impact of market and non-market environments on green marketing than have an appreciation of theories related to market and non-market environments. Accordingly, here, based upon the concept of green marketing, an attempt has been made to understand the interplay of market environment and green marketing.

GREEN MARKETING

Green marketing represents a broader term. However, the existence of several meanings, which intersect and contradict each other –an example of this will be the existence of varying social, environmental and retail definitions attached to this term –makes the definition a difficult task (Hemantha, 2014). The terminology used in this field includes 'green marketing' 'environmental marketing' and 'ecological marketing'. Green marketing is part of the overall corporate strategy (Menon and Menon, 1997). Green marketing ties closely with issues of industrial ecology and environmental sustainability such as extended producers' liability, life-cycle analysis, material use and resource flows, and eco-efficiency. Thus, Green marketing comprises a wide range of activities, including product modification, changes to the production process, packaging modification, delivery changes, and promotion modification (Polonsky, 1994).

Green marketing subsumes greening products as well as greening firms. Firms can 'green' themselves in three ways. The first greening strategy pertains to value-addition processes (firm level). A steel firm may install a state-of-the-art furnace (new technology), thereby using less energy to produce steel. The second greening strategy pertains to management systems (firm level). Firms could adopt management systems that create conditions for reducing the environmental impact of value-addition processes. As pointed out by Prakash (2002), "[a] good example is the Responsible Care program of the chemical industry, which establishes systems to promote environmental, health and safety objectives" (p.286). In addition, the third greening strategy,

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building on Charter (1992), pertains to products involving extending the life of a product through repair, recondition, reusable design; rejuvenating product attributes through remanufacture and recycles. In spite of this clear-cut classification of greening ways, these three categories may not be mutually exclusive but mutually inclusive as far as the implementation of these strategies is concerned.

The essence of environmental marketing is the strategic product and customer decisions in which environmental issues are emphasized and environmental strengths are used as a competitive advantage. Implementation of the strategies is not possible without structures (e.g. environmental management systems, organization, contact channels) taking environmental issues into account (Karna et al., 2003). Marketing structures and functions (communication, advertising, personal relationships) should be planned so that they carry out and support the environmental marketing strategies. However, an insufficient relationship among strategies, structures, and functions can lead to unfounded claims about a company's environmental performance. This kind of 'green washing' is the misuse of the principles of environmental marketing (Juslin, 1994). Thus, green marketing is the process for formulating and implementing environmentally beneficial marketing activities designed to generate and facilitate voluntary exchanges that satisfy a firm's economic and social performance objectives.

GREEN MARKETING AND MARKET ENVIRONMENT

Firms may choose to green their systems, policies and products due to economic and noneconomic pressures from their consumers, business partners (the market environment) (Prakash, 2002). It appears that all types of consumers, both individual and industrial are becoming more concerned and aware about the natural environment and can be assumed that firms marketing goods with environmental characteristics will have a competitive advantage over firms marketing non-environmentally responsible alternatives. For example, McDonald's replaced its clam shell packaging with waxed paper because of increased consumer concern relating to polystyrene production and Ozone depletion (Gifford 1991, Hume 1991).

Consumer surveys over the past decade reveal a growing segment of consumers who either reward or intend to reward firms that address environmental concerns in their business and marketing practices and who punish firms that appear to ignore the environmental imperatives (Carlson et al., 1993). There are examples of firms adopting strategies of using the fact that either they are environmentally responsible as a marketing tool or they can become responsible without promoting this fact. Organizations like the Body Shop heavily promote the environmental initiatives, while Coca-Cola does not promote the fact that they are environmentally responsible (Polonsky, 1994). Coca-Cola has invested large sums of money in various recycling activities, as well as having modified the packaging to minimize its environmental impact. While being concerned about the environment, Coke has not used this concern as a marketing tool. Thus, many consumers may not realize that Coke is a very environmentally committed organization (Polonsky, 1994).

Political economists assume that, when 'collective action dilemmas' (the divergence between individual and collectively rational behaviour leading to sub-optimal outcomes both for the individual actors and the collectivity) occur, actors, whether consumers, firms, regulators or other stakeholders, seek to maximize net excludable benefits accruing to them from any action and minimize non-excludable benefits from a policy. Since most individuals have a similar calculus, collective endeavors with non-excludable benefits are impeded (Hardin, 1968; Olson, 1965). Green marketing may help firms overcome these collective action dilemmas occurring in the context of green marketing. According to Prakash (2002),

> *"If firms could price green products at a premium (and the price elasticity's are less than unity), they transform environmental benefits from non-excludable externalities to excludable monetary benefits. Thus, green marketing allows firms to encash and internalize the reputational benefits for their environmental stewardship or the environmental attributes of their products" (p.290).*

However, premium-pricing strategies transfer firm-level collective action dilemmas to consumers and rational customers often want the benefits of a cleaner environment (from which they cannot be excluded) without directly paying for them. Of course, if firms can offer green products at no additional costs, and if such products are not perceived by consumers as inferior in quality or performance, collective action dilemmas will not occur. Similarly, if firms can add green attributes to a product at low costs, they may gain competitive advantage. However, it seems that for most industries, especially once the 'low hanging fruit' has been harvested, greening policies / products is expensive within the *extant* regulatory and institutional contexts (Walley and Whitehead, 1994).

Unlike traditional marketers, social and societal marketers need to determine the needs of target markets and to deliver the desired satisfactions in a way that enhances the consumer's and *the society's wellbeing*. By doing so, social and societal marketers seek to persuade consumers to change their lifestyles. "However", according to Prakash (2002), "these behavioral modifications may not directly/sufficiently benefit consumers or the benefits may also be non-excludable" (p.291). Marketing literature also examines the relative salience of consumers' attributes and structural parameters (market environment, social norms and institutions) in inducing consumers to support green products (Prakash, 2002).

Clear, comprehensible and credible information provision about greenness is a key component of green marketing. Further, firms willing to provide clear, comprehensive and credible information must ensure that consumers have low-cost access to it.

According to Prakash (2002),

> *"[g]reen marketing could be viewed as a subset of information disclosure strategies available to both managers and policymakers. Such disclosures can take place at the industry level (industry codes), firm level (annual environmental reports), the facility level ... and/or the product level (labels)" (p.292).*

Consumers purchase products primarily based on products' (product level) attributes. However, development of information on firm-level attributes (greenness of processes and systems) can also show significant association with promotional strategies.

Another major force in the environmental marketing area has been firms' desire to maintain their competitive position. In many cases, firms observe competitors promoting their environmental behaviour and attempt to emulate this behaviour. In some instances, this competitive pressure has caused an entire industry to modify and thus reduce its detrimental environmental behaviour (Polonsky, 1994). Scholars claim that green firms can adopt a strategic approach to pre-empt command-and-control regulations that often hurt their profits (Fri, 1992), and to enable them shape future regulations, thereby reaping first-mover advantages (Porter and van der Linde, 1995). Championing stringent product and process standards will be attractive to technologically advanced firms could claim to be virtuous, and at the same time, raise rivals' cost of entry – the assumption being that higher standards will lead to stringent regulations – by championing stringent product and process standards (Barrett, 1991; Salop and Scheffman, 1983). Firms may also use green marketing in an attempt to deal with cost or profit related issues. Disposing of environmentally harmful by-products, such as polychlorinated biphenyl (PCB) contaminated oil are becoming increasingly expensive and in some cases difficult. Therefore, according to Polonsky (1994), firms that can reduce harmful wastes may incur substantial cost savings.

> *"When attempting to minimize waste, firms are often forced to re-examine their production processes. In these cases, they often develop more effective production processes that not only reduce waste, but also reduce the need for some raw materials. This serves as a double cost savings, since both waste and raw material are reduced. In other cases, firms attempt to find end-of-pipe solutions, instead of minimizing waste. In these situations, firms try to find markets or uses for their waste materials, where one firm's waste becomes another firm's input of production.... The last way in which cost or profit issues may affect firms' environmental marketing activities is that new industries may be developed. This can occur in two ways: 1) a firm develops a technology for reducing waste and sells it to other firms; or 2) a waste recycling or removal industry develops ... For example, firms that clean the oil in large industrial condensers increase the life of those condensers, removing the need for replacing the oil, as well as the need to dispose of the waste oil. This reduces operating costs for those owning the condensers and generates revenue for those firms cleaning the oil" (pp.6-7).*

Extending Maslow's (1943) theory, Herzberg (1966) developed a theory of work motivation that focused on two work-related factors: those that motivated employees (motivators) and those that prevented dissatisfaction among them (hygiene). Thus, in context of green marketing, firm/product greening may either motivate consumers to purchase a given product (preference for a product is an increasing function of the greening level) or the absence of firm/product greening may bother consumers but, after a low threshold of greening, the preference for a product is not an increasing function of the greening level (hygiene factors). If green policies/products are motivating factors then, according to Prakash (2002), managers have economic justification to ensure that their firms/products are greener than their competitors'. However, if consumers do not care much about who is greener, but they do penalize firms that violate environmental laws or emit high levels of toxins, greenness is a hygiene variable – 33% of adults claimed to have avoided buying products, at least occasionally, from companies with poor environmental records (Ottman, 1996). If so, then the managerial task then is to obey environmental laws, to stay out of trouble with the regulators and to avoid bad press by undertaking minimal beyond-compliance initiatives (Prakash, 2002). Thus, most of the greening strategies are customer-focused. It is important to note, however, that, other elements in the market environment also create incentives for firms to adopt green marketing strategies in addition to consumer pressure (especially if green attributes are viewed as motivating factors). For example, investors and suppliers could also vote with their money to reward or to punish firms for their environmental performance. Investors could reward firms with superior environmental records (as a proxy for less risk), especially in pollution-intensive industries such as petroleum and chemicals, by investing in them (Prakash, 2002). Parallel to the product and market influences, companies are now increasingly subject to a new form of investor influence, namely, social investing (Labadie 1991). Thus, it appears that all types of consumers, both individual and industrial, and other elements in the market environment are becoming more concerned and aware about the natural environment and can be assumed that firms marketing goods with environmental characteristics will have a competitive advantage over firms marketing non-environmentally responsible alternatives.

CONCLUSION

Firms may choose to green their systems, policies and products due to economic and noneconomic pressures from their consumers, business partners (the market environment) (Prakash, 2002). Environmental or green marketing has been seen as a tool towards sustainable development and satisfaction of different stakeholders. Green marketing subsumes greening products as well as greening firms.

The essence of environmental marketing is the strategic product and customer decisions in which environmental issues are emphasized and environmental strengths are used as a competitive advantage. The sources of influences on green marketing subsume market and nonmarket environments. As Baron (1995) has argued, the impact of market and nonmarket environments is mutual. Thus, firms need to adopt a coordinated approach to their market and nonmarket strategies.

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INDIAN AGRICULTURE IN THE ERA OF DIGITAL MEDIA

Charan Kamal Walia[19]

ABSTRACT

"Agriculture is the backbone of the Indian Economy"- said Mahatma Gandhi five decades ago. Even today, as we enter the new millennium, the situation is still the same, with almost the entire economy being sustained by agriculture, which is the mainstay of the villages. Not only the economy, but also every one of us looks up to agriculture for our sustenance too. Media plays a crucial role in the development of a country.

Agriculture is a prominent sector in the most developing countries especially in a country like India and media can play a significant role in this development process. The economic development of developing countries is largely dependent on agriculture. The planners in developing countries have realized that the success of their programs and policies regarding agriculture depend much on the effective use of mass media. This study will give an understanding of the place and treatment of Indian agriculture in the media today.

KEYWORDS

Agriculture, Coverage, Digital Media, Media, Planners, Case Study etc.

INTRODUCTION

Agriculture in India is an age-old occupation. It has been there since the formation of this country. Still, more than 60% of Indian population resides in rural areas and is engaged in agriculture and its other allied activities. Agriculture in India is the means of livelihood of almost two thirds of the work force in the country. It has always been INDIA'S most important economic sector. Agriculture has been variously defined depending upon the stage of development and perception of people and society.

According to its **Latin Origin**, "The word agriculture consists of *ager* and *culture*. Ager means field and culture means tilling or ploughing. It means ploughing of land.

According to **Oxford Dictionary,** "Agriculture is a science or practice of cultivating the land and rearing of animals. In it are included animal husbandry, ploughing, farming etc."

According to **Chambers Dictionary,** "Agriculture is that science in which animal husbandry and growing of crops are included."

According to **Zimmermann, E.W**, "Agriculture consists of those productive efforts which man living in fields makes in using the land in addition to his reforms in genetic or growing practices of vegetation and animal life so that he is able to meet his requirements of vegetation and animal products."

According to **Webster Dictionary,** "Agriculture is the art or science of production of crops and livestock on a farm."

According to **Wikipedia,** "Agriculture is the production of food and goods through farming."

According to **Soni, R.N,** "Agriculture for long had been associated with production of crops. However, as economic development proceeded, many other occupations, allied to farm production began to be considered as part of agriculture. Agriculture at present includes, besides production of crops, forestry and animal husbandry."

AGRICULTURE IN INDIA

Agriculture in India has a long history, dating back to ten thousand years. Today, India ranks second worldwide in farm output. During 2009-10, agriculture accounts for 14.6 per cent of the country's gross domestic product (GDP), and 10.23 per cent (provisional) of the total exports. Furthermore, the sector provided employment to 58.2 per cent of the work force.

In Indian context, agriculture is not a business and land is not only the source of making money but agriculture is a way of life and land is treated as a goddess. Most of the people are engaged in agriculture not for making money but people are closely associated with their land. Lot of people irrespective of their social status and financial positions in the society are engaged in agriculture only for this reason.

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"Agriculture plays an important role in Indian Economy. According to 1991, Population Census nearly 74 percent of India's population lives in rural areas for its livelihood. Agriculture is the largest contributor in the country's Net Domestic Product accounting for as much as 34.2 percent in 1991-92 at current prices. Thus, Agriculture has a key position in India's economy both in view of employment and contribution to the national income." [1]

"The agricultural sector has always been an important contributor to the country's GDP. This is because the country is mainly based on the agriculture sector and employs around 60% of the total workforce in India. The agricultural sector contributed around 18.6% to India GDP in 2005, 19.90% in 2007 and this is likely to grow higher in the coming years." [2]

"The landmark movement came in Indian agriculture with the coming of Green Revolution also called New Agricultural Strategy or Seed- Fertilizer- Water technology. Since the mid 1960's, the traditional agricultural practices are gradually being replaced by modern technology and farm practices in India and a veritable revolution is taking place in our country. Initially, the new technology was tried in 1960-61 as a Pilot Project in seven districts and was called **Intensive Agricultural District Programme (IADP)**. Later the **High Yielding Varieties Programme (HYVP)** was also called and extended to the entire country. Traditional agriculture depends on the use of manures, seeds, simple ploughs and other primitive agricultural tools, bullocks etc. Modern technology consists of chemical fertilizers, pesticides, HYV seeds, agricultural machinery, extensive irrigation, use of diesel and electric power etc." [3]

Green Revolution gave a boost to the production of cereals especially rice and wheat. Tremendous increase was noticed in the production of commercial crops like sugarcane, cotton, jute, oil seeds etc. It brought about significant changes in the crop pattern as well. In the present era of commercialization of agriculture, there is a dire need of an efficient, fast and accurate system of communication with the help of which agriculture related information could reach the agriculturists soon. From past few years, Punjab farmers are making continuous efforts to adopt as much newer technologies as they can. As a result, Punjab agriculture is becoming hi-tech with every passing day. Print media has and can contribute a lot in this progress by disseminating the agriculture-based information/messages to the concerned.

With the spread of literacy in rural Punjab, newspapers have become an effective means of communication for spreading farm information among the masses. They act as a bridge between the source of technology and the users of it. Newspapers provide information, education, awareness, guidance and entertainment to their readers. They provide news related to various fields including agriculture.

Newspapers can be efficiently used to provide precise and practical information to the farmers regarding their farm problems, new agriculture policies and plans. The part played by television and radio in scattering farm based information cannot be ruled out but print media has more authenticity over them. Written words can be preserved for years, which is not possible in case of a spoken word, they can be referred repeatedly whenever required.

RESEARCH METHODOLOGY

In order to collect the data about the agricultural practices in other countries of the world; case study method had been adopted by the researcher. Case studies of Japan, Ghana and China have been taken up and that of India. This has helped the researcher in knowing how electronic media has played a vital role in the development of agriculture in these countries.

Coverage in Electronic Media

- At present a total of 171 AIR FM Transmitters and 248 Private FM Radio Stations are operational in the country.

- Approximately 600 + TV channels are operating in India at present. We have movie, music, news and entertainment channels but no channel on agriculture.

- Recently, ministry of rural development has decided to have a dedicated TV channel, which would focus on programs relating to agriculture, water, and sanitation issues, amongst others.

- According to sources in the I&B ministry, the government may transform one of the existing Doordarshan channels for this purpose.

- This is significant because recently Doordarshan celebrated the success of its flagship agriculture-based show 'Krishi Darshan'. According to Doordarshan officials, 'Krishi Darshan' manages to rake in Rs 100 crore every year in revenues. The proposed channel may model a number of its own television content on Krishi Darshan.

- In the state of Andhra Pradesh, three television channels namely ETV, Doordarshan and TV 5 are transmitting the programs on agriculture.

What can be done?

In this era of digital technology, we should not depend on newspapers anymore. The need of the hour is to make use of digi-media to serve the problems of agriculture. Among the three main categories of mass communication tools for agricultural extension such as radio, television and print media, the importance of radio for agricultural extension cannot be denied. Once radio was used to spread the message of Green Revolution in north India. There was a time when Satellite experiments like; SITE, Kheda Project and Jhabua Project were successfully undertaken.

Presently, radio, TV, Internet and Mobile Phones can work wonders. Farmer's quest for authentic, credible and usable information is ever increasing. To keep the radio as useful and relevant information and communication media, in taking scientific knowledge or technologies to the farmers, is necessary. Thus, it is a considerable challenge in providing farmers, extensionists and radio broadcasters with the training and skills required in making agriculture based program, in the era of digital revolution. Agricultural Extension can be studied in the light of the case studies done in various countries of the world. Based on these successful ventures, Indian Agricultural Extension model can be formed.

Case Study of Japan

The Agricultural Extension Service of Japan has two purposes. One of them is to improve agricultural production and another is to improve the standard of living in rural areas. A nationwide computer network system in the field of agricultural extension services was started in 1988 experimentally with 69 terminals across Japan. The number of terminals has increased and the system has improved year by year. Now, the farmers have an easy access to crop information, weather data, current market prices and much more. This has helped in tremendous growth of rice in areas like Fukui.

Case Study of Ghana

The agricultural extension efforts started in this region from 1940's onwards. As radio technology has developed over the past half-century or so it has been adopted widely in many developing countries, not just in Africa. Radio stations are run by organizations ranging from the government to private commercial enterprises, NGOs and religious organizations. Initially, there were big and electric radio sets but with the coming of portable and non-electric sets, the trend changed. Local radio stations produced programs of agricultural development and were transmitted to the rural audience. By 1990's, the agricultural change could be witness in Ghana.

Case Study of China

Farming depends on timely and accurate information as much as any other industry, if not more. One such research happened in China also. In 2003, Tsinghua Tongfang (THTF) a high-tech Beijing computer company, conducted three rounds of market research and identified several challenges. THTF needed a simplified, low-cost computer that could do many things and withstand the rigors of the rural environment. Therefore, it built one. This system is serving the purpose of farmers and many rural problems also.

Case Study of India

The Radio Rural Forum Project, which was conducted in 1956 in district, is the example of agricultural extension and rural development. It was based on the theme, "Listen, Discuss and Act." The introduction of high-yielding varieties of seeds after 1965 and the increased use of fertilizers and irrigation are known collectively as the **Green Revolution**, which provided the increase in production needed to make India self-sufficient in food grains, thus improving agriculture in India. All India Radio (AIR) played a vital role in creating awareness for these methods. Along with high yielding seeds and irrigation facilities, the enthusiasm of farmers mobilized the idea of agricultural revolution and is credited to All India Radio. Moreover, Krishi Darshan Programme started in 1967 on television at the behest of Prof. M.S Swaminathan aimed at popularizing modern methods of farming. The major benefits of the Green Revolution were experienced mainly in northern and northwestern India between 1965 and the early 1980s; the program resulted in a substantial increase in the production of food grains, mainly wheat and rice. School-on-air programme of AIR, which was started in the states of Andhra Pradesh and Karnataka in early 1970's, is another successful communication project.

CONCLUSION

Audio is effective but audio-visual is powerful. Therefore, television can work wonders in this era. With the availability of n-number of channels, the choice is tremendous for a viewer. A channel or two can be on agriculture. It can have audience among the ruralizes and the farmers if not urban people. The Internet and Cellular Telephony as new ICTs have significant potential to be used for agricultural extension and education. Now the constraints of hardware, software skills, connectivity and content, similar to problems faced with the use of radio and television, hamper the use of these new ICTs. Farmers can be taught to use and access internet through agricultural extension programs like "Kisan Melas." Indian farmers especially farmers in Punjab have an easy access to mobile technology. This can be further used for agricultural development.

Mobiles have the internet facility and it can be used for getting agricultural information. Hourly or weekly agricultural alerts can be sending on the mobiles. Radio in mobiles is another medium of getting agriculture-based information. CD's or DVD's having agricultural information can be made available to the farmers in order to diffuse the technical knowledge. Videos related to agriculture; crop production, use of machinery etc. can be made an uploaded on 'YouTube'. Farmers for their benefits can access these. It is difficult to convince the farmers about the usage of digital technology but the case studies easily show that revolution is the result of newer technologies only. The time has come where agriculture needs a restructuring and this will be possible with Digital Media. India is on the verge of second Green Revolution and Indian farmer is still living in the primitive age using obsolete methods of crop production.

Present age is the age of 'e- Agriculture'. "e-Agriculture" is an emerging field in the intersection of agricultural informatics, agricultural development and entrepreneurship, referring to agricultural services, technology dissemination, and information delivered or enhanced through the Internet and related technologies.

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ROLE OF JOB PORTALS IN E-RECRUITMENT: AN EMPIRICAL STUDY

Preeti Srivastava[20] Risa Singh[21]

ABSTRACT

Internet has touched every bit of business operation. Since the inception of internet, way of business operation has also changed significantly. It has not only touched marketing, finance or production but also HR. Recruitment is one of the crucial task of any HR manager in an organization. This task if done carefully and correctly, results into the enhanced efficiency and effectiveness of the employees.

The recruitment is taking a new shape with the changes in the technological environment. The role of internet in recruitment can be traced out as an opportunity or a bundle of benefits. This paper will try to understand the role of e-recruitment in recruitment process. It would try to find out the relationship between factors influencing job portals and selection of candidates. It would also put light on choice of candidates of diverse experience for job portals for job from across organizations.

KEYWORDS

E-recruitment, Internet, Human Resource, Job Portals etc.

INTRODUCTION

Recruitment is the method of selection for desirable employees in which various sources of recruiting personnel are found out to meet the requirements of the staffing objectives and attracting the adequate number of employees among the applicants for the company.

Recruitment is a crucial part of HR who undertakes the responsibility of hiring suitable employees for a specific vacant position. The employees are carefully scrutinized on the grounds of all desirable skills and expertise required to meet the expectations of management and are selected and offered jobs after examining their capability to complete task within the constraints of cost and time. However, not every source of recruitment is equally important and hence employers and employees choose only those.

As recruitment is one of the crucial tasks for any organization irrespective of size of a company, it is as much significant as other task of an organization. Several renowned researchers have undertaken numerous researches in this regard.

Previous researches have been conducted on several issues of recruitment to have understanding and find better approaches to deal with problems of recruitment. With the passage of time, methods of recruitment gradually improved and few changes were made. However, no major benefits were seen with those techniques of recruitment. Introduction of internet was a revolution for almost everything. The whole world was connected. This benefited all job seekers as they can come to know about the vacant positions in a company.

LITERATURE REVIEW

E-recruitment cuts the cost of recruitment, which was focused on web-based recruitment at the expense of traditional methods, Williams (2009). He also described that online methods gained more popularity, as almost two-third of the HR professionals surveyed informed that the jobs section of their own company's website was used as a recruitment tool for most jobs.

A paper was recently presented at an international conference by Florea & Badea (2013), which emphasized the manner in which the organizations use technology increases or decreases its positive net effect. The findings suggest that through the Internet, HR can develop an effective recruitment program, which helps manage the highly competitive and time-consuming process of finding skilled personnel.

Subbarao (2006) has conducted a study on sources of recruitment. He tried to explain the recruitment sources used by individual job seekers at various levels. Another study, which highlights the importance of different types of approaches used at the time of recruitment, which in turn makes any organization well established, or less established. Sarkar and Kumar (2007) have tried to identify the reasons for an organization to be either well-established or less-established organization - according to the approach, which they adopt while recruiting their employees. They have importance to a holistic model of recruitment i.e. emphasizing the importance of the whole process of recruitment and the interdependence of its parts. Thus, mostly previous researches have emphasized on the importance of recruitment and its process.

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OBJECTIVES OF STUDY

- To understand the concept and objective of e-recruitment.
- To identify the role and influence of job portals among candidates of different experiences.
- To know the candidates perception towards job portals for securing a job in any organization.

METHODOLOGY OF RESEARCH

To conclude the study primary data was collected from 148 candidates of different age-group and varied experience holders. Familiar and friends were approached to amass data for the study. The respondents shown their interest and participated to share crucial information for the objective of the study. They shared not only information relating to their experience but also disclosed their opinion about other sources of job vacancy.

Data Collection Method

Close-ended form of questionnaire was used to collect the required data. The questionnaire included a set of questions related to their personal information and rest of questions was directly related to the objective of the study. The target sample of the study was the applicants of jobs/internship. Students from different colleges of Lucknow were also targeted for the study. All students were in their final semester or graduated recently. 257 questionnaires were emailed and the people with the response rate of 57.59% returned 148 complete questionnaires. A convenience sampling technique was used because of less response rate.

Analysis

Statistical Package for Social Sciences 20.0 and MS Excel 2007 were used to analyses the gathered data. The data was first recorded and arranged in MS Excel 2007. After recording the information, analysis of the collected data was done on SPSS 20.0

FINDINGS AND INTERPRETATION

The below data show that the respondents were comprised of graduates and post-graduates and P.HD holders. The respondents in this study comprised of males with 42.60% and females with 57.40%. The data consists of highest respondents 66.20% belong to age group of 20-30. The second highest group of respondents were from age bracket 30-40 with 26.40% and 40 & above with 23.10%. Thus, mostly young candidates were participated in this study. It is also interesting to know that education also shows that majority of respondents were graduates and postgraduates with the percentage of 48% and 49.30% respectively. The PHD holder respondents were only 2.7%.

Table-1 (Sex)

		Frequency	**Percent**	**Cumulative Percent**
Valid	Male	63	42.6	42.6
	Female	85	57.4	100.0
	Total	148	100.0	

Sources: Authors Compilation

Table-2: Age

	Age	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	20-30	98	66.2	66.2	66.2
	30-40	39	26.4	26.4	92.6
	40 and above	11	7.4	7.4	100.0
	Total	148	100.0	100.0	

Sources: Authors Compilation

Table-3: Qualification

	Qualification	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Graduation	71	48.0	48.0	48.0
	Post-Graduation	73	49.3	49.3	97.3
	Doctoral	4	2.7	2.7	100.0
	Total	148	100.0	100.0	

Sources: Authors Compilation

RESULTS AND DISCUSSION

The data of this study was first used to calculate the mean and standard deviation. The below mentioned table-4 reveals the fact that job portals are fulfilling the need of job seekers. The mean value of this factor is 2.05 with standard deviation 0.637 on a Likert scale ranging one to five where 1 is highly satisfied and 5 is highly dissatisfied.

Table-4: Job Portals Score

	N	Minimum	Maximum	Mean	Std. Deviation
Job Portals	148	1.00	4.00	2.05	0.637
Valid N (list wise)	148				

Sources: Authors Compilation

Factor Analysis

Factor analysis was chosen as an analysis technique to check the impact of various sources of information about job vacancy. All the sources were carefully observed, obtained and considered after going through previous researches and having conversation with some respondents. However, some sources were grouped because of having similar nature or scope of varied exposure and reach. Kaiser-Meyer-Olkin (KMO) was found as an initial step to check the influence job portals along with other sources on job seekers. The KMO of this study was found 0.571, which is greater than 0.50. Since the KMO (0.570) is above 0.50, factor analysis can be applied on this study to accomplish the objective.

Table-5: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.571
Bartlett's Test of Sphericity	Approx. Chi-Square	138.617
	df	28
	Sig.	.000

Sources: Authors Compilation

Table-6: Rotated Component Matrix[a]

	Component		
	1	**2**	**3**
Placement Agencies	.109	.826	-.025
Employee Referral	-.096	.771	.305
Job Portals	.717	.078	.035
Direct Mail shots	.742	.071	-.191
Newspaper	.651	.052	.280
SMS Text Messaging	.366	.374	.637
Company's Own Website	.089	.328	-.078
Professional Magazine	-.080	-.127	.826
Note: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 4 iterations.			

Sources: Authors Compilation

CONCLUSION

The study discloses that 'Job Portals' does have a positive impact on job seekers. However, other sources like direct mail shot was found very influencing and significant along with direct mail shot. The second grouped factors consist of other sources viz. placement agencies and employee referrals that have an important place in job seeker's mind. Therefore, it can be concluded that among popular sources, job portals are significant source among fresher and one-to-two-year experience holders. On the other hand, company's own website is not considered better option to get information regarding job openings. The respondents also stated that they could find several openings of different companies at the same time with very less efforts and cost.

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JOB SATISFACTION IN BIRLA ERICSSION OPTICAL LIMITED, BHOPAL

Yasmeen Khan[22]

ABSTRACT

As every one of us is aware about the satisfaction of the job. It is basically the inner feeling of the employees towards the job that either they are happy with their job it means that they are satisfied with the job or they are unhappy with the job then it means that they are unsatisfied with their job. Satisfaction & unsatisfaction of the job may be due to the several factors, which are responsible for the job. Therefore, the paper is an attempt to know whether the employees of Birla Ericssion are satisfied with their job or not and to check the degree of satisfaction of the employees. To analyze the company's working environment and to find out that the employees are working with their full capabilities or not.

KEYWORDS

Job Satisfaction, Working Environment, Degree of Satisfaction etc.

JOB SATISFACTION

Job satisfaction is defined as a pleasurable, emotional, state resulting from appraisal of one's job.
An effective reaction to one's job.

Weiss

Job satisfaction is general attitude, which is the result of many specific attitudes in three areas namely: a) Specific job factors, b) Individual characteristics, and c) Group relationship outside the job.

Blum and Naylor

LITERATURE REVIEW

The term job satisfaction was brought to lime light by Hoppock (1935). He revived 35 studies on job satisfaction conducted prior to 1933 and observes that Job satisfaction is combination of psychological, physiological and environmental circumstances. That causes a person to say. "I m satisfied with my job". Such a description indicate the variety of variables that influence the satisfaction of the individual but tell us nothing about the nature of Job satisfaction.

Job satisfaction has been most aptly defined by Pestonjee (1973) as a job, management, personal adjustment & social requirement. Morse (1953) considers Job satisfaction as dependent upon job content, identification with the co., financial & job status & priding group cohesiveness.

One of the biggest preludes to the study of job satisfaction was the Hawthorne study. These studies (1924-1933), primarily credited to Elton Mayo of the Harvard Business School, sought to find the effects of various conditions (most notably illumination) on workers' productivity.

These studies ultimately showed that novel changes in work conditions temporarily increase productivity (called the Hawthorne Effect). It was later found that this increase resulted, not from the new conditions, but from the knowledge of being observed. This finding provided strong evidence that people work for purposes other than pay, which paved the way for researchers to investigate other factors in job satisfaction.

Scientific management (aka Taylorism) also had a significant impact on the study of job satisfaction. Frederick Winslow Taylor's 1911 book, Principles of Scientific Management, argued that there was a single best way to perform any given work task. This book contributed to a change in industrial production philosophies, causing a shift from skilled labor and piecework towards the more modern approach of assembly lines and hourly wages.

The initial use of scientific management by industries greatly increased productivity because workers were forced to work at a faster pace. However, workers became exhausted and dissatisfied, thus leaving researchers with new questions to answer regarding job satisfaction.

It should also be noted that the work of W.L. Bryan, Walter Dill Scott, and Hugo Munsterberg set the tone for Taylor's work.

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Some argue that Maslow's hierarchy of needs theory, a motivation theory, laid the foundation for job satisfaction theory. This theory explains that people seek to satisfy five specific needs in life – physiological needs, safety needs, social needs, self-esteem needs, and self-actualization. This model served as a good basis from which early researchers could develop job satisfaction theories.

IMPORTANCE OF JOB SATISFACTION

- Job satisfaction is an important indicator of how employees feel about their job and a predictor of work behavior such as organizational, citizenship, Absenteeism, Turnover.
- Job satisfaction can partially mediate the relationship of personality variables and deviant work behavior.
- Common research finding is that job satisfaction is correlated with life style.
- This correlation is reciprocal meaning the people who are satisfied with the life tends to be satisfied with their jobs and the people who are satisfied their jobs tends to satisfied with their life.
- This is vital piece of information that is job satisfaction and job performance is directly related to one another. Thus it can be said that, "A happy worker is a productive worker."
- It gives clear evidence that dissatisfied employees skip work more often and more like to resign and satisfied worker likely to work longer with the organization.

IMPORTANCE TO WORKERS AND ORGANIZATION

Job satisfaction and occupational success are major factors in personal satisfaction, self-respect, self-esteem, and self-development. To the worker, job satisfaction brings a pleasurable emotional state that can often leads to a positive work attitude. A satisfied worker is more likely to be creative, flexible, innovative, and loyal.

For the organization, job satisfaction of its workers means a work force that is motivated and committed to high quality performance. Increased productivity- the quantity and quality of output per hour worked- seems to be a byproduct of improved quality of working life. It is important to note that the literature on the relationship between job satisfaction and productivity is neither conclusive nor consistent.

However, studies dating back to Herzberg's (1957) have shown at least low correlation between high morale and high productivity and it does seem logical that more satisfied workers will tend to add more value to an organization.

Unhappy employees, who are motivated by fear of loss of job, will not give 100 percent of their effort for very long. Though fear is a powerful motivator, it is also a temporary one, and as soon as the threat is lifted, performance will decline.

Job satisfaction benefits the organization includes reduction in complaints and grievances, absenteeism, turnover, and termination; as well as improved punctuality and worker morale. Job satisfaction is also linked with a healthier work force and has been found to be a good indicator of longevity. Although only little correlation has been found between job satisfaction and productivity, Brown (1996) notes that some employers have found that satisfying or delighting employees is a prerequisite to satisfying or delighting customers, thus protecting the "bottom line".

FACTORS OF JOB SATISFACTION

Hoppock, the earliest investigator in this field, in 1935 suggested that there are six major components of job satisfaction. These are as under:

- The way the individual reacts to unpleasant situations,
- The facility with which he adjusted himself with other person,
- The relative status in the social and economic group with which he identifies himself,
- The nature of work in relation to abilities, interest and preparation of worker,
- Security,
- Loyalty.

Herzberg, Mausaer, Peterson and Capwell in 1957 reviewed more than 150 studies and listed various job factors of job satisfaction. These are briefly defined one by one as follows:

- **Intrinsic Aspect of Job:** It includes all of the many aspects of the work, which would tend to be constant for the work regardless of where the work was performed.

- **Supervision:** This aspect of job satisfaction pertains to relationship of worker with his immediate superiors. Supervision, as a factor, generally influences job satisfaction.

- **Working Conditions:** This includes those physical aspects of environment which are not necessary a part of the work. Hours are included this factor because it is primarily a function of organization, affecting the individuals comfort and convenience in much the same way as other physical working conditions.

- **Wage and Salaries:** This factor includes all aspect of job involving present monitory remuneration for work done.

- **Opportunities for Advancement:** It includes all aspect of job which individual sees as potential sources of betterment of economic position, organizational status or professional experience.

- **Security:** It is defined to include that feature of job situation, which leads to assurance for continued employment, either within the same company or within same type of work profession.

- **Company & Management:** It includes the aspect of worker's immediate situation, which is a function of organizational administration and policy. It also involves the relationship of employee with all company superiors above level of immediate supervision.

- **Social Aspect of Job:** It includes relationship of worker with the employees specially those employees at same or nearly same level within the organization.

- **Communication:** It includes job situation, which involves spreading the information in any direction within the organization. Terms such as information of employee's status, information on new developments, information on company line of authority, suggestion system, etc, are used in literature to represent this factor.

- **Benefits:** It includes those special phases of company policy, which attempts to prepare the worker for emergencies, illness, old age, also. Company allowances for holidays, leaves and vacations are included within this factor.

REASONS OF LOW JOB SATISFACTION

1. Conflict between co-workers.
2. Conflict between supervisors.
3. Not being opportunity paid for what they do.
4. Have little or no say in decision making that affect employees.
5. Fear of losing their job.

EFFECTS OF LOW JOB SATISFACTION

High Absenteeism

Absenteeism means it is a habitual pattern of absence from duty or obligation. If there will be low job satisfaction among the employees the rate of absenteeism will definitely increase and it also affects on productivity of organization.

Figure-1
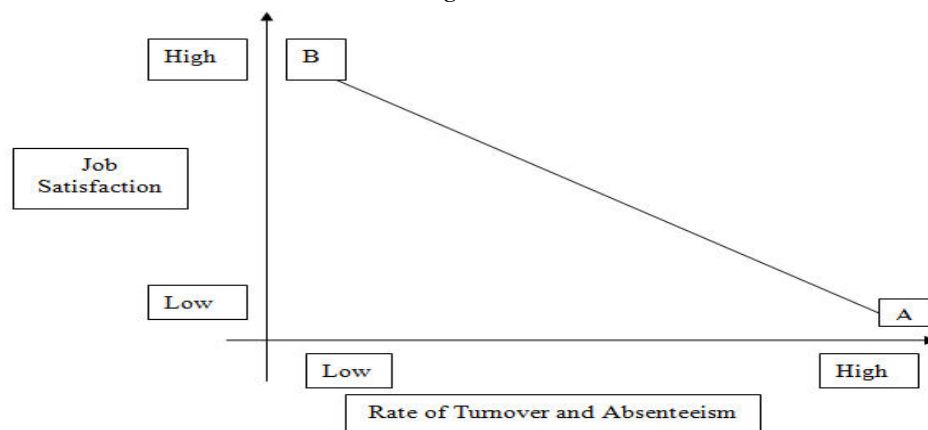
Sources: Authors Compilation

In the above diagram, line AB shows inverse relationship between job satisfaction and rate of turnover and rate of absenteeism. As the job satisfaction is high, the rate of both Turnover and Absenteeism is low and vise- versa.

High Turnover

In human resource refers to characteristics of a given company or industry relative to the rate at which an employer gains and losses the staff. If the employer is said to be have a high turnover of employees of that company have shorter tenure than those of other companies.

Training Cost Increases

As employees leaves organization due to lack of job satisfaction. Then Human resource manager has to recruit new employees. So that the training expenditure will increases.

INFLUENCES ON JOB SATISFACTION

There are number of factors that influence job satisfaction. For example, one recent study even found that if college students majors coincided with their job, this relationship will predict subsequent job satisfaction. However, the main influences can be summarized along with the dimensions identified above.

The work itself

The concept of work itself is a major source of satisfaction. For example, research related to the job characteristics approach to job design, shows that feedback from job itself and autonomy are two of the major job related motivational factors. Some of the most important ingredients of a satisfying job uncovered by survey include interesting and challenging work, work that is not boring, and the job that provides status.

Pay

Wages and salaries are recognized to be a significant, but complex, multidimensional factor in job satisfaction. Money not only helps people attain their basic needs butevel need satisfaction. Employees often see pay as a reflection of how management views their contribution to the organization. Fringe benefits are also important. If the employees are allowed some flexibility in choosing the type of benefits they prefer within a total package, called a flexible benefit plan, there is a significant increase in both benefit satisfaction and overall job satisfaction.

Promotions

Promotional opportunities are seem to be having a varying effect on job satisfaction. This is because of promotion take number of different forms.

SUBJECT MATTER OF RESEARCH

- To find that whether the employees are satisfied or not.
- To analyze the company's working environment.
- To check the degree of satisfaction of employees.
- To find that they are satisfied with their job profile or not.
- To find that employees are working with their full capabilities or not.

RESEARCH METHODOLOGY

Research refers to a search for knowledge. It is a systematic method of collecting and recording the facts in the form of numerical data relevant to the formulated problem and arriving at certain conclusions over the problem based on collected data.

Thus, formulation of the problem is the first and foremost step in the research process followed by the collection, recording, tabulation and analysis and drawing the conclusions. The problem formulation starts with defining the problem or number of problems in the functional area. To detect the functional area and locate the exact problem is most important part of any research as the whole research is based on the problem.

According to Clifford Woody research comprises defining and redefining problems, formulating hypothesis or suggested solutions: collecting, organizing and evaluating data: making deductions and reaching conclusions: and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.

Research can be defined as "the manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art". In short, the search for knowledge through objective and systematic method of finding solution to a problem is research.

Drafting Questionnaire

The questionnaire is considered as the most important thing in a survey operation. Hence, it should be carefully constructed. Structured questionnaire consist of only fixed alternative questions. Such type of questionnaire is inexpensive to analysis and easy to administer. All questions are closed ended.

Sampling Design

Sampling Universe: All the employees are the sampling universe for the research.

Sampling Technique: Judgmental sampling

Sample size: 100 employees **of BEOL.**

The questionnaire was filled in the office and vital information was collected which was then subjects to:

 - ➢ A pilot survey was conducted before finalizing the questionnaire.
 - ➢ Data collection was also done with the help of personal observation.
 - ➢ After completion of survey, the data was analyzed and conclusion was drawn.
 - ➢ At the end, all information was compiled to complete the project report.

Data Collection

The task of data collection begins after the research problem has been defined and research design chalked out. While deciding the method of data collection to be used for the study, the researcher should keep in mind two types of data viz. Primary and secondary data.

Primary Data
The primary data are those, which are collected afresh and for the first time and thus happen to be original in character. The primary data were collected through well-designed and structured questionnaires based on the objectives.

Secondary Data
The secondary data are those, which have already been collected by someone else and passed through statistical process. The secondary data required of the research was collected through various newspapers, and Internet etc.

OBJECTIVES OF STUDY

The research has been undertaken with following objectives:

 - ▪ To study the level of job satisfaction among the employees of SEVA Automotive Pvt. Ltd.
 - ▪ To study the methods of measuring job satisfaction of SEVA Automotive Pvt. Ltd.

RELEVANCE OF STUDY

The study was thoughtful for knowing the existing job satisfaction level of the employees of B.E.O.L., Rewa, Madhya Pradesh, India.

LIMITATIONS OF STUDY

Yet there are always some problems faced by the researcher. The prime difficulties in collection of information are discussed below:

1. **Short Time Period:** The time for carrying out the research was short because of which many facts have been left unexplored.

2. **Lack of Resources**: Lack of time and other resources as it was not possible to conduct survey at large level.

3. **Small Number of Respondents:** Only 20 employees have been chosen which is a small number, to represent whole of the population.

4. **Unwillingness of Respondents:** While collection of the data many consumers were unwilling to fill the questionnaire. Respondents were having a feeling of wastage of time for them.

5. **Small Area for Research:** The area for study was Kaithal, which is quite a small area to judge job satisfaction level.

DATA ANALYSIS & INTERPRETATION

Ques-1: Does employee passed up at least once for a promotion in the past few years.

The study says that 20% of employees are agree on the point, 30% are neither agree nor disagree,50% are disagree and rest 0% of employees are strongly disagree.

Ques-2: Does employees spent parts of day daydreaming about a better job.

As per analysis, 60% of employees are strongly agree about the point , 15% of employees are agree on the point, 15% are neither agree nor disagree,10% are disagree and rest 0% of employees are strongly disagree.

Ques-3: Does employees found their job repetitive and boring?

As per analysis, 75% of employees are strongly agree about the point , 10% of employees are agree on the point, 10% are neither agree nor disagree,5% are disagree and rest 0% of employees are strongly disagree.

Ques-4: Does employees feels that their job has little impact on the success of the company?

50% of employees are strongly agree about the point , 30% of employees are agree on the point, 20% are neither agree nor disagree,0% are disagree and rest 0% of employees are strongly disagree.

Ques-5: Are employees completely satisfied with their job although their salary is good enough?

The study says that 0% of employees are strongly agree about the point , 0% of employees are agree on the point, 20% are neither agree nor disagree,60% are disagree and rest 20% of employees are strongly disagree.

Ques-6: Does all employees used their full capabilities?

As per analysis, that 0% of employees are strongly agree about the point , 40% of employees are agree on the point, 20% are neither agree nor disagree,40% are disagree and rest 0% of employees are strongly disagree.

Ques-7: Does employees feels as though their boss and employer have let him down?

The study says that 0% of employees are strongly agree about the point , 0% of employees are agree on the point, 10% are neither agree nor disagree,55% are disagree and rest 35% of employees are strongly disagree.

Ques-8: Does employees often feel overworked and overwhelmed?

The study says that 45% of employees are strongly agree about the point, 20% of employees are agree on the point, 35% are neither agree nor disagree,0% are disagree and rest 0% of employees are strongly disagree.

Ques-9: Does the employees stressed out at work?

As per analysis, 0% of employees are strongly agree about the point, 20% of employees are agree on the point, 15% are neither agree nor disagree,15% are disagree and rest 50% of employees are strongly disagree.

Ques-10: Does employees feels that they are negatively comparing their situation to peers?

As per analysis, 0% of employees are strongly agree about the point, 15% of employees are agree on the point, 25% are neither agree nor disagree,40% are disagree and rest 20% of employees are strongly disagree.

Ques-11: Does employee's feels that there are bad days at work outweigh the good ones?

The study says that 25% of employees are strongly agree about the point, 30% of employees are agree on the point, 45% are neither agree nor disagree,0% are disagree and rest 0% of employees are strongly disagree.

Ques-12: Does employees experience a sensation of time standing still are at work?

As per analysis, 15% of employees are strongly agree about the point, 35% of employees are agree on the point, 30% are neither agree nor disagree,20% are disagree and rest 0% of employees are strongly disagree.

Ques-13: Does the employees lost sight of my career goals and aspirations?

The study says that 15% of employees are strongly agree about the point, 25% of employees are agree on the point, 45% are neither agree nor disagree,15% are disagree and rest 0% of employees are strongly disagree.

Ques-14: Does the employees no longer feel valued for their work?

The analysis is that 25% of employees are strongly agree about the point, 25% of employees are agree on the point, 20% are neither agree nor disagree,20% are disagree and rest 10% of employees are strongly disagree.

FINDINGS

- 50% employees disagree about the promotion in the past few years.
- Most of employees agreed that the spent part of day daydreaming about a better job.
- 75% employees strongly agreed that their job is repetitive & boring.
- Some employees are strongly agreed that their job has little impact on the success of the company.
- Employees are not completely satisfied with their job although their salary is good enough.
- 40% employees says that yes they show their full capabilities towards their job.
- Most of the employees are disagree that they feel as though their boss and employer have let him down.
- Most of the employees feel overworked and overwhelm.
- 50% employees agree that they are stressed out at work.
- Some employees feel that their negatively comparing their situation to peers.
- 25% employees feel that their bad days at work outweigh the good ones rest employees are neither agree nor disagree.
- Some employees are feeling experience sensations of time standing still are at work.
- 15% employees are agreeing to lost sight of their career goals and aspirations.
- Employees are not getting value to their work.

RECOMMENDATIONS

To increase the job satisfaction level of the employees the company should concentrate mainly on the incentive and reward structure rather than the motivational session;

- Ideal employees should concentrate on their job.
- Educational qualification can be the factor of not an effective job.
- Company should give promotion to those employees who deserve it.
- Company should give them better working environment.
- It is a responsibility of the company, that they should give rewards for their better job.
- Company should encourage employee's work or efforts during their job.
- There should not be made any comparison between employees, it is helpful to avoid employees grievance.
- To overcome in the situation of stress or overwork load, there should be a meditation class or session in the company.
- There should be also indoor activities or games for the employees.
- There should be good relation between employer and employees and with their peers for the better working environment.
- Jobs should be made in such a manner that employees does not feel boring or repetitive.
- Company should give salary to the employees according to their job.

CONCLUSION

Job satisfaction is the major factors in personal satisfaction, self-respect, self-esteem, and self-development. To the worker, job satisfaction brings a pleasurable emotional state that can often leads to a positive work attitude. A satisfied worker is more likely to be creative, flexible, innovative, and loyal.

For the organization, job satisfaction of its workers means a work force that is motivated and committed to high quality performance. Increased productivity- the quantity and quality of output per hour worked- seems to be a byproduct of improved quality of working life. It is important to note that the literature on the relationship between job satisfaction and productivity is neither conclusive nor consistent.

Job satisfaction is an important indicator of how employees feel about their job and a predictor of work behavior such as organizational, citizenship, Absenteeism, Turnover.

Job satisfaction can partially mediate the relationship of personality variables and deviant work behavior.

This is vital piece of information that is job satisfaction and job performance is directly related to one another. Thus it can be said that, "A happy worker is a productive worker."

It gives clear evidence that dissatisfied employees skip work more often and more like to resign and satisfied worker likely to work longer with the organization.

Job satisfaction is combination of psychological, physiological and environmental circumstances. That causes a person to say. "I m satisfied with my job". Such a description indicate the variety of variables that influence the satisfaction of the individual but tell us nothing about the nature of Job satisfaction.

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(Editor-In-Chief)

A BRIEF SUMMARY OF GAME THEORY AND ITS USABILITY

Bhuwan Joshi[23]

ABSTRACT
A broad coverage of many of the developments in game theory has been made since the optimization technique came into existence. The main purpose of this paper is to present a broad and wide brush picture of the game theory and its various areas of study and applications that are to be used and being used in different fields in real world. The use of deep techniques of game theory flourishes best when it stays in touch with applications and its uses in various fields. There is a vital symbiotic relationship between good theory and practice.

KEYWORDS
Game Theory, Artificial Intelligence, Strategy, Pay off, Saddle Point etc.

MILE STONES OF GAME THEORY

Game Theory has emerged recently as a powerful technique to the conventional method of examining economics. Although many illustrious predecessors worked on problems in what can be called "game theory", the fundamental, formal conception of game theory as part and parcel of economic theory were first organized in John von Neumann and Oskar Morgenstern's 1944 classic, *Theory of Games and Economic Behavior*(1944).[1]

John von Neumann and Oskar Morgenstern (1944) introduced the strategic normal game, strategic extensive game, the concept of pure/mixed strategies, coalitional games as well as the axiomatization of expected utility theory, which was so useful for economics under uncertainty. They employed the "maximum" solution concept derived earlier by John von Neumann (1928) to solve simple strategic, zero-sum normal games.

In 1950, John Nash gave a concept of a "Nash Equilibrium" (NE), which became the organizing concept under Game Theory. Using this "Nash Equilibrium" in 1951, John Nash introduced a new concept, which is known as "Nash Bargaining Solution" (NBS) for coalitional games.

In 1957, R. Duncan Luce with Howard Raiffa introduced a first popular textbook on Game theory in the field of non-cooperative games. After that in 1965, Reinhard Selten developed the refined solution for extensive form games, which is known as "Subgame Perfect Equilibrium". Further, in 1967-68 John C. Harsanyi gave the concept of "Bayesian Nash Equilibrium" (BNE) for such types of games, which have some uncertainty about moves or nature. In 1973, John C. Harsanyi provided a remarkably insightful new interpretation of the concept of a "mixed strategy". Robert J. Aumann defined "Correlated Equilibrium" for Bayesian Games in 1974, while in 1975 Reinhard Selten introduced "Trembling Hand Equilibrium" for Bayesian Games. David M. Kreps and Robert Wilson introduced a new concept in 1982 for extensive games with imperfect information, which is known as "Sequential Equilibrium" (SEQE). For extensive games, Elon Kohlberg & Jean- François Mertens developed the concept of "Forward Induction" in 1986. Again, in 1986 Drew Fudenberg and E.S. Maskin developed one of the most famous "Perfect Folk Theorems" for infinitely repeated games. Finally, in 1988, J. C. Harsanyi and R. Selten developed the idea of "equilibrium selection" for any type of game while D. Fudenberg and Jean Tirole (1991) developed the "Bayesian Perfect Equilibrium" (BPE) for Extensive Bayesian Games. Nobel Prizes have been awarded to John Nash, J.C. Harsanyi and R. Selten in 1994 and William Vickrey and James Mirrlees in 1996. Herbert Simon won the Nobel in 1979 for concepts (e.g. bounded rationality) which have since been incorporated into the corpus of (Evolutionary) Game Theory.

A BREIF INTRODUCTION ABOUT GAME

Competition is the rule of modern life or we can say that competition is the watch world of modern life. We say that a competitive solution exists if two or more individuals make decisions in a situation that involves conflicting interests, and in which the outcome is controlled by the decision of all the concerned parties. In simple words, a competitive situation is called a game. The term game represents a conflict between two or more parties or a situation is termed a game when it has the following properties:

- The finite number of competitors.
- There is a conflict of interest between the participants
- Finite number of courses of action for each participant.
- Standards are known by all the players.
- A game gives result when each of players chooses single courses of action from the list of available courses.

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- The result produce by a game is affected by the choices made by the player.
- Game theory provides a specific mathematical formula and an algorithm to produce a result for a specific game.

MODELS OF GAME THEORY

We have several models of game theory, the brief description of these models are as follows:

3a: 2 Person Game: Each player has several strategies. If the first player chooses strategy *i* while the second player chooses Strategy *j*, then Player 1 gains a_{ij} while Player 2 gains b_{ij}. This outcome is represented by $a_{ij} + b_{ij}$. In 2-person game where the players' interests are completely opposed is called *zero-sum* or *constant-sum* games in which one player's gain is the other player's loss. In other hand where the players' interests are not completely opposed are called *variable-sum* games. Such games arise in everyday basis on business, and to solve them is not an easy task.

N person game: When there are more than two players and some fundamental differences arise among them. Here is an example with three players: each player has two strategies, say A and B. Whatever Players 1 and 2 play, the payoff vector is (1, -1/2, -1/2) when Player 3 chooses Strategy A and it is (-1/2, 1,-1/2) when Player 3 chooses Strategy B. We will call the player that receives the payoff of 1 the *winner* and the players that receive a payoff of -1/2, the *looser*. In this game, although Player 3 can never be the winner, he determines which of Players 1 or 2 will be the winner. When this situation occurs, we say that Player 3 is a *spoiler*. We can take an example in Lok-Sabha election 2014 in India 3 parties have the competition BJP, Congress and AAP here the third party knows already that he is not about to win the match it means AAP is spoiler.

3b: Cooperative Game Theory: In cooperative game theory, we focus on the individual player's strategies and their influences on payoffs and try to predict what strategies player will choose. In Cooperative Game Theory, we "investigate such coalitional games with respect to the relative amounts of power held by various players."[2]

Non-cooperative Game Theory: we abstract from individual players strategies and instead focus on the coalition player may form we assume each coalition may attain some payoff then we try to predict which coalition will form

3c: Zero sum game in game theory and economic theory, **zero-sum** describes a situation in which a participant's gain or loss is exactly balanced by the losses or gains of the other participant(s). If the total gains of the participants are added up, and the total losses are subtracted, they will sum to zero. Zero-sum can be thought of more generally as **constant sum** where the benefits and losses to all players sum to the same value of money. Cutting an apply is zero- or constant-sum, because taking a larger piece reduces the amount of apple available for others.

Non zero sum game a **non-zero-sum** describes a situation in which the interacting parties' aggregate gains and losses is either less than or more than zero. Zero-sum games are also called *strictly competitive*.

3d: Finite Games: It has a definite beginning and ending. In this, we have some definite rules to ensure the game is finite. Some Examples are debates, sports, receiving a degree from an educational institution etc. **Infinite games**, in infinite games we do not have a starting and ending point of the game. An infinite game continues play, for the sake of play. If the game is approaching resolution because of the rules of play, the rules must be changed to allow continued play. According to Carse James, "It is an invariable principle of all plays, finite and infinite, that whoever plays - play freely"[3]

3e: Minimax strategy or Mixture: A strategy that limits a player's opponent to his minimax strategy, in other hand the lowest value a player's opponent can limit him to is known as **minimax value**.

Maximin Strategy or Mixture: A strategy that assures a player of his maximin value, or, we can say the highest value a player can assure himself is known as maximin value.

3f: Constant sum Game: in a constant sum game, for every possible outcome of the game, the utility k1 of Player 1 plus the utility k2 of Player 2, adds to a constant. For example, if two firms are competing for market shares, then k1 + k2 =100%.

STRATEGY

The term strategy is defined as a complete set of plans of action specifying precisely what the player will do under every possible future contingency that might occur during the play of the game that is strategy of a player is the decision rule he uses for making a choice from his list of courses of action. "a strategy is one of the given possible actions of a player."[4] **Or,** in other words, we can say that a strategy is a planning or a set of rule from the list of courses of action. Alternatively, we can say that strategy is any of the options they can choose in a setting where outcome does not depend only on their own actions but also on the other's action. Various types of strategies are defined as:

Pure Strategy

A pure strategy provides an entire definition how a player will play a game we can also say that it determines the move a player will make for any situation they could face and here point is very remarkable that a players strategy set is the set of pure strategies available to that player or we can say that a strategy is called pure if one knows in advance of the play that it is certain to be adopted irrespective of the strategy that other player might choose.

Mixed Strategy

A mixed strategy is one where the players introduce a random element in their choice of a strategy, thus leaving the opponent guessing.

PAY OFF

In any game payoffs are various numbers which represents the motivations of players, it may represents earn profit/loss, quantity. In other words, we can say that outcome **of the game.**

Saddle point a saddle point is a position in the payoff matrix where the maximum of row minima coincide with minimum of the column maxima.

Value of the game the payoff at the saddle point is called the value of the game.

Let we take an example to understand all these terms:

Table-1: Value of Game

	B1	B2	B3
A1	1	3	1
A2	0	-4	-3
A3	1	5	-1

Sources: Authors Compilation

In the above table row minimum are respectively(1,-4,-1) and column maximum are respectively (1,5,1) row minimax=1 ,column maxmin=1 hence saddle point exist and the value of the game saddle point which is 1, that lies at (A1B1).

APPLICATIONS OF GAME THEORY

We can use Game theory in various fields in general life, such as law, philosophy, resource allocation, Robotics, biology, military strategies, Bargaining etc. In all these applications, a "deep study of the formulation of the problem in the game theory perspective shows a strong inclination to work from existing values, consider only currently contending parties and options, and in other ways to exclude significant redefinitions of the problems at hand".[5]

Game theory is very useful in practical advice on various tactical decision making situations like military areas involving various missiles and aircraft tracking using the concept of artificial intelligence.

CONCLUSION

This article would only sketch the basic concepts of game theory and its uses. Here we can say that game theory is a procedure of strategic interaction or competition between two or more players with a condition that is with a set of rules and the outcome of the game, it might be necessary to be able to point to an alternative theory, with different in-built values and a different selective usefulness. For game theory, such an alternative appears not to be available. Game theory itself is an alternative to certain models of economics, but reflects many of the same values as these models .overall candid opinion of the article from the above lines that Game Theory has become an integrated part where it is being applied such as law, ethics, sociology, biology, and of course parlor games, Crime Evaluation, international relations etc.

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DATA MINING FOR ENHANCE SECURITY OF LINUX OPERATING SYSTEM

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ABSTRACT

There has been much interest in applying data mining to Linux operating system security. This paper provides lessons learned in this task. Based upon our experiences in getting started on this type of project, we suggest data mining techniques to consider and types of expertise and infrastructure needed. This paper has two intended audiences: Linux security professionals with little background in data mining, and data mining experts with little background in Linux security.

KEYWORDS

Data Mining, Security, Linux, Operating System etc.

LINUX OPERATING SYSTEM

Linux is a free Unix-like operating system that has become popular with PC users around the world. An independent POSIX implementation, Linux does true multitasking and includes virtual memory, shared libraries, demand loading, memory management, TCP/IP networking and other features that are available with current full featured commercial operating systems.

A feature of the Linux operating system that distinguishes it from other operating systems is one of the few operating systems whose source code is also available as free software under the GNU General Public License (GPL). [1] The GNU GPL is intended to safeguard and guarantee the freedom of any user of free software to share, modify and Share the modified software. This is in contrast to the licenses given for proprietary software that prohibits its users to share or modify software. Just like how antivirus software generally detects and safeguards against malware and IDS, which detect by assessing traffic patterns against the baseline and look for anomalies. Besides that, there are that observe and alert, plus systems that carry out an action or even actions in reaction to a recognized threat. The following will take a brief look on each intrusion detection system:

NIDS

These are installed at a tactical point or maybe points inside the network in order to monitor all traffic on the network. In reality, you would check out all incoming and outgoing traffic, but doing this could produce a bottleneck, which would damage the all-round speed of your computer network. [2]

Signature Based

This can be used to monitor the packets on the system and then do a comparison against the database of attributes or signatures from recognized malicious threats. It is similar to how most anti-virus software would detect malware. However, there is a downside with this system because there will be a lag in between when new threats are identified in the wild and the signature for finding that threat being used on your IDS. In that lag period, the IDS will be unable to identify any new threat.

HIDS

These operate on individual devices or hosts on the system. This will monitor all the incoming and outgoing packets on the device only and can notify the administrator or user of any suspicious activity. [3]

IDS BEFORE DATA MINING

When we first began to do intrusion detection on our network, we didn't focus on data mining, but rather on issues that are more fundamental: How would the sensors perform? How much data would we get? How would we display the data? What kind of data did we want to see, and what queries would be best to highlight that data? Next, as the data came in, sensor tuning, incident investigation, and system performance commanded our attention. The analyst team grew handle the load, and training and team coordination were the issues of the day. However, the level of reconnaissance and attack on the internet was constantly increasing, along with the amount of data we were collecting and putting in front of our analysts. We began to suspect that our system was inadequate for detecting the most dangerous attacks—those performed by adversaries using attacks that are new, stealthy, or both.

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Therefore, we considered data mining with two questions in mind: [3]

- Can we develop a way to minimize what the analysts need to look at daily?
- Can data mining help us find attacks that the sensors and analysts did not find?

DATA MINING

It is the crucial step in which clever techniques are applied to extract patterns potentially useful. [8] Here are a few specific things that data mining might contribute to an intrusion detection project:

- Remove normal activity from alarm data to allow analysts to focus on real attacks,
- Identify false alarm generators and "bad" sensor signatures,
- Find anomalous activity that uncovers a real attack,
- Identify long, ongoing patterns (different IP address, same activity).

To accomplish these tasks, data miners use one or more of the following techniques:

- Data summarization with statistics, including finding outliers,
- Visualization: presenting a graphical summary of the data,
- Clustering of the data into natural categories [Manganaris et al., 2000],
- Association rule discovery: defining normal activity and enabling the discovery of anomalies [Clifton and Gengo, 2000; Barbara et al., 2001],
- Classification: predicting the category to which a particular record belongs [Lee and Stolfo, 1998].

START BY MAKING YOUR REQUIREMENTS REALISTIC

The seductive vision of automation is that it can and will solve all your problems, making human involvement unnecessary. This is a mirage in intrusion detection. Human analysts will always be needed to monitor that the automated system is performing as desired, to identify new categories of attacks, and to analyze the more sophisticated attacks. In our case, our primary concern was relieving the analyst's day-to-day burden. [4]

Real-time automated response is very desirable in some intrusion detection contexts. However, this puts a large demand on database performance. The database must be fast enough to record alarms and produce query results simultaneously. Real time scoring of anomaly or classification models is possible, but this should not be confused with real-time model building. There is research in this area [Domingos and Hulten, 2000], but data mining is not currently capable of learning from large amounts real-time, dynamically changing data. It is better suited to batch processing of a number of collected records. Therefore, we adopted a daily processing regime, rather than an hourly or minute-by-minute scheme. [5]

SELECT A BROAD AND CAPABLE PROJECT STAFF

Our staff will need skills in three areas: network security, data mining, and database application development. [6]

- Of course, the security staff needs a solid grounding in networking and intrusion detection, but they also need to be able to tackle big, abstract problems.
- The data miners should have a good grounding in statistics and machine learning, but they will also need to learn detailed concepts involved in computer networking.
- The database developers will need good skills in efficient database design, performance tuning, and data warehousing.

INVEST IN ADEQUATE INFRASTRUCTURE

Significant infrastructure is required to do this sort of work. In addition to the normal processing of the data from the intrusion detection system, you will need: [7]

- **A Database:** Because you will need to store a great deal of data, update this data regularly, and obtain rapid responses to complex queries, we recommend that you select a high-end production-quality database management system.

- **Storage Space:** In addition to the handling of normal IDS data, you will need data and working space associated with data mining. Additional data includes calculating and saving metadata, as well as sometimes copying existing data into more convenient data types. Working space will hold the various sample data sets that will be extracted for experimentation, as well as working files containing intermediate and final results. Plan for data mining to double your storage requirements.

- **Compute capability:** Data mining tools are very CPU and memory intensive. Naturally, the more memory and CPU power the better. We have found that we needed at least four times the memory and CPU power over what would be needed for an IDS database without the data mining.

- **Software:** In addition to what is required for the basic system (production quality database, Perl, database middleware, database administration and tuning aids), plan for acquisition of specialized tools. [8]

PLAN, COMPUTE, AND STORE APPROPRIATE ATTRIBUTES

Data records consist of many attributes. When doing data mining for intrusion detection one could use data at the level of TCPDUIVIP [Lee and Stolfo, 1998] or at the alarm level [Manganaris, et al. 2000]. In both types of data you will find fields for source IP address, destination IP address, source port number, destination port number, date/time, transfer protocol (TCP, UI)P, ICMP, etc.), and traffic duration (or equivalently, both start and end times). These 'base' attributes give a good description of the individual connection or alarm, but they often are insufficient to identify anomalous or malicious activity because they do not take into account the larger context. The individual connection records in a denial of service attack are not, by themselves, malicious, but they come in such numbers that they overwhelm your network. A single connection between an outside machine and a single port on a machine inside your network is also not malicious - unless it is part of a series of connections that attempt all the active ports on that machine. For this reason, you will want to add additional fields containing values derived from the base fields. [9]

Another type of derived data, called an aggregation, is a summary count of traffic matching some particular pattern. For example, we might want to know, for a particular source IP address X, and a particular IP address Y, how many unique destinations IP addresses were contacted in a specific time window Z. A high value of this measure could give an indication of IP mapping, which is a pre-attack reconnaissance of the network. Aggregations are generally more expensive to compute than other kinds of derived data that are based upon only a single record.

A third type of derived data is a flag indicating whether a particular alarm satisfies a heuristic rule. Because data mining methods handle many attributes well, and because we do not know for sure which one will be useful, our approach is to compute a large number of attributes (over one hundred) and store them in the database with the base alarm fields. [10]

INSTALL DATA FILTERS

In our sensor log table, upwards of 95% of the traffic fit the profile of an IP mapping activity. That is, a single source IP was attempting a connection to hundreds or even thousands of destinations IPs. Before security, specialists can start providing input to the data mining effort, this traffic must be filtered. It is a straightforward task to create a filter that can find these patterns within a data table of traffic.

At MITRE, this preliminary filter is called HOMER (Heuristic for Obvious Mapping Episode Recognition). The heuristic operates on aggregations by source IP, destination port, and protocol and then check to see if a certain threshold of destination IPs were hit within a time window. If the threshold is crossed, an incident is generated and logged to the database. The reduction obtained by HOMER is significant. For example, for the period of Sep. 18 to Sep. 23, 2000, MITRE network sensors generated 4,707,323 alarms (71,094 of priority 1). After HOMER there were 2,824,559(3,690 of priority 1) - a reduction of 40% (94% of priority 1).

IP mapping activity does not pose much of a security threat in itself, but it can be a prelude to more serious activity. Thus, HOMER provides one other important function. Even though the bulk traffic due to the mapping activity is not shown to the analyst, the source host itself is placed on the radar screen of our system. Please note that some normal activity (e.g., name sewers, proxies) within an organization's intranet can match the profile of an IP mapping. HOMER handles this situation by means of an exclusion list of source IPs.

A second heuristic under development, called GHOST (Gathering Heuristic for Obvious Scanning Techniques), plays a slightly different role than HOMER. Port scanning is a more targeted form of information gathering that attempts to profile the services that are run on a potential intrusion target. The GHOST heuristic uses a different set of fields, and has its own configurable time window and port threshold, which if exceeded, triggers a security incident. [10]

LIMIT THE OVERALL ARCHITECTURE FOR INTRUSION DETECTION SYSTEM

Our current architecture for intrusion detection is shown in Figure 1. Network traffic is analyzed by a variety of available sensors. This sensor data is pulled periodically to a central server for conditioning and input to a relational database. HOMER filters events from the sensor data before they are passed on to the classifier and clustering analyses. Data mining tools filter false alarms and identify anomalous behavior in the large amounts of remaining data. A web server is available as a front end to the database if needed, and analysts can launch a number of predefined queries as well as free form SQL queries from this interface. The goal of this operational model is to have all alarms reviewed by human analysts.

Figure 1. How sensors feed into overall intrusion detection system
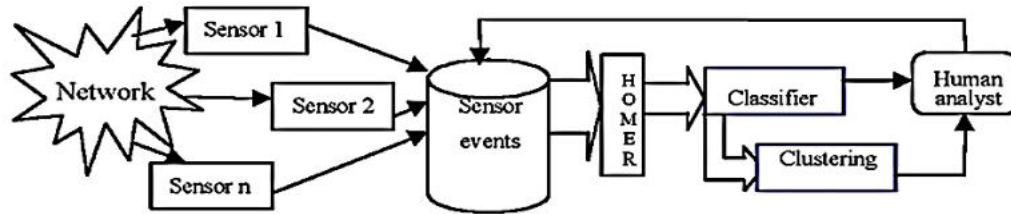
Sources: Authors Compilation

Without automated support, this task is increasingly difficult due to the volume of alarms. In one recent day at MITRE for example, sensors generated about 3.4 million alarms, of which about 48,000 are labeled priority 1. Attacks and probes can be frequent and noisy, generating thousands of alarms in a day. This can create a burden on the network security analyst, who must perform a triage on the enormous flood of alarms. [6]

BUILD CLASSIFICATION RULES

Classification is used to assign examples to pre-defined categories. Machine learning software performs this task by extracting or learning discrimination rules from examples of correctly classified data. Classification models can be built using a wide variety of algorithms. Henery [1994] classifies classification algorithms into three types:

- Extensions to linear discrimination (e.g., multi-layer perceptron, logistic discrimination),
- Decision free and rule-based methods (e.g. C4.5, AQ, CART), and
- Density estimators (Naïve Bayes, k-nearest neighbor, LVQ).

In this work we have, so far, used only decision tree and rule-based methods because of their familiarity to us and because of their ability to give human understandable results.

> **Good Examples:** The 'quality' of the training data is one of the most important factors in achieving good classifier performance. Training data quality is a function of the number of examples, how representative the examples are, and the attributes used to describe them.
>
> **Labeled Data:** Supervised classification uses labeled training examples to build a model. The labels usually come from a human expert (or experts) who manually review cases. In our application of classification to intrusion detection we obtained labeled examples by building a web-based interface that required a label to be assigned to a new incident each time it was constructed by an analyst Using this feedback we were able to collect 12,900 labeled examples of seven different classes of incidents from August 2000 and 16,885 for September 2000.
>
> **Classes:** Mother Factor in getting good examples is to have a well-defined set of classes. It is important to maintain consistency in assigned labels over time, both for a single person and across multiple people. Label inconsistency can make classification very difficult especially if identical examples are labeled ambiguously. [8]

PERFORM ANOMALY DETECTION

Both intruder techniques and local network configurations will change. In spite of efforts to update defenses, new attacks may slip through defenses and be labeled as either normal network traffic, or else filtered as a known but benign probe. Anomaly detection techniques can help humans prioritize potentially anomalous records for review. Catching new attacks cannot depend on the current set of classification rules. Since classification assumes that incoming data will match that seen in the past, classification may be an inappropriate approach to finding new attacks. Much of the work in outlier detection has been approached from a statistical point of view and is primarily concerned with one or very few attributes. However, because the network data has many dimensions, we have investigated use of clustering for anomaly detection.

Clustering is an unsupervised machine learning technique for finding patterns in unlabeled data with many dimensions (number of attributes). We use k-means clustering to find natural groupings of similar alarm records. Records that are far from any of these clusters indicate unusual activity that may be part of a new attack.

The network data available for intrusion detection is primarily categorical (i.e., Attributes have a small number of unordered values). Clustering approaches for categorical data, such as in [Guha et al., 1999] are not generally available commercially. Unsupervised approaches for detecting outliers in large data sets for the purposes of fraud or intrusion detection are starting to appear in the literature, but these approaches are primarily based on ordered data.

Knorr and Ng [1998] recently developed a distance-based clustering approach for outlier detection in large data sets.

Ramaswarny, et al. [2000] defines a new outlier criterion based on the distance of a point to its kth nearest neighbor.

Breunig et al. [2000] define a new local outlier factor, which is the degree to which a data point is an outlier. [6]

MAKE YOUR SYSTEM EFFICIENT

There are a number of practical considerations in building an effective intrusion detection system. Some of these derive from the use of data mining, but many of them would be present in any intrusion detection system:

- **A central repository must be designed and enabled:** The repository must allow for inputs from a potentially large number of diverse network sensors, preferably within a single data table. Any derived data, such as data mining attributes, should also be stored in this central location. It must also support the creation and tracking of security incidents.

- **Efficient querying is essential to feed the daily operations of security analysts:** A bottleneck in querying the data will affect everything else in the system. Some steps that can be taken to improve query efficiency include the inclusion of a database performance guru on the project team, statistical/ trend analysis of query performance over time, elimination of time-consuming queries, or the retirement of old data from the database.

- **Efficiency call also be improved by selecting appropriate aggregations of attributes and statistics:** A manual analysis of network activity will reveal that a large volume of atomic network activity breaks down into a much smaller set of meaningful aggregates. At MITRE, two of the more useful aggregates were (source IP, destination port), used for catching some IP mapping activity, and (source IP, destination IP), used for catching port scanning activity. However, any combination of fields or attributes could also be used, resulting in a wealth of choices. Regardless of the fields used, aggregates reduce the downstream volume of data.

- **While most attributes and aggregates are used to feed an automated process, do not forget the analysts:** Analysts must have efficient tools to spot check the automatically generated security incidents, and to manually comb through the raw sensor data for new or complex patterns of malicious activity. The MITRE interface is centered on a set of predefined queries of the sensor database, and a browser of the incident database. With this tool, an analyst can create new security incidents or update existing incidents with new status information.

- **Due to the high volume and frequency of data inputs, and the variety of both automated and human data sources, there will invariably be some process failures:** When a failure does occur, the condition must be caught and the security team notified. Scripts that verify the integrity of the data tables, and repair inconsistencies, are useful. If possible, the process should be halted until the error is corrected; but, in some situations, the ability to operate normally regardless of errors, and then rollback and correct statistics and attributes at the team's convenience, may be a more practical recovery strategy.

- **Scheduling is an important aspect of the operational environment.** Each organization must decide for itself how much of its intrusion detection system truly needs to be "real-time". The calculation of real time statistics must be completed in a matter of seconds, and the amount of data available in this manner will always be limited. However, daily batch processing of data may be adequate in many cases. [8]

SUMMARY

We have described our experiences with integrating data mining into a network intrusion detection capability. We believe that when starting such a project you should:

- Choose your requirements carefully and be realistic.
- Assemble a team with broad, relevant capabilities.
- Invest in adequate infrastructure to support data collection and data mining.
- Design, compute, and store appropriate attributes with your data.
- Reduce data volume with filtering rules.
- Refine the overall architecture for your system, taking into account both automated processing and human analysis.
- Use data mining techniques such as classification, clustering, and anomaly detection, to suggest new filter rules.
- Make sure that automated data processing can be done efficiently.

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PERFORMANCE ANALYSIS OF ZIGBEE PAN IN LARGE SCALE DEPLOYMENTS

Pushpa Raikwar[28]

ABSTRACT

This paper gives an overview of the work done on Zigbee IEEE 802.15.4 standard based Personal Area Network Modelling. Zigbee is low cost, power conservative technology, which finds its applications in control systems for varied purposes including agriculture automation, shopping mall light controls to home automation systems. In this paper, it is tried to find how Zigbee network could be scaled to fit for the purpose of agriculture automation. The ratio of end nodes to the routers and spacing issues including hop counts, throughput, end-to-end delays and dimensions of test area are focused on. Analysis of 5 different scenarios will provide us with the key indicators of how Zigbee could be scaled. The simulation is done using OPNET.

KEYWORDS

ZIGBEE IEEE 802.15.4, Personal Area Network Modelling, Technology, Nodes, Routers, Sscalability, Packet Loss, Greenhouse (GH) etc.

INTRODUCTION

ZigBee is the only standards-based wireless technology designed to address the unique needs of low-cost, low-power wireless sensor and control networks in just about any market. Since ZigBee can be used almost anywhere, is easy to implement and needs little power to operate, the opportunity for growth into new markets, as well as innovation in existing markets, is limitless. [1][5] In this research work it is tried to find out how to scale Zigbee for large scale deployments in agriculture. In climates where conditions are harsh to grow certain vegetables greenhouses are used, since the conditions (such as humidity, moisture, temperature, soil composition, water supply) for growing plants must be maintained all the time, it becomes tedious to monitor / maintain large scale GHs. Zigbee could provide the climate control system at low cost and long life service. Aim is to find out how many GHs could be supported with single coordinator Zigbee setup. [2]

SETUP

First the Zigbee environment will be set using OPNET, simulations will be conducted with equally spaced Zigbee end devices (ZED) and Zigbee Routers (ZR) with a single Zigbee Coordinator (ZC) in middle. Each scenario will generate comparison graphs to analyse end-to-end delay, throughput, no. of hops and packet drops with increasing size of deployments. [4] The whole set up is done considering greenhouse environment in mind. Scenario 1, 2 and 3 will be with single greenhouse and scenarios 4 and 5 are with 20 GHs, while the last scenario is with 50 GHs. Details could be found in Table I.

Table-1: Scenario Parameters

| Scenario	Scenario Parameters			
	Number of GHs	Power (W)	Area (m^2)	Number of Nodes
1	1	0.05	200x200	20
2	1	0.05	200x200	20
3	1	0.1	200x200	20
4	20	0.05	1000x800	377
5	20	0.05	1000x800	377
6	50	0.05	2000x1000	946

Sources: Authors Compilation

NETWORK LOGICAL DESIGN

Coloured squares are used to show the separate Green Houses, due to sheer number of devices the logical diagram cannot be elaborated more. Small black dots are showing the devices, with red one as coordinator. Each GH is of dimension 200 m x200m Scenario 4, 5 are: 1000m x 800m in dimensions. Scenario 6 is: 2000m x 1000m in dimension. Zigbee devices are shown in red colour and the whole GH is represented using blue background. In first scenario the devices are spaced 20 meters apart, in second scenario the distance between nodes is kept 10 meters to find the difference between delay and packet drops, this will help to identify what density of nodes per square meter should be used when deploying Zigbee control system on large scale.

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Graph-1: Logical Diagram of Single GH
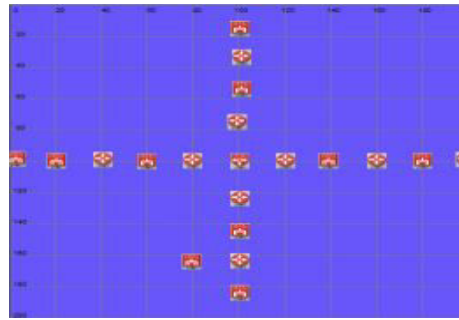
Sources: Authors Compilation

MEASUREMENTS

To find the optimal values of number of nodes and the size/number of GHs we are measuring performance using parameters such as delay, throughput, load, traffic rates and packet loss. Measurements are divided in two categories at low power consumption and double power consumption. At default transmission power we are measuring:

- Number of nodes v/s application - end-to-end delay,
- packet drops based on Number of nodes,
- Number of nodes v/s MAC throughput (bits/sec),
- Number of nodes v/s mac load,
- load v/s throughput,
- load v/s loss of packets,
- data arrival rate v/s delay,
- data arrival v/s throughput,
- data arrival rate v/s loss of packets,
- Traffic sent,
- Traffic received.

At increased power consumption measurements are made on:

- Number of nodes v/s application - end-to-end delay,
- Packet drops based on Number of nodes,
- Number of nodes v/s MAC throughput (bits/sec)

SIMULATION

As described in setup section OPNET is used to simulate Zigbee controlled GH environment, parameters are set for each device using node attributes and then each simulation is run for 1 hour to collect the sample data for analysis. Diagram below shows such settings for a ZR.

Figure-1: Zigbee Router Settings
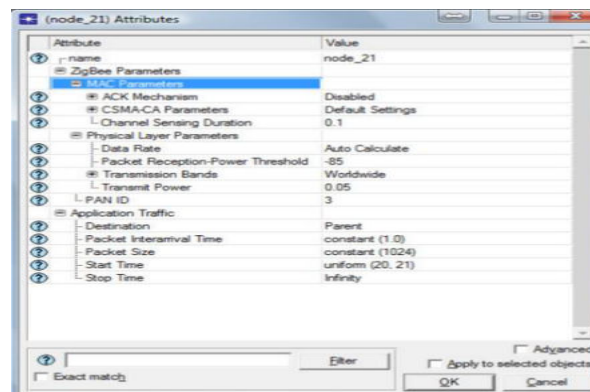
Sources: Authors Compilation

RESULTS

Delay

Delay increases as the number of GHs increase, however delay for 20 GH scenarios is more than for 50 GH scenario, initial delay was greater for 50 GH scenario but later due to many un-joined nodes there was sudden fall in the delay as the far end devices were not communication at all with co-coordinator.

With 20 nodes spaced at 10 / 20 meters the delay was 7-8 micro seconds, as we start to increase the number of nodes delay gradually increased to double reaching 13-16 microseconds for 50 GH scenario and 22-24 micro seconds for setup with 20 GHs.

The anomaly here is that delay stayed less for 50 GH scenario, while for 20 GH it went 3 times from the single GH, this can be explained on the basis of number of nodes were able to join the PAN 3 coordinator.

Throughput

MAC throughput can be seen as increasing where the communication between maximum percentage of nodes is working, the scenario with 20 GHs is showing maximum MAC throughput; whereas, scenario with 50 GHs is way below on graph showing that amount of traffic being exchanged is even less than what it is been exchanged in scenario with single GH and 20 nodes.

This supports the anomaly in end-to-end delay as well, less delay, less throughput in 50 GH scenario signifies that many nodes were not able to participate in the network, Zigbee standard defines the range from anywhere between 25 meters to 100 meters or even 400 meters in a line of sight field.
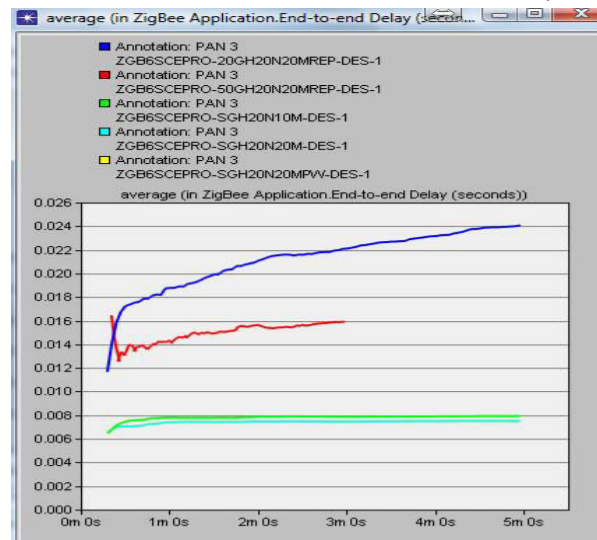
For 20 node single GH scenario the throughput gradually reached 68-70 kbps maximum, for scenario with single GH spaced at 10 meters the throughput stayed between 20-25 kbps, and for the 50 GH scenario, it did not want any further than 7-8 kbps. It shows that with 20 meters distance we are getting maximum throughput.

Figure-2: Number of Nodes v/s End-to-End Delay

Sources: Authors Compilation

Figure-3: Number of Nodes v/s Mac Load

Sources: Authors Compilation

Packet Loss

From the graphs, it can be seen the packet drops are only observed in 2 scenarios, scenario number 4 and 6. Scenario 4 with 20 GHs has packet drops between 400 500 approximately, while the packet drops in scenario 6 are way beyond 1500. The large number of packet drops in 50 GH scenario shows that routers are dropping the join or relay requests from end devices, as they are too busy in processing requests from other end devices.
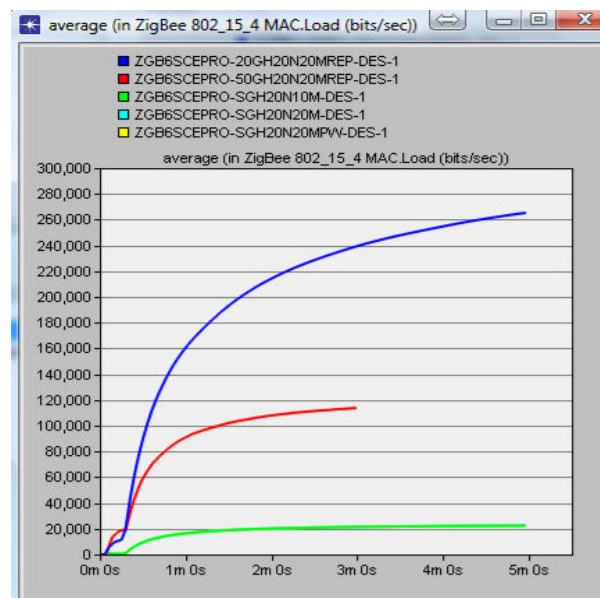
With setup as big as 50 GHs, we cannot rely on single coordinator setup as it is too far for the nodes to hop all the way, standards shows that the routers could handle 14 other nodes including parent devices (coordinators / routers). However, from implementation it seems that each router is not able to handle the children nodes effectively when the numbers increased beyond 20 GH setup.

Traffic

Traffic sent in scenario with 20 GH is reaching the IEEE 802.15.4 industry specification of 250 kbps showing that the data is being sent at maximum possible rates in this scenario. With less number of nodes scenario with 20 nodes is sending data at rates much lower , about 20 kbps inside the PAN 3, for 50 GH scenario the data being sent is 80 kbps approximately showing that even with large number of devices the sending rate is not as much as scenario with 20 GH scenario.

ISSUES OBSERVED

The main problem in this design was that the simulation of 50 GH with nodes more than 1000 in number took lot of computer resources and it was slow and was impractical to simulate for more than 5 actual (not simulation) minutes, just for 5 minutes simulation it took more than 4 hours on a hardware with 2 GB ram and dual core processor.

Another issue faced is that from the Zigbee standards theoretically it is shown as the router can connect to 14 other nodes but in simulation it didn't seem so, thus the design done with that figure and even with 5 possible adjoining nodes the results are not very satisfying, thus it is also needed to find the optimal ratio of number or routers needed per couple of end devices and parent devices.

CONCLUSIONS

In this research work, we investigated the performance of Zigbee WSNs in OPNET simulation software based on specific features and recommendations of the IEEE 802.15.4 / ZigBee standards. Performance parameters such as throughput, end-to-end delay, packet loss, traffic sent, traffic received, and sensor field coverage depending on the network topology is an important criterion to investigate.

This project will focus on the simulation and exploration of the performance of ZigBee WSNs and ZigBee protocol under various conditions using OPNET.

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INFORMATION AND COMMUNICATION TECHNOLOGY FOR WOMEN EMPOWERMENT

V. Shugufta Yasmeen[29]

ABSTRACT

Women empowerment is an essential tool to bring about changes in their socio- economic condition. Through their empowerment women gain greater share of control over resources - material, human and intellectual such as knowledge, information, ideas and financial resources involving access to money and control over decision making in the home, community, society and nation. The world is in the midst of a knowledge revolution, complemented by opening up of entirely new vistas in communication technologies. Recent developments in the fields of information and communication technology are indeed revolutionary in nature.

IT has become the chief determinant of the progress of nations, communities & individual. There is potential for ICTs to eliminate gender inequality and to empower women in society. There is a growing body of evidence on the benefits of ICT for women's empowerment, through increasing their access to health, nutrition, education and other human development opportunities, such as political participation.

Against this backdrop, an attempt is made in this paper to investigate women's empowerment through ICTs in rural areas and the role of the Government and the NGOs in promoting the IT sector for women's development. Besides this, the present study explores the barriers to the usage of ICTs by women and suggests strategies to improve their access to IT.

KEYWORDS

Women Empowerment, ICT Applications, NGO Initiatives, Barriers, Strategies etc.

INTRODUCTION

Women's empowerment is focused on increasing their power to take control over decisions that shape their lives, including in relation to access to resources, participation in decision-making and control over distribution of benefits. For women who can access and use them, ICT offer potential, especially in terms of reducing poverty, improving governance, overcoming isolation, and providing a voice.

The World Summit on the Information Society (WSIS), held in 2003 in Geneva, saw ICTs as vital tools for women's empowerment: "We are committed to ensuring that the Information Society enables women's empowerment and their full participation on the basis of equality in all spheres of society and in all decision-making processes. To this end, we should mainstream a gender equality perspective and use ICTs as a tool to that end" **(World Summit on the Information Society, 2003).**

Information and Communication Technology (ICT)

The world is in the midst of a knowledge revolution, complemented by opening up of entirely new vistas in communication technologies. Recent developments in the fields of information and communication technology are indeed revolutionary in nature. In fact, IT has become the chief determinant of the progress of nations, communities & individual.

The highlights of Indian IT Industries

According to NASSCOM Industry Ranking Report 2013:

- IT industry has generated aggregate revenue of USD 3.9 billion in Fiscal Year (FY) 1998 **(Embassy of India, 2007)** to more than USD 100 billion in FY2012.
- IT has rapidly become one of the most economically significant industries in India in terms of share of total exports (approximately 25% for FY2012) and export revenue (USD 69.1 billion and growing by more than 16%).
- Its contribution to GDP is estimated to have grown from 1.2% in FY 1998 to 7.5% in FY2012.
- IT services alone account for more than half of the software and services exports in the industry, and is the fastest growing segment of the sector at 18% **(NASSCOM, 2012).**

It is considered crucial that the improvements in our society benefit all citizens. No single group should be ignored or favored. The only way is "**to make it better for all**". There is potential for ICTs to eliminate gender inequality and to empower women in society.

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REVIEW OF LITERATURE ON WOMEN EMPOWERMENT THROUGH ICT

Sunil Agarwal (2003) has underlined the role of appropriate technology to develop women entrepreneurs by building local capacity to improve quality of work life. The author firmly believes that understanding behind the processes / products will inculcate a scientific temper among women, which will improve their production efficiency and reduce their drudgery in their day-to-day work. Further, the author has stated that there is need to use science and technology to ease the workload of women inside and outside the house. Furthermore, he recognized the role of knowledge and experience of women in sustainable development. These would facilitate them to function as equal partners in development.

Chowdhury (2006) in his article "Empowering Rural Women through Science and Technology" has pointed out that to develop women oriented technologies for empowerment, the women specific jobs and their perspectives have to be identified. The author presents the following principles for developing technologies for rural women: (i) to reduce the drudgery in the life of women; (ii) to provide employment opportunities to women; (iii) to improve sanitation and environmental conditions; (iv) to improve the health and nutritional status of women; and (v) to protect women from hazards. The author argues that there is an urgent need to recognize women as the technology makers and as technology users. The main contention is to liberate science and technology from its elite structure and reintegrate rural women in a more equitable development process.

Mary Cherian (2006) has critically examined the global policy and process initiatives of NGOs, the Government and the Corporate Houses in empowering women through ICT. The study is based on the case studies of women in countries like India, Bangladesh, Guyana, Africa, Zimbabwe, Uganda who gained tremendously by increased accessibility to internet connectivity. The author has suggested some strategies to overcome barriers to use and assess to ICT for women with special reference to India which includes: (i) taking issue of women empowerment through ICT as a priority issue, (ii) necessity of a rights-based approach to ICT policy, (iii) Adopting of ICT policy which fit to the needs of women i.e., ICTs should be made more "women friendly", (iv) Addressing language options in the center of policy decisions, and (V) providing of incentives for the enrollment of girls in ICT programs.

Raman Kumar and Rajesh Kochher (2011) have illustrated the effective usage of technology for small-scale industries, which are promoted by women under self-employment scheme. The authors have found that The IT based micro-enterprises by the self-help groups of poor women have helped the demystification of the common man that a few elite ones in the society are the only beneficiaries of the powerful IT. They have begun to consider IT as a tool for attaining knowledge and development by everyone. Further, the author opines that the strategy to encourage the participation of the poor women in the digital revolution is expected to reduce the gap in digital and gender divide. The authors have concluded that the economic empowerment of women via IT enables them to challenge discrimination and overcome gender barriers.

Padmini Chattu et. al., (2013) have highlighted that the role of Mobile Technology in the field of women empowerment. The authors have stated that not only for communication, women are also using the mobile for different ways: to be safe in times of difficulty, as a media connector with current updates in day to day and as an e-learning device to become literate. Further, the authors have recommended that IT can be applied in the empowerment of rural women through imparting virtual classroom education, providing training on Internet and email services, developing a web based information system about the SHG (Self Help Group) and they can be popularized in papers, magazines and internet, which acts as a motivational factor. Furthermore, the study has recognized that the scaling of women-centered mobile programs and applications can only be achieved with improved financial, commercial, and marketing incentives and of course, cooperation.

Arivanandan (2013) has analyzed the socio-economic inclusions of rural women through the two kinds of Information and Communication Technologies i.e., cell phones and Internet in rural areas. For the empirical study, the author has selected 60 women, aged between 15 and 30 years from Trichirappalli district of Tamil Nadu. The author has found that the accessibility of cell phones is creating decision-making capacity and economic liberalization to women in the study area. Further, Most women now search for jobs by using cell phones and personal contacts. This ability to get jobs means that rural women are earning money, which can go towards the cost of their marriage and that of their siblings.

As a contrast, the study has revealed that accessibility to the internet by rural people did not reach the expected level because of lack of infrastructure facilities, erratic electric power supply and internet connectivity, low levels of education and the economic condition of the people.

OBJECTIVES OF STUDY

This study has the following objectives:

- To investigate women's empowerment through ICTs in rural areas,
- To identify the barriers of usage of ICTs by women,
- To examine the role of the Government and the NGOs in promoting the IT sector for women's development,
- To suggest strategies to overcome barriers and offer some practical suggestions for policy makers to improve women's access to ICT.

RESEARCH METHODOLOGY

Data used in this study is secondary in nature and is collected from various sources such as journals, periodicals, articles, books, reports, websites etc.

APPLICATION OF INFORMATION TECHNOLOGY IN WOMEN EMPOWERMENT OF RURAL AREAS

There is a growing body of evidence on the benefits of ICT for women's empowerment, through increasing their access to health, nutrition, education and other human development opportunities, such as political participation. Women's sustainable livelihoods can be enhanced through expanded access of women producers and traders to markets, and to education, training and employment opportunities. By using one of the most important democratizing aspects of the Internet—the creation of secure online spaces that are protected from harassment—women are enjoying freedom of expression and privacy of communication to oppose gender discrimination and to promote women's human rights **(Chat Ramilo et.al, 2005).**

ACCESS TO INFORMATION

ICT can deliver potentially useful information, such as market prices for women in small and micro-enterprises. For example, use of cellular telephones illustrates how technology can be used to benefit women's lives, by saving travelling time between the market and suppliers, by allowing women to call for product prices and by facilitating the constant juggling of paid and unpaid family activities.

EMPOWERMENT THROUGH EMPLOYMENT

According to Data Quest's Best Employer Survey 2012, the percentage of women employed in the IT industry in India has actually decreased from **26%** in 2010 to **22%** in 2012 (**Sharma, 2012**) even though the number of jobs created in this sector continues to increase annually. Again, these statistics most likely point to a larger number of males available for employment than females (and therefore a larger proportion of men being employed), but they also show that the number of women employed in the IT sector is not significantly increasing.

Considering, then, how important the IT industry may be for the employment of young female professionals (and if it is not now, it will be soon), the responsibility to create nondiscriminatory and comfortable workplace environments should fall heavily on the largest and most economically significant companies in the software sector, as they have the opportunity to set precedents not only for the rest of the industry but for Indian employers as a whole

However, ICT has played an important role in changing the concept of work and workplace. New areas of employment such as teleworking, i.e. working from a distance, are becoming feasible with new technology. As a result, a high proportion of jobs outsourced by big firms are going to women; therefore, work from outside the office, often from their own homes and at any time, thereby raising their incomes to become more financially independent and empowered.

EMPOWERMENT THROUGH INTERNET & E-COMMERCE

The Internet can offer great assistance to women entrepreneurs. It offers databases, put together by women's groups, from which women can find relevant links, connections, resources and information and develop partnerships, not just for their services, but also for financing, mentoring and business coaching. It can even mitigate the effect of lack of access to capital. Support groups can be formed through electronic bulletin boards. Thus, the internet itself can help to organize and build solidarity with and between people working from home offices. It can break down isolation, aid job related concerted action, or just increase information, opportunities and interaction.

Rural women in developing countries may be able to sell their products directly without going through intermediaries. One of the most powerful applications of ICT is electronic commerce [E-commerce]. E-commerce refers not just to selling of products and services online but also to the promotion of a new class of ICT-savvy women entrepreneurs in both rural and urban areas. E-commerce initiatives can link producers and traders directly to markets at national, regional and even global levels, allowing them to restructure their economic activities and bypass intermediaries and the male-dominated and exploitative market structure.

BARRIERS TO USE & ACCESS OF ICT'S FOR WOMEN

- Lack of clear National Policy for Promoting ICT for Women's development.
- Poor ICT infrastructure, inefficient telephone services, lack of electricity in many remote, far-flung areas, and frequent power cuts.
- Lack of or limited computer skills on various areas including hardware and software installation and maintenance, internet and non- internet based skills such as telnet, FTP, mailing etc.
- Little awareness of the full range of opportunities offered by ICT other than access to information.

- Limited online information in languages other than English.
- Women's time is at a premium. The barrier to ICT use includes the issues of information overload and the time consumed in searching for useful and practical information.
- Social and cultural barriers.

ROLE OF GOVERNMENT AND NGO SECTOR

Keeping in view the plight of rural women, who are more unaware of new technologies than their urban counterparts, government is providing special packages for them, who are involved in home based or small-scale activities related to handloom, handicraft, sericulture, etc. From identification of projects to the marketing of products, these packages are helping women entrepreneurs largely. Government of India is in the process of establishing Community Information Centers (CIC) at all block levels, which are designed as the prime movers of ICT in the most economically backward and geographically difficult terrains. CICs are supposed to provide multipurpose information (on health, education, social welfare and small-scale industry, etc.). This might prove to be a "shot in the arm" for the rural women that can boost their economic and social status.

SITA (Studies in Information Technology Applications) is a women empowering project that aim to educate low-income women in Information Technology, and trying to change the deeply rooted discriminating attitudes towards women. The project has been successful to that extent it has trained 500 women.

The Self Employed Women's Association (SEWA) has been organizing women in the informal sector in India since 1972. *It was one of the first organizations globally to realize the potential of using IT for the productive growth of the informal sector* (**Kinkini Dasgupta Misra, 2004**). SEWA has effectively used ICTs to improve the efficiency and reach of its operations The SEWA Trade Facilitation Centre (STFC) showcase members' products online, facilitates business-to-consumer sales, builds business-to-business links and empowers members to ride the ICT wave. The STFC experience of training rural and urban women in using ICT to gain increased access to markets can offer lessons to women's cooperatives elsewhere in the region. STFC has also introduced a bar-coding mechanism for its products. All these provide a number of advantages. These include the acquisition of much needed market research, superior management of inventory levels, greater standardization and thus a more optimal utilization of time and resources throughout the organization thereby helping it to accomplish its fundamental objective of providing greater livelihood security to its members.

Kudumbasree (which means prosperity for the family) is a poverty eradication project of the Government of Kerala, being implemented in the state through the local bodies since 1998. The project gives importance to women and children from Below Poverty Line (BPL) families and is being implemented through neighborhood groups, which are formed by 15 to 40 members Kudumbasree encouraged and trained the poor educated women from the neighborhood groups to form enterprise groups to set up micro-enterprises based on ICT applications. Each group was motivated to set up micro-enterprises for data entry, data processing, and IT education. The most important and positive factor-favoring women's entry into IT industry has been the support from Kudumbasree officials in the form of financial, technical and managerial help. The major help came in the form of training in both hardware and software. This gender focused, interventionist ICT initiative involving significant state intervention brought about positive changes to livelihood outcomes and empowerment of economically poor women.

Under the rural e-Seva centers, initiated by the Government of Andhra Pradesh in West Godavari District, web-enabled rural kiosks were established to provide a large number of citizen services. Initially the project started in all 46 *mandal* (block) headquarters in the district, with the first women's e-Seva center opening in June 2002. Out of the 46 bigger e-Seva Centers at mandal headquarters, 20 are managed by women. Women from SHGs took loan to set up this initiative (computer, printer, digital camera, scanner, photocopy machine) and all these centers are running profitably.

STRATEGIES TO IMPROVE WOMEN'S ACCESS TO ICT

- Equitable access to ICT technology and the autonomy to receive and produce the information relevant to their concerns and perspectives are critical issues for women. They therefore need to be involved in decision-making regarding the development of new technology in order to participate fully in its growth and impact. Access and costs being some of the greatest barriers for ICT use, it is of the utmost importance to engage women and gender advocates in the policymaking process and dialogue. It is important to engender ICT policy to ensure that women, particularly rural and poor women, benefit from ICT.

- There is need to use a rights-based approach to ICT policy development, where everyone has the right to affordable access to ICTs. Only then, can we work toward securing universal access to ICTs, and consequently promote and facilitate the use of ICTs for women's empowerment.

- Personal ownership of ICT is not feasible in the foreseeable future for the vast majority of women in developing countries. Hence, the question of where and how they can gain access to ICT becomes important. This is an area where intermediary organizations can help bridge the 'last mile' of connectivity. They can ensure that email accounts, bulletin

boards, search engines, mailing lists, and other useful functions serve as communication, networking and collaboration channels among women's groups, and between women and the external sphere. In order to facilitate access for women from other classes and sectors, these intermediary organizations need to be strategically located in local institutions to which women have open and equal accesses, such as health centers, women's NGOs, women's employment centers, libraries, women's studies departments and institutes, community centers etc.

- The potential of ICT for women in developing countries is highly dependent upon their levels of technical skill and education and is the principal requirement for accessing knowledge from the global pool. Government and NGOs need to impart technical education on the use of ICT as a part of both formal and informal education system and to initiate distance learning and vocational courses. It needs to be realized that information and communication technology by itself cannot answer all the problems facing women's development, but it does bring new information resources and can open new communication channels for marginalized communities.

- Promote the enrollment of girls in ICT programs by providing incentives such as scholarships and awareness raising activities.

- Language access must be addressed as a serious barrier to gender equity on the international ICT policy level. Language options have to be taken as a political issue, an issue that must be in the center of policy decisions.

- ICT policy must rest on the understanding that technology must be adopted to fit the needs of women. The key issue is that the technologies should be adapted to suit women rather than that women should be asked to adapt to suit the technologies. Most policymakers are proceeding on the second premise. If they can be encouraged to think and act in terms of the first premise then we will ensure that ICTs become more "women friendly" in terms of cost, access, applicability in different fields, etc.

- Last but not the least, when policies and programs are in place to improve access, paucity of funds should not be a hindrance to establishing ICT access points or even implementing telecenter-type programs. As UN studies have indicated, though the costs of using ICTs for development may be high, not using them at all may prove to be costlier.

CONCLUSION

The gamut areas in which ICT can put a greater control in the hands of women is wide and continuously expanding, from managing water distribution at the village-level to standing for local elections and having access to lifelong learning opportunities. ICT have the potential to reach those women who hitherto have been not been reached by any other media, thereby empowering them to participate in economic progress and make informed decision on issues that affect them.

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CONCEPTUAL FRAMEWORK FOR CLOUD SUPPORTED E-LEARNING SERVICES

Preeti Bansal[30]

ABSTRACT

E-Learning is the topic related to the virtualized distance learning by means of electronic communication mechanisms, specifically the Internet. The need for education is increasing constantly. The development and improvement of the e-learning solutions is necessary. In addition, the e-learning systems need to keep the pace with the technology, so the new direction is to use cloud computing. Cloud computing is highly scalable and creates virtualized resources that can be made available to users. Cloud computing will have a significant impact on the educational environment in the future.

In this paper, we give an overview of the current state of Cloud Computing. We provide details of the most common infrastructures for e-learning, and finally we present some challenges of e-learning approaches for Cloud Computing.

KEYWORDS

Cloud Computing, E-Learning, ICT, SaaS, PaaS, IaaS etc.

INTRODUCTION

The Electronic Learning, better known as E-Learning, is defined as an Internet enabled learning. Components of e-Learning can include content of multiple formats, management of the learning experience, and an online community of learners, content developers and experts. The study summarized the main advantages, which include flexibility, convenience, easy accessibility, consistency and its repeatability.

Cloud Computing is a new paradigm that provides an appropriate pool of computing resources with its dynamic scalability and usage of virtualized resources as a service through the Internet. The resources can be network servers, applications, platforms, infrastructure segments and services. Cloud computing deliver services autonomously based on demand and provides sufficient network access, data resource environment and effectual flexibility. This technology is used for more efficient and cost effective computing by centralizing storage, memory, computing capacity of PC's and servers. With the tremendous advantages of cloud computing, we expect this technology to revolutionize the field of e-learning education. Cloud computing applications provide flexibility for all educational universities, schools and institutions. The cloud platform in institutions' campuses provides effective infrastructure and deployment model for their dynamic demands. Cloud computing is becoming an attractive technology due to its dynamic scalability and effective usage of the resources; it can be utilized under circumstances where the availability of resources is limited. This paper presents the impact of using cloud computing upon e-learning solutions development.

WHAT IS CLOUD COMPUTING?

Cloud computing is a colloquial expression used to describe a variety of different types of computing concepts that involve a large number of computers that are connected through a real-time communication network (typically the Internet).

Cloud computing is a jargon term without a commonly accepted non-ambiguous scientific or technical definition. In science, cloud computing is a synonym for distributed computing over a network and means the ability to run a program on many connected computers at the same time. The phrase is also more commonly, used to refer to network based services which appear to be provided by real server hardware, but which in fact are served up by virtual hardware, simulated by software running on one or more real machines. Such virtual servers do not physically exist and can therefore be moved around and scaled up (or down) on the fly, without affecting the end user - arguably, rather like a cloud.

Cloud computing providers offer their services according to several fundamental models:[2][54] infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS) where IaaS is the most basic and each higher model abstracts from the details of the lower models. Other key components in anything as a service (XaaS) are described in a comprehensive taxonomy model published in 2009, such as Strategy-as-a-Service, Collaboration-as-a-Service, Business Process-as-a-Service, Database-as-a-Service, etc. In 2012, network as a service (NaaS) and communication as a service (CaaS) were officially included by ITU (International Telecommunication Union) as part of the basic cloud computing models, recognized service categories of a telecommunication-centric cloud ecosystem.

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Figure-1: Infrastructure of Cloud Computing
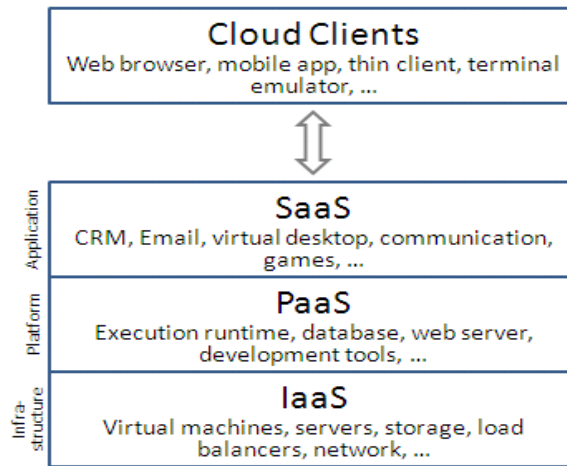
Sources: Authors Compilation

Infrastructure as a service (IaaS)

In the most basic cloud-service model, providers of IaaS offer computers - physical or (more often) virtual machines and other resources. (A hypervisor, such as Xen or KVM, runs the virtual machines as guests. Pools of hypervisors within the cloud operational support system can support large numbers of virtual machines and the ability to scale services up and down according to customers' varying requirements.) IaaS clouds often offer additional resources such as a virtual-machine disk image library, raw (block) and file-based storage, firewalls, load balancers, IP addresses, virtual local area networks (VLANs), and software bundles. IaaS - cloud providers supply these resources on-demand from their large pools installed in data centers. For wide-area connectivity, customers can use either the Internet or carrier clouds (dedicated virtual private networks).

Platform as a service (PaaS)

In the PaaS model, cloud providers deliver a computing platform, typically including operating system, programming language execution environment, database, and web server. Application developers can develop and run their software solutions on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layers. With some PaaS offers, the underlying computer and storage resources scale automatically to match application demand so that the cloud user does not have to allocate resources manually.

Examples of PaaS include: AWS Elastic Beanstalk, Cloud Foundry, Heroku, Force.com, EngineYard, Mendix, OpenShift, Google App Engine, AppScale, Windows Azure Cloud Services, OrangeScape and Jelastic.

Software as a service (SaaS)

In the SaaS model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. Cloud users do not manage the cloud infrastructure and platform where the application runs. This eliminates the need to install and run the application on the cloud user's own computers, which simplifies maintenance and support. Cloud applications are different from other applications in their scalability—, which can be achieved by cloning tasks onto multiple virtual machines at run-time to meet changing work demand. Load balancers distribute the work over the set of virtual machines. This process is transparent to the cloud user, who sees only a single access point. To accommodate a large number of cloud users, cloud applications can be multitenant, that is, any machine serves more than one cloud user organization. It is common to refer to special types of cloud based application software with a similar naming convention: desktop as a service, business process as a service, test environment as a service, communication as a service.

Examples of SaaS include: Google Apps, Microsoft Office 365, Petrosoft, Onlive, GT Nexus, Marketo, Casengo, TradeCard, Rally Software, Salesforce and CallidusCloud.

Network as a service (NaaS)

A category of cloud services where the capability provided to the cloud service user is to use network/transport connectivity services and/or inter-cloud network connectivity services. NaaS involves the optimization of resource allocations by considering network and computing resources as a unified whole.

Traditional NaaS services include flexible and extended VPN, and bandwidth on demand. NaaS concept materialization also includes the provision of a virtual network service by the owners of the network infrastructure to a third party (VNP – VNO).

WHAT IS E-LEARNING?

E-learning refers to the use of electronic media and information and communication technologies (ICT) in education. E-learning is broadly inclusive of all forms of educational technology in learning and teaching. E-learning is inclusive of, and is broadly synonymous with multimedia learning:

- Technology-enhanced learning (TEL),
- Computer-based instruction (CBI),
- Computer-based training (CBT),
- Computer-assisted instruction or computer-aided instruction (CAI),
- Internet-based training (IBT),
- Web-based training (WBT),
- Online education, virtual education,
- Virtual learning environments (VLE) (which are also called learning platforms),
- M-learning,
- Digital educational collaboration.

These alternative names emphasize a particular aspect, component or delivery method.

E-learning includes numerous types of media that deliver text, audio, images, animation, and streaming video, and includes technology applications and processes such as audio or video tape, satellite TV, CD-ROM, and computer-based learning, as well as local intranet/extranet and web-based learning. Information and communication systems, whether free-standing or based on either local networks or the Internet in networked learning, underlay many e-learning processes.

There are various e-learning solutions from open source to commercial. There are at least two entities involved in an e-learning system: the students and the trainers. Some benefits of e-learning are discussed below: Time: One of the key benefits of online study is that one can learn or take a course through e-learning at any time, as it is convenient for them. Pod casts and downloadable lectures mean that students are no longer constricted by a conventional timetable of lectures. Location: Neither are students restricted by their physical location. With an Internet connection, they can attend live online tutorials, participate in dedicated discussion forums or download course material and notes regardless of where they are. Communication: Another key advantage of online study is that it encourages and enables students to collaborate and communicate with their fellow students as well as their tutors.

Improved Training and Material Costs

With e-learning, each time the course is accessed our return on investment improves because users are dividing the fixed production costs by number of uses. We also have savings through decreased travel, reduced material, and hopefully improved (and more efficient) performance.

Increased Productivity

Because e-learning is not bound by geography or time, you can control training's impact on production by training people during down times. In addition, with the current economy, you are asking people to do more with less. So e-learning is a great way to give them the tools and skills needed to enhance their performance.

CLOUD COMPUTING BASED E-LEARNING

With the increase in number of students, rapid growth of education content and changing IT infrastructure, the educational institutes are confronted with a dramatic increase in costs and a decrease in budgets, which leads to the need of finding some alternative for their e-learning solutions. In addition, the current e-learning systems are not scalable and do not lead to the efficient utilization of the resources. As a response to this increase in pressure and to increase the efficiency and availability of their current e-learning system, the educational institutes may adopt a service-oriented approach. The potential efficiency of using cloud computing in higher education has been recognized by many universities such as University of California, Washington State University's School of Electrical Engineering and Computer Science, higher education institutes from UK, Africa, US and others.

In cloud based e-learning systems, the institutions are responsible for content creation, management and delivery while the cloud service provider is responsible for system construction, development, management and maintenance. The institutes are charged according to the usage that directly depends on the number of students.
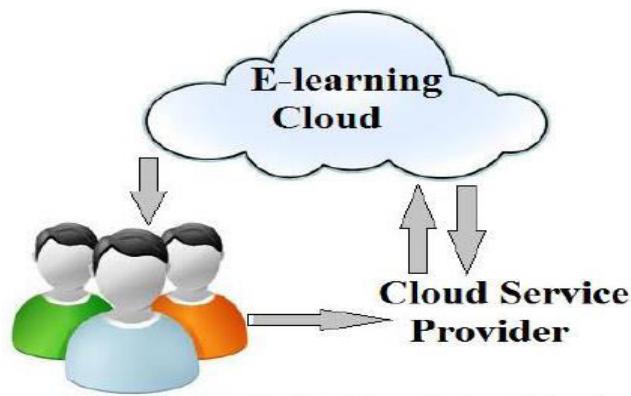
Figure-2: Separation of roles in Cloud based E-Learning
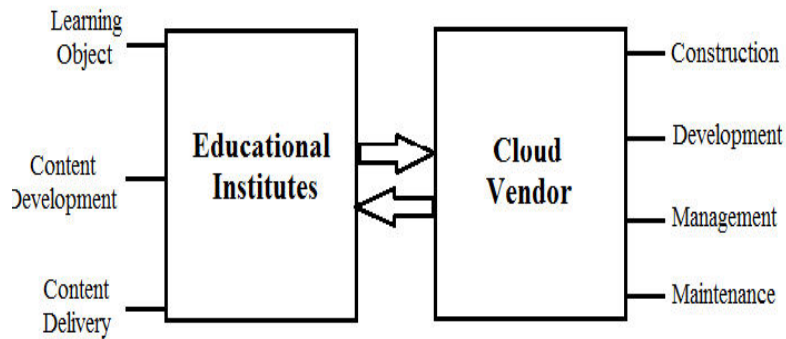
Sources: Authors Compilation

In, Kaewkiriya and Utakrit have proposed a model for e-learning using cloud computing which is shown in figure-3.

Figure-3: Abstract Model of Cloud Computing based E-Learning

Sources: Authors Compilation

In this model, the request from the user is sent to the cloud service provider, which in turn connects to the e-learning cloud in order to give response to the user's query. The architecture of a system that uses cloud computing as an e-learning solution is shown in Figure-4.

Figure-4: Cloud Computing Architecture
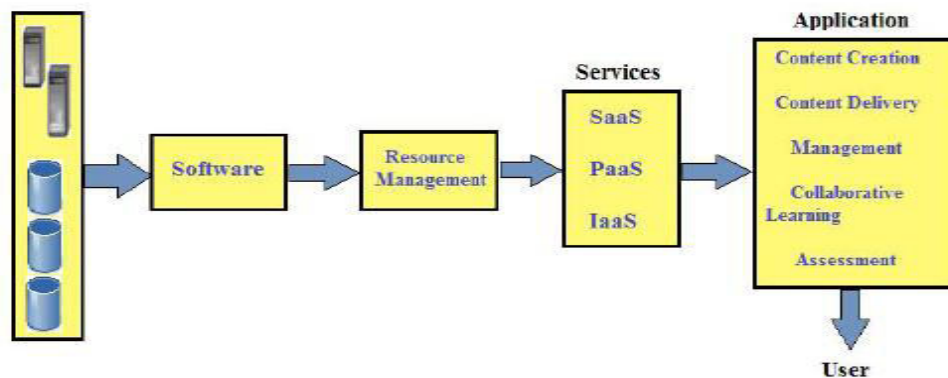
Sources: Authors Compilation

This architecture has five layers:

Infrastructure Layer is composed of dynamic and scalable resources such as physical memory, CPU and memory etc.

Software Resource Layer mainly consists of operating system and middleware to provide interface to the software developers for easy development of applications that will be made available to the end users.

Resource Management layer is used to achieve loose coupling of hardware and software resources so as to provide on demand service.

Service Layer has three levels namely IaaS, PaaS and SaaS that help the cloud users to use various cloud services.

Application Layer includes specific applications to integrate teaching resources with cloud computing model.

BENEFITS OF USING CLOUD COMPUTING IN E-LEARNING

One of the most interesting applications of cloud computing is educational cloud. The educational cloud computing can focus the power of thousands of computers on one problem, allowing researchers search and find models and make discoveries faster than ever. The role of cloud computing at university education should not be underestimated as it can provide important gains in offering direct access to a wide range of different academic resources, research applications and educational tools. Usually, E-learning systems are developed as distributed applications, but not limited too. The architecture of an e-learning system, developed as a distributed application, includes a client application, an application server and a database server, beside the hardware to support it (client computer, communication infrastructure and servers).

Figure-5: E-Learning System
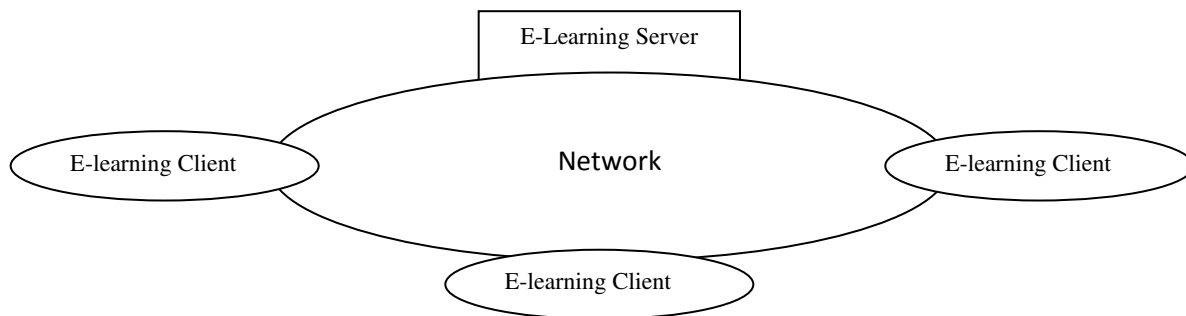
Sources: Authors Compilation

E-learning systems can use benefit from cloud computing using:

> A. Infrastructure: use an e-learning solution on the provider's infrastructure
> B. Platform: use and develop an e-learning solution based on the provider's development interface
> C. Services: use the e-learning solution given by the provider.

CURRENT CHALLENGES OF E-LEARNING SYSTEMS

Among the learning technologies, web-based learning offers several benefits over conventional classroom-based learning. Its biggest advantages are the reduced costs since a physical environment is no longer required and therefore it can be used at any time and place for the convenience of the student. Additionally, the learning material is easy to keep updated and the teacher may incorporate multimedia content to provide a friendly framework and to ease the understanding of the concepts. Finally, it can be viewed as a learner-centered approach, which can address the differences among teachers, so that all of them may check the confidence of their material to evaluate and re-utilize common areas of knowledge.

However, there are some disadvantages that must be addressed prior to the full integration of e-Learning into the academic framework. Currently, e-Learning systems are still weak on scalability at the infrastructure level. Several resources can be deployed and assigned just for specific tasks so that when receiving high workloads, the system need to add and configure new resources of the same type, making the cost and resource management very expensive.

This key issue is also related to the efficient utilization of these resources. For example, in a typical university scenario, PC labs and servers are under-utilized during the night and semester breaks. In addition, these resources are on high demands mainly towards the end of a semester, following a dynamic rule of use. The physical machines are hold even when they are idle, wasting its full potential.

Finally, we must understand that there is a cost related to the computer (and building) maintenance, but that the educational center must pay for the site licensing, installation and technical support for the individual software packages.

CONCLUSION

Cloud computing as an exciting development is a significant alternative today's educational perspective. Students and administrative personnel have the opportunity to quickly and economically access various application platforms and resources through the web pages on-demand. This automatically reduces the cost of organizational expenses and offers more powerful functional capabilities. There will be an online survey to collect the required data for the use of cloud computing in the universities and other governmental or private institutions in the region. This will help us review the status and probable considerations to adopt the cloud technology. Beginning with the outsourcing of email service seems attractive. The gradually removal of software license costs, hardware costs and maintenance costs respectively provides great flexibility to the university/corporate management. In this paper, we discuss a cloud computing based e-learning. Describe its definition and some benefits. Cloud based education will help the students, staff, Trainers, Institutions and also the learners to a very high extent and mainly students from rural parts of the world will get an opportunity to get the knowledge shared by the professor on other part of the world. Even governments can take initiatives to implement this system in schools and colleges in future and we believe that this will happen soon.

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STRESS AMONG IT PROFESSIONALS

Vrinda N. N.[31] Nisha Ann Jacob[32]

ABSTRACT
Effects of stress are felt in all walks of human life. Work stress is a high predictor of psychological symptoms in addition to life events. IT professionals face lot of stress in their day-to-day life. IT sector has become one of the most competitive sectors in India. They face many physical illness and psychological disturbances. Procedures, techniques are getting complicated with the use of advance technology. Not every employee can cope with such rapid changes taking place in their jobs. This will lead to arising of stress among employees. An attempt has been made through this research paper to know the reasons of stress among the IT professionals and the ways used by employees to cope with the stress generated at workplace.
KEYWORDS
Workplace Stress, Social Life, Health, Satisfaction, Conflict etc.

INTRODUCTION

Stress refers to the strain from the conflict between our external environment and an individual, leading to emotional and physical pressure. In our fast-paced world, it is impossible to live without stress, whether you are a student or a working adult. There is both positive and negative stress, depending on each individual's unique perception of then tension between the two forces.

Rapid growth of technology and its extensive use in business and industry has increased the competition manifold among organizations across the globe. These compelling forces in the organizations are continuously reshaping the business strategies, restructuring the hierarchy, re-engineering business processes and altering managerial practices there by forcing the organizations to adapt innovative business models with their unique blend of technology.

An employee spend almost one third of his life on his work and some time he has to face a lot of stress during his/her job. The nature of the job has gone through extreme changes over the last decade and it is still changing rapidly. Stress in the work place has touched almost all professionals, strain from executive level to coworkers who are directly engaged in the production. The result of job stress ultimately affects the physical as well as mental health of an employee.

It is believed that people with higher percentage of job stress on their work may not be satisfied with their job and may feel frustrated and depressed on the job and burned out when they reach home. Therefore, in this case job stress negatively affects the performance of the employee and the company. According to Assian health care services study report in 2001 approximately 30% of IT (Information technology), professionals suffer from depression and over the last eight years we have seen a dramatic rise in the number of such case reported from IT industry (Arun Kumar, 2002).

REVIEW OF LITERATURE

Nakakis Konstantinos, Ouzouni Christina, (2008), conducted a study on **Factors influencing stress and job satisfaction of nurses working in psychiatric units.** They found that variety of factors influences stress and job satisfaction of mental health nurses. Among these, clinical leadership and quality inter-professional collaboration between nurses and doctors and amongst nurses are particularly important. Nurses' job satisfaction was found to be influenced primarily by psychological stress and the quality of clinical leadership. A strong negative relationship was found between clinical leadership, inter-professional collaboration, stress and job satisfaction.

Raja Zuraidah RM. Rasi, Suhana, M., Mardhiah, Y., Zuraidah, A., Norhasniza, M. H. A., Nooririnah, O., conducted a study on the topic of The Impact of Job Stress to Job Satisfaction among Engineers (2014), This report tries to emphasize that controlling of job stress would increase Productivity. A challenging career as an Engineer usually leads to many types of job stress. Stress is an unpleasant emotional situation of an employee. Issues like health problems, role ambiguity, home interference as well as management role and work pressure are among the stress factors, which have always been debated with 2419 common problems. This study also provides information regarding job stress factors and how its effects the job satisfaction among engineers. In addition, they found that companies that are able to manage their engineers' stress could increase their job satisfaction.

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J. E. Agolla in his research article titled **"Occupational Stress among Police Officers: The Case of Botswana Police Service",** **(2009)** has conducted a study among the police to find out work stress symptoms and coping strategies among the police service in Botswana. This study analyses that the police work stressors are; getting injured while on duty and the use of force when the job demands to do so, etc. The managing strategies were identified as exercising, socializing, healthy eating or diets, career planning and employee training.

Ernest Brewer, and Jama Mcmahan-landers, in their study titled **"the relationship between job stress and job satisfaction among industrial and technical teacher educators".** The researchers examined the relationship between job stress and job satisfaction among a random sample of 133 industrial and technical teacher educators. They found strong inverse relationship between the constructs, with stressors related to lack of organizational support being more strongly associated with job satisfaction than stressors related to the job itself.

Nagesh, P. and Murthy, M. S. Narasimha19 in their study titled "Stress Management at IT Call Centers" (2008), has identified that the six factors effect workplace stress: demands of the job, control over work, support from colleagues and management, working, clarity of role, and organizational change. This paper also suggested measures in the form of training to enable organizations and individuals to manage stress at workplaces in general and IT call centers in particular.

Harish Shukla, Rachita Garg, (2013), this paper discussed about **stress management among the employees of nationalized banks.** In addition, it examines the various factors like workplace stress, social life, health, satisfaction, and conflict among the employees. The researcher tries to find the causes of stress among employees, level of stress on employees and effect of stress on productivity of an organization. It is found that maximum numbers of employees in banks are stressed. Majority of the employees try to find solution to relieve them from stress. Arranging YOGA camp, meditation camp, entertaining programs helps to overcome stress of bank employees.

Rajesh Kumar, Roshan Lal, Yashu Bansal, Saran K. Sharma (2013), study aims to find out **the impact of techno stress on job satisfaction and organizational commitment among IT professionals.** Results clearly revealed that techno stress is negatively correlated to job satisfaction and organizational commitment. Techno stress leads to negative appraisals of job, reduced productivity, increased turnover and absenteeism, and poor task performance resulting in job dissatisfaction and lower organizational satisfaction. Management of techno stress depends on how one perceives techno changed interprets it. Positive attitude and involvement in job work may help software professionals to cope up with techno stress.

Mohsin Altaf (2011), The Study aims to **investigate the relationship of employee stress and Career related satisfaction.** This study suggested that mostly people left their job for monetary reason, unfair reward system, workload etc. These factors create the job stress at work place and which is ultimately a great hurdle in the path of career satisfaction. Finally, there were negative relationships between job stress and career satisfaction.

Panagiotis Trivellas, Panagiotis Reklitis, Charalambos Platis (2013), This paper investigates the **impact of job related stress on Job Satisfaction of nursing staff working in hospitals.** Job stress is one of the most important workplace health risks for employees, and job satisfaction has been considered as a crucial factor in the provision of high quality services and superior performance at hospitals. Results showed that conflict, heavy workload and lack of job autonomy are negatively associated with all job satisfaction dimensions, while shortage in information access and feedback is positively related to employees' satisfaction with rewards and job security.

Muhammad Mansoor, Sabtain Fida, Saima Nasir, Zubair Ahmad, (2011), this paper aims to examine **the impact of job stress on employee job satisfaction**. A sample of 134 employees from the telecom sector from Pakistan was used for this analysis. Job stress has been measured by conflict at work, workload and physical environment. This study results revealed that stress is negatively related to employee's job satisfaction, which support Caplan (1991), and Keller (1975) result. This study reinforces the importance of employee job satisfaction, which is essential for successful firm in current era.

Nor Liyana Mohd Bokti,·,Mansor Abu Talib (2009), This is a Preliminary Study on **Occupational Stress and Job Satisfaction among Male Navy Personnel at a Naval Base in Lumut, Malaysia.** Total of 40 male officers and non-officers, from the seaman and engineering and supply branch in the Lumut Naval Base participated in this study. It was found that occupational stress was associated with overall job satisfaction.

Tilottama Azad (2014), this study aims to determine the **cause-effect relationship between factors causing stress and their impact on banker's personal life and health**. The study was conducted in banking sector employees in Bhopal. It is found that the 90 % of the respondents believed that they face high level of stress, which may be due to both professional and personal reasons and the respondent were over burdened with workload in their work place. Researcher identified few initiatives for effectively handling stress. Meditation was found to be the integral part of life to reduce stress.

Simin Bemana, Hamideh Moradi, Mohsen Ghasemi, Sayed Mehdi Taghavi and Amir Hosain Ghayoor (2013): this study investigates **the relationship between job stress and job satisfaction among Municipality Personnel in Iran.** The results show

there is a significant negative relationship between job stress and job satisfaction. In addition, the study found that employees who are highly motivated will feel happier and are more willing to work for the organizations.

Hong Lu, Alison E. While, K. Louise Barriball (2006), this study aimed to explore Job satisfaction and its related factors. The study reveals that, Hospital nurses have positive feelings regarding their working lives may be influenced by developments in the health care system and the nursing profession in Mainland China. Nurses' educational level is an influencing factor on nurses' views and experiences of their working lives with the findings suggesting the need to develop a clinical career ladder for nursing staff in Mainland China.

Viljoen, J. P., and Rothmann, S. aimed at studying and investigating the relationship between "**occupational stress, ill health and organizational commitment**" (2009). The results were that organizational stressors contributed significantly to ill health and low organizational commitment. Stress about job security contributed to both physical and psychological ill health. Five stressors, namely work-life balance, overload, control, job aspects and pay, predicted low individual commitment to the organization.

Prof. Prajna Prusty (2012), conducted a study on the topic effect of job stress on job satisfaction among management college faculties. He observes that motivation helps to reduce stress level. Employees who are highly motivated would feel happier and are more willing to work for the organization.

Dr. S. Sankari, and R. Subha (2007), this paper discussed in detail about stress among IT professionals. The analysis of the study revealed that IT professionals face lot of stress in their day-to-day life. They face many physical illness and psychological disturbances. He observed that the major factors responsible for stress is working conditions, Shift work, long hours, New Technology and Overload.

RELEVANCE OF STUDY

From review of various studies, the following theoretical framework emerged. Stress model has been tested through a number of studies, conducted by management researchers, in various settings, mostly covering stress among nurses and bank employees in different countries. The present study tries to analyses job stress among IT professionals in InfoPark, Kakkanad.

THEORETICAL PERSPECTIVES

Sources of Stress

Stress is reality of our everyday life. The stresses and strains experienced in one domain are carried over to the other.

Organizational Sources
One major source of stress is job itself. The way the job is designed, the amount of time pressure an individual faces, and the amount of expectations others have of a personal work can all lead to job stress.

Environmental Sources
It influences stress levels among employees in that organization. Changes in the business cycle create economic uncertainties. When the economy is contracting, people become increasingly anxious their security.

Individual Differences
Some people thrive on stressful situations, they distribute others. There are individual different variables, which moderate the relationship between potential stressors and experienced stress. These variables are perception, social support, job experience, hostility and frustration.

Stress among IT professionals is mainly due to:

- Unrealistic deadlines and expectations from the higher officials.
- Cognitive demands of work memory, attention, decision making, creative problem solving.
- Poor lifestyles of IT professionals less sleep, junk food and staring at a monitor for days.
- Isolation from social relationships

Stress in IT (Indian Scenario)

Studies until late 80s reveals:

- High job satisfaction within the range of 'satisfied' to 'highly satisfied' studies during 90s.
- Started showing signs of distress in Indian IT industry.

Express computer study (2003) found the following:

- Little is being done to address computer related injuries (CRI) afflicting the Indian IT professionals.
- Out of 50 companies surveyed only 3 had human resources policies for computer related injuries.
- Computer related injuries are not treated as an occupational hazard in India, unlike developed countries.
- 62% of IT companies in Chennai do not provide medical allowance and compensation to employees.
- Very few IT companies in India, formally conduct programs on stress management, yoga or ergonomic.

FACTORS RESPONSIBLE FOR STRESS AMONG IT PROFESSIONALS

There are many factors responsible for the stress among IT professionals is as follows:

Work Overload

Two different types of work overload have been described by researchers namely quantitative (overload refers simply too having too much work to do) and qualitative (refers to work that is too difficult for an individual). They are supposed to suffer more interruptions and suffer more by physiological strain through higher heart rates and higher cholesterol levels.

Low Working Conditions

Our physical surrounding noise, lighting, smells and all stimuli, which bombard our senses, can affect our moods and overall mental state. Since IT companies are air conditioned, the professionals may race with health problem, which in turn affects their activity.

Shift Work

IT professionals job requires them to work in shifts some of which involve working in staggered hours. It has been known that shift work affects blood temperature, metabolic rate, blood sugar level, mental efficiency and work motivation.

Long Hours

Many individuals such as executives work long hours and some might have no sleep for 6 hours or more, which in turn affect their body and mind.
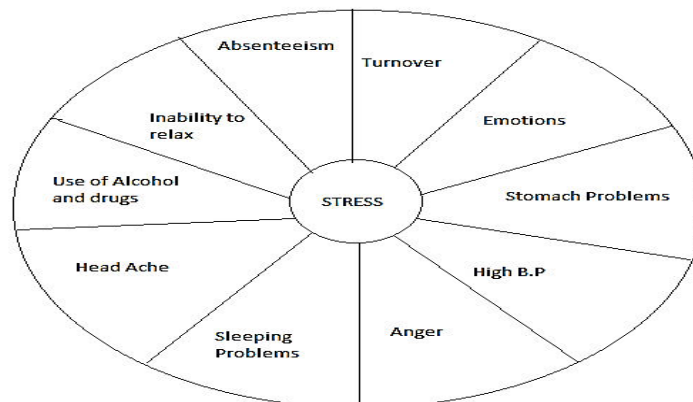
New Technology

The introduction of new technology into work environment will be difficult for new employees to adapt to new systems, equipment way of working.

PHYSIOLOGICAL SYMPTOMS

It has been found that stress could create changes in metabolism, increase heat and breathing rates; increase blood pressure brings headaches, and induce heart attacks.

Figure-1

Sources: Authors Compilation

PSYCHOLOGICAL SYMPTOMS

Stress produces various psychological consequences also. Job dissatisfaction, depression, anger, anxiety, irritability, boredom and procrastination.

BEHAVIORAL SYMPTOMS

Behaviorally related stress symptoms include changes in productivity absence and turnover as well as changes in eating habits, increased smoking or consumption of alcohol, rapid speech and sleep disorders.

IMPORTANT METHOD FOR MANAGING STRESS

• Role Analysis Techniques • Employee Counseling • Time Management	• Job Relocation • Delegation • Exercise	• Meditation • Networking

A Model of Stress

Figure-2
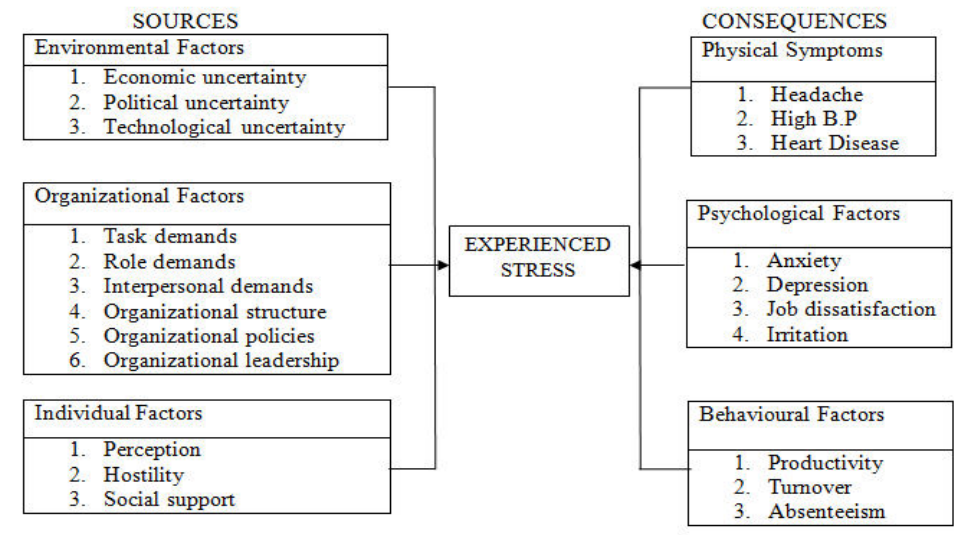
Sources: Authors Compilation

FINDINGS AND CONCLUSION

Most of the employees fear about the quality in their work, which leads to stress. It is found that maximum number of employees in IT remains stressed. Most of the employees feel that they are overloaded with work and feel tensed due to their non-achievement of their targets at work. Few employees accepted that they would obey the order of their boss by sacrificing their important domestic function. It indicates fear and stress among employees. Family related problems also cause stress. It means such employees feel greater level of stress as compared to other employees. Half of the employees accepted that there is conflict among the employees. It is a concern for top management. Most of the employees use YOGA or other ways to relieve them from stress. In spite of stress, majority of the employees balance in their social life.

SUGGESTIONS

- The company can introduce relaxation activity program for their employees in order to reduce the tension among employees.
- Guidance and counseling, quality consciousness awareness programs, psychological support can be provided to employees.
- The company can also focus on training the employees on how to make decisions in stressful situation.
- There should exist friendly environment inside the organization.
- Employees should strive for improved quality in their performance rather than fear.

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USE OF WEB TECHNOLOGY AS TEACHING PEDAGOGY FOR ENHANCING TASK-BASED TEACHING, LEARNING AND EVALUATION: A CASE STUDY

Dr. Manohar Kacharu Sanap[33]

ABSTRACT

This paper has discussed the application of the task-based teaching, learning and evaluation with the aid of Web 2.0 technology. The findings of the case study indicate that the teaching, learning and evaluation process becomes more enjoyable and meaningful through the task-based teaching and learning. The study also emphasizes the need of changing the nature of teaching, learning and evaluation process as per the inclination of youngsters.

As the present young generation is techno-savvy, Web 2.0 technology (blog) can be effectively used in the process of teaching, learning and evaluation as it provides a platform for collaborative work and independent learning with a moderate monitoring. In addition to this, the paper attempted to explore and devise strategies to give feedback to learners monitoring. In addition to this, the paper attempted to explore and devise strategies to give feedback to learners monitoring.

In addition to this, the paper attempted to explore and devise strategies to give feedback to learners through peer-assessment. Thus, it can be said that Web 2.0 technology has a lot of potential in fuelling up the task-based teaching, learning and evaluation.

KEYWORDS

Web Technology, Teaching Pedagogy, Youngsters, Web 2.0 Technology, Blog etc.

INTRODUCTION

With the advent of Web 2.0 technology, the nature of teaching, learning and evaluation has been taking shape and turn dramatically. The present young generation is very techno-savvy and therefore, it is necessary to make use of the things which they enjoy doing for that matter the teaching of business communication is not an exception.

Mark Warschauer (2000) says: 'The Internet is a powerful tool for assisting a socio-cognitive approach to teaching, and it is in fact this fit of the internet with a socio-cognitive approach which largely accounts for the new-found enthusiasm for using computers in the business communication classroom.' A socio-cognitive approach emphasizes or socialization into particular social discourse settings. In view of this, learners should be provided with ample opportunities for authentic social interaction, which will immensely help them in a variety of communication outside the classroom. This can be achieved through students' collaboration on authentic tasks and projects (Prabhu, 1987; Willis and Willis 2007). Therefore, a task-based approach needs to gain a momentum in teaching of Business Communication. It focuses on the use of authentic language and encourages students to do meaningful tasks using the target language. It is more student-centred, allows for more meaningful communication, and often provides situations to sharpen extra-linguistic skills in the real context. In the present era, the ultra-modern digital technology has almost encompassed every sphere of life and therefore, the use of language and communication cannot remain untouched by it.

The Web 2.0 technology provides learners with opportunities for increased access to authentic materials and contexts for communication skills use and encourages more interactive, collaborative and learner-centered approach. In 2001, Chappelle explored the interface between computer-assisted language learning, task-based teaching, learning, evaluation, and second language acquisition. *According to him:*

> …anyone concerned with second language teaching and learning in the 21st century needs to grasp the nature of the unique technology-mediated tasks learners can engage in for language acquisition and how such tasks can be used for assessment…. To meet the challenge, the study of the feature of computer-based tasks that promote learning should be a concern for teachers as well as for SLA researchers who wish to contribute to knowledge about instructed SLA.

The present research paper is an attempt in response to Chapelle's focus on 'technology-mediated tasks' and tries to explore strategies to develop communication through peer assessment. The research paper is an outcome of the case study carried out in the Second Year B. Com Business Communication Course. The main motive of the case study is to make the teaching, learning and evaluation process more enjoyable and meaningful through task-based teaching and learning with a view to improving students' four-fold skills of the language and communication with the aid of Web 2.0 (blog) technology.

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THEORETICAL BACKGROUND

Corresponding to the digital revolution of the 1980s, task-based approach evolved in the field of learning and teaching. The focal point of task-based teaching, learning and evaluation is to engage learners in authentic use of the language through meaningful collaborative communicative tasks. It puts more emphasis on the completion of tasks leading to a desired task outcome rather than on accuracy of language and communication forms. Especially, this feature popularized task-based teaching, learning and evaluation as it focuses on target language and communicative fluency and students' confidence.

According to Willis (1996), it is a logical development of teaching and learning as it indicates several features of the communicative language movement of the 1980s and particularly, it focuses on the use of real life situations that necessitate communication. Basically, the concept of task-based teaching was originated and popularized by N. Prabhu (1987) while working in Bangalore, India. According to him, effective learning takes place when students are fully engaged in communication and language tasks, rather than just learning about communication and language.

The roots of task-based teaching, learning and evaluation can be traced in Hymes' notion of communicative competence (1972) that knowing a language and communication involved more than knowing a set of grammatical, lexical and phonological rules. For the effective use of language, leaners need to develop communicative competence i.e. the ability to use the target language appropriately in a given social context. Hymes' notion was further elaborated by Canale and Swain (1980) who viewed communicative competence as 'a synthesis of knowledge of basic grammatical principles, knowledge of how language is used in social settings to perform communicative functions, and knowledge of how utterances and communicative functions can be combined according to the principles of discourse.' In short, it can be said that communicative competence comprises grammatical competence, sociolinguistic competence, discourse competence and strategies competence. The concept of 'task' has developed out of communicative teaching, learning and evaluation and the various definitions of the term have been offered. Richards, Platt & Weber's definition supports to the contention of the researcher.

A task usually requires the teacher to specify what will be regarded as successful completion of the task. The use of a variety of different kinds of tasks in communication and language teaching is said to make teaching more communicative…since it provides a purpose for classroom activity, which goes beyond practice of language for its own sake (1985).

Krahnke also points out: 'The defining characteristic of task-based content is that it uses activities that the learners have to do for non-instructional purposes outsides the classroom as opportunities for communication and language learning' (1987). Largely, the basic purpose of task-based teaching, learning and evaluation is to encourage the students to use the target language. As a result of this, language experts now not only focus on teaching the rules of grammar to students, but rather help them in gaining apprenticeship though authentic and meaningful interaction both within and outside the classroom. For this purpose, students need to provide with certain tools for their social, cultural and linguistic exploration. In this regard, Warschauer and Meskill suggest: 'The computer is a powerful tool for this process, as international cross-cultural discourse is frequently taking place in an online environment.' (2000)

USE OF TECHNOLOGIES

With the rise of 21st century, Web 2.0 emerged as a powerful tool of communication and interaction and participatory information sharing among users worldwide. Web 2.0 tools include blogs, wikis, video sharing sites podcasts, RSS feeds and social bookmarks etc. These tools equip teachers with new techniques to engage students in a meaningful way. Collins and Halverson (2009) point out: 'Children raised on new media technologies are less patient with filling out worksheets and listening to teachers.' In a traditional classroom, students are less interested in participation, whereas, technologies available in Web 2.0 increase the amount of participation as students get the opportunities to learn for themselves and share that learning with their peers.

Russell and Sorge (1999) point out that technology provides students "more control over their own learning", facilitating the analytical and critical thinking and the collaboration championed in the constructivist approach to education. In addition, they stated that integrating technology into instruction tends to move classrooms from teacher dominated environments to ones that are more student centered. On the same lines, Will Richardson believes that education must not only socially, but collaboratively constructive.

Web 2.0 technology expects students to collaborate with their peers. In a business communication classroom, negotiation of meaning is necessary for communication and language learning to take place, and this is only possible when there is interaction through real communication. Web 2.0 tools provide opportunities to use the four-fold skills of communication and language i.e. listening, speaking, reading and writing.

The main thrust of the present-paper is on the use of blog in business communication teaching, learning and evaluation. A blog is a type of website, which provides interaction and collaboration by allowing users to give and receive comments. It is managed by a writer. Campbell defines the term as an "online journal that an individual can continuously update with his or her own words, ideas, and thoughts through software that enables one to easily do so (2003)." It publishes content in a chronological order with

regular updates. In the classroom, the blog can be used as a new assessment tool as it keeps recording postings by learners, and the teacher can review how much the postings have improved in terms of selecting formal grammar or writing style. Blogging makes the learning process more communicative and interactive by involving participants in multiple-activities. It also provides the facility of posting audio-video clips. In his academic blog, Stanley (2006) notes that "(Blogs are) a way of opening up the classroom walls and showing the wider world what is happening…thus creating a small communication and language learning community."

METHODOLOGY USED

This paper examines the case study carried out in the Second Year B. Com Business Communication Course by using a technology-mediated task-based approach for teaching, learning and evaluation. The study comprised 90 participants divided into 9 groups, each group consisting of 10 students. The students were already taught the skills related to formal letter and report writing as part of their syllabus. For conducting a task-based activity, the researcher followed a comprehensive framework of three stages suggested by Jane Willis (1996): Pre-task, Task-cycle, Communication and Language focus. In the Pre-task, the researcher identified the various activities available on the college campus on which an exhaustive report could be written. For instance, the list included topics like College Gymkhana, College Library, Neville Wadia Institute of Management and Research Studies, National Cadet Corps, Centre for English and Foreign Languages, Mountaineering Club, National Service Scheme, Drama and Film Association, Samata Mandal, Students' Co-operative Store, and an interview of Vice-Principals of the College. From the given list of topics, each group was asked to select the topic of their choice for report writing. In addition, the nature of the task was explained to students in detail. Two students were given a responsibility of creating a blog and maintaining it. In the Task-cycle phase, each group was asked to prepare a detailed plan and allot the work of report writing based on the guidelines and steps suggested by the researcher.

The task of report writing was divided into sub-tasks: 1) Writing a permission letter to the in-charge of a particular In-charge of Centre for taking an interview, 2) Preparing an interview questionnaires for the Head, 3) Preparing questionnaires for students and others, 4) Video-shooting of the chosen unit and interviewers, 5) Writing a final report on the basis of the data collected. During this phase, the researcher, with only a few minor suggestions, monitored all the sub-tasks of each group. After writing the final report, each group was asked to publish or post all the sub-tasks and the report on the blog. Then, each group was asked to review the tasks of other groups published on the blog and give its feedback on the tasks of other groups online.

The communication and language focus has two aspects: Analysis and Practice. The case study followed the process of analysis through a peer assessment. Each group analyzed the sub-tasks of other groups published on the blog and made its comments online. The observations are summarized as follows: 1) The groups analyzed the permission letters on the basis of a format i.e. British style or American style, tone, appropriate use of grammar, vocabulary and phrases. 2) The interview-questionnaires were analyzed on the basis of structure and appropriateness of words. 3) The video shootings were reviewed based on coverage, clarity of audio and video, confidence level of the presenters, use of the language and tone used while taking interviews. 4) The final reports were evaluated based on the format, conciseness, and appropriateness of the structures, words and phrases.

Next, in the communication and language focus stage, each group was asked to give a presentation on its chosen topic and either support or counter argue the comments made by other groups on the blog. In addition, the teacher reviewed what happened in the task of each group, with regard to the communicative and language and highlighted relevant parts for the students to analyzed. Then the teacher selected language and communication areas to practice, based upon the needs of the students.

FINDINGS

The learners enjoyed the technology-mediated task-based activity as they found it very interesting and exciting. It provided the scope for using all the four-fold skills of the communication and language-listening, speaking, reading and writing. Particularly, the learners could use the language in the real social context. The significant part of the task was the peer assessment through online feedback.

The sub-tasks helped the learners in a number of ways:

Firstly, the task of writing a permission letter helped the students to learn a format of a formal letter both in British and American style by providing a situation to write in the real situation. The peer assessment helped them to pay attention to a format, spellings, grammar and vocabulary.

Secondly, the task of preparing an interview-questionnaire involved a lot of pre-reading or collection of basic information as the questions were based on the data collected. Indirectly, the task helped the learners to learn a skill of framing Wh-type questions and Yes/No-type questions and provided the opportunity to the groups to point out the mistakes of one another related to structure, faulty expressions and aptness of words.

Thirdly, the task of interviewing provided the groups a chance to interact with someone in a real setting.

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Fourthly, the task of video shooting made the process of task completion more interesting and exciting. It was a remarkable thing to note that some of the groups, by using their mobile-handsets, shoot the interviews and other things wonderfully. The students got the chance to review the speech and body language of their own and others.

Lastly, the final report-writing task made the students aware of a communication skill of organizing the gathered information in a logical sequence. It made them more conscious of grammar, spellings, vocabulary and structure as they were writing in the real context. Incidentally, the task helped the students to develop their soft-skills related to leadership, interpersonal relations, communication, group dynamics, team-building and time-management etc.

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