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**Research and Reviews in  
Literature, Social Sciences,  
Commerce and Management  
Volume II**

**Editors:**

**Mr. Shahid Gul**

**Ms. Chakkoria Deena David**

**Ms. Janvi**

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## **PREFACE**

*In the vast landscape of human knowledge, literature, social sciences, education, commerce, and management stand as pillars that shape our understanding of the world and guide our endeavors. They are the domains where ideas take flight, theories evolve, and practical wisdom finds its roots. It is within this dynamic intersection that "Research and Reviews in Literature, Social Sciences, Education, Commerce, and Management" emerges as a beacon of intellectual exploration and scholarly discourse.*

*This compendium stands as a testament to the relentless pursuit of knowledge and the unwavering commitment of scholars, researchers, and practitioners in their respective fields. It is a repository of insights, analyses, and reflections that collectively contribute to the ever-expanding tapestry of human understanding.*

*In the pages that follow, readers will embark on a journey through diverse landscapes of inquiry. From the nuanced realms of literature where narratives intertwine with culture and emotion, to the empirical realms of social sciences where patterns in human behavior are deciphered, each chapter offers a glimpse into the multifaceted dimensions of our existence.*

*Education, the cornerstone of societal progress, is explored with depth and breadth, illuminating pathways to transformative pedagogies and innovative practices that nurture minds and inspire lifelong learning. Meanwhile, commerce and management, amidst the complexities of global markets and organizational dynamics, unveil strategies and paradigms that drive economic prosperity and organizational excellence.*

*As we delve into these domains, we recognize that knowledge is not static but rather a river in constant flux, shaped by the currents of inquiry, debate, and discovery. The contributions within this volume stand as tributes to this ceaseless pursuit, offering perspectives that challenge assumptions, provoke thought, and invite dialogue.*

*At its core, "Research and Reviews in Literature, Social Sciences, Education, Commerce, and Management" embodies the spirit of intellectual curiosity and scholarly rigor. It is a testament to the collective endeavor of individuals who seek to unravel the mysteries of the human experience and contribute meaningfully to the advancement of society.*

**Editors**

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## **MANAGING CREATIVITY, INNOVATION, MANAGEMENT STYLES AND CONTROL METHODS**

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### **Introduction:**

Change management is an all-encompassing term that refers to all the strategies, methods and actions used to support if not prepare organizations for change. Change management is defined as the process of 'continually renewing an organization's direction, structure and capabilities to serve the ever-changing needs of external and internal customers' (Moran and Brightman, 2001: 111). Creativity and innovation in any institution are integral and increasingly important determinants of organizational performance, success, and longer-term survival. With the tougher competition, technology advances and shifting client preferences, many organizations have done their best to shift from their old shells to the new ones and have become learning organizations in order to survive in today's world. Creativity has typically examined the stage of idea generation, whereas innovation studies have commonly also included the latter phase of idea implementation. Innovation has been highlighted as a core competence for contemporary organizations to maintain or enhance effectiveness in rapidly changing and challenging environments (Erez, & Farr, 2009). Managers in general, are progressively hired to manage collaborative creativity and innovation processes and much effort is required to deal with the tensions they encounter in managing change in institutions or organizations. Effere (2005) defines management styles as mechanisms used by managers to in managing organisational activities. Various managers use different styles in managing their organisations and subordinates depending on the nature of the organisation's culture, structure, personnel, and nature of the manager. This essay will expound four main issues namely; change management, innovation and creativity, control methods and management styles in relation to social welfare organisations. On change management, the writes will focus on the process, approaches, models, historical development, and triggers of change management, internal and external drivers, and potential areas for change, policies and challenges that hinder the change management process. On innovation and creativity, the

essay will focus on the theoretical approaches, how to manage factors that stimulate or kill creativity and innovation in social welfare organisations. In addition, the writer will explain the various management styles that are used by managers to ensure creativity and innovation organisations. Consideration will be given to various management styles their characteristics, and importance of management and control methods

## **Change Management**

### **a. The Concept of Change Management**

Mandeya (2016) postulates that change management involves the techniques utilized by management, in redefining business processes, such as the use of resources (human, material and technological), budget allocations as well as other internal systems or means of operation that impact on the overall well-being of the organization. Change management is the transitioning of firms or individuals from present status quo to a desired and predetermined future state, with leadership playing an important role for the change process to be successful (Dawson, 2015). Change management is traditionally used to discuss and address how teams are affected by organizational transitions, from older systems or methods of operating. Staudenmayer, Tyre, and Perlow (2002) assert that the discourse of change management is dynamic and fluid incorporating various issues and methodologies that focus on the welfare of employees during organizational change. In the context of project management, it further speaks to the introduction and approval of change control processes that modify the scope of the project.

The concept of change management has been argued to speak mainly to the position and reaction of employees who are affected by the changes and adjustments made by the organization. Basteman and Snell (2002) contend that focus of change management is not necessarily the systems or strategy of the organization but rather the employee who must still achieve organizational targets in spite of the adjustments or changes that have been made. In line with this view, change management processes are an amalgam of sequential activities that the change initiator must implement to enable transitions at various levels that still meet the project or programme's intended outcomes as well as consider employee's vested interests. Change management, therefore, engages a structured approach towards ensuring that changes are executed successfully and efficiently for value addition to the organization. Change management processes, though necessary can be a source of apprehension for staff and can be met by enthusiasm or resistance depending on the nature of change that needs to be made.



## **b. Historical Development**

The adoption of change management, as a crucial component, to effective organizational transition is attached to a fascinating background within the context as well as a praxis of human resource management. Welbourne (2014) traces the development of change management processes and models to grief studies that observed that the sorrow of employees over the loss of certain jobs or departments was similar to that of persons grieving over health-related issues. Soon change management models comprehensively captured, the totality of human emotion in mourning over occupational transitions. Rogers (1995) posits that change in organizations must be viewed according to a number of criteria including time, communication, and the overall impact on employees. It was also important to take note of people's responses to change. Hence, the emergence of what Rogers (1995) termed adopter groups. These were: early adopters, early majority, late majority, laggards, and innovators. In 1982, a model was developed leading to the popularization of the term change management. Anderson and Anderson (2001) note that leaders became dissatisfied with the top-down method that had been used to create and initiate changes within organizations as it had led to many failures. These led to the creation and formalization of change practitioner roles as well as a movement away from strategy-driven, large-scale change programmes that were only developed or informed by senior management. The skills, knowledge, and techniques that characterize change management developed from this background.

### **Change Management Models**

Following the above train of thought, an eclectic base of theories, principles and best practices for effective change management thus exists. These underpin change management models that prescribe differing styles towards effecting change initiatives or programmes within organizations. Each theory or model has its strengths and weaknesses. The philosophy underpinning the entire process is equally important as the change initiator or manager must ensure that the transitions bring least harm are characterized by beneficence and adhere to organizational policies.

#### **a. Kurt Lewin Three Phase Model**

According to Smith (2015), German-American psychologist Kurt Lewin was responsible for the development of the three-phase model, which acted as a precursor to other models of change management. Through the model, Kurt Lewin introduced the very first fundamentals of change management. Much of his work was informed by his

background in social psychology as it was his area of expertise both professionally and academically.

Lewin's model consisted of repeating cycles comprised of three phases. The first phase referred to as the thawing phase where the efforts are made to overcome resistance to change. The second phase of the model entailed training and education so as to implement changes effectively within the organization. The final stage entitled refreezing involved, cementing the changes and drafting them into organizational policies or regulations.

Albeit, the basis for much of the change management models that exist today, the framework was criticised for being reductionist by limiting change to a fixed cyclical step. This meant that much energy would be expended when (dogmatically) applying the model in the manner in which it is presented. Smith (2015) further asserts that the model did not provide adequate solutions towards resistance to change. This means that organization may find itself trapped in the repetitive cycle of change transitions when encountering resistance.

From Kurt Lewin 's model, the process of change management entails, involving and considering the welfare needs and concerns of staff during change management processes. The model also brought about the importance of staff training so as to adapt effectively to change. In the case of re-deployment staff may require training to adapt to new skills and duties as of required of them.

#### **b. Kotter's Eight-Step Model**

The Change Management Model, proposed by Dr. John Kotter, is an eight-step model that can be surmised by four stages. These are:

1. Determining the Need for Change,
2. Preparing and Planning for Change,
3. Implementing the Change
4. Sustaining the Change.

Within the above four stages, the change initiator further ascribed to the eight steps proposed by Kotter to implement effective change transitions. These included establishing the drive and urgency for change, assembling a team dedicated to change, creating a vision and goal for a change, communicating change needs, empowerment of staff to enact change, creation of short-term goals, persistence, and finally refreezing as a present by Kurt Lewin to cement the changes.

Kotter's eight-step model further cemented the need to engage staff effectively through a charismatic approach, that continuously emphasized the importance of the change to the organization.

### **c. Keynesian S model**

The Keynesian S model is typified by a fluid and more dynamic approach toward change management. According to Smith (2015), the model boasted a multi-faceted and holistic style in initiating and maintaining change within an organization. The flexible structure of the model entails implementing the change or transition from a point that is most suitable for the organization. This equated to a more open-ended model with ample room for innovation in regards to the change management style. Each facet outlined by the model starts with an S and can be seen as referring to strategy, structure, shared values, systems, staff, and style. The model was adopted because of its structure which allows for the incorporation of other models.

The Keynesian model demonstrates the need for skillful rather than dogmatic change management processes. The framework depicts that change management as demanding the use of many methods rather than adopting a singular unitary approach. It establishes the need to make adjustments when necessary to ensure transitions have the least harm and are beneficial to the organization.

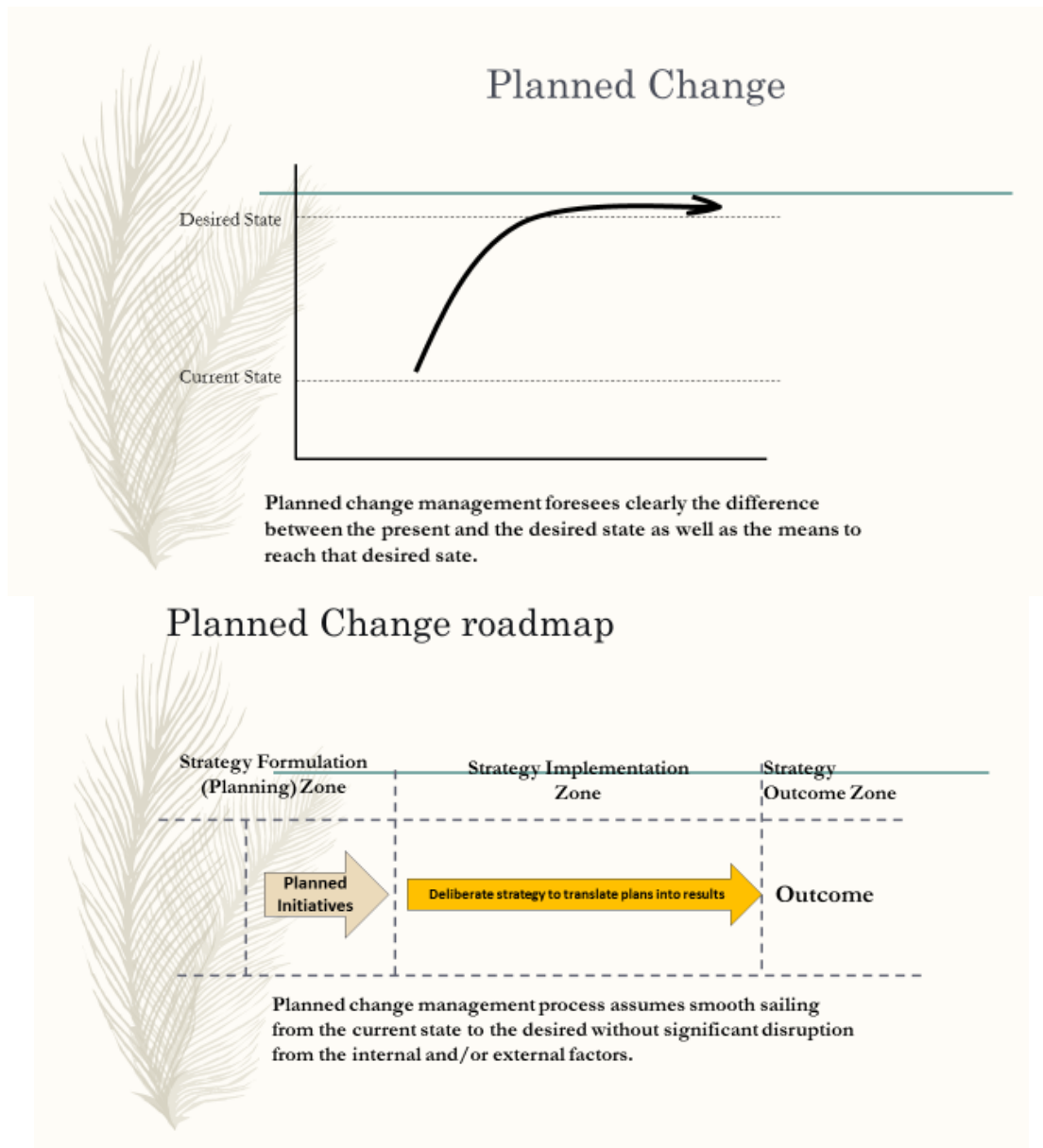
## **Change Management Approaches**

Approaches to change management include the planned or evolutionary approach and the emergent or revolutionary approach to change. The planned approach to change attempts to explain the process that brings about change. Emergent approach emerged as a result of criticism of the planned approach based on the following suggestions. Therefore, there is no one widely accepted, clear and practical approach to organisational change management.

### **a. Planned Approach to Change**

It emphasises the importance of understanding the different states which an organisation will have to go through in order to move from an unsatisfactory state to an identified desired state e.g. (Unfreeze, Move and Refreeze). The planned approach to change was initiated in 1946 by Kurt Lewin who was a theorist, researcher, and practitioner in interpersonal, group, intergroup, and community relationships. Before change and new behaviour can be adopted successfully, the previous behaviour has to be

discarded. Bullock and Batten (1985) also developed a four-phase model of planned change that splits the process into exploration, planning, action, and integration.



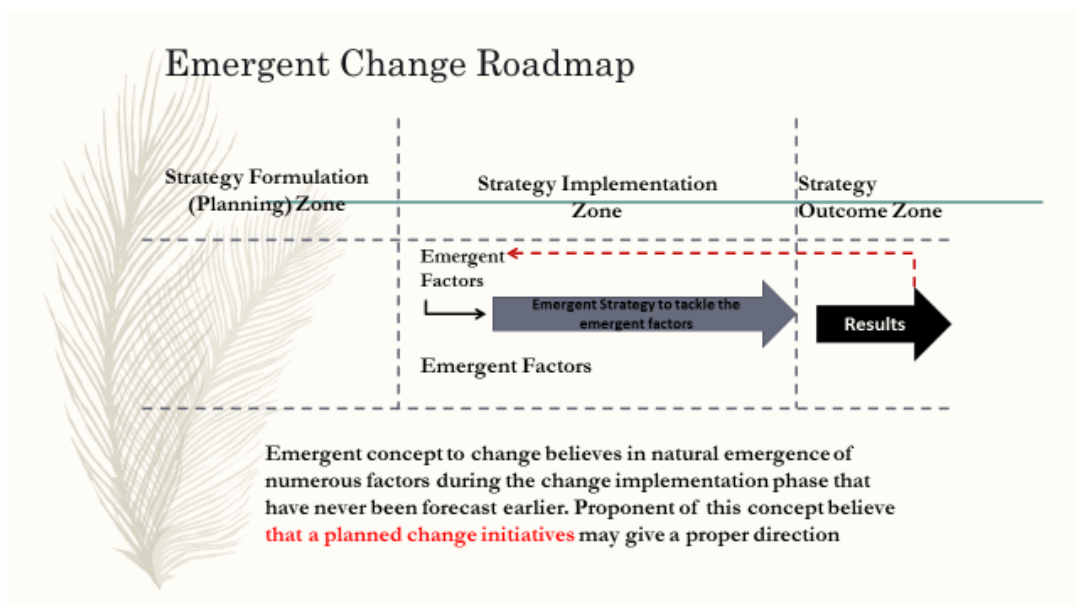
Planned change management process assumes smooth sailing from the current state to the desired without significant disruption from the internal and/or external factors. An incremental approach to change management gives an image of the two-steps-forward-one-step-back process. As a result, the planned change initiatives are generally producing both more and less than what was originally expected.

The planned has been criticised for its one size fits all' or 'straight- jacket' approach. It assumes that one type of approach to change is suitable for all organizations, all situations, and all times. In addition, the approach has been condemned for laying down timetables and methods in advance, ignoring the complex and dynamic nature of

environmental and organizational processes, therefore it fails to address crucial issues such as the continuous need for structural adaptations and employee flexibility. It heavily assumes that change management experts can have a full understanding of the consequences of their actions and that their plans will be understood, accepted, and can be implemented fully. Furthermore, the approach is based on the assumption that common agreement can be reached among all parties involved in the change process ignoring the universal reality of organizational conflict and politics, or at least assumed disagreement can be easily identified and resolved.

### **b. Emergent Approach to Change**

This approach maintains that change is driven from the bottom going up instead of top bottom and it should not be perceived as a series of linear events within a given period of time, but as a continuous, open-ended process of adaptation to changing circumstances and conditions (Burnes, 1996, 2004; Dawson, 1994). It stresses the unpredictable nature of change and views it as a process that develops through the relationship of a multitude of variables within an organisation. Change is also perceived as a process of learning and organisations need to become open learning systems. It is the uncertainty of both the external and internal environment that makes this approach more pertinent than the planned approach (Bamford and Forrester, 2003). The approach, therefore, stresses a promotion of 'extensive and in-depth understanding of strategy, structure, systems, people, style, and culture. Successful change is less dependent on detailed plans and projections than on reaching an understanding of the complexity of the issues concerned and identifying the range of available options.



Therefore, the emergent approach to change is more concerned with change readiness and facilitating for change than to provide specific pre-planned steps for each change project and initiative. In addition, emergent approach to change management stresses the developing and unpredictable nature of change and views change as a process that unfolds through the interplay of multiple variables within the organizations.

#### **c. Change Management in Social Welfare Organizations**

Change management policies have become a critical component for social welfare organizations in Zimbabwe. This is owing to the volatile and unpredictable socio-political and economic situation of the country. In consideration of the above, it is essential that managers are conscious of the various factors that can culminate into or trigger the need for change management by the organization. As alluded to earlier change management can be a welcome or unwelcome process, depending on the nature of the change and the impact that it will have on the position of employees as well as the structure of the organization.

#### **d. Triggers for Change Management**

Dawson (2003) asserts that varying triggers for change management exist and these may emanate from within or outside the organization, leading to what can be termed external and internal drivers of organizational change.

#### **Conclusion:**

Change management, innovation, and control though overlooked are in fact very crucial concepts within the realm of Management. Change management considers tactful efforts made to balance organization and employee interests in the light of organizational change. Innovation in management focuses on the development of new ideas or enhancements of older systems for improved results. Managing creativity and innovation is indeed a difficult job. Successful companies see creativity and innovation as a basic function that needs managing. Control engages mechanisms utilized by managers to ensure that activities do not deviate from their intended purposes and achieve intended results.

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## **AN OVERVIEW OF PHOSPHOINOSITIDE 3-KINASE DELTA (PI3K $\Delta$ ) ACTIVATION SYNDROME (APDS)**

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### **Abstract:**

Activated phosphoinositide 3-kinase delta syndrome (APDS) is a recently identified type of inborn error of immunity (IEI), resulting from heterozygous mutations in either the PIK3CD or PIK3R1 genes. These genes encode the leukocyte-specific catalytic p110 $\delta$  subunit and the widely expressed regulatory p85 $\alpha$  subunit of phosphoinositide 3-kinase delta (PI3K $\delta$ ), respectively. Initially observed in patients presenting with respiratory infections, hypogammaglobinemia accompanied by normal to elevated IgM serum levels, lymphopenia, and lymph proliferation, the disease's onset appears to vary over time in terms of age at onset and the complexity of clinical and immunological manifestations. Often, patients are referred to multiple specialists, such as hematologists, rheumatologists, and gastroenterologists, before undergoing immunological assessments, leading to diagnostic delays that can adversely impact prognosis. The considerable diversity in clinical and immunological presentations necessitates awareness among healthcare providers, as promising outcomes have been reported with p110 $\delta$  inhibitors, significantly enhancing patients' quality of life and prognosis.

**Keywords:** Activated phosphoinositide 3-kinase delta syndrome, Phospholipid 4,5-bisphosphate, Toll-like receptors, Immunoglobulin replacement therapy

### **Introduction:**

A regulatory subunit plus a catalytic subunit, designated as p110, make up class IA PI3Kinase (PI3K). Phospholipid 4,5-bisphosphate (PIP<sub>3</sub>), an essential secondary messenger phospholipid, is synthesized by class IA PI3Ks from PIP<sub>2</sub>. The genes PIK3CA, PIK3CB, and PIK3CD encode for the class IA PI3K catalytic subunits p110 $\alpha$ , p110 $\beta$ , and p110 $\delta$ , respectively. It is noted that leukocytes are the main origin of P110 $\delta$  expression. Additionally, three genes encode proteins for class 1A regulatory subunits. p85 $\alpha$ , p55 $\alpha$ , and

p50 $\alpha$  are the regulatory subunits that the gene PIK3R1 encodes since it uses distinct initial exons. The regulatory subunits P85 $\beta$  and P55 $\gamma$  are encoded by the genes PIK3R2 and PIK3R3, respectively. Each catalytic subunit has the capacity to bind to any regulatory subunit in response to external signals. The regulatory subunit is essential for the proper function of the catalytic unit as it regulates kinase activity, stability, and cellular localization. Many membrane receptors, such as the T cell and B cell receptors, cytokine receptors, and costimulatory membrane molecules, activate the PI3K pathway, which phosphorylates downstream molecules, including ribosomal protein S6 and AKT. [1,2]

A recently acknowledged primary immunodeficiency disorder is referred to as activated phosphoinositide 3-kinase  $\delta$  syndrome (APDS). APDS (APDS1) arises from gain-of-function (GOF) mutations originating from the PIK3CD gene, responsible for encoding the p110 $\delta$  catalytic subunit of phosphoinositide 3-kinase  $\delta$  (PI3K $\delta$ ). [3]

Another associated syndrome, termed APDS2, has been documented, caused by a mutation in the PIK3R1 gene, responsible for encoding the p85 $\alpha$  regulatory subunit of PI3K $\alpha$ . This protein, predominantly expressed in leukocytes, plays a role in activation, proliferation, and survival. Clinical manifestations of this disorder resemble those of common variable immunodeficiency (CVID), but patients also exhibit indications of autoimmune and cellular immunodeficiency. APDS is a combination immune insufficiency as a result. Another name for APDS is "p110 $\delta$ activating mutation causing lymphadenopathy, immunodeficiency, and senescent T cells". [4,5]

### **The Development and Genetic Basis of APDS:**

The family of enzymes known as phosphoinositide 3-kinases (PI3Ks) plays a crucial role in intracellular signaling across various mammalian cell types. Comprising three classes, namely PI3K $\alpha$ , PI3K $\beta$ , and PI3K $\delta$ , each PI3K class consists of three catalytic subunits and five regulatory components. These enzymes operate downstream of T cell receptors (TCRs), B cell receptors (BCRs), Toll-like receptors (TLRs), and various cytokine receptors. Furthermore, PI3Ks are involved in essential cellular processes such as survival, differentiation, trafficking, and proliferation. [6]

The components comprising PI3K $\delta$  include catalytic subunits (p110 $\alpha$ , p110 $\beta$ , and p110 $\delta$ , encoded by PIK3CA, PIK3CB, and PIK3CD, respectively) and regulatory subunits (p85 $\alpha$ , p55 $\alpha$ , p50 $\alpha$ , p85 $\beta$ , p55 $\gamma$ ). Among the regulatory subunits, p85 $\beta$ , p55 $\alpha$ , and p50 $\alpha$  are encoded by PIK3R1, while PIK3R2 and PIK3R3 encode p85 $\beta$  and p55 $\eta$ , respectively.

Class IA PI3Ks encompass both p85 $\alpha$  and p110 $\delta$  and play a critical role in various stages of T and B lymphocyte growth, differentiation, and function. The p110 $\delta$  catalytic subunit of the PIK3CD gene is primarily expressed in hematopoietic cells, including lymphocytes, myeloid cells, and stem cells. Mutations that lead to a gain of function in the PIK3CD gene result in hyperactivity of PI3K $\delta$ , causing effector T cells to undergo premature aging. This condition, known as Activation of PI3K $\delta$  syndrome (APDS type I), is attributed to such mutations. On the other hand, mutations in the PIK3R1 gene, responsible for encoding regulatory components (p85 $\alpha$ , p55 $\alpha$ , and p50 $\alpha$  units), lead to PALS1-R1 or APDS Type 2. [7,8]

### **Explanation of the Autoimmune Response and Excessive Lymphocyte Growth Observed in Individuals with APDS:**

Upon activation of receptor tyrosine kinases (RTKs), specific adaptors like Gab2 or IRS family proteins are attracted to the p85 subunit, the regulatory component of PI3K. This interaction leads to the activation of the catalytic p110 $\alpha$ ,  $\beta$ , and  $\delta$  subunits of PI3K. PI3K converts phospholipid phosphatidylinositol 3,4-triphosphate to phosphatidylinositol 3,4,5-triphosphate (PIP3). AKT (AKT Serine/Threonine Kinase 1), PDK1, and PDK2 (part of mTORC2) are recruited from the cytosol to the plasma membrane by PIP3. PDK1 phosphorylates AKT on Thr308, and PDK2 phosphorylates AKT on Ser473. This leads to further activation of the mTOR signaling pathway and upregulation of pro-transcription factors like FOXO. These transcription factors regulate apoptosis and cell cycle progression by entering the nucleus and initiating the transcription of genes such as CDKN1A (p21Cip1), CDKN1B (p27Kip1), Fas-L (TNFL6), and BIM. Dysregulation of this mechanism in individuals with APDS results in autoimmunity and excessive lymphocyte growth. [9,10]

### **Inheritance Pattern**

An autosomal dominant mode of inheritance characterises APDS, a genetic illness. According to recent research, activated PI3-kinase delta syndrome 7 may be inherited through paternal gonadal mosaicism.

### **Genetic Elements in the PI3K/AKT Signaling Pathway:**

The PIK3CD and PIK3R1 genes consist of several domains, including the adaptor-binding domain (ABD), proline-rich regions (PrR), breakpoint cluster region homology domain (BH), and Ras-binding domain (RBD). Recently identified mutations in the linker between RBD and ABD specifically alter the orientation of ABD, influencing the interaction between translated proteins. [11]

### **Genetic Mutations Observed in Individuals with APDS:**

Genetic alterations in the implicated genes lead to an overactive PI3K/AKT signaling pathway. These variations, particularly gain-of-function mutations in the germline, result in various clinical symptoms such as lymphoproliferation, autoimmunity, and heightened downstream signaling, including CD8<sup>+</sup> T cell senescence. A portion of these mutations result in the shortening of the p85 $\alpha$  domain, which causes the catalytic subunit (p110 $\delta$ ) APDS to become hyperactive and prevents the catalytic and regulatory subunits from interacting.

E1021K is the PIK3CD gene variation that is most frequently observed to occur. It improves the activity of p110 $\delta$  and membrane association. Phenotype similar to Hyper IgM syndrome may also be caused by mutations in the PIK3CD gene in some situations. raise the likelihood of developing cancer. One of the causes of these aberrant phenotypes is aberrant signalling via the PI3K/AKT pathway.

Moreover, research indicates that patients carrying this mutation exhibit elevated levels of PIP3 and phosphorylated AKT protein in their lymphocytes, rendering these cells susceptible to activation-induced cell death.

Recently, Tsujita *et al.* reported two individuals with loss-of-function mutations in the PTEN gene, showing clinical and immunological traits akin to APDS. Their study revealed heightened AKT/mTOR/S6 signaling in the lymphocytes of these individuals, potentially contributing to this observed phenotype. [12,13]

### **Laboratory Examinations:**

Senescent T-cells (CD57<sup>+</sup>CD3<sup>+</sup>) are one of the hallmark laboratory manifestations of APDS and are frequently elevated in patients. Additionally, these cells frequently with treatment, get better. Patients with APDS are characterised by hyperactive PI3K signalling. In these cases, functional tests can be conducted using phosphorylated AKT as markers<sup>46</sup>.

Telomere shortening is a hallmark of senescent cells. There have been prior reports of shortened telomeres on total lymphocytes in both a young patient with APDS and an elderly patient with APDS<sup>11</sup>. Comparing naïve CD8<sup>+</sup> T cells from APDS patients to age-matched controls, telomere lengths were shorter in the former group.

A conclusive diagnosis of APDS patients may result from sequencing the genes involved in the PI3K/AKT pathway, including PIK3CD and PIK3R1. [14]

### **Treatment Alternatives:**

From simple monitoring to hematopoietic stem cell transplantation (HSCT), patients with APDS have a range of therapeutic options based on the severity of their condition, from mild to life-threatening presentations. Antimicrobial drugs used for prophylaxis remain consistent due to the similar infection profile seen in antibody deficiency. Azithromycin and trimethoprim/sulfamethoxazole are the two most commonly prescribed medications. In some cases, this treatment may suffice on its own.

The majority of research indicates a positive response to immunoglobulin replacement therapy (IRT) in patients with possible defects in antibody generation and function. Both subcutaneous (SCIG) and intravenous (IVIG) administration routes are viable options. The standard monthly IVIG dosage is 0.4 g/kg, with the possibility of increasing it to 0.6 g/kg in cases involving bronchiectasis. While this therapy is effective in reducing recurrent respiratory infections, its efficacy in preventing autoimmunity, lymphoproliferation, or herpes infections may be limited. [15,16]

Treatment with immune modulators is beneficial when there are indications of autoimmunity, such as sclerosing cholangitis, arthritis, inflammatory colitis, cytopenias, and renal disease. Steroids, rituximab, and splenectomy have all been used to treat autoimmune cytopenias. Transplant of the liver been carried out on individuals suffering from sclerosing cholangitis as well. Non-neoplastic lymphoproliferation benefited from rituximab as well.

Sirolimus (Rapamycin), an mTOR inhibitor, plays a role in T cell metabolism and immunological regulation. It has demonstrated effectiveness in treating non-neoplastic lymphoproliferation, leading to a reduction in hepatosplenomegaly, lymphadenopathy, and the restoration of T cell proliferation. However, its response is not as satisfactory for gastrointestinal complaints accompanied by cytopenias. In clinical studies, adult individuals with APDS are undergoing treatment with selective PI3 kinase inhibitors like nemoralisib and leniolisib. Preliminary data show a positive response in lymphoproliferation, overall health, and immunological markers. [17]

APDS patients have traditionally received Ig replacement therapy and antibiotic prophylaxis (such as trimethoprim/sulfamethoxazole and/or azithromycin) as their primary treatments. However, these approaches have shown limited effectiveness in preventing lung damage, managing symptoms of immunological dysregulation, or controlling herpes virus infection.

Advancements in our understanding of APDS pathophysiology have enabled personalized treatment approaches in primary immunodeficiency disorders. Treatment with the mTOR inhibitor rapamycin has demonstrated positive outcomes in regulating lymphoproliferation and addressing gastrointestinal symptoms, although its efficacy in managing cytopenias is somewhat limited. [18]

Recent treatment trials involving specific p110  $\delta$  inhibitors have shown promising results in reducing senescent CD57+ T-cells and circulating transitional B cells in small cohorts of APDS patients. Notably, nearly every patient experienced a reduction in autoimmune symptoms and lymphoproliferation. These clinical investigations underscore the potential for targeted pharmacological interventions to modify the underlying causes of this disorder. The future use of oral p110  $\delta$  inhibitors holds promise for individualized treatment approaches in APDS, potentially improving prognosis and quality of life, particularly given the association between PI3K hyperactivation and B-cell lymphomas.

**Conclusion:**

APDS presents an intriguing blend of autoimmune inflammation and primary immunodeficiency, making it a compelling subject for further investigation. Delving into its complex etiology will be essential to uncover new avenues for diagnosis and treatment. Understanding the molecular mechanisms underlying clinical symptoms beyond immune system-related issues, such as the neurodevelopmental delays associated with both forms of APDS, presents intriguing research paths. Additionally, exploring the SHORT syndrome-like characteristics observed in APDS2 individuals offers further intriguing avenues of study.

Furthermore, identifying prognostic indicators to guide treatment decisions will be a future challenge. This can be addressed through initiatives like the Primary Immune Deficiency Treatment Consortium in North America and the ESID-APDS registry in Europe, leveraging natural history investigations to achieve their goals.

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## **COVID-19 PANDEMIC: NEW OPPORTUNITIES FOR EMPLOYMENT**

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### **Abstract:**

The impact of COVID 19 on businesses is unavoidable, it has hampered everything from the economy to livelihood, businesses and organizations are going through this difficult time. Organizations look for innovative solutions by which they can continue operations smoothly. From hiring employees to retaining them everything is a big challenge. The recruitment process identifies the vacancy of jobs, inviting applications, analyzing the job demands, reviewing the applications, screening, listings, and selecting the suitable candidate for the job. In COVID-19, organizations are operating remotely and their workers are working from their homes. In recruitment, electronic-Recruitment or online recruitment uses web-based technology for identifying, evaluating, picking, signing, and on boarding job prospects. It is a technology that helps firms to online workflows and recruitment tasks to boost productivity, time-to-fill, cut hire costs and improve their organization's overall skills profile. This study aims to analyze the impact of Covid-19 Pandemic inference in the recruitment process, to understand how E-recruitment is swapping human involvement in the recruitment process. The objective of this study is to examine the impact of the Covid-19 Pandemic situation on the Recruitment process i.e, E-recruitment.

**Keywords:** Recruitment Process, Electronic-Recruitment, Covid-19 Pandemic, Web based technology

### **Introduction:**

In today's changing world, finding the right individual for the appropriate job is critical. Companies rely on qualified resources, but finding them is an expensive endeavor. Most firms have a conventional hiring process that includes evaluating resumes, group discussions, interviews, and psychometric tests. According to studies, companies are moving and adopting technology. Without abandoning the idea of going global in social aspects, the recruiting cost can be decreased by having an e-recruitment platform. Most Organizations should be concentrating on building an online recruitment procedure that allows for the creation of concrete premade profiles. An organization's goal is always the

same: to reduce costs and automate procedures. According to the wiki, e-recruitment is "the method and process of recruiting personnel utilizing electronic resources, particularly the internet." Organizations and recruitment agencies have shifted much of their recruitment process and method from traditional to online mode to enhance the speed with which potential candidates are matched with available positions. HR Managers now fill the available positions in a fraction of the time which was previously achievable by utilizing database technology, online job advertising boards, and search engines." Though Covid-19 comes up with many challenges for the organizations, recruitment is one of them.

Traditional methods used by organizations such as posting the jobs on various platforms may create unemployment and unavailability of skilled employees for the organization. Recruiting and finding the right candidates for the organization is no small task. Corporate as enhancing to adopt technology-aided recruitment techniques and total which can be used remotely and help in ensuring hiring as well as in business continuity caused by the pandemic disruption. Organizations tend to have data-based and analysis-driven inputs that can be used in recruitment decisions to ensure the availability of skilled candidates. The e-Recruitment system reduces the pollutants and energy associated with the production, transportation, and usage of paper items. The automated procedure would save energy in various functions like sending letters by posts, recording the data in hard copy, filing of details, report making, etc. E-Recruitment helps in reducing paperwork used in resumes, advertising, and publishing results. The organization should create an easy-to-use and functional online portal to build a tangible online recruitment process that can provide a concrete premade profile.

The E-recruitment should be well-designed so that it provides the organizations with competent professionals for the role, with an emphasis on taking the tests in the Online platform which should focus on Skills tests, Competency tests, Experience sharing, Psychometric tests, and in the end submitting the candidature. Once the profile is submitted to HR, the system should be able to generate the necessary required data, allowing the HR team to conduct telephonic/online interviews to assess the person's capabilities, followed by a face-to-face interview with the stakeholder. Employers can access a larger number of potential employees through e-recruitment. Companies can construct their electronic-recruitment platforms, by using e-recruitment HR software, or by using recruiting agencies that include e-recruitment in their package.

### **Literature Review:**

Abia, M., & Brown, I. (2020) reviewed that e-recruitment is known by many other names, like internet recruitment, online recruiting, web recruitment. E-recruitment as compared to traditional recruitment use information technology and software to manage the recruitment process of the organization. A recruiting model that presents the recruitment process includes the activities like setting the objectives of recruitment, strategy designing, conducting the recruitment activity, and assessing recruitment output. Recruiters fight for the best-fit applicants (job seekers which are suitable and perfect fit for the available job), whereas, job seekers compete for jobs to get selected; this motivates both the organization and candidate to adopt information technology fastly to alleviate some of the challenges in the recruitment efforts. This study reviewed five concepts of e-recruitment that emerged from extant literature; these are e-recruitment as a technology tool, system, process, service, and proxy. It also concluded the problem of diversity in the organization to understand the concept of e-recruitment, which goes unnoticed in the stored literature, and advocated that recognizing and labeling the many conceptualizations of e-recruitment can be part of the articulation of diversity.

Simón, C., & Esteves, J. (2015) concluded that substantial forces of institutions may induce firms to choose the features of the recruitment websites of the organization are based on copying and feature the colleagues in their reference, networks, and groups. In the other research studies of the IT industry, e-recruitment functions that the HR personnel may utilize to tailor the available application to as per their requirements and cost-benefit criteria. IT sector examination of digital business strategies by emphasizing the significance of understanding the external environment and its role in forming the digital business strategy. To summarize, electronic recruitment has the scope to become a significant tool and method for employers and HR professionals in seeking and identifying the top people while reducing expenses occurred with the screening of worldwide candidates. E-recruitment has obvious benefits for any organization; it also creates several obstacles for businesses.

Ehrhart *et al.* (2012) The study on attracting and recruiting is both conceptually and practically useful because the job market is flooded with Web-savvy applicants who frequently visit various websites as their first point of contact with a company. It is crucial to examine the contributions made by the website so that businesses can use it to manage the available resources and attract the best valuable human resources. Given the

prominence of this recruitment strategy in companies and the need to balance its potential and risks and also suggested that employee-organization fit should be there to achieve the organizational objective. It also helps in mediating the relationship between work-life balance and enhancing the usability of the website. Organizations should plan for the implications and opportunities of attracting a huge number of potential applicants, and to provide feedback or other important information that could encourage and helps in the better and more accurate selection of human capital through the e-recruitment process.

Kucherov, D., & Tsybova, V. (2021) presented that the e-recruitment methods which include internet based and internal technology-enabled solutions, are to be used in the overall context of human resource management (HRM) digitalization. E-recruitment methods are associated with the favorable outcome. However, e-recruitment utilization does not serve as a bridge between e-recruitment techniques and outcomes. E-Recruitment aid not only in lowering the cost of advertisements and selection procedures but also in eliminating paper work. Hot skill alerts can be enabled to allow organizations to be notified when a candidate who meets the criteria for future requirements registers. People looking for a job can browse for and apply 24\*7. Recruitment agencies, which can cost thousands of pounds, can also be avoided to reap the true economical benefits of internet recruitment. Bhupendra, S.H., & Swati, G. (2015) The strategy of hiring the best candidates and encouraging them to investigate job opportunities are defined. The organization itself can recruit, or by outsourcing it to an external agency. On the other hand, it is difficult to determine the most efficient recruitment source and it is situational and has its pros and cons.

Adetunji, O.J., & Ogbonna, I.G. (2013) Recruitment has a long history, starting from prehistoric times because individuals tend to consume the services of others when they cannot do that alone. Adeosun, O. T., & Ohiani, A. S. (2020) presented that organizations can use salary, brand recognition, referral, and job stability as key variables in attracting and recruiting great people. In addition, digitalization is a major approach for attracting, recruiting, and selecting the most eligible employees. Using social media, traditional media, taking interviews online, as well as physical interviews have been shown to aid in the selection of top personnel. Gignac *et al.* (2021) studied the influence of COVID-19 on health, money, and organizational support. Human beings with the challenges of physical and mental health expressed more fears and less assistance as compared to other groups during the early stages of the COVID-19 epidemic, as per the findings. The findings also

highlighted the significance of job conditions to understand COVID-19, as well as the necessity to evaluate disparities in the conditions of COVID-19 perceptions and understand how work impacts views and can contribute to disparities that may occur as a result of a pandemic. Furthermore, the significance of working circumstances is not restricted to COVID-19. It merits additional research attention in the future and emphasizes the significance of developing more inclusive work opportunities for people with the challenges of physical and mental health.

Feldman, D. C., & Klaas, B. S (2002) Concluded that in the recruitment process both recruiter and job seeker can maintain their anonymity. Organizations can search for potential candidates and their CVs without advertising vacancies, or they can also promote the vacancies without making their names out. Additionally, job searchers can submit their CVs with the help of the Internet while maintaining the secrecy of their details like their names and details of employment. Al-Zagheer, H., & Barakat, S. (2021) Investigated and introduces the concept of electronic recruitment, as well as its benefits for both businesses and job seekers. Some of the advantages of internet recruitment include: Lowering the organization's costs. Moreover, generating information about a job online is less expensive than advertising it in the newspapers, there are no mediators. Also, the time taken in the recruitment is reduced. E-recruitment facilitates and helps in hiring the right candidate with the optimal skills which improves the efficiency of the recruitment process and also enhances the access to 24\*7 to an ample amount of online resumes for both applicants and organizations. E-recruitment has its own set of advantages and disadvantages, some of which are like screening and verifying the skills which consume lots of time. B. Low internet speed or lack of internet access or lack of awareness is also a flaw. C. Companies cannot rely solely on internet recruitment strategies. D. In India, both the interviewer and interviewee prefer to connect in person rather than over email.

### **Research Gap:**

An analysis of the existing literature on this topic suggests that, to date, there is a lot of research done in the area of recruitment traditional recruitment, methods of recruitment, and the role of technology. This research paper is an attempt to show the impact of the Covid-19 pandemic situation on the recruitment process during pandemic

### **Research Objectives:**

1. To examine the impact of the Covid-19 pandemic situation on the recruitment process.

### **The Changing Dynamics of Work:**

The administrative center of 2021 is dynamic, digital, flexible, and much more likely to mirror the attitudes of the out of doors international than it's ever been earlier. The team of workers is extra assertive about its technique to work and existence, and the significance of labor to many human beings is declining. Indeed, today's personnel anticipate their organization to provide the power they want to actively pursue work and existence. At the equal time, they insist their enterprise offers improvement opportunities, an experience of purpose, and famous values that align with their own. Whether you're a candidate, a hiring manager, or a recruiter, know-how of these dynamics is critical. Recruiting is intrinsically human, after all, and the system of seeking out work or in search of new employees is impacted a lot with the aid of using non-public desire as it's miles with the aid of using commercial enterprise situations and economics. Today's employees don't reflect on consideration on work stability a lot as work integration. They're media-savvy, socially conscious, and decided to stay their lives their manner. In the past, organizations dictated the kind of era personnel used. Today, employers ought to adapt to several manufacturers and tools sort as employees select for themselves the answers that fine shape their manner of working—and their manner of existence. Even earlier than COVID-19, such developments have been gaining momentum. When the pandemic struck, thousands have been pressured to work from home, although the variety of remote employees was step by step developing for years. Childcare has become a disaster for many households as dads and moms juggled their obligations at duties of work life with supporting their children to learn, crystallizing the balancing act many households had struggled with for a few time. Meanwhile, administrative center protection and well-being have become vital problems for the rank and file. In the middle of all this sits skills acquisition. New expectancies from personnel and a new era embraced with the aid of using purchasers have fueled modifications in how applicants look for work in addition to how and in which they do their jobs. The team of workers has undergone essential modifications in current years, and the maximum critical modifications may be in play a few times.

### **New Varieties of Employees**

In the past, classifying employees turned noticeably simple: They had been both full-time and part-time. Then, around 2009, businesses started to hire "gig" employees, unbiased contractors working on a brief basis. Spurred by the upward thrust of businesses like Uber, DoorDash, eCourier, and Deliveroo, the gig financial system grew, as did the

number of businesses experimenting with new procedures to the body of workers' strategy. Contingent employees permit businesses to lessen overhead and boom flexibility. At the equal time, more youthful employees consider contingent work to offer them extra management over their existence and incomes. According to the contingent body of workers control firm unlimited, over 1/2 of professional employees can be unbiased through the cease of 2021. More employers in extra industries will use them for the entirety from taking patron service calls to coding internet pages. The huge availability of contingent employees permits businesses to increase extra dynamic expertise strategies. Part-time and gig employees allow businesses to quickly address modifications in commercial enterprise situations or income cycles by increasing or shrinking their body of workers. Specialized expertise may be without problems working on-demand, for much less money, and kept on for so long as their capabilities are needed. Meanwhile, the communications and collaboration era permits many employees to do their jobs from quite tons anywhere. Their proximity to a bodily workplace has become much less important to the organization's operation if it turned into a component at all. At the equal time that far-off works have become extra familiar, industries like era, finance, and expert offerings looked for extra applicants no matter their location. The talent around the globe is now inside anyone's reach.

### **Digital Work:**

At the peak of the pandemic, as hiring fell and unemployment rose, many employers set their skills acquisition groups to work strengthening pipelines and adopting new technology. In a few cases, recruiting persevered so the commercial enterprise might be saved running. In others, executives desired to make certain they may fast resume hiring once the economic system recovered. But hiring is trickier now, especially for organizations that rely upon workplace people. In-character interviews have long passed via way of means of the wayside and collaboration among skills acquisition and hiring managers should be done virtually. Many agencies that stopped actively recruiting in early 2020 turned their interest to sourcing activity seekers and constructing a pipeline of qualified skills. Here again, they have been making ready-for-the-day hiring selections up. Just as they needed to include far-off work to maintain operation, many employers had little preference however to undertake new tactics for communication, such as cell access, and addressing precise workflows, which includes onboarding through virtual platforms. Today, digital activity festivals and video interviews are less probably to be taken into

consideration as nice-to-haves. Most skills acquisition experts trust that digital recruiting becomes routine. A survey via way of means of LinkedIn determined that 81% of skills acquisition experts trust digital recruiting will stay used post-COVID. 70% trust virtual interviews become standard. Video-based recruiting structures have imposed several administrative duties onto skills acquisition groups. Interviews need to be set up, exams made, and references and backgrounds checked in remarkable volumes. Meanwhile, relationships should be developed with promising candidates, even though there's no instant want to rent them.

### **Internal Mobility:**

Of course, now no longer each activity may be stuffed via way of means of outside candidates. For one thing, there's a capabilities shortage, which makes attracting and hiring the right person for any given function especially challenging. By 2030, the global economic system could be brief greater than eighty-five million people, in keeping with Korn Ferry. Demographics are at the back of the shortage; the firm's observation says. Older people are retiring quicker than more youthful people can get the schooling and enjoy they want to update them. Training has handiest grown in significance as employers emphasize the want for up-to-date, specialized capabilities of their body of workers' improvement plans. In response, many people prioritize possibilities to broaden new capabilities and attain the enjoy important to rise. One observation, for example, determined that the 2 pinnacle motives Millennials depart their jobs are a loss of improvement and mobility. All of this made the exertions marketplace intensely competitive. As they sought greater options, employers found out that they'd a supply of skills hiding in undeniable sight: their body of workers. In 2020, numerous agencies applied inner mobility structures to now no longer handiest fill full-time positions however to cope with gig initiatives and activity sharing, as well. Layoffs, tightening budgets, and hiring freezes notwithstanding, employers nonetheless wanted people to fill vital roles. And it wasn't misplaced on them that inner mobility accelerated engagement and retention, decreased fees and time to rent, and accelerated agility and versatility all through the organization. Internal mobility offers any other benefit: The idea's famous with more youthful people, who examine the opportunities for motion whilst they're thinking about a brand new activity. According to PwC, 52% of Millennials say that possibilities for professional development make a potential agency attractive.



## **What can Candidates Do: Searching for the Next Position?**

**1. Understand the Role, Company, and Recruiting Process:** Understand the agency you're using and the manner its hiring technique works. Don't be afraid to ask about flexible artwork arrangements, compensation, opportunities for boom, and transferring throughout the corporation. Ask about the hiring technique itself and what you may anticipate at each step.

**2. Demonstrate that You're Comfortable Working Remotely:** For a way of working, make sure you're comfortable taking components in video interviews and have reliable technology. Many work-from-home opportunities moreover require unique abilities, collectively with sturdy agency and verbal exchange. If you've got the ones, make sure to consciousness on them to your resume and with inside the direction of interviews. For opportunities that offer a combination of in-person and way of work, ask employers to make clean their expectations spherical the one's arrangements.

**3. Know How Contingent Work Fits with Your Search:** If you're having trouble landing the right procedure, consist of contingent work. It's a top-notch way to avoid resume gaps at the same time as growing new reviews and abilities. Ask about versions amongst contingent roles and distinct employment types, especially if the one's opportunities are new to you. Most vital, inquire about which contingent work may also lead inside the future.

**4. Learn About the Company's Commitment To DEI:** If you're a member of an underrepresented group or have in my opinion labored to foster DEI, talk about it. Research the organization's commitments and initiatives, and prepare questions about the corporation's vision and its programs' impact. Also be cautious for crimson flags, collectively with a lack of variety inside the C-suite or a few application data on the website.

**5. Be Prepared, Flexible, and Responsive:** Expect competition to boom for suitable roles. Keep your resume and LinkedIn profile updated, and continuously be networking. Remember that many agencies use applicant monitoring systems to help evaluate candidates, so tailor your resume to each procedure description and consist of news and abilities that are relevant to the position. Look for strategies to stand out: Develop gift abilities or look at new ones, post an article, produce a podcast, and percent data with ability employers.

## **What can Hiring Managers Do: Seeking Strong Candidates?**

### **1. Create Direct and Appealing Job Listings**

Make certain activity descriptions are clean and concise. Use titles that applicants would seek, inclusive of product advertising and marketing supervisor in place of rock famous person product promoter. Responsibilities and qualifications ought to be smooth to apprehend and realistic. Most importantly, promote the activity and your corporation. Show applicants why it's higher to be just right for you than a person else.

### **2. Ensure Remote Hires Are a Part of the Team**

Give far-flung applicants an experience of what it's want to be just right for you. Since they won't be with inside the workplace, honestly introduce them to your crew for the duration of interviews, provide an experience in your tradition, and describe expectancies for collaboration and communications.

### **3. Make Your Expectations Clear**

Make certain contingent employees apprehend the expectancies for their position and feature opportunities to get their questions answered. Pursue a thorough, disciplined hiring procedure. Don't bypass steps like screening due to the fact a role is "just" contingent. You need to make certain contingent employees are devoted to doing their jobs nicely and pose no safety risk.

### **4. Match Candidates to Appropriate Jobs**

Pay interest to how resumes align with every activity. An ATS that permits applicants to add social profiles can come up with delivered perceptions of their strengths and weaknesses. Have human beings show how they'll technique their works. For example, ask income applicants to behavior mock income calls or product marketers to supply presentations.

### **5. Embrace Questions, Don't Fear Them**

Be organized to reply to hard questions. Candidates will need to recognize how COVID-19 affected your crew's operations or approximately what you're doing to foster DEI. If human beings are asking comparable questions, start proactively accomplishing out to address them. Technology, the shape of automation or virtual assistants, for example, could make this much less of a burden.

## **What Can Recruiters Do: Attracting and Engaging Talent?**

**1. Expand Outreach to New Targets and Channels:** Cast an extensive net. Reach out to everyone – each lively or passive applicant. Even employees who aren't actively looking are

open to taking over roles with higher compensation, greater flexibility, progressed mobility, and the like. To attain the proper applicants, use an extensive variety of channels and systems like LinkedIn, Stack Overflow, Angel list, or Facebook. And make certain your outreach efforts are prepared. Contacting the equal man or woman in a couple of instances reflects poorly on you and your commercial enterprise.

**2. Personalize the Entire Candidate Process:** Personalize your professional websites and candidate communications. If you're seeking out commercial enterprise analysts or new university graduates, for example, broaden messages and construct out touchdown pages that communicate in particular to the one's segments. Personalized studies growth the chance of applicants responding and might be instrumental in convincing them to pick your corporation over its competitors. At the equal time, make sure your emblem and tradition don't wander off inside the weeds.

**3. Showcase New Opportunities to Current Employees:** Share jobs internally and attain out to personnel. Use verbal exchange channels that they often engage with and companion with different departments to promote positions throughout the organization. When speaking with inner targets, make yourself as to be had as you'll for outside applicants, and make certain they apprehend how the transition procedure works.

**4. Assess Sourcing Bias and Talk About DEI:** To power diversity, often examine sourcing bias and comprise DEI into your message. Assess activity descriptions, professional webpage copies and pictures, and different communications to make sure language is independent and photos replicate various workplaces. Talk proactively approximately DEI, earlier than applicants even deliver it up. If you're worried approximately subconscious bias, remember the use of synthetic intelligence to reduce it in hiring decisions.

**5. Keep Teams Organized and in Touch:** For recruiting leaders seeking to keep productiveness whilst operating from home, make certain dependent approaches are in region and groups live prepared. Ensure recruiters have to get admission to gear that allows collaboration with others. Talk duties and closing dates to stakeholders. Keep everyone updated on what's taking place with every applicant and what's coming next. All of these continuous responsibilities from falling through the cracks and guarantee closing dates are met.

## **Platforms for Social Media Recruitment**

### **Recruitment through LinkedIn**

As per the online survey and some recent studies showed that LinkedIn is used 96% for Recruitment. With more than 14 million active job postings, LinkedIn is the way to find out suitable candidates for most recruiters. It also offers a vision of their interests, endorsements, and recommendations. 562 million global authorities including more than 160 million in the United States come across hundreds of industries that are using LinkedIn. Applicants on LinkedIn are permitted to do much more than post a job. Start by connecting with and following potential applicants. Start conversations with personalized messages presenting themselves and their company. Comment, like and share industry content to gain attention and authority. Monitor, validate, and write endorsements for capable individuals to shape relationships. Requesting for referrals and overviews and responding the favor. Companies using LinkedIn for recruiting are LogMeIn & Real Self.

### **Recruitment through Facebook**

Face book is used 40% of the time for Recruitment. Facebook may not be a dedicated professional network like LinkedIn, but it's an indispensable resource for recruiters. It is an unplanned atmosphere that can shed some bright on an individual's personality away from work, and it offers uncountable ways to discover and unite with candidates. It uniforms applications and a job board. Facebook has more than 2.85 billion global users, including 179.7 million active users in the United States. 84% of job seeker has Facebook accounts. Candidates on Face book options are just about endless. Follow and interact with prospective candidates; creating groups relevant to the positions looking to fill. Create and share content to promote the company and employer brand. Encourage hiring and networking procedures. Start chats on Messenger and post openings on the Facebook job board. Companies using Facebook for recruiting: Secure Link & Scopely.

### **Recruitment through Twitter**

Twitter is used 67.7% of the time for Recruitment. With its 280-character limit, Twitter is known for being short and sweet. That brevity is not a wicked thing, however, as Twitter has converted into a go-to source for news and events. Everyone from celebrities to common people or major company's practices Twitter to involve people worldwide. Twitter supports more than 17 languages. A user on Twitter gave birth to the hashtag, so start there. Chase for appropriate hashtags to link conversations and appeal to compatible candidates.

### **Recruitment through YouTube**

YouTube is used 11% for Recruitment. If you're one of those "back in my day" types you may want to look away: when given the option between text and video, 72% of internet users choose video. And when it comes to video, YouTube is the undisputed heavyweight. Like Instagram, few recruiters have embraced the channel, so those who get in now will have the advantage. Candidates on YouTube are 1.8 billion global users, including 184 million in the US. Candidates on YouTube are a little more straightforward. Create great video content personalized to your potential candidates. Don't overlook regenerate videos from the company website and supplementary social media channels. Companies using YouTube for recruiting: Headspace & Carbon Black hones.

### **Recruitment through Instagram**

Instagram is used 11% of the time for Recruitment. Instagram's film presentation has become immensely popular with millennials (the biggest percentage of the workers) and Generation Z. In spite of its attractiveness, less than 10% of recruiters influence this channel, which represents a huge early motivator opportunity (More than one billion global users, including more than 200 million in the US). Closely 70% are millennials and Gen Z candidates on Instagram curate a variety of visual content that captivates the audience's attention and encourages them to follow the company page. Involve with individuals' interests by following, liking, and commenting on their content. Participate in trending topics by posting related content with appropriate hashtags; Host Q&A sessions with the Stories feature, either live or with their infinite library of stickers. Companies using Instagram for recruiting: Exactly Corp & Teachable. Andrew Fennell (January 2022) finds out exactly how social media is being used in today's hiring process, he carried out 2 surveys; one of 350 job seekers and another of 95 recruiters.

### **Discussion:**

- a) Job Interviews Cannot Be Handled Face-to-Face All over the world, government institutions are making arrangements for their employees to work remotely from home. The goal is to prevent unnecessary travel and face-to-face interaction. Thus, job interviews cannot be held in the office but rather via zoom or Google meet or whatever platform is available.
- b) On boarding New Employees We are living extraordinary times, but we still have new employees starting at our offices who we need to onboard. It is not so simple to provide a great on boarding experience without meeting face-to-face or giving a tour at

the office. Yet, it is possible with proper infection control protocols being practiced at the office.

- c) **AI-powered Job Outreach Tools and Analytics** The need for HR to step up their game and also ensure a sound remote work experience for existing employees while ensuring vacancies are filled using remote processes demands better HR tools to help with job outreach and identification of candidates. Companies are now also looking at investing in Analytics tools to help scan several candidates and help shortlist the most relevant few based on specific keywords and skills sets so that they can achieve their hiring goals while maintaining their existing HR functions well during a remote work schedule.
- d) **Layoffs, Fewer Available Positions, and More Open Applications** Layoffs lead to more people being unemployed, which is a very unfortunate situation. Thus, there will be more candidates applying for jobs. With more unqualified applicants and fewer positions available in the government bureaucracy, there will be more open applications among potential applicants which usually results to unemployment.
- e) **People Will Be Less Open to Changing Jobs** During crisis or pandemic, the best employment agency is the government sector. Government employee's mindset is to value security over uncertainty during the crisis. Sourcing potential candidates can become difficult if their functions are exposed to a high rate of infection. Considering that government employees are guaranteed of their security, their productivity levels during pandemic declines.

**Conclusion:**

Given the negative impact of the pandemic to society relative to human resource management, it is important to note that as the world adapts to the new normal, recruitment for the right person with the appropriate competencies is essential for the success of any agency. COVID-19 strain examined recruiting and sharpened the expectancies of applicants. More regularly than they did earlier, personnel weigh a role's pleasure and ability towards their preference for training and advancement. Employers seek forward-searching competencies from a various variety of applicants, a lot of whom are already of their corporate "family." Talent acquisition is set know-how the competencies and aims of every candidate, the necessities of every position, and the capacity to fit each as quickly as possible. For that to happen, employers need to respond to or anticipate the candidate's needs. That starts evolved the procedure of constructing a

courting that is deep, profitable, and long-term. For applicants, guidance and versatility are the keys. The higher you apprehend a potential organization and its commercial enterprise, the greater assured you'll be for the duration of interviews with recruiters and hiring managers. Using contingent works to gain enjoyment in addition to paying, and locating methods to face out from others inside the field, builds credibility and encourages managers to peer you as an answer to the demanding situations they face in getting work done. The commercial enterprise global has by no means provided a lot of possibilities and the exertions pool has by no means held such ability. Whether you're seeking out a brand new activity or a brand new member of your crew, you may control today's marketplace dynamics through the know-how of the tendencies we've mentioned and make plans for your approach to mirror them.

#### **Limitation & Future Aspects of the Study:**

The authors have added fresh information to the study. This will add to the existing body of knowledge. The study includes some new points that will help e-recruitment practitioners uncover more functionalities into recruitment apps and identify gaps in current e-recruitment applications. The proposed research can be carried out in various locations in India, especially where hitech firms are located, such as Bangalore, Mumbai, Delhi-NCR, Pune, and so on. Future research can be done to compare the e-recruitment procedure of different industries.

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## **USING ARTIFICIAL INTELLIGENCE TO PRIORITIZE ELEMENTS AFFECTING CUSTOMER SATISFACTION IN ONLINE BANKING**

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### **Abstract:**

Customers' interactions with their banks have been completely transformed by internet banking, which gives them easy access to a variety of financial services from the comfort of their homes or mobile devices. Client contentment An endeavor's ability to succeed depends on a crucial element: the supply of internet banking services, which has a direct impact on client loyalty and retention. This study investigates the use of convolutional neural networks (CNN) and random forests as artificial intelligence (AI) techniques to prioritize the elements that impact online banking customer happiness. Data on demographics, transaction histories, and customer feedback are first gathered from a wide sample of online banking users for the study. After that, this dataset is preprocessed to deal with outliers and missing values. To extract pertinent features from the data, such as transaction frequency, UI preferences, and security perceptions, feature engineering approaches are used. A machine learning method called Random Forest is used to determine how significant each feature is in predicting customer happiness. It offers perceptions on the main elements that influence online banking customers' pleasure. These could include how simple it is to navigate, how quickly the platform responds, and how confident you are in the bank's security protocols. Convolutional neural networks (CNNs) are also used for the analysis of unstructured data, such reviews and consumer feedback. CNNs use natural language processing methods to glean topical and sentiment information from customer comments. This makes it possible to understand the underlying causes of client happiness or dissatisfaction on a deeper level.

An extensive grasp of the variables affecting customer satisfaction is made possible by the combination of CNN and Random Forest research. Based on the Random Forest model's significance scores, these elements are ordered. The quantitative results from Random Forest are supplemented with qualitative insights from the CNN analysis.

The findings of this study can help online banks prioritize their efforts to improve client happiness. Banks can better satisfy customer expectations by customizing their services, user interfaces, and security measures by concentrating on the most important elements discovered by AI techniques. In the end, this strategy may result in increased client loyalty and retention, preserving the long-term viability and competitiveness of online banking platforms. To sum up, this study demonstrates the effectiveness of AI, more especially Random Forest and CNN, in ranking the variables that influence online banking customers' pleasure. It emphasizes how important it is to do both quantitative and qualitative research in order to fully understand consumer attitudes and preferences in the context of digital banking.

**Keywords:** Internet Banking, Customer Satisfaction, Artificial Intelligence, Random Forest, Convolutional Neural Networks

**Introduction:**

In the twenty-first century, internet banking—also known as online banking or digital banking—has taken on a crucial role in our daily lives. With the ability to perform a variety of financial activities and conveniently manage their accounts using web-based platforms and mobile applications, it signifies a revolutionary change in the way people and organizations engage with financial institutions. This shift has profoundly changed client expectations and experiences in addition to revolutionizing the banking sector.

The expectations of customers regarding the caliber of services given by financial institutions have changed in tandem with the evolution of internet banking. One important indicator of the performance and competitiveness of online banking services is customer satisfaction. A happy consumer is more likely to stick with the bank, interact with it more, and refer others to it for services. On the other hand, unhappy clients are more likely to leave and look for other options, which can be bad for a bank's profits.

Financial companies must grasp the elements that influence consumer satisfaction with online banking. In a time of intense competition and erratic customer loyalty, the stakes are enormous. As a result, the banking sector has resorted to cutting-edge technology, mainly artificial intelligence (AI), in order to better understand the dynamics of customer satisfaction and create plans that improve the overall customer experience.

This study aims to investigate how artificial intelligence (AI), more especially the Random Forest algorithm and convolutional neural networks (CNNs), can be used to prioritize the elements that affect online banking customers' pleasure. Financial institutions can better understand the needs and preferences of their customers by

utilizing AI and data-driven approaches. This allows organizations to tailor their services, user interfaces, and security measures to the preferences and needs of their users.

### **1. The Evolution of Internet Banking:**

The idea of home banking first surfaced in the 1980s, which is when internet banking first started to take off. Through phone lines, users may access their accounts and do simple transactions. But true internet banking did not emerge from the World Wide Web until the 1990s. Basic features like checking balances and transferring money between accounts were all that early online banking systems offered.

The accessibility, functionality, and security of online banking have significantly improved over time. The acceptance of internet banking has been further expedited by the widespread use of smartphones and the creation of mobile applications. Customers may now handle a wide range of financial tasks from the palm of their hand, such as bill payment, fund transfers, investment management, and even loan applications.

### **2. The Significance of Customer Satisfaction**

In the fiercely competitive world of online banking, client happiness has become a vital component of success. Customers that are happy with a bank are more likely to stick with them, build stronger financial ties, and use a wider range of services. Additionally, by telling their friends and family about their great experiences, they can act as brand ambassadors for the bank, drawing in new business.

Conversely, unhappy consumers represent a serious risk. Customer retention is a never-ending difficulty because people tend to move their accounts to other financial institutions or institutions that provide better services. Retaining current customers is far less expensive than acquiring new ones, which emphasizes the value of maintaining current ones satisfaction an economical approach to sustained expansion and financial success.

### **3. The Role of Artificial Intelligence (AI) in Banking**

The sector of banking has seen a major transformation due to the rise of artificial intelligence. Financial institutions can use a wide range of technologies and approaches in this industry, including deep learning, machine learning, and natural language processing, to exploit data in novel ways.

Algorithms for machine learning, like Random Forest, are becoming indispensable resources for data analysis. Large volumes of data may be sorted through by these algorithms, which can then spot patterns and correlations that human analysts might find difficult to see. Given the scenario, it's critical to take into account all of the variables that

could affect the result. Random Forest can assist in measuring the significance of many elements that contribute to client happiness when it comes to online banking.

On the other hand, convolutional neural networks (CNNs), a subset of deep learning, have shown remarkable promise in analysing unstructured data, particularly text and images. In internet banking, CNNs can be applied to customer feedback and reviews, extracting sentiment and topic information to gain qualitative insights into customer satisfaction.

This research embarks on a journey to explore the role of Artificial Intelligence, particularly Random Forest and CNNs, in uncovering the factors that drive customer satisfaction in internet banking. As the banking industry continues to evolve in the digital age, understanding and prioritizing customer satisfaction are critical for the long-term success and competitiveness of financial institutions. Through the application of AI and data-driven methodologies, this study aims to provide valuable insights that can empower banks to meet and exceed customer expectations in the dynamic landscape of internet banking.

#### **Related Study:**

Banks are currently undergoing a transition towards a more competitive financial landscape, characterised by an extensive range of financial goods and services. From a pragmatic standpoint, the anticipation of client loyalty holds the potential to enhance comprehension of Islamic banking in relation to customer loyalty, hence furnishing a framework for bank management to enhance said loyalty. Hence, the central aim of this study is to construct an artificial intelligence framework for evaluating client loyalty within the context of Islamic banking in Malaysia. In order to accomplish this objective, an initial sample of 500 individuals was targeted in order to gather data, a systematic approach to data collecting is necessary. In total, 373 responses were obtained through the distribution of self-administered questionnaires, which were personally handed out to clientele at various branches of Islamic financial institutions situated in Kuala Lumpur, Malaysia. Furthermore, the examination of the returned samples involved doing data analysis and employing several statistical tools and methodologies, which were performed. The Statistical Package for the Social Sciences (SPSS) was utilised in the analysis. The criteria examined in this study were customer satisfaction, customer service quality, customer perceived value, and customer trust, as these aspects have been identified as influential in determining client loyalty. In addition, a novel evaluation model was formulated and constructed utilising an artificial neural network (ANN) methodology, which used cross-

validation techniques to effectively model and predict client loyalty. The choice to modify the design of the artificial neural network (ANN) is mostly driven by the predictive outcomes in order to achieve optimal computational performance of the ANN model for quantifying customer loyalty. A statistical analysis was performed, which involved calculating the the evaluation of the accuracy of customer loyalty estimation involves the computation of two key metrics: the root means square error (RMSE) and the correlation coefficient (COE). These metrics quantify the discrepancy and the strength of the relationship between the measured and estimated customer loyalty values, respectively. using artificial neural networks (ANN). The experimental findings, derived through cross-validation using COE (0.9867), suggest that the third artificial neural network (ANN) model exhibits superior accuracy when trained using fold 4 and the trainLM algorithm as compared to alternative structural configurations. The simulation findings demonstrated a statistically significant relationship between the predictor variables and customer loyalty. In summary, this study has successfully accomplished its intended objective of constructing an artificial neural network (ANN) model that offers a quantitative evaluation to support Islamic bank management in their endeavours to formulate and execute effective customer loyalty strategies [1].

The objective of this study is to examine and assess the fundamental elements that lead to the phenomenon. The advent of digital banking services (DBS) has significantly transformed the conventional approach to banking in response to the rapidly evolving contemporary landscape. The achievement was facilitated by the utilisation of contemporary artificial intelligence-incorporated technology. The motivation for this action was to address the increasing needs of consumers by using technology that is both user-friendly and time-efficient. The primary objective the objective of this study is to investigate and evaluate the many determinants factors that impact the level of acceptance and utilisation of digital the provision of financial services to rural micro, small, and medium businesses (MSMEs). The sector including micro, small, and medium businesses (MSMEs) in India is characterised by its high level of activity. The importance of this factor in the economic growth of the nation is significant since it contributes to both exports and domestic supply while also generating job possibilities. The design and methodology employed in this study are outlined in this section. The research was carried out through a questionnaire-based survey. A total of 148 rural micro, small, and medium enterprise the analysis undertaken for this study encompassed proprietors of Micro, Small, and Medium Enterprises (MSMEs). The adoption rate of digital banking services among rural micro,

small, and medium companies (MSMEs) in India is comparatively lower in comparison to their urban counterparts. This study employs IBM SPSS and AMOS as analytical tools. elucidate the predominant elements that impact individuals' attitudes about using digital banking services. The results of the study indicate the study reveals that many factors, including convenience (comprising Several factors, including perceived value and perceived simplicity of use, perceived self-efficacy, demonetization, performance expectations, and the impact of the pandemic, have a significant impact on individuals' views towards the adoption of DBS. The study's findings will offer valuable insights for banks and government organisations seeking to revise their plans in order to transform the economic and financial environment inside the nation towards a "cashless economy". The practical ramifications of this phenomenon are significant. The acceleration of digital banking services (DBS) in India may be attributed to many factors, such as the implementation of demonetization, the significant growth of eCommerce, the enforcement of the implementation of lockdowns or limitations in response to the epidemic, as well as the role of the government in this regard, emphasis on promoting the digital economy. These factors all contribute to the rapid adoption and utilisation of DBS in the country. The results of this investigation will offer significant contributions to our understanding of the subject matter governmental bodies and financial institutions in formulating effective strategies to support rural micro, small, and medium enterprises (MSMEs) in adopting digital banking services (DBS). The originality and value of the research findings are of utmost importance in academic discourse. The utilisation of digital banking services in India is now in its early stages; however, the pace of acceptance is rapidly accelerating. The fast growth of digital banking services may be attributed to factors such as the affordability of electronic devices, inexpensive internet access, and the availability of many mediums for utilising digital banking services. However, there is a lack of comprehensive studies examining the variations in The present study focuses on the adoption rates of digital banking services, with a special emphasis on rural micro, small, and medium businesses (MSMEs) [2].

Cryptography refers to the examination of encryption techniques, which involve the concealment of information using mathematical and logical principles with the objective of safeguarding data from unauthorised access or compromise. The increasing concerns over security in the use of Internet of Things (IoT) and artificial intelligence (AI) applications have led to a heightened recognition of the importance of this approach in the field of computer technology. This is particularly relevant in the domains of banking and

healthcare systems, transportation, and several other applications. While each cryptographic strategy is designed with unique capabilities. However, the use of a single cryptographic strategy inside a system has some restrictions, which will be elaborated upon in subsequent discussion in the following discussion. The use of symmetric key encryption is an economically efficient method for safeguarding information without compromising its security. However, the issue of distributing the private key is of considerable importance. The use of the asymmetrical technique effectively addresses the challenge of transmitting private keys. However, it is important to note that the independent approach exhibits slower performance and consumes greater computational resources when compared to symmetric encryption. In contrast, a hash function generates a unique and fixed-length representation for a given message, serving the purpose of safeguarding information integrity. However, It is crucial to acknowledge that this methodology functions as a non-invertible function, indicating that it is not viable to recover the initial message from its hash value. The hybridization technique is suggested as a viable remedy for the security flaws inherent in individual cryptographic algorithms, by integrating various cryptographic schemes. This strategy presents the benefit of improving the efficiency of information security, while simultaneously tackling the issue of key transmission. The use of hybrid approaches in existing domains of IoT and AI has been acknowledged, and research has been conducted to classify the specific area being examined. Ensuring the security of networks and the transmitted data is of utmost importance to network providers and operators. Consequently, cryptographic techniques are employed to safeguard the integrity and confidentiality of data throughout its transmission and various exchanges. Conventional cryptographic techniques, employed by both parties, have gained widespread recognition due to the fact that hackers possess knowledge of the solution to the underlying challenge. Consequently, there is a need for a novel cryptographic technique that enhances the security and intricacy of data encryption while simultaneously preserving its simplicity. This paper presents a novel hybrid cryptographic strategy aimed at boosting data security during network transmission. It then examines the implications of implementing and evaluating this approach. During a comparative performance analysis, the proposed cryptographic approach demonstrated the ability to find the most efficient and improved encrypted communication [3].

The role of artificial intelligence systems is undergoing a significant transformation as human involvement increasingly supplants their supply of services. The Internet of Things (IoT) is a significant factor in these changes, as it represents an advanced and

evolving technology that establishes a connection between tangible items and the digital realm. This connection facilitates constant connectivity and accessibility for a wide range of entities, regardless of time or location. The Internet of Things (IoT) is a technological framework that facilitates the interconnectedness and exchange of data across many entities, including physical items, individuals, devices, vehicles, and other entities. The Internet of Things (IoT) obviates the necessity for human-computer interaction by establishing direct communication with the user. This fosters enhanced communication across entities as a consequence. The integration of this technology has the potential to augment the core services offered within the domains of transportation, banking, healthcare, and education. Recent investigations have indicated that the Internet of Things (IoT) and its associated components exhibit a high degree of susceptibility to security flaws. The implementation of artificial intelligence methodologies can effectively address the security concerns associated with the Internet of Things (IoT). Artificial intelligence (AI) plays a pivotal role in the development of essential applications that facilitate the seamless transmission of data within an Internet of Things (IoT) ecosystem. The intelligent transmission technique is a method that utilises advanced algorithms and technologies to optimise the transfer of data or information [4].

### **Methodology:**

The methodology employed in this research is designed to leverage Artificial Intelligence (AI) techniques, specifically Random Forest and Convolutional Neural Networks (CNNs), to prioritize the factors affecting customer satisfaction in internet banking. This section provides a detailed overview of the research methods and procedures involved.

#### **1. Data Collection:**

The first step in our methodology is data collection. We will collect a comprehensive dataset from a diverse sample of internet banking customers. This dataset will include both structured and unstructured data to ensure a holistic understanding of customer behavior and sentiments.

**1.1 Structured Data:** This component will encompass demographic information, transaction history, and customer behavior metrics. Demographic data will include age, gender, location, and income level. Transaction history will cover details such as transaction frequency, average transaction amount, and types of transactions. Customer behavior metrics may include login frequency and session duration.



**1.2 Unstructured Data:** Unstructured data will primarily consist of customer feedback and reviews. These textual data sources will be collected from various channels, such as customer surveys, social media, and online forums. The feedback will include both positive and negative comments, allowing us to assess sentiment and gather qualitative insights.

## **2. Data Preprocessing:**

Once the data is collected, it will undergo thorough preprocessing to ensure its quality and suitability for analysis. Data preprocessing involves several critical steps:

**2.1 Data Cleaning:** The dataset will be cleaned to handle missing values, outliers, and any data inconsistencies. This ensures that the data used for analysis is accurate and reliable.

**2.2 Feature Engineering:** Feature engineering techniques will be applied to extract relevant features from the structured data. This includes creating variables that capture customer behavior patterns and aggregating transaction data.

**2.3 Text Data Processing:** Natural Language Processing (NLP) techniques will be employed to preprocess the unstructured text data. This involves tasks such as text tokenization, removing stop words, stemming or lemmatization, and sentiment analysis.

## **3. Random Forest Analysis:**

Random Forest is a powerful machine learning algorithm known for its ability to assess feature importance in predictive modeling. In this research, Random Forest will be used to quantify the importance of each feature in predicting customer satisfaction in internet banking. The process involves the following steps:

**3.1 Data Splitting:** The dataset will be divided into training and testing sets to evaluate model performance.

**3.2 Random Forest Training:** The Random Forest model will be trained using the training data. It will iteratively build multiple decision trees and aggregate their predictions to make robust predictions.

**3.3 Feature Importance:** Random Forest calculates feature importance scores, indicating the contribution of each feature to the model's predictive performance. These scores help prioritize factors influencing customer satisfaction.

**3.4 Model Evaluation:** The model's performance will be evaluated on the testing data to ensure its effectiveness in predicting customer satisfaction.

#### **4. CNN Analysis:**

Convolutional Neural Networks (CNNs) will be employed to analyze unstructured text data, such as customer feedback and reviews. CNNs have demonstrated proficiency in handling natural language processing tasks. The CNN analysis will involve the following steps:

**4.1 Text Data Encoding:** The preprocessed text data will be encoded into numerical representations suitable for neural network input.

**4.2 Model Architecture:** A CNN architecture will be designed for sentiment analysis and feature extraction. The model will consist of convolutional layers, pooling layers, and fully connected layers.

**4.3 Training:** The CNN model will be trained on the encoded text data to classify sentiments (positive, negative, neutral) and extract relevant features.

**4.4 Qualitative Insights:** The output of the CNN analysis will provide qualitative insights into the reasons behind customer satisfaction or dissatisfaction based on the sentiment and topics expressed in customer feedback.

#### **5. Prioritization:**

The prioritization step combines the results from Random Forest and CNN analyses to rank the factors affecting customer satisfaction. This integration of quantitative and qualitative insights allows for a comprehensive understanding of these factors. Factors will be prioritized based on their importance scores derived from Random Forest and enriched with qualitative context from the CNN analysis.

#### **Results and Discussions:**

The culmination of our research on prioritizing factors affecting customer satisfaction in internet banking, using Artificial Intelligence techniques such as Random Forest and Convolutional Neural Networks (CNNs), has generated a wealth of valuable insights. In this section, we delve into the findings and engage in a comprehensive discussion to contextualize and interpret the results. Our exploration not only sheds light on the critical factors influencing customer satisfaction but also paves the way for strategic recommendations that can empower internet banking providers to enhance their services and user experiences.

#### **Conclusion:**

Finally, using cutting-edge AI methods like Random Forest and Convolutional Neural Networks (CNNs), our study has shed light on the complex terrain of consumer satisfaction in online banking. We have determined and ranked the variables that have the

biggest impact on customer satisfaction using quantitative analysis, giving online banking companies crucial knowledge about the levers they can push to improve client satisfaction and loyalty. In addition, our qualitative investigation using CNNs has deepened our understanding by revealing the complex attitudes and underlying causes of customer happiness or dissatisfaction. Armed with these findings, financial institutions can now embark on targeted strategies to tailor their services, user interfaces, and security measures, fostering an environment where customers feel not only satisfied but truly engaged and loyal in the dynamic landscape of internet banking.

### **Future Work:**

While our research has provided valuable insights into factors affecting customer satisfaction in internet banking using AI techniques, there are several avenues for future exploration and refinement in this field:

- 1. Real-time Analysis:** Future studies can consider implementing real-time analysis of customer interactions and feedback. This would enable banks to respond promptly to emerging issues or opportunities, thereby improving customer satisfaction in a more dynamic manner.
- 2. Personalization:** Further research can delve into personalized recommendations and experiences for internet banking users. AI can play a pivotal role in tailoring services to individual preferences, which could significantly enhance overall satisfaction.

Incorporating these future directions into research and practice will not only keep internet banking providers at the forefront of innovation but also ensure that customer satisfaction remains a central focus as the digital banking landscape continues to evolve.

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## **BRIDGING THEORY AND PRACTICE: THE DYNAMIC INTERPLAY OF DRY AND WET LABS IN SCIENTIFIC EDUCATION AND RESEARCH**

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### **Abstract:**

Laboratories are integral to education, with a particular emphasis on scientific and technical fields, playing a crucial role in the learning process. Laboratories serve as dynamic spaces where theoretical knowledge transforms into practical understanding, fostering hands-on experiences that bridge the gap between theory and real-world applications. The essay discusses the importance of laboratories in cultivating critical thinking, problem-solving skills, and a deep appreciation for the scientific method. The classification of laboratories into dry and wet labs is examined, highlighting their distinct characteristics and applications. Dry labs, centered on computational methods and data analysis, offer advantages such as cost-effectiveness and efficient processing of large datasets. However, they face challenges related to real-world validation and assumption dependency. Wet labs, known for hands-on experimental work with biological and chemical substances, provide real-time observation and versatile experimentation but are associated with higher costs, safety concerns, and limitations in scalability and accessibility. The essay explores the emerging trend of interdisciplinary research that combines both dry and wet lab approaches, emphasizing the complementary nature of these methodologies. The abstract concludes by underlining the importance of a balanced and flexible approach, acknowledging that the choice between dry and wet labs depends on the nature of the research question. Overall, laboratories remain indispensable in shaping well-rounded individuals equipped to tackle the complexities of scientific disciplines in an ever-evolving educational landscape.

**Keywords:** Experiential learning, Interdisciplinary research, Dry labs, Wet labs, Computational methods, Hands-on experience, Bioinformatics

### **Introduction:**

Laboratories play a pivotal role in education, serving as dynamic spaces where theoretical knowledge transforms into practical understanding. In academic settings,

especially in scientific and technical disciplines, laboratories offer students an invaluable opportunity to bridge the gap between theoretical concepts and real-world applications. These hands-on environments foster a deeper comprehension of complex theories, allowing students to witness principles in action and engage in experiential learning. The importance of laboratories extends beyond mere skill development; they cultivate critical thinking, problem-solving abilities, and a profound appreciation for the scientific method. Through experimentation, students not only reinforce theoretical knowledge but also encounter the unpredictability inherent in scientific inquiry, promoting adaptability and resilience. Moreover, laboratories serve as incubators for curiosity, sparking students' interest and encouraging exploration in their chosen fields. The collaborative nature of lab work promotes teamwork and communication skills, essential for success in professional endeavors. In essence, laboratories are indispensable in the educational landscape, contributing significantly to the holistic development of students by nurturing a blend of theoretical understanding, practical skills, and a scientific mindset that prepares them for the challenges of the real world. As educational paradigms evolve, the enduring importance of laboratories remains a cornerstone in shaping well-rounded, competent individuals equipped to tackle the complexities of their chosen disciplines.

### **Types of Laboratories**

Laboratories play a crucial role in scientific research and experimentation, providing controlled environments for scientists to conduct investigations and gather data. One fundamental classification of laboratories is based on the nature of the experiments conducted within them, leading to the distinction between dry labs and wet labs. Dry labs, also known as computational or theoretical labs, focus on data analysis, computer simulations, and modeling. Researchers in dry labs utilize advanced computational tools and software to analyze existing data, develop mathematical models, and simulate various scenarios. These labs are essential in fields such as computer science, physics, and engineering, where theoretical frameworks and simulations help understand complex phenomena. On the other hand, wet labs, the more traditional and perhaps more widely recognized type, involve hands-on experimental work with chemicals, biological samples, and other physical materials. Scientists in wet labs conduct experiments to generate new data, validate hypotheses, and explore the practical applications of theoretical concepts. These labs are prevalent in disciplines like chemistry, biology, and medicine, where direct manipulation of materials and observation of physical processes are integral to advancing

scientific knowledge. Each type of laboratory has its distinct advantages and challenges, and the choice between them depends on the nature of the research question and the methodologies involved.

In recent years, however, there has been a growing trend toward interdisciplinary research that combines both dry and wet lab approaches, emphasizing the complementary nature of these methodologies. Integrating computational analysis with experimental validation allows researchers to leverage the strengths of each approach, leading to a more comprehensive understanding of complex scientific phenomena. This interdisciplinary approach is particularly evident in fields like bioinformatics and systems biology, where researchers use computational models to predict biological outcomes and then validate these predictions through wet lab experiments. The evolving landscape of scientific research continues to highlight the importance of flexibility and collaboration among researchers from different disciplines. Ultimately, whether a laboratory is dry or wet, the primary goal remains the same: advancing knowledge and contributing to the scientific community's collective understanding of the world around us.

### **Dry Lab**

A dry lab refers to a scientific research environment where experiments are conducted using computational methods and data analysis rather than traditional wet lab techniques involving physical experiments with chemicals or biological samples. In a dry lab setting, researchers utilize computers, software tools, and existing datasets to simulate experiments, model complex systems, and analyze large datasets. This approach is particularly prevalent in fields such as bioinformatics, computational biology, and materials science, where the focus is on understanding biological processes, predicting molecular interactions, and designing new materials. Dry labs offer several advantages, including cost-effectiveness, faster data processing, and the ability to explore a wide range of scenarios without the constraints of physical experimentation. However, they also face challenges related to the accuracy of simulations and the reliance on existing data. Despite these challenges, dry labs play a crucial role in advancing scientific knowledge by complementing wet lab experiments and offering insights into complex phenomena that may be difficult to study through traditional methods alone. A dry lab refers to a laboratory environment where computer simulations, data analysis, and other computational methods are used instead of traditional experimental methods involving physical experiments with

chemicals or biological materials. While dry labs offer several advantages, they also have their own scope and constraints.

### **Scope of Dry Lab Facilities**

- **Data Analysis and Interpretation:** Dry labs excel in handling large datasets and conducting complex data analyses. They allow for efficient processing of data, identifying patterns, and drawing conclusions.
- **Modeling and Simulations:** Dry labs are valuable for creating and running simulations to understand and predict various phenomena. They enable the modeling of complex systems that may be challenging to replicate in a wet lab.
- **Bioinformatics and Computational Biology:** In fields like genomics and proteomics, dry labs are essential for analyzing biological data, predicting protein structures, and understanding genetic relationships.
- **Chemoinformatics:** Dry labs are crucial for the study of chemical data, molecular structures, and drug design through computational methods.
- **Environmental Studies:** It can be used to model and simulate environmental processes, climate change scenarios, and ecological systems.
- **Educational and Training Purposes:** It provide a safe and cost-effective environment for training students in data analysis, computer programming, and computational methods.

### **Constraints of Dry Lab**

- **Lack of Real-world Validation:** Results obtained in a dry lab setting may lack real-world validation because they are based on simulations and models rather than physical experiments.
- **Assumption Dependency:** Dry lab results heavily depend on the accuracy of assumptions and models. Incorrect assumptions can lead to inaccurate conclusions.
- **Inability to Capture Certain Complexities:** Some biological or chemical processes may be too complex to model accurately in a dry lab, requiring wet lab experiments for validation.
- **Instrumentation Challenges:** Certain experimental setups, especially those requiring hands-on manipulation of physical materials, cannot be replicated in a dry lab setting.



- **Limited to Existing Knowledge and Models:** Dry labs are constrained by the existing knowledge and available models. They may struggle with novel or poorly understood phenomena.
- **Ethical and Safety Concerns:** While dry labs eliminate the need for physical experimentation, they may not address ethical concerns related to data privacy, bias in algorithms, or other ethical considerations.
- **Initial Setup Costs:** Setting up a robust dry lab infrastructure, including powerful computing systems and software, can have high initial costs.

Dry labs are powerful tools for certain types of research and analysis, but they are not a panacea. Combining both dry and wet lab approaches can provide a more comprehensive understanding of scientific phenomena.

### **Wet Lab**

In the realm of experimental biology, the wet lab serves as the quintessential arena where scientific hypotheses are put to the test through hands-on manipulations of biological materials. Unlike its dry counterpart, the wet lab involves tangible interactions with living organisms, cells, and biochemical substances. Researchers in wet labs engage in a myriad of techniques, ranging from basic procedures like pipetting and centrifugation to sophisticated molecular biology methods such as PCR (polymerase chain reaction) and gel electrophoresis. The wet lab is a dynamic environment where variables are meticulously controlled to elucidate biological phenomena, and the outcomes are often unpredictable, necessitating adaptability and problem-solving skills. Experiments in wet labs may span various disciplines, including genetics, biochemistry, microbiology, and pharmacology. The distinctive feature of wet lab work lies in its reliance on the manipulation of physical entities, fostering a deep connection between the scientist and the experimental process. In this wet domain, the quest for scientific knowledge unfolds amid the hum of machinery, the delicate handling of specimens, and the anticipation of uncovering nature's secrets through the tangible exploration of the biological world. The scope of wet labs is dynamic and continually evolving as scientific knowledge advances. It involves a combination of experimental techniques, analytical methods, and the use of specialized equipment to explore and understand various aspects of the natural world. Wet labs, also known as experimental laboratories, are settings where scientific experiments are conducted using liquids, chemicals, and various laboratory equipment. Like any approach, wet labs have both merits and demerits.

### **Merits of Wet Labs**

- **Hands-On Experience:** Wet labs provide hands-on experience, allowing researchers and students to physically engage with experiments. This practical approach enhances learning and skill development.
- **Real-Time Observation:** Researchers can observe reactions and phenomena in real time, enabling them to make immediate adjustments and gather accurate data.
- **Versatility:** Wet labs can accommodate a wide range of experiments across different scientific disciplines, including biology, chemistry, and biochemistry.
- **Traditional Techniques:** Many foundational scientific techniques were developed in wet labs, making them essential for mastering fundamental experimental skills.
- **Team Collaboration:** Wet labs often promote collaboration among researchers and students, fostering a sense of teamwork and the exchange of ideas.
- **Physical Manipulation:** Certain experiments require physical manipulation of samples and equipment, which is a unique aspect of wet labs that cannot be replicated in virtual environments.
- **Equipment Utilization:** Wet labs allow the use of specialized laboratory equipment, such as centrifuges, spectrophotometers, and microscopes, which are crucial for certain experiments.

### **Demerits of Wet Labs**

- **Costly:** Setting up and maintaining wet labs can be expensive due to the need for specialized equipment, consumables, and safety measures.
- **Time-Consuming:** Wet lab experiments can be time-consuming, particularly when waiting for reactions to occur or samples to be processed. This can slow down the pace of research.
- **Safety Concerns:** Working with chemicals and biological materials poses safety risks. Accidents can occur, and researchers must adhere to strict safety protocols to minimize the potential for harm.
- **Limited Accessibility:** Not everyone may have access to wet labs, especially in educational institutions with limited resources. This can hinder students' exposure to practical laboratory experiences.
- **Environmental Impact:** Disposal of chemical waste generated in wet labs can have environmental consequences if not managed properly.

- **Sample Size Limitations:** Certain wet lab experiments may have limitations in terms of the quantity of samples that can be processed simultaneously, restricting the scalability of some studies.
- **Dependency on Physical Presence:** Wet labs typically require researchers to be physically present, limiting flexibility, especially in situations where remote work is desirable.

Wet labs offer valuable practical experiences but come with associated costs, safety concerns, and limitations in terms of scalability and accessibility. The choice of experimental approach depends on the nature of the research and the balance between practical hands-on work and the advantages offered by alternative methods, such as computational simulations and virtual labs.

### **Conclusion:**

Laboratories are integral to education and scientific research, providing environments where theoretical knowledge transforms into practical understanding. The distinction between dry and wet labs underscores the diverse methodologies employed in scientific exploration. Dry labs, with their emphasis on computational methods, offer cost-effective and efficient data analysis, modeling, and simulations. However, they face challenges in real-world validation, assumption dependency, and ethical considerations. On the other hand, wet labs provide hands-on experiences, real-time observation, and versatile experimentation across scientific disciplines, yet they come with associated costs, safety concerns, and limitations in scalability and accessibility. The evolving trend of interdisciplinary research highlights the complementarity of both approaches. Ultimately, the choice between dry and wet labs depends on the nature of the research question, emphasizing the need for a balanced and flexible approach to advance scientific knowledge comprehensively. As educational paradigms evolve, the enduring importance of laboratories remains crucial in shaping well-rounded, competent individuals prepared for the complexities of their chosen disciplines.

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## **EMPLOYEE ENGAGEMENT- DURING COVID-19 AND POST LOCKDOWN**

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### **Abstract:**

COVID-19 has left the globe in a situation of despondency. Physical as well as the human resources (HR) of an organization were adversely affected during the lockdown. The corporate world is observing several corporate crises from the full or partial shutdown of businesses to layoffs, furloughs and resignations. HR managers are struggling to curb this renunciation of employees and grappling with reduced employee engagement. To keep employees highly motivated in this time of mayhem and maelstrom of the pandemic, HR managers need to revisit their employee engagement strategies with a new perspective. This article provides list of variables to HR managers to enhance employee engagement level during COVID-19 and post lockdown. Employee engagement is a vital force in the success of every organization. Having collectively involved and committed employees in the discharge of their functions improve organizational performance, enhance creativity, and strengthens relationships, consequently ensuring client satisfaction. It sought to understand if this health crisis has changed their work engagement practices. It also explored if the employees' levels of engagement varied when grouped according to the nature of their jobs.

**Keywords:** Employee Engagement, COVID-19, lockdown, Creativity

### **Introduction:**

Companies have modified their workspace substantially as a result of the global pandemic. As a result, HRM practices have changed accordingly; employees are forced to adopt the new 'work from home' (WFH) culture, thereby affecting the overall employee engagement. Employee engagement is defined as an employee's level of commitment to and participation in their company's beliefs and goals. It is not only about enhancing productivity when it comes to employee engagement, even though organisations that have a higher degree of employee engagement tend to have an elevated productivity report of 22% or more than that of other organizations, according to a newly conducted metaanalysis by Gallup Organization on 1.4 million employees. Employee engagement leads to a range of positive results for both workers and customers (Baldoni, 2013).

Employees who are engaged believe in the firm, have a desire to improve their job and their work, are willing to go above and beyond to help the firm succeed, and are inspired by its representatives. Effectiveness and excitement are the trademarks of a dedicated worker. Disengaged employees, on the other hand, do the bare minimum, display little excitement for their work, and view work as a waste of time, to keep receiving paychecks. Employees who are disengaged are employees who have lost their passion for their job, and hence, hamper the performance of the organization. Organizations usually keep in mind that engaged employees lead to increased productivity at work, which in turn leads to increased customer satisfaction and, without a doubt, increase in sales and profit for the company (Chanana & Sangeeta, 2020). Outsized returns for this investment can be achieved through thoughtful and effective performance and employee engagement, thereby benefitting our communities and stakeholders. It is up to library leaders to create the ideal conditions for optimal performance, such as pursuing evidence-based tactics that motivate individuals to do their best, and eliminating processes that demotivate and discourage them (Risley, 2020).

### **Employee Engagement and Its Definitions**

Organizations have been trying to align their growth with organizational success as they have witnessed a change in employees from “being satisfied” to “being committed” (Avery *et al.*, 2007). In practice, organizations typically define engagement as feeling related to the organization, being committed, taking pride in the organization, and making that extra effort beyond the described duty. The term “engagement” can be used to denote psychological attributes of commitment, involvement, and attachment of an employee with his organization or the observable performance attributes including organizational citizenship behavior (Macey & Schneider, 2008). According to Wellins and Concelman (2005), engagement is an internal force that drives people towards higher level of performance. Harter *et al.* (2002) described employee engagement as “the individual’s involvement and satisfaction as well as enthusiasm for work.” This can be explained as ensuring the psychological presence of an employee along with his physical presence while performing his organizational roles. Engaged employees are the engine of passion who drive innovation and take the organization forward. Employee engagement can be described as a practice by which organizations try to enhance commitment and involvement of its employees in achieving greater outcomes (International Survey Research, 2003). After persistent long research on this construct, it was concluded that a

large number of engaged employees in an organization will help in retaining and attracting talent, while an organization with disengaged employees suffers because of lower efficiency and productivity of its workforce (Gallup, 2005). According to Towers Perrin talent report (2003), the factors that increase engagement among workforce are top management's inclination towards employee's well-being, challenging work, and the worker's participation in decision-making. Corporate Leadership Council (2004) emphasized on commitment as a measure of engagement of employees with their organization: the efforts they put in their work and how long they stay with that organization. It is a favorable condition for the organization that implies involvement, commitment, passion, enthusiasm, and focused energy that can be depicted in employee's behavior as "say, stay and strive" (Hewitt Associates LLC, 2005). So, engagement is a vital measure of an employee's emotional and psychological connect with his organization. In the words of Brown (2006), engagement can be defined as a manifestation of motivation, commitment, and satisfaction that an employee experiences as he grows in an organization

### **Rationale of the Study**

This pandemic of COVID-19 has pushed this dynamic world to a halt along with devastating effects on the world economy. With frequent phases of lockdown, work from home (wfh) and physical distancing have become the new normal. This has further led to anxiety and stress in the minds of people in regard to their personal safety and job security. This has necessitated a transformation in the traditional employee engagement approaches to retain talented workforce and maintain their physical and psychological well-being so that they continue working with same effectiveness as during normal times.

### **Research Objectives**

1. To discuss the concept of employee engagement.
2. To identify various employee engagement strategies adopted by different organizations in normal times.
3. To explore the strategies used by organizations during this turbulent phase of COVID-19 to engage employees who are working from home.

### **Research Methodology**

It is a conceptual article based on an extensive literature review. Secondary data has been gathered from many different sources including already published research papers, articles, newsletters, and reports. The data already collected is organized to develop a new understanding related to traditional employee engagement practices and those adopted by

organization in this time of widespread pandemic. Further, an elaborate and sequential literature review was done to relate employee engagement to well-being.

### **Research Gap**

There have been limited observable research papers pertaining to the comprehensive exploration of non-monetary levers for the augmentation of employee engagement in organizations, especially with reference to the current scenario of the ongoing COVID-19 pandemic.

### **Review of Literature**

Employee engagement can be used as a mediator for measuring the attitudes, intention, and conduct of employees to an improved work performance. (Andrew & Sofian, 2012; Saks, 2006). Andrew and Saudah (2012) concluded that employee engagement can be utilized as a mediator to enhance the conduct, purpose, and assertiveness of employees toward a better work performance. Basquille (2013) recommended that managers should be supported by the executive to provide development assistance, career support, and recognition. Blessing White Organization developed a model for Employee Engagement by classifying the concept into five levels with reference to the level of individual contribution towards organizational achievement and satisfaction receive from the job. Herzberg's Two Factor Theory is probably the most often cited point of view. In fact, the main idea is that employees in their work environment are under the influence of factors that cause job satisfaction and factors that cause job dissatisfaction. Therefore, all factors that have derived from large empirical research and divided in factors that cause job satisfaction (motivators) and factors that cause job dissatisfaction (hygiene factors). During the post COVID- engagement and empowerment are changed from motivators to hygiene factors. This is due to risk of life and personal safety and Health reasons. Paul E. Spector (1997) summarizes the findings concerning how people feel towards work, including: cultural and gender differences in job satisfaction and personal and organizational causes; and potential consequences of job satisfaction and dissatisfaction. He provides with a pithy overview of the application, assessment, causes and consequences of job satisfaction. Sophie Rowan (2008) reveals how to create a happier work life, without changing career. She provides practical and realistic guidance on how one can achieve optimal job satisfaction and overcome the obstacles that make so many of us unhappy at work. Robert M. Hochheiser (1998) reassessed the meaning of the workplace and proposed a simple formula for success- Forget the idea that hard work alone leads to success and instead focus on



building good relationships. He asserts that the best way to win at work is to understand what is needed to support the egos of bosses, peers, and subordinates. Accurate assessment of those needs can then be indirectly associated with one's own personal goals and exploited to make substantive workplace gains. Methods of determining needs are given for a variety of situations, and strategies are offered to help make some of the worst work situations at least marginally better through networking and personal development. C. J. Cranny, Patricia Cain Smith, Eugene F. Stone (1992) reveals perceiving future opportunity can actually be more motivating than actually receiving a raise, getting promoted, or being given additional responsibilities. Jane Boucher (2004) offers practical advice for improving both your attitude about your job and the job itself. She shows workers how to cope with keeping their jobs in this difficult economy. Chris Stride, Toby D. Wall, Nick Catley (2008) presented widely used measurement scales of Job Satisfaction, Mental Health, Job-related Well-being and Organizational Commitment, along with benchmarking data for comparison. The benchmarking data is based on a sample of almost 60,000 respondents from 115 different organizations across a wide spectrum of industries

### **COVID-19 and Employee Engagement**

The year 2020 opened with misery and mayhem of COVID-19. After almost a complete standstill for six months, the economies reopened itself with social distancing and other protective norms, along with persisting uncertainty at the workplace. The mantra of employee engagement pre COVID-19 has changed its definition during the COVID-19. With a higher number of lay-offs and furloughed employees, many organizations started de-prioritizing employee engagement owing to sever business losses due to lockdown. As economies are convalescing themselves gradually, it is imperative to invest in employee engagement in a more meaningful way of keeping the 'new normal' into mind.

### **Employee Engagement Strategies Adopted by Various Organizations**

Today's fast paced world leading to mobility and agility has changed the way employees used to look at their job. Now they are more enthusiastic about their work and look for more than just being paid. This makes employee engagement a must have for every growing organization. As we have discussed the concept of employee engagement, now any inquisitive reader would like to know what organizations do to retain their employees. There are some employee engagement strategies suggested by Jones and Kober (2019):

- Staying focused on the core values helps in engaging employees
- Supporting your employees so that they remain motivated to work

- Encourage employee feedback so that they share positivity and negativities freely
- Communicate openly and honestly with employees
- Employees commit themselves to the organization when the employer commits to employee engagement.

The IT sector takes the lead when we talk about employee benefits, flexible work hours, learning and development, employee career, and succession planning. The tech companies are the most rewarding when it comes to fostering the engagement and commitment of employees (Dwivedi, 2020). Digitalization has changed the face of business; employees are more connected to each other and to their organization than ever before. So, companies have started capitalizing on their digital identity and social networking to promote overall value, good sentiments amongst employees, and team building activities. Organizations acknowledge the importance of employee retention and, hence, have started paying attention to “workers participation in management” where they can work and collaborate as a team, as the management believes voice of each and every member needs to be heard. Apart from the IT sector, automobile sector, manufacturing plants of FMCG companies, and many educational organizations have also introduced employee engagement activities to promote team building and sense of belongingness towards their organizations. Many organizations have started team building exercises using board games such as Scrabble, Pictionary, Snakes & Ladder, and Ludo and many use Lego Building blocks to foster their child’s creativity and innovation.

### **Employee Engagement Strategies Adopted by Organizations During Turbulence (COVID-19)**

COVID-19 appeared as a respiratory disease in Wuhan (Hubei province, China) suggested to be related to a seafood market there (Fan *et al.*, 2020) and soon it engulfed the whole world in its tide. As per the recent report of World Health Organization (WHO), there have been 191,773,590 confirmed cases of COVID-19 globally as on July 22, 2021. WHO has issued certain guidelines and recommendations for general public for protection against this fatal virus (World Health Organization [WHO], 2020). There are restrictions on international travels (Ghosh *et al.*, 2020) along with other precautionary restrictions such as lockdown, social distancing, and wearing a face mask in public. As per the demand of the situation, many organizations started working online and granted wfh to its employees. As the entire world is facing turbulence and instability, the management realizes that there is a great deal of pressure and distraction being faced by employees. With everyone at home

and increased household chores, creating an organizational set up at home and coordinating live video rooms may seem to be a challenging task. The leadership roles have amplified when the entire team is remotely dispersed and under stress. Communication has become critical as the dependence on technology has increased many folds. The way leaders behave during tough times leaves an everlasting impact on the people (Tymchenko, 2020). In the absence of that personal empathetic touch and organic information flow, interaction through social media is the only option. Managing outcomes rather than inputs is the mantra for the day. The organizations have provided all necessary support to the workforce to ensure timely delivery of performance objectives. It is a tough time, and things are hard but new age companies have definitely found a way out to engage their employees. Yes, now the engagement is technology driven. There are Zoom dance parties, family get together, kids' competitions, online yoga and Zumba classes, webinars on health and safety, and grievance redressal online forums adopted by companies as a compassionate response to COVID-19 lockdown. In contrast to the conventional strategies, employees are engaged differently during this time of turbulence:

- Webinars to promote continuous learning and development
- Success story sharing sessions
- Mobile games and contests
- Spiritual and religious sessions
- Wellness meetups
- Virtual family get together
- Celebrating special occasions and festivities together.

During this pandemic time, companies have been using different strategies such as team meetings, online games and contests, virtual competitions and contests, video lunch, online appreciation, and apology sessions to keep their workforce engaged (Goyal *et al.*, 2020). Taking a yet closer look at our India Inc., top corporate employers such as TCS, Microsoft, Wipro Dabur, Flipkart, Axis Bank, Ola, Vedanta, Bank of Baroda, ITC, and BigBasket emphasized on saving human capital and promoting employees' well-being. They have provided options such as doctor on call, online psychological counselling, meditation, and fitness programs. During this time of crises, different top companies are trying to put their employees on priority by adopting different types of strategies (Bhattacharyya *et al.*, 2020)

### **Employee Engagement Strategies Followed during COVID-19**

- Vedanta: Telephonic helplines to relieve people from anxiety and stress through psychological counselling
- Welspun Group: Sensitivity training for leaders and managers on how to deal with their employees and mistakes they make Encouraging employees to focus on their families and themselves
- Axis Bank: Informal meetings and team lunches and virtual meditation sessions
- Ola: Emphasized on the concept of “work for home” and encouraged people to devote at least four hours daily to household chores
- Microsoft: Promoting their philosophy of a “hybrid workplace” by promoting “work from home” and focusing more on work life balance
- Bank of Baroda: As the banks were operational during lockdown, it exempted employees over 55 years of age or with a medical condition from coming to work as a humanitarian measure.
- Flipkart: Promoted virtual connects such as Pasta Live and Chai Break Mahindra Webinar on emotional hygiene, a session with clinical psychologist to keep mental peace while working from home
- Johnson & Johnson: “Telemedicine program” to create awareness about physical and mental health amongst employees and their families Virtual fitness sessions, knowledge sharing sessions, and meetups with medical and health experts
- Honda: Webinars on stress management and conflict management while working from home

### **Impact of Employee Engagement Strategy on Employee Well-Being**

Employee engagement is an important ingredient in the success of an individual as well the organization. An engaged employee is highly productive, holds less grievances, and delivers beyond expectations. In this time of uncertainty, when the entire human race is fighting COVID-19 clinically or mentally, it becomes even more important to build a psychological connect between the employer and employees to retain talent and win their loyalty for a long time. Employees feel motivated towards their work and committed towards their workplace when they are given growth opportunities and a culture of openness. Engaging employees helps in strengthening their creativity and inquisitiveness (Singh, 2020). It has been established that during this pandemic time when the workforce is physically dispersed, effort of the organization to communicate regularly with its

workforce can act as a great stress-reliever. The organizations have started organizing different well-being exercises to promote engagement and performance of employees (Fan *et al.*, 2020). In research conducted by Boston Consulting Group (BCG) on 12,000 professionals from the USA, Germany, and India to explore their attitudes towards well-being, social connect, productivity, job security, learning and development during this time of pandemic, a majority of respondents said that they were able to maintain or improve their productivity during crises. This survey suggests that with continued effort from the organizations in engaging and developing the employees, newer methods of remote working could also be continued postCOVID (Dahik *et al.*, 2020). A 5 C's model comprising of conciliation, cultivation of new technologies, confidence, compensation, and communication has been proposed to strengthen engagement and build organizational health and well-being (De-la-Calle-Durán & Rodríguez-Sánchez, 2021). This COVID-19 has brought the entire world to its knees, but with extensive technological support from the organizations and the emotional connect, the employees have been able to deliver beyond the set targets. A number of global tech companies have very active intranet and social media groups to enable employees share their success stories, funny incidences, and various team experiences to create a sense of belongingness and pride amongst employees and create a well-knit organizational culture (Dwivedi, 2020). A sense of loyalty and belongingness develops in the employees, and they start taking pride in being associated with a good humanitarian organization. It has been observed that organizations with highly engaged employees face less turnover and absenteeism. Employee engagement is definitely an approach that fosters business growth and advancement resulting from better performance, productivity, and well-being of employees (Chanana & Sangeeta, 2020). The organizations that have engaged their employees during this turbulent phase will definitely succeed in the long run as the satisfied employees will help the organization achieve its objectives and execute its strategy even after crises.

**Conclusion:**

COVID-19 has deeply impacted all facets of life and also the way organizations used to manage their business and manpower. There is a renewed focus on mission, engagement, and employee well-being. Most of the organizations have reformatted their engagement strategies and are now offering some form of well-being assistance such as webinars with doctors, wellness check-in apps, promotion of mental and emotional well-being through yoga and Zumba sessions as well. Although engagement activities have been

the top-most priority of many big conglomerates from time immemorial, it is comforting to see that even small business units are also meeting the challenges of this tough time with compassion and creativity. It is easier to sail forward with the current, but a successful leader is the one who sails ahead despite the opposing forces. An engaged employee has always contributed towards the organizational success, but how the companies treat them during uncertain times will definitely have a lasting impact for years to come.

Employee engagement in the workplace is a vital factor that can contribute to the success of an organization. It is a crucial indicator of employees who are committed, loyal, enthusiastic, productive, motivated, and willing to give their best to attain organizational goals. The findings gathered from this study have revealed positive results. First, it was gathered that, as a whole, the employees were very strongly engaged at work before and during the pandemic. Second, their levels of work engagement before and during the pandemic did not significantly differ. This result means that even after the pandemic hit them, their sense of commitment to engage themselves at work did not significantly deteriorate or diminish. However, small details detected on specific indicators of work engagement have shown evidence that the teaching employees are the ones who have been most affected, particularly in their motivation or drive, resilience, and focus at work. This has been attributed to the numerous adjustments they had to face in the transition from in-class to online instructors and their worries over the threats of COVID-19 on themselves and their respective families, which could have financial repercussions. Administrative intervention in the form of technical, physical, moral, emotional, and financial support and wellmanaged employee engagement activities that could boost their mental and emotional wellness was recommended to mitigate the effect of a pandemic or crisis on employees' engagement.

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## **THE ROLE OF KHADI & VILLAGE INDUSTRIES COMMISSION (KVIC) IN PROMOTING WOMEN ENTREPRENEURSHIP IN INDIA**

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### **Abstract:**

Approximately 65% of India total population resides in rural areas, from which 27% are women's, underscoring the vital significance of village industries in both economic and rural development. Women entrepreneurship assumes a pivotal role, not only by creating employment opportunities in low-capital regions but also by contributing to agricultural growth. It emerges as a viable solution to address challenges such as poverty, migration, economic disparity, unemployment, and the overall upliftment of rural as well as underdeveloped areas. Khadi & village industries play a crucial role in fostering women entrepreneurship especially in rural areas.

This article, rooted in secondary data, explores the promotion of women entrepreneurship through khadi & village industries and identify the factors determining women entrepreneurship in India.

**Keywords:** Women Entrepreneurship, KVIC, Employment. etc.

### **Introduction:**

In India, women have typically been limited to domestic tasks, primarily focused on raising children and managing household affairs. Their roles are often centered around family responsibilities, leading them to explore entrepreneurship as a means of supplementing family income. Societal norms and prejudices further restrict their access to opportunities, resulting in women engaging in entrepreneurship primarily for subsistence. Factors such as limited involvement in creative endeavors and predominant illiteracy among women serve as significant barriers, impeding the broader growth of women entrepreneurship in India.

The Khadi & Village Industries Commission (KVIC) is a statutory entity established through the Parliament Act (No. 61 of 1956, as amended by Act No. 12 of 1987 and Act No. 10 of 2006), succeeding the former All India Khadi and Village Industries Board in April 1957. It is guided by broad objectives, providing employment, the economic aim of

producing marketable goods, and the overarching objective of fostering self-reliance among the underprivileged while fostering a robust rural community spirit.

KVIC is responsible for strategizing, promoting, coordinating, and executing development initiatives for Khadi and other village industries in rural areas. Its collaboration with other rural development agencies is integral to its operations. Key functions encompass the establishment of raw material reserves, creation of shared service facilities for raw material processing, facilitation of Khadi and Village Industries (KVI) product marketing, organization of artisan training, and promotion of cooperative efforts among artisans. KVIC actively encourages research in production techniques and equipment, with a focus on leveraging non-conventional energy to enhance productivity, alleviate drudgery, and bolster competitiveness.

Financial assistance is extended by KVIC to institutions and individuals involved in Khadi and village industries development, encompassing support through design supply, prototypes, and technical information. Quality standards and product genuineness are ensured, with KVIC forging linkages with established marketing agencies. The Commission is empowered to initiate studies and research directly or through other agencies to address challenges faced by Khadi and village industries, including the execution of pilot projects for development. KVIC is further authorized to establish separate organizations to fulfil its objectives and engage in related activities. According to data from KVIC, women constitute 46% of the labor force in the Khadi and Village Industries sector. Given this significant participation, it becomes imperative to explore the factors influencing women entrepreneurship in India.

The subsequent sections of this study are structured as follows: The second section provides a succinct review of existing global and Indian literature on women entrepreneurship. The third section delves into the recent trends and progress of women entrepreneurship facilitated by KVIC in India. The fourth section outlines the factors that determine women entrepreneurship in the country. Finally, the concluding section summarizes the findings derived from the study.

### **Review of Literature**

Lal and Khurana (2011) discussed the significant contribution of women in the farming sector, emphasizing their roles and challenges in terms of employment, wages, dual responsibilities, and education levels. Despite their substantial involvement in farming and longer working hours compared to men, women faced unequal pay for similar work,

reflecting prevailing gender biases. The study concluded that due to a lack of awareness about their rights, rural women were often exploited by landlords.

Rajasekhar and Saikala (2013) explored the stress faced by working women, highlighting factors such as family responsibilities, job insecurity, workplace culture, and high job performance demands. They suggested that managing stress involves understanding its nature, channelling stress for productive purposes, and empowering individuals to cope effectively.

Bhuvaneshwari (2013) investigated stress factors in working married women, including various family and professional commitments, workplace harassment, long working hours, and an imbalance between work and family life. The study observed that stress-related issues, such as prolonged headaches, hypertension, and obesity, could be alleviated through a balanced approach to work and family, including spending time with family and engaging in physical exercise.

Quires (2005) emphasized the crucial role of women in farming and advocated for their education in agricultural practices. The study suggested educating women in areas like floriculture and food preservation to enhance their participation in the agricultural sector.

Balaji (2014) examined the work-family conflict and stress experienced by married women employees. The study highlighted those factors like flexible or inflexible working hours, family dependents, and family size contributed to mental distress among married working women.

Srivastava (1988) focused on the significant roles played by rural women in India and their contribution to family income. Despite their crucial roles, the study noted that rural women faced challenges in participating in Panchayats, reflecting gender inequities at ideological and practical levels.

Suman and Chatterjee (2015) compared the physical fitness levels of working and non-working women. The study found that housewives faced fewer problems than working women due to their less physically demanding roles and fewer role limitations.

Sharma and Dhawan (1986) delved into the health problems faced by rural women in Haryana, identifying issues like bronchitis, conjunctivitis, skin diseases, and gynecological problems. The study underscored the need for health education programs to address these health challenges among rural women.

Singh (2005) emphasized the importance of women's empowerment in rural development, connecting it to the growth of small-scale industries. The study highlighted

those empowering women economically led to broader rural development and economic growth for the nation.

Kaur (1987) focused on the role of women in rural development, emphasizing their participation in agriculture and handicraft production. The book highlighted various tasks performed by women, such as cleaning Jhumland, sowing seeds, and harvesting crops, and proposed strategies to involve rural women more effectively in the development process.

Devi and Kiran (2013) observed the employment of skilled and unskilled female labor in the construction industry. The study highlighted issues such as health problems, job stress, injuries, sexual harassment, gender bias, and wage discrimination faced by women in the construction sector.

Singh (2012) discussed the health conditions of rural women, attributing health issues to anxiety, family tensions, improper care in early ages, hereditary factors, and poor sanitation. The study emphasized the need for proper nutrition and sanitation to improve the health of rural women.

Bagha (2014) addressed the various problems faced by rural women in India, focusing on economic backwardness and the need for education to change their identity and destiny. The study emphasized the importance of government welfare schemes to improve the quality of life for this disadvantaged group.

O'Driscall *et al.* (1992) explored mutual disputes, work overload, and role conflict leading to psychological exhaustion among women. The study found that high mental workloads at home and work were linked to increased psychological distress, emphasizing the need for interventions to manage stress effectively.

Dhanabhakyan and Malarvizhi (2014) identified a positive relationship between family difficulties and stress in working women. The study suggested that an increase in work-family conflict led to increased work stress and vice versa in married working women.

Alam (2006) highlighted that many women in self-employment, particularly in hazardous conditions, faced issues related to health and safety. Women engaged in agriculture and horticulture were exposed to various risks, emphasizing the need for improved working conditions.

Tripathi and Bhattacharjee (2012) studied the psychological stress faced by working women, focusing on causes and solutions. The research highlighted the impact of full-time working mothers on their child's studies, with working women experiencing more stress than their male counterparts.

Sidhu and Satyamoorthy (2014) explored factors causing stress and coping strategies among women managers in India. The study linked role conflict, role ambiguity, and work-family conflicts to stress among women managers, suggesting strategies such as stress management programs and job redesign to reduce stress.

Vandana (2012) study on women workforces in the unorganized sector, specifically focusing on women as workers in construction, agriculture, and as a domestic worker. The research highlighted issues such as wage disparities, irregular working hours, and harassment at workplaces faced by women in these sectors

The current research expands its scope by increasing women entrepreneurship in India through Khadi & Village Industries Commission (KVIC) and factors which determine women entrepreneurship.

### **Objectives of the Study**

- To discuss the recent trend in women entrepreneurship through KVIC in India.
- To identify the factors determining women entrepreneurship in India.

### **KVIC and Women Entrepreneurship in India**

The Ministry of Micro, Small, and Medium Enterprises (MSME) is actively involved in promoting the empowerment of women entrepreneurs through diverse initiatives. Notably, the Prime Minister's Employment Generation Programme (PMEGP) Scheme, a substantial credit-linked subsidy program since 2008-09, has played a pivotal role in facilitating the establishment of 1.59 lakh projects by women entrepreneurs, as of the year 2022. This scheme is designed to set up micro enterprises, contributing to employment generation in both rural and urban areas nationwide. Under PMEGP, the project cost is limited to Rs.25.00 lakhs for manufacturing sector units and Rs.10.00 lakhs for service sector units.

Women entrepreneurs, identified under the Special Category, are entitled to subsidies of 25% and 35% for projects in urban and rural areas, respectively. Noteworthy is the fact that women beneficiaries are required to contribute only 5% of the project cost, while the general category entails a 10% contribution. The implementation of PMEGP is overseen by the Khadi and Village Industries Commission (KVIC). In addition to PMEGP, KVIC administers programs under its Khadi Programme, collaborating with 34 State/UT Khadi and Village Industries Boards (KVIBs) and 2518 Khadi Institutions. These initiatives collectively have resulted in employment opportunities for 4.65 lakh individuals, with more than 80% of artisans being women

The government is taking additional steps to encourage and promote women entrepreneurs:

1. Awareness camps about KVI schemes are organized at the District and State levels to ensure that unemployed youth and women can avail themselves of the scheme's benefits.
2. Publicity through print and electronic media is carried out to disseminate information about PMEGP schemes.
3. District, State, and National level exhibitions are conducted to provide a platform for entrepreneurs, including women, to showcase and sell their products.
4. To boost MSME registration, the government encourages PMEGP units to implement the Udyog Aadhar Memorandum (UAM) for online registration, facilitating applications for industrial land and credit etc.
5. An online grievance management system for PMEGP has been established for prompt and online complaint resolution.
6. KVIC has published a booklet titled "Celebrating the Spirit of Women Entrepreneurship" highlighting success stories of women entrepreneurs under PMEGP during 2014-15.
7. Another publication by KVIC, "PMEGP Success Stories of Entrepreneurs," features National Awardees and successful entrepreneurs of PMEGP during 2014-15.
8. In the Khadi sector, 80% of artisans are women. KVIC, under its Skill Development Programme, focuses on women-oriented training courses such as Beautician, Baking, Tailoring, Cooking, etc

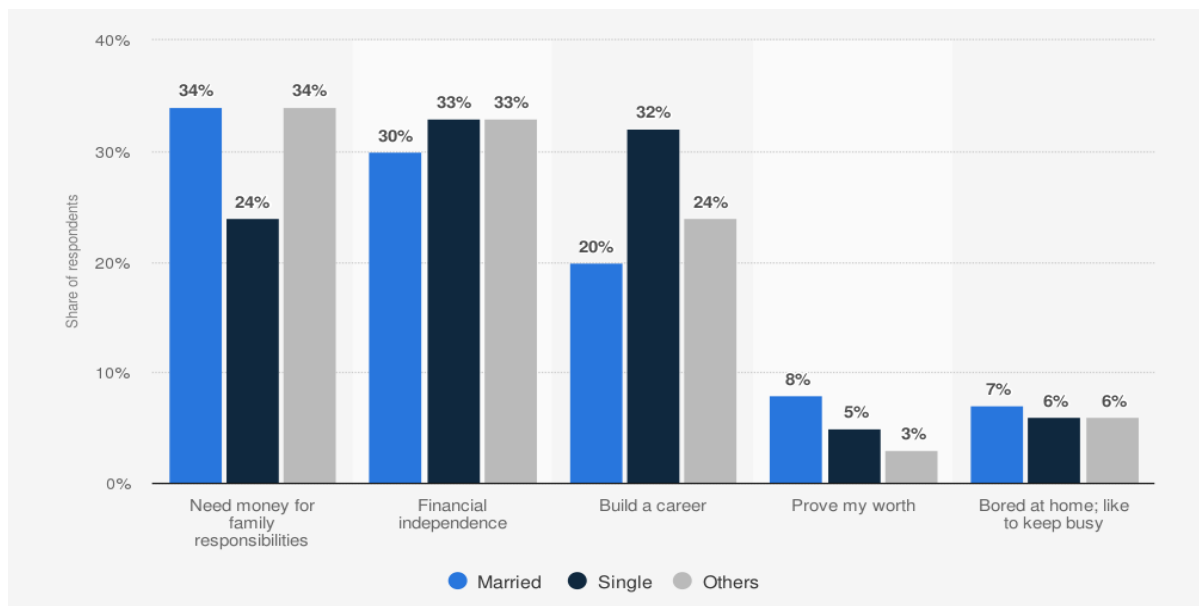
**Table 1: Details of the number of employments created under PMEGP for women during the year 2018-19 to 2022-23 (Source: Annual Report of MSME 2022-23)**

<b>Year</b>	<b>No. of Employment provided to women under PMEGP</b>
2018-19	25434
2019-20	24720
2020-21	27285
2021-22	39192
2022-23	18288

The Prime Minister's Employment Generation Programme (PMEGP) is an employment generation initiative which is adopted by the Khadi and Village Industries

Commission (KVIC) as the nodal agency. This scheme operates as a credit-linked subsidy program aimed at promoting and establishing Micro, Small, and Medium Enterprises (MSMEs) while fostering employment opportunities in both rural and urban regions. Above table reveals that in the last five years women employment numbers is not significant but it is increasing day by day.

### **Factors affecting women in India to take up employment**



**(Source: compiled from Statista)**

This study indicates that factors like educational level, entrepreneurial experiences, business training, admittance to finance, business information, government support, land ownership, and tax play a significant role in influencing the women entrepreneurship. Conversely, variables such as age, marital status and access to physical infrastructure are identified as immaterial factors in determining the women entrepreneurship.

**Push and Pull Factors:** The term 'Push' refers to necessities, where women perceive that their family's income is insufficient to meet basic needs. They may find themselves as the sole breadwinner or face challenges in securing suitable employment. These factors tend to be more significant for women compared to men. The concept of 'Pull' signifies attraction towards something desirable.

Some Push factors include situations like the death of the main breadwinner, leading women to seek livelihood opportunities. Separation from a spouse or the health issues of the primary breadwinner may also drive women to pursue employment to fulfil the basic needs of their families.

Conversely, 'Pull' factors encompass financial independence, a key outcome of entrepreneurial profits that strongly attracts women to entrepreneurship. The desire to utilize existing education, talents, and skills, along with staying engaged, can also be a motivating factor. The prospect of generating employment and contributing to economic empowerment in society serves as another pull factor, fostering economic progress. In the Indian context, women have consistently sought higher social status through their individual efforts.

**Conclusion:**

Khadi serves as an exemplary illustration of sustainable development, rooted in traditional processes of hand cropping, spinning, and weaving. These methods, reliant on individual competencies and skills, epitomize sustainability. The market processes associated with Khadi contribute to the generation of employment and income for rural communities, characterized by their non-reliance on extensive machinery or technology. The products crafted from Khadi are not only recyclable but also biodegradable. Khadi introduces a novel paradigm of self-reliance, wherein artisans exclusively depend on locally sourced materials, steering clear of imports and fostering sustainability at the individual, societal, and national levels.

Even amidst changing times, where development models have undergone some modifications, Khadi has consistently prioritized sustainability. Its diversified scope reflects principles of sustainable development across various dimensions. Whether aiding families affected by terrorism, providing life support, offering economic freedom to victims of tiger attacks, or rehabilitating communities impacted by poaching, Khadi continues to play a pivotal role in empowering individuals and promoting sustainable practices.

A total of 1088 Khadi & village industries institutions, along with REGP/PMEGP Units, have been granted association to ventures into the field of export. Several employment generation schemes have been introduced in the last five years, including the Honey Mission aimed at creating employment opportunities for farmers, women, and Adivasi through beekeeping to boost India's honey production. The Kumhar Sashaktikaran Yojana was initiated to empower the marginalized pottery community and revive the declining art of pottery. A Leather Artisans' Empowerment program was launched, renaming leather artisans as "Charm Chikitsak." Additionally, Cycle-mounted Tea/Coffee Selling units were innovatively introduced under Project DigniTEA in six Indian cities. The



Khadi Agarbatti Aatmanirbhar Mission was also rolled out to enhance local Agarbatti production in India and generate rural employment.

In an effort to empower unemployed youth, including women, innovative cycle-mounted Tea/Coffee selling units were distributed as part of a project launched in Delhi, Varanasi, Jaipur, and Chandigarh. The primary goal of the project is to provide beneficiaries with a means to earn a respectable livelihood. These tea/coffee units enable beneficiaries to sell beverages under hygienic conditions, offering them the potential to earn up to Rs 600-700 per day.

In contemporary times, women are increasingly embracing risk, embracing their visions, and refusing to settle for anything less. A growing number of women are expanding their entrepreneurial endeavors and entering diverse business domains. The expanded array of employment opportunities for women, including roles as bureaucrats, professionals, and executives, has been a key catalyst for their entry into the competitive business landscape, seeking economic independence.

The Ministry of Micro, Small & Medium Enterprises has launched Udyam Sakhi, a network designed to promote social entrepreneurship by creating business models focused on affordable products and services to address social inequalities. This platform is tailored to the needs of around 8 million Indian women who have established or are starting their own businesses. Udyam Sakhi offers resources for entrepreneurship learning, an incubation facility, training programs for fundraising, mentorship opportunities, one-on-one investor meetings, market survey capabilities, and technical assistance.

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## **LANGUAGE ATTITUDES AND IDENTITY: A STUDY OF KONKANI SPEAKERS IN GOAN EDUCATIONAL SETTINGS**

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### **Abstract:**

This research paper explores language attitudes and identity among Konkani speakers in Goan educational settings, emphasizing the complex interplay of history, culture, and education on linguistic identity. Through a detailed examination of the Konkani language's historical evolution, particularly in the context of Portuguese colonization and its aftermath, this study reveals the profound impact of socio-political forces on language attitudes and practices. It addresses the challenges faced by Konkani in the education system, including the marginalization of Konkani-medium education and the dominance of English, reflecting broader issues of social stratification and identity formation. The paper also highlights the role of parents, community, and educational materials in shaping language preferences and fostering a sense of belonging among Konkani speakers. By analyzing the current language policies and practices in Goan educational settings, the study underscores the importance of linguistic diversity and multilingual education in promoting social integration and preserving cultural identity. Ultimately, the research calls for a reevaluation of language policies to better support the revitalization of Konkani, advocating for a balanced approach to education that honors Goa's rich linguistic heritage while accommodating global linguistic influences.

**Keywords:** Goa, Education, Identity, Culture, Attitudes

### **Introduction:**

Language is not merely a tool for communication but a profound element of cultural identity and social integration, particularly in multilingual societies. This research paper delves into the intricate dynamics of language attitudes and identity among Konkani speakers in Goan educational settings, a topic that resonates deeply within the socio-linguistic fabric of Goa, India. Konkani language, with its rich historical lineage and cultural significance, serves as a lens through which we examine the broader themes of linguistic diversity, cultural heritage, and educational policy in a post-colonial context. Goa's unique historical background, marked by Portuguese colonization and subsequent integration into

the Indian subcontinent, presents a fascinating case study for exploring the interplay between language, culture, and identity. The imposition of Portuguese language and culture, followed by the liberation and efforts to reclaim indigenous identity, has left an indelible mark on the Goan people and their linguistic practices. This paper aims to unpack the complex relationships between language attitudes, identity formation, and educational practices among Konkani speakers, shedding light on the broader implications for language policy and cultural preservation in Goa.

### **Historical Background of Konkani language**

The Konkani language has a rich history and has played a significant role in shaping the identity of the Goan people. Originating as an Indo-European language, Konkani is spoken by approximately 3-4 million people in India, with 57% of the Goan population identifying it as their state language. Despite its widespread usage and cultural importance, the development and evolution of the Konkani language have not been without challenges, particularly due to the influence of Portuguese colonization and shifting attitudes towards language and identity. Portuguese colonization had a lasting impact on the Konkani language and its speakers. As a former Portuguese colony, Goa's linguistic and cultural identity were significantly disrupted, with the colonizers imposing their language and customs upon the native population. This imposition led to a decline in the use and development of Konkani, as many Goans perceived Portuguese and English to be more prestigious languages. However, despite these challenges, the Konkani language remained essential to the Christian community, who continued to use it as their language of worship. As a result, the influence of Portuguese colonization on the Konkani language is evident in the integration of Portuguese vocabulary and the evolution of distinct dialects.

The role of the Konkani language in Goan culture and society is multifaceted, as it is not only a means of communication but also a reflection of the diverse socio-linguistic reality in the region. Multilingualism is a shared cultural value in Goa, with Konkani serving as a common thread that unites its people across different communities, castes, and classes. However, the language has faced challenges in its recognition as a representation of "Goan identity," due to its association with specific communities and the lack of a centripetal force to unite its speakers. Despite these challenges, Konkani remains an essential aspect of Goan culture, as it embodies the unique history and identity of the region and its people.

## **Language Attitudes and Identity among Konkani Speakers**

Factors influencing language attitudes among Konkani speakers in Goan educational settings can be traced back to the region's history of multilingualism and its socio-cultural context. The nature of Goan multilingualism is shaped by the complex interplay of historical, political, and cultural factors, with Portuguese, English, and regional languages such as Marathi and Hindi coexisting alongside Konkani. Additionally, the influence of colonial legacies and the role of language in social stratification have contributed to the development of distinct language attitudes among different sections of the Goan population. Some Goans feel a sense of shame or humiliation associated with speaking Konkani, while others see it as a link to "genuine" Indian identity.

The connection between language and identity is particularly evident among Konkani speakers in Goan educational settings. Language use and attitudes in schools can have a profound impact on students' perceptions of their own cultural identity. For example, the denial of grants-in-aid to Konkani-medium schools in the past has been seen as an attempt to marginalize the language and undermine its role in shaping the identity of Goan students. Moreover, the prevalence of English in Goan schools and its association with social prestige and upward mobility has further complicated the relationship between language and identity. As a result, many students struggle to negotiate their linguistic and cultural identities, often facing pressure to conform to the dominant language norms in their educational environment.

The impact of language attitudes on identity formation among Konkani speakers in Goan educational settings can be seen in the ways students navigate their multilingual environment. For instance, students may choose to speak different languages with different interlocutors, depending on the social context and the perceived status of the languages involved. The findings of a study conducted among high school students in Jakarta reveal that the majority of students tend to make language choices based on factors such as: - The language spoken by their family members, friends, and teachers - The perceived appropriateness of a language in a given situation - Their own proficiency in the language - The language's potential to facilitate social integration and academic success. As students negotiate their linguistic choices, their language attitudes can significantly influence their sense of identity and belonging, both within and beyond the school context.

## **Language Policies and Practices in Goan Educational Settings**

The current language policies in Goan educational settings have significant implications for the teaching and learning of Konkani, as well as other languages spoken in the region. These policies have been shaped by the multilingual environment of Goa and the complex interplay between language, caste, and identity. In recent years, there has been a growing recognition of the importance of linguistic diversity in education, with the Indian government employing a hierarchical language policy to accommodate the needs of minority language speakers. However, challenges remain in ensuring equitable access to education for all language groups, particularly in the context of grants-in-aid and the promotion of Konkani as a representation of "Goan identity".

Teaching and learning of Konkani in Goan schools is shaped by several factors, including the language policies mentioned earlier, as well as the historical context and socio-linguistic realities of the region. While the translation of the Bible into Konkani in 1616 played a significant role in the development of written Konkani and the preservation of the language among Catholic Brahmin families, the language has also been influenced by caste dynamics and the coexistence of multiple dialects and scripts. Additionally, the proficiency of students in Konkani is shaped by their exposure to the language both at home and in school, with some researchers arguing that Konkani speakers may have an advantage in this regard. However, the teaching and learning of Konkani in schools remains a contested issue, with debates surrounding the prioritization of English and other languages in the curriculum.

The role of English and other languages in Goan education is a complex and multifaceted issue, with various perspectives on the importance of multilingualism and the prioritization of different languages for different purposes. Many Goans view English as a crucial language for social and economic success, arguing that it should be the focus of educational efforts in the region. Conversely, others emphasize the importance of preserving and promoting local languages, such as Konkani, as a means of fostering a sense of cultural identity and belonging. This tension between the global appeal of English and the local significance of Konkani and other languages has shaped the language policies and practices in Goan educational settings, with ongoing debates surrounding the balance between linguistic diversity and the practicality of language instruction in schools.

### **Challenges Faced by Konkani Speakers in the Education System**

Access to quality education in Konkani remains a significant challenge for many Goan students, especially those who identify with this language as a crucial aspect of their cultural identity. The National Curriculum Framework in Goa offers education in both Konkani and Marathi mediums, but the majority of the available literature for non-Konkani and non-Marathi speakers is in English. This language barrier limits the educational resources available to Konkani speakers, often leading to a preference for English-medium education, which can further alienate them from their linguistic heritage. The lack of quality educational materials in Konkani can be attributed to several factors, including: - Limited funding for the development of Konkani-medium educational resources - A focus on promoting English as a global language - The diverse range of dialects within the Konkani-speaking community.

Attitudes towards Konkani-medium education are complex, with many Goans expressing concern over the lack of use of Konkani in their homes and communities. However, when interacting with notable Goans and friends, they often prioritize English as the primary language of communication. This could be due to the perception that English is a more prestigious and globally recognized language, which can lead to negative attitudes towards Konkani-medium education. Furthermore, the lack of a strong centripetal force for Konkani as a representation of "Goan identity" may contribute to the mixed attitudes towards Konkani-medium education. The diverse socio-cultural backgrounds of Konkani speakers, including regional, caste, and religious affiliations, can create a fragmented sense of identity that undermines the perceived value of Konkani-medium education. The impact of language challenges on the academic performance of Konkani speakers is a significant concern, as it can perpetuate social and economic inequalities within the Goan community. A study exploring high school students' perceptions of language use in an international school in Jakarta found that the majority of students in the first and second year of high school struggled with language barriers, which negatively impacted their academic performance. Similarly, in Goa's multilingual environment, the denial of grants-in-aid to Konkani-medium schools can further exacerbate these challenges, limiting the educational opportunities available to Konkani-speaking students. The ongoing debates surrounding Goan identity, including whether Goans should use Marathi or Konkani as their official state language, further complicate the issue and contribute to the continued marginalization of Konkani speakers within the education system.

## **Role of Parents and Community in Language Attitudes and Identity**

Parental expectations and language preferences play a significant role in shaping the language attitudes and identity of Konkani speakers in Goan educational settings. Multilingualism has been a salient characteristic of the socio-linguistic reality in Goa, and a shared cultural value. Parents often have specific language preferences for their children, which can influence their attitudes towards and identification with the Konkani language. For example, some parents may prioritize the learning of English or other regional languages, such as Marathi, over Konkani, due to perceived benefits in terms of education and social mobility. This can result in children developing a weaker connection to their Konkani heritage and identity.

Community support and promotion of the Konkani language are crucial factors in fostering positive language attitudes and a strong sense of identity among Konkani speakers. In the context of primary education and language in both colonial and post-colonial Goa, language shifts and the consequent changes in attitudes towards Konkani have been observed. The community plays a vital role in preserving and promoting the Konkani language by organizing cultural events, celebrating Konkani literature, and encouraging the use of the language in everyday life. A supportive community can help counterbalance any negative perceptions or stigma associated with speaking Konkani, thereby promoting a more positive attitude towards the language and a stronger sense of Goan identity.

The influence of family and community on language attitudes is essential in shaping the identity of Konkani speakers in Goan educational settings. According to Salikoko Mufwene, the ultimate locus of language contact is always in the individual act of communication, especially in a multilingual setting. Family members, such as parents and grandparents, often transmit their language preferences and attitudes to younger generations through daily interactions and conversations. Similarly, the community's attitude towards the Konkani language can have a profound impact on individuals' language choices and self-perception. For instance, if the community values and supports the use of Konkani, individuals are more likely to develop positive attitudes towards the language and embrace their Goan identity. Conversely, if the community perceives Konkani negatively or as inferior to other languages, individuals may distance themselves from the language and their cultural heritage.



## **Representation of Konkani Language in Educational Materials**

The availability and quality of Konkani textbooks and resources in Goan educational settings play a crucial role in shaping the language attitudes and identity of the speakers. As the state language of Goa, Konkani is spoken by approximately 3-4 million people, making it essential for educational materials to be accessible and comprehensive. However, the reality is that there is a lack of centripetal force of Konkani as the representation of "Goan identity", as diverse socio-economic factors contribute to the marginalization of the language. This, in turn, affects the quality and availability of educational resources, leading to language shifts and the erosion of cultural identity. Educational materials have a significant impact on shaping language attitudes among Konkani speakers in Goan educational settings. As students' perceptions of language use are influenced by the resources they interact with, the lack of quality Konkani textbooks and learning materials can lead to negative attitudes towards the language. The language patterns observed at home and school in contemporary Goa's multilingual environment further exacerbate the issue, as the denial of grants-in-aid to Konkani-language institutions hinders the promotion of the language. This, in turn, impacts students' willingness to learn and engage with the language, which can have lasting effects on their cultural identity and sense of belonging.

Efforts to improve and promote Konkani-language resources in Goan educational settings are essential to foster a more positive attitude towards the language and preserve cultural identity. One such effort is the translation of the Bible into Konkani in 1616, which allowed Brahmin families converting to Catholicism to retain their caste. Encouraging the development of high-quality textbooks and learning materials, as well as promoting the use of Konkani in educational institutions, can help to strengthen the language's presence and relevance in the lives of its speakers. Additionally, fostering connections between Konkani speakers and encouraging them to learn from one another can contribute to the overall improvement and promotion of the language.

## **Language Revitalization Efforts in Goa**

Government initiatives have played a crucial role in supporting the Konkani language in Goa. As multilingualism is a significant characteristic of the socio-linguistic reality in the region, the Indian government employed a hierarchical language policy to incorporate increasing awareness of linguistic identity among the people. Standardization of the script, recognition as an official language of the State of Goa, and inclusion in Schedule VIII were among the demands of the Konkani language. These efforts have been

instrumental in emphasizing the importance of Konkani as an essential part of Goan identity.

Non-governmental organizations have also been actively involved in the preservation and promotion of the Konkani language. They have worked to address the challenges faced by the language, such as language shifts in the context of primary education and language in colonial and post-colonial Goa. These organizations have focused on a variety of issues, such as: - Encouraging the use of Konkani in educational settings - Promoting the understanding and appreciation of Konkani's diverse dialects spoken by different geographical regions, castes, and tribes - Engaging in debates surrounding the use of Marathi or Konkani as the official state language by addressing these issues, non-governmental organizations have contributed significantly to the revitalization of the Konkani language. While there have been successes in revitalizing the Konkani language, challenges still persist. One major challenge is the perception of some individuals in the community who avoid speaking or supporting the language publicly, which has a negative impact on the preservation of their Goan identity. Additionally, debates surrounding the use of Marathi or Konkani as the official state language have created divisions among the population. Despite these challenges, the combined efforts of government initiatives and non-governmental organizations have led to progress in revitalizing the Konkani language and fostering a sense of linguistic identity among the people of Goa.

### **Impact of Language Attitudes and Identity on Social Integration**

Language barriers and social cohesion in Goa have been a matter of debate in recent years, particularly concerning the identity of Goans and the use of Marathi or Konkani as the official state language. This debate has been fueled by the history and cultural identity of Goa, which has been influenced by both Portuguese and Indian rule, leading to a mix of linguistic and cultural identities. The choice of official language has significant implications for social cohesion, as language plays a crucial role in defining one's identity and connecting with others. In a diverse society like Goa, it is essential to address these language barriers to promote social integration and harmony. The role of language in fostering social inclusion or exclusion in Goa can be observed in educational settings, where language shifts have occurred in both colonial and post-colonial periods. English, for example, is viewed as a language of opportunity and social mobility and is extensively used in Goa for these purposes. However, this preference for English can lead to social exclusion

for those who are not proficient in the language. Additionally, the decision to include Konkani in Schedule VIII of the Indian Constitution was a response to the demands of Konkani speakers who sought a separate identity for the language. This recognition in the constitution can be seen as a step towards social inclusion for Konkani speakers, as it validates their linguistic identity and provides them with a sense of belonging.

To promote social integration through language in Goa, several solutions can be implemented in the educational sector. One such solution is to ensure that everyone has access to basic education, regardless of their linguistic background. This can be achieved by incorporating an increased awareness of linguistic identity into language planning and policy. Furthermore, fostering a sense of linguistic pride and appreciation for the diverse languages spoken in the region can help strengthen social cohesion. Some key points to consider when promoting social integration through language include: - Ensuring access to basic education for all linguistic groups - Recognizing the importance of linguistic identity in language planning and policy - Encouraging a sense of pride and appreciation for the diverse languages spoken in the region By addressing these points, it is possible to create a more inclusive and harmonious society where language barriers are minimized and social integration is promoted.

### **Comparison with Other Indian Linguistic Minorities**

Similarities and differences in language attitudes and identity among Konkani speakers can be observed when compared to other Indian linguistic minorities. Multilingualism is a shared cultural value and a prominent characteristic of the socio-linguistic reality in Goa. The nature of Goan multilingualism, however, differs from that of other communities, as the major debates revolve around whether Goans are Portuguese, Indian, or simply Goans, and whether they should use Marathi or Konkani as their official state language. The lack of centripetal force of Konkani as the representation of "Goan identity" can be attributed to diverse socio-economic factors, including caste and class. Although it is claimed that Goans have no identity, a much stronger argument can be made that Goans have developed a dual Goan/Indian identity, which is largely influenced by their linguistic choices.

Lessons learned from other linguistic minority communities can provide valuable insights into addressing the language challenges faced by Konkani speakers in Goan educational settings. For instance, the separate identity demanded for Maithili, a sister language of Hindi from Northern India, highlights the importance of recognizing and

preserving linguistic diversity. Maithili and Konkani were recently incorporated into the Eighth Schedule of the Indian Constitution, granting them official status and reinforcing their significance within their respective communities. By examining language shifts in the context of primary education and language in colonial and post-colonial Goa, one can gain a better understanding of the consequent socio-cultural implications and devise strategies to promote linguistic diversity.

Strategies for addressing language challenges in diverse settings, such as Goan educational institutions, can include the following: - Acknowledging and promoting linguistic diversity to foster a sense of identity and belonging among minority language speakers. - Encouraging multilingualism to enable students to navigate different linguistic environments and develop valuable communication skills. - Ensuring that grants-in-aid are allocated fairly to schools that support minority languages, as the denial of such funding can hinder the preservation and growth of these languages. - Integrating language education into the curriculum and providing opportunities for students to learn and use their mother tongue in both formal and informal contexts, as this can help maintain and strengthen their connection to their linguistic and cultural roots. - Encouraging collaboration and dialogue between native speakers of different languages to foster mutual understanding and appreciation. - Conducting in-depth case studies on the language situation in multilingual communities, such as China, to gather insights on how language changes affect the meanings of identity, ethnicity, and nationality.

### **Future Prospects for Konkani Language and Identity in Goa**

Demographic trends play a crucial role in understanding the implications for Konkani speakers in Goa. Multilingualism has been a salient characteristic of the socio-linguistic reality in Goa, with Konkani being the state language spoken by approximately 57% of the population according to the 2001 census. However, the diverse socio-linguistic landscape in Goa, influenced by factors such as caste and class, has led to a lack of centripetal force of Konkani as the representation of "Goan identity". Consequently, the future prospects of Konkani language and identity in Goa depend on the evolving demographic patterns and their impact on the linguistic composition of the state. The potential impact of globalization and technology on the Konkani language cannot be overlooked. As the world becomes more interconnected, the influence of English and other global languages on local languages such as Konkani intensifies. Moreover, the spread of technology and access to global media exposes Konkani speakers to an increasingly diverse

range of linguistic and cultural influences. This may lead to a shift in language use and preferences among younger generations, thus impacting the future prospects of the Konkani language. However, globalization also offers opportunities for the preservation and promotion of Konkani, as it enables access to resources and platforms for language learning, documentation, and dissemination.

Several strategies can be employed to strengthen the Konkani language and identity in Goa. Education plays a pivotal role in fostering linguistic and cultural pride among the younger generation. By incorporating Konkani language and literature into the school curriculum, students can develop a deeper understanding and appreciation of their linguistic heritage. Moreover, promoting the use of Konkani in public spaces, media, and official communication can contribute to its normalization and acceptance in everyday life. Additionally, encouraging dialogue and collaboration among different linguistic communities within Goa can facilitate a sense of shared identity, while preserving the unique linguistic and cultural characteristics of each group.

### **Conclusion:**

In conclusion, the study of language attitudes and identity among Konkani speakers in Goan educational settings highlights the complex interplay between language, culture, and society. The historical background of Konkani and its role in Goan culture and society underscores the importance of preserving and promoting this language. However, the challenges faced by Konkani speakers in the education system, including limited access to quality education and negative attitudes towards Konkani-medium education, pose significant obstacles to language revitalization. The role of parents, community, and educational materials in shaping language attitudes and identity cannot be overstated. Efforts to revitalize Konkani, including government initiatives and non-governmental organizations, offer hope for the future. However, the potential impact of globalization and technology on Konkani language and identity requires continued attention and strategic planning. Ultimately, promoting social integration through language is essential for building a more inclusive and equitable society in Goa.

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# **ENGINEERING INTELLIGENCE: A SYSTEMATIC APPROACH TO THE MACHINE LEARNING LIFECYCLE**

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## **Abstract:**

The life cycle of machine learning is a cyclic process that is followed by data science projects. It specifies each step an organization should take in order to benefit from machine learning and artificial intelligence (AI) in a practical way for the benefit of the business. An approach for creating an efficient ML project is the machine learning lifecycle. The main aim of the ML life cycle is to determine a solution to the given problem. The most basic part of the whole cycle is to determine where the issue is and know the cause of the issue. The ML life cycle is a cyclic interaction to create, train, and use models. It clarifies each step an organization must take in order to utilize machine learning techniques in their business. It describes the entire procedure for resolving a machine learning problem.

**Keywords:** Machine Learning, Data Wrangling, Modeling, Data Preparation, Data Collection.

## **Introduction:**

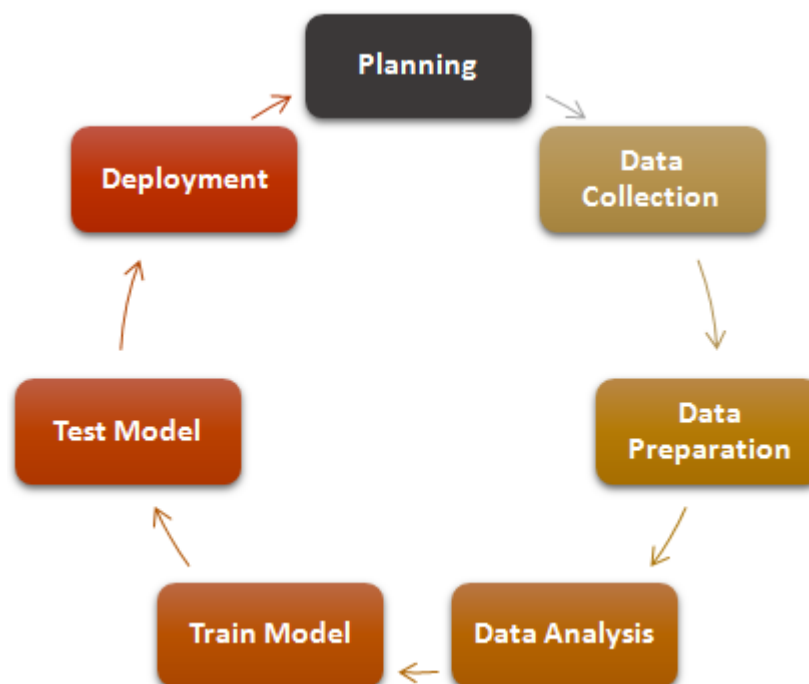
Machine Learning is a subfield of Artificial Intelligence that helps the machine in automatically learning from the data and previous experiences with minimum human intervention. It involves a process that helps to solve problems and provide answers to questions with the help of data analysis. For the purpose of predicting outcomes and discovering patterns in the data, data scientists construct different models. These models help to gain insights from the data [1]. This insight information is used by the organisations in making decisions that can help in improving the future outcomes of the organization. In order to solve the different problems, researchers need a foundation methodology that helps in organising the work and analysing different types of data. With Machine Learning gaining momentum in organizations and giving importance to their rising benefit rates, a development lifecycle for creating models that work on specifically designed learning algorithms has become very essential. Understanding each step of a machine learning life cycle and utilizing it to choose and utilize the most suitable ML model is a definitive point of



concentrating on the ML cycle. The machine learning life cycle is completely dependent on data as the designed model and the output obtained from the model are linked to the training data [2]. Thus, the starting steps of the ML cycle solely elucidate how to deal with raw data. Then, trends are obtained from the data and at last used to foresee an attribute or trait. The life cycle in developing an ML project is necessary because it describes the job of each and every individual in an organization who is managing the ML and data science projects. It takes each project from starting to the end and gives a significant level viewpoint of how the organizational data should be organized and managed so as to obtain benefits from it and enhance profits. If an error occurs at any of the steps in ML life cycle, the model thus obtained would not provide accurate results and will not be of any functional use to institutions [3].

### **Machine Learning Life Cycle**

Machine learning provides computer systems the ability to learn automatically without being programmed explicitly. The working of a machine learning system can be described with the help of a life cycle which is a cyclic process that helps in building an efficient project. The steps of the life cycle when followed properly help to find a solution for the problem. The life cycle includes different phases and each of the phases needs to follow a quality assurance framework for consistent improvement and maintenance of the system as per the requirements and restrictions [4].



**Figure 1: Life Cycle of Machine Learning**

The ML lifecycle is an iterative process with guidelines and best practices to use across characterized stages while fostering an ML workload. The ML lifecycle adds comprehensibility and composition for making an ML project successful. The different phases of ML life cycle are shown in fig. 1:

The different phases are explained below:

### **Step 1: The Planning Phase**

The development of a model starts with detailed planning which involves identifying the problem that needs to be solved. It involves determining the objectives that need to be achieved. It involves activities such as assessing the scope, determining the success metrics and identifying the feasibility of the ML project [5]. A feasibility report needs to be created which contains the following information - a) Data availability: It is important to determine whether enough data is available for training the model or not. b) Applicability: To determine whether machine learning can be used to solve the problem. c) Availability of resources: To determine the availability of resources such as man-power, network, storage capacity for solving the problem. It involves selection of appropriate algorithms that can be applied to solve the problem. It is essential to specify the deadline of the project and identify the budget of the project.

### **Step 2: Data Collection**

Data is essential for finding solutions for a problem. It can be considered as a fundamental step in the pipeline of machine learning. The Data Collection step can have a direct impact on the performance of the model and the results obtained from the model. Data can be obtained from various sources [6]. Data can be collected using several methods such as survey, questionnaire, interviews, observations, experiments, and web scraping and social media. Data can be secondary also which means the data that is already researched and can be obtained through journals, magazines, organisations etc. The collected data may be in structured form or unstructured form. The structured data is stored in .xls format in excel files. The unstructured data is stored in the form of audio, video or text files that can be accessed through different tools.

### **Step 3: Data Preparation**

Data preparation involves two steps: a) Data pre-processing and b) Data wrangling

- A. Data Pre-Processing:** It is also referred to as data cleaning. It involves cleaning and modifying the raw data for making accurate predictions through ML algorithms. Every project needs data to be formatted in specific form. Datasets must be

prepared in proper format before its application in a project. Data collected may have some missing values which need to be corrected as it may result in accurate predictions [7]. The following steps are involved in data pre-processing:

- I. Data exploration:** After collection of data, data needs to be explored in order to find out the incorrect, missing information or to determine trends in the data. It helps in identifying collinearity problems in which standardization of data sets is necessary.
- II. Data Validation and Cleaning:** It involves determining and solving the inconsistencies or anomalies in the data. Data cleaning helps in finding valuable trends and patterns in data and removes irrelevant data from datasets.
- III. Data Formatting:** After validating the data, the data needs to be formatted properly. Since the data is obtained from various sources, there may be some discrepancies in the data that need to be corrected as it may result in incorrect predictions.
- IV. Feature Engineering:** It involves selection of the right attributes for analysis purposes. It validates the work of features and makes improvement in features, if required.

**B. Data Wrangling:** Data Wrangling, also known as Data Munging. Data wrangling process refers to the cleaning and enriching of the raw data so that it can be converted into a better format which makes the process of decision-making easier. The data wrangling process involves the following six steps as shown in fig. 2:



**Figure 2: Data Wrangling process**

**Discovering:** It helps to know what exactly is in the data and this information will be very useful to find out the process required to analyze the data.

**Structuring:** Since the raw data can be found in different shapes, sizes and formats, it becomes necessary to organize the data. If data is not easily readable, then it becomes difficult to work with it. So, the data must be well structured and in proper format.

**Cleaning:** It helps to increase the quality of data by removing the data that might disturb the process of data analysis. For example, removing a null value or replacing it with zero or empty string. The data is converted into a standard format by proper cleaning.

**Enriching:** Enriching the data means combining the data obtained from internal sources with disparate data or third-party data or data which is obtained from external sources. The process of enrichment makes the data more valuable for an organization by adding more value to the data. The enriched data becomes a valuable asset for the organization as it gives more insight and useful information to them. For example, in the case of customer data, the enrichment process helps different brands to get a better understanding of their customers and gets insight into their preferences and interests. This process helps in saving the money as the information that is not useful for the business need not be stored. It can also be used to get rid of the data that is redundant and thus improves the data quality.

**Validating:** The process of validation helps to verify the consistency, quality and security of the data. This process verifies that the transformations have been applied properly to the data. It takes a deeper look at the values so as to make sure that the data being transformed makes sense and can be used in the business.

**Publishing:** It refers to the delivery of the output for use whether by software or a particular user. The data thus obtained is now ready to use for the analytics purpose.

#### **Step 4: Data Analysis**

Now, the data becomes available in the needed format and this step involves understanding the data in greater depth [8]. The insights from the data are obtained by doing analysis through different statistical tools. Data analysis is done by a data engineer. This step can also be referred to as Exploratory Data Analysis (EDA). In this step, the data is explored by utilizing several statistical techniques. The data must be analyzed carefully and this careful analysis helps in determining the important features from the data.

#### **Step 5: Train Model**

This stage is used for deciding whether the data prepared for processing is appropriate or needs more cleaning and transformation [9]. This stage focuses on the development of predictive or descriptive models on the basis of the analytic approach defined previously. In case of predictive models, the data scientists make use of a training set. A training set can be defined as a set consisting of historical data in which the outcomes are already known. This training set is used as an indicator that determines if the model

needs to be adjusted. The modeling process is an iterative process which is used by the organizations to gain insights. This phase includes the following four steps:

- **Select Modeling Technique:** This step includes identifying the modeling technique that needs to be used. For example, Decision tree technique, neural network modeling etc.
- **Generate Test Design:** A procedure or mechanism is generated so as to test the quality and validity of the model.
- **Building a Model:** The model is actually built by making use of modeling tools.
- **Assessing a Model:** The models are interpreted according to the domain knowledge. In this stage, the business objectives and success criteria are taken into consideration so as to access the model.

### **Step 6: Test Model**

During the phase of model development and before the stage of deployment, the model is evaluated by the data scientist so as to understand the data quality and address the business problem [10]. This step helps to determine the degree to which the model meets the objectives of the business. The assessment results are summarized in terms of the business success criteria.

### **Step 7: Deployment**

After the model is evaluated, it becomes ready for deployment in the business market. The approved model is deployed in the production environment or the comparable testing environment. This phase checks the capability of the model to withstand the external environment by making practical decisions on the basis of the data. Model deployment can be considered as one of the most important phases that helps in making decisions and gain value from the machine learning algorithms. This requires coordination among the data scientists, software developers, IT teams, and business professionals so as to increase the reliability of the model in the external environment.

### **Conclusion:**

The machine learning life cycle is an iterative process utilized in data science projects. The ML life cycle is a thorough structure that directs the development and organization of ML projects. It incorporates different stages, from problem framing and data gathering to selection of model, evaluation, and deployment. Though this process is not straightforward, it enhances the process of modeling, evaluation, and is consistently working. Organizations can develop steps for acquiring value and managing resources with

the help of the ML life cycle. A team's work will be guided by the ML life cycle, making it possible for non-technical individuals to comprehend the project's requirements.

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## **ROLE OF SUPPORT VECTOR MACHINE LEARNING ALGORITHM AND ITS WORKING**

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### **Abstract:**

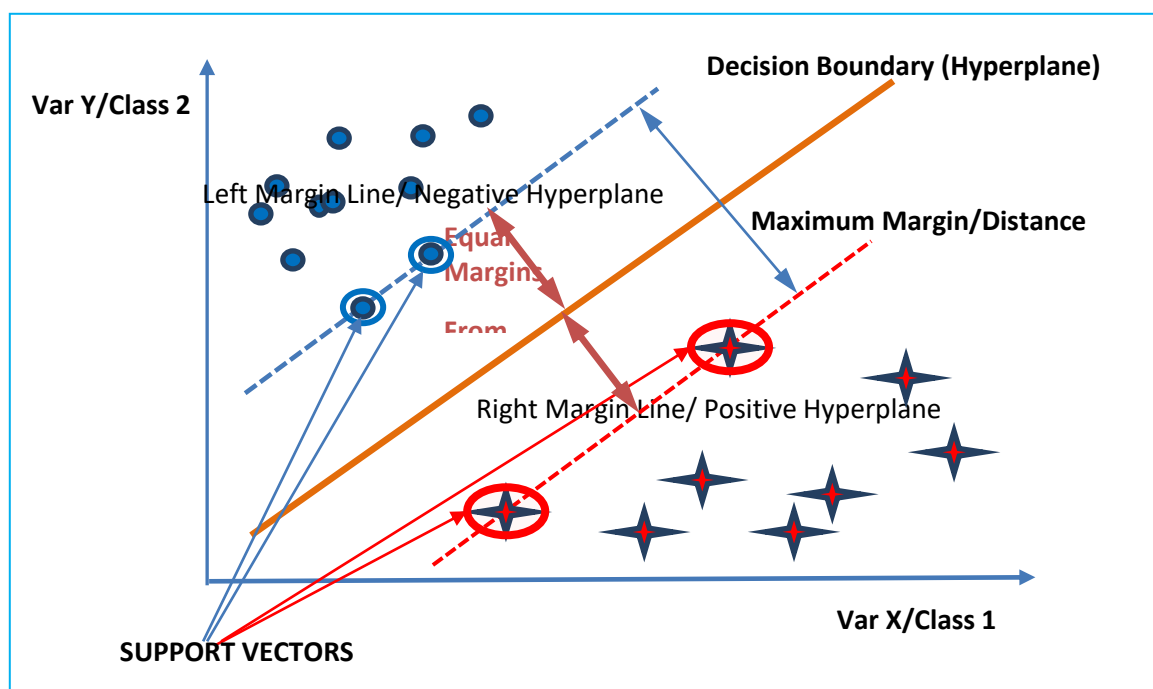
Support vector machine is a now a branch of machine learning, it is a popular algorithm for the classification of two-dimensional data and works very well with the small complex data sets. The algorithm is capable in handling of structured and unstructured data both and that's why it is widely used in the major applications like face recognition, intrusion detection, and classification of images etc. The method performs well on linear data to find the hyperplane that is the decision boundary or separating line between two classes, it can also handle the non-linear data using the different kernel functions where the low feature space is mapped to high dimensional space. The chapter highlight the basics of support vector machine, its working, advantages and disadvantages and pictorial representation of the hyperplane. The chapter also discuss the various parameters like cost-C, bad and good margins, gamma, positive and negative hyperplanes, soft as well as hard margins and outliers.

**Keywords:** Decision Boundary, Hyperplane, Outliers, Maximum Margin, Gamma, Non-Linear Data.

### **Introduction:**

Support vector machine (SVM) is popular supervised algorithm that was introduced in COLT-92 by Boser, Guyon & Vapnik [5] in 1960 that got refined in 1990s. [3] [7] It is a powerful and flexible machine learning algorithm applied for classification, regression, and outliers detection [1] [3] and gives its best on the smaller complex data sets. [1] [2] It is the representation of different data sets in a hyperplane in multi-dimensional space and divide the data set in a way that a maximum margin can be produced to separate the data elements. In this chapter data is linearly separable that means classification is done into two classes. Support vectors are also called the "extreme cases" and with this beauty the support vectors can separate the two classes even if the outliers are present in the data sets. This algorithm can accurately predict the data classes and useful in many real world

applications like face detection, classification of text and images etc. In figure 1, data is linearly separated into two classes by the two parallel lines making the maximum possible distance between them and a single line between these two parallel lines (lines on the edges of maximum margin) is called a decision boundary [9] or the hyperplane represented with a bold line in the centre of these two parallel lines. These side parallel lines are called left margin (negative hyperplane) or right margin (positive hyperplane). [2] [3][7] SVM is all about the generation of decision boundary based on these two hyperplane and selection of the data points to get the best possible maximum margin between these two hyperplanes [3][8] shown in figure 1.



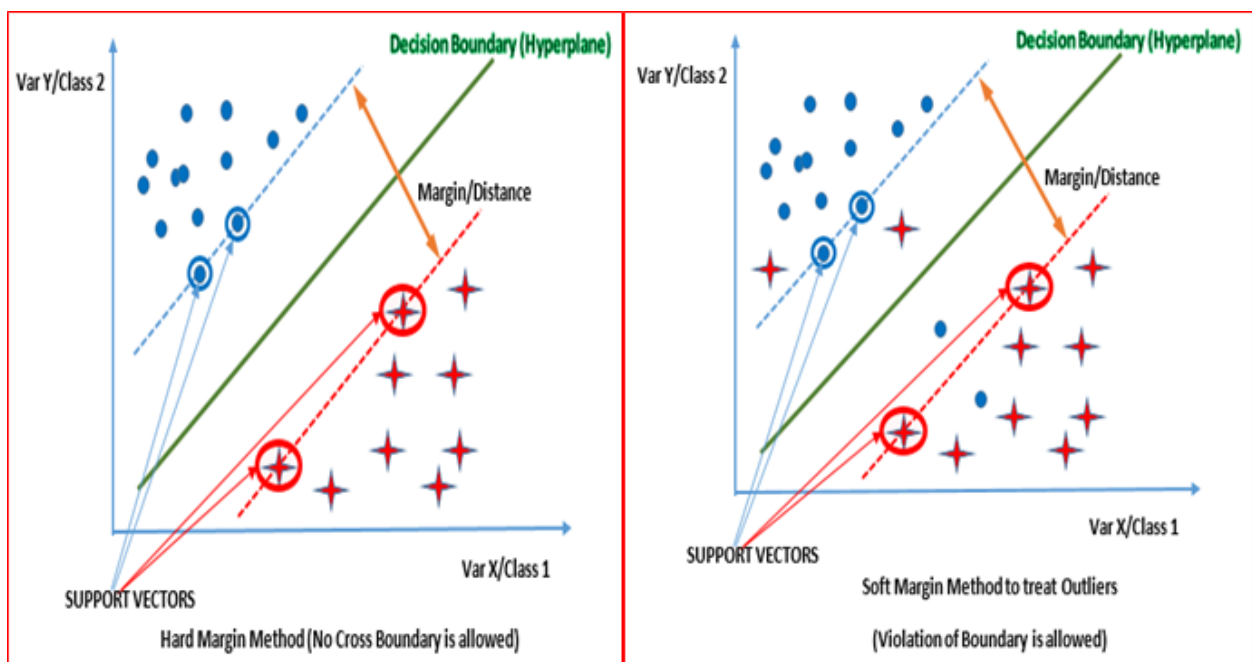
**Figure 1: Shows Support Vectors and Hyperplane for the two Classes**

Pictorial representation of the two classes (if data is linearly separable) or the variables on x-axis and y-axis makes it easy to view the data classes or the groups and their scattering just like the linear representation of the data between two classes and line of best fit as a decision boundary line. [9] In more than two features, data is non-linearly separable, kernel function is used to map the data and find the hyperplane. [2][7][8]

Though in the support vector machine, the X and Y variables [8] or the given two classes are considered independent so that they can be linearly separable by the single best fit line. However, not all the variables can be independent always, therefore in spot vector machines, the margins can be soft or hard. In hard margin, classes are separated rigidly and



no margin violation is allowed, the data is linearly separated into two classes by two parallel hyperplanes making maximum possible distance between them. [3] Whereas in soft margin, some data points can lie on the incorrect side of the hyperplane; for example in 2-D feature space, some of the data points of class 1 lie on the side of class 2 and some of the data points of class 2 lie on the side of class 1 or class 1 hyperplane. So, so the method is partially linearly separable allowing the violation of some constraints, this soft margin method is not rigid like the hard margin method and is most suited to the real world applications as in reality, that a points are not exactly separable or Independent and may violate the hyperplane boundaries. [11] Sometimes these noisy points are also called abnormal values, or the outliers in the clusters or classes as shown in figure 2.



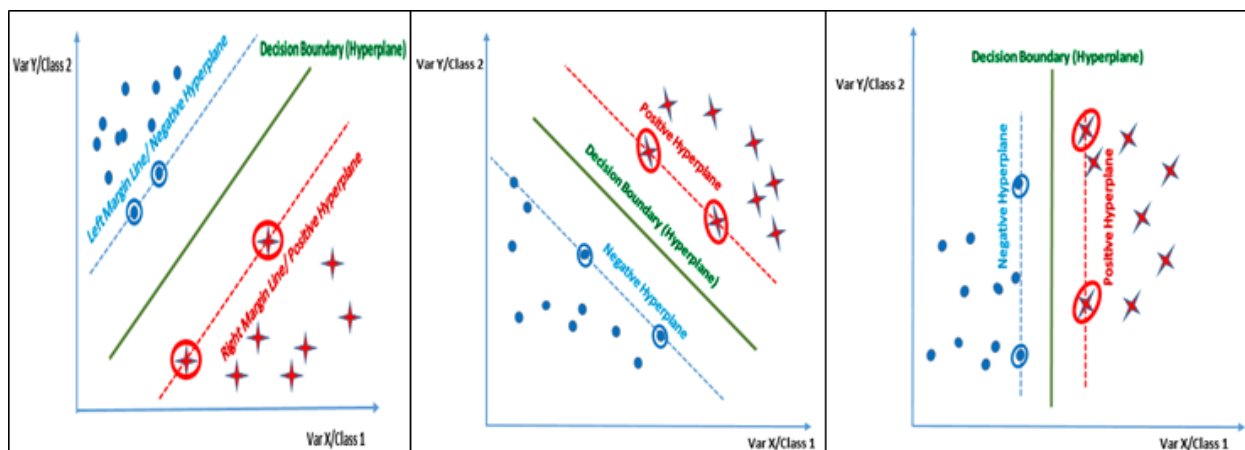
**Figure 2: (a) Hard Margin, (b) Soft Margin**

Mathematically support vectors expression is  $w \cdot x + b = +1$  for one class,  $w \cdot x + b = 0$  for decision boundary, and  $w \cdot x + b = -1$  for another class where  $w$  is a weight vector,  $x$  is input vector and  $b$  is bias. [4][5][10] [11]

### **Role of Hyperplane and Support Vectors**

Hyperplane is the best decision boundary line that classified the data into categories and presented a clear picture of the classification. It can be two dimensional feature space or the multidimensional data. In two dimensional features space, it is a straight line and in 3-D (having more than two features) it is 2D Plane. The hyperplane is created with maximum margin from the data elements. [3][8][11]

Support vectors are the closet point to the hyperplane and effect the position of the hyperplane. The maximum margin hyperplane is the best hyperplane as it represent the largest and clear separation between the given classes. [8] Decision line can move in any direction either positively or negatively as a data set can be distributed in any ways as shown in figure 3, so the direction of the central line doesn't matter but the important thing is how the data is being classified into different clusters or the groups in the best possible way so that they can be differentiated easily.



**Figure 3: Different forms of Hyperplanes according to data shape, size and distributions**

SVM can ignore the outliers in finding the best hyperplane. It allows the data elements present in the opposite side of the class shown in figure 2. The penalty is used to handle such outliers and it is added for each outlier. In order to handle the outlets in selecting the best hyperplanes the gamma value should be considered. The high gamma considered only the most needed appoints to create a hyperplane whereas low gamma value also considered those data points that are far away. The overfitting and underfitting of the data points would also be should be avoided to get the accurate prediction. [5] [8] [9] If the data points cannot be separated clearly, the low dimensional space will be converted to the high dimensional space and this mapping allow the model to find the best hyperplane or the decision boundary. [9] This function is called as 'kernel'. [5] [8] [9] This mathematical function helpful in finding the hyperplane even if the data is not linearly separable. The mapping of the kernel function, selecting the best kernel method, normalization of the input data and a parameter tuning for converting to high dimension space requires much memory space and time. Therefore, sometimes the performance of

this function is very poor especially in case of the large data sets that are non-linearly separable. [7]

### Best and Poor margins

Support vectors are the key data element that helps in generating the hyperplanes (margin lines) of the two classes and finding a best possible boundary line to create a best hyperplane at the centre of the two margin lines therefore, such vectors or the data elements are called support on which hyperplane is drawn. [3] [5] [9] The selection of the hyperplanes is very crucial for best possible decision boundary; thus it is mandatory to get the perfect margin lines otherwise poor margin may mislead the decision as shown in figure 4.

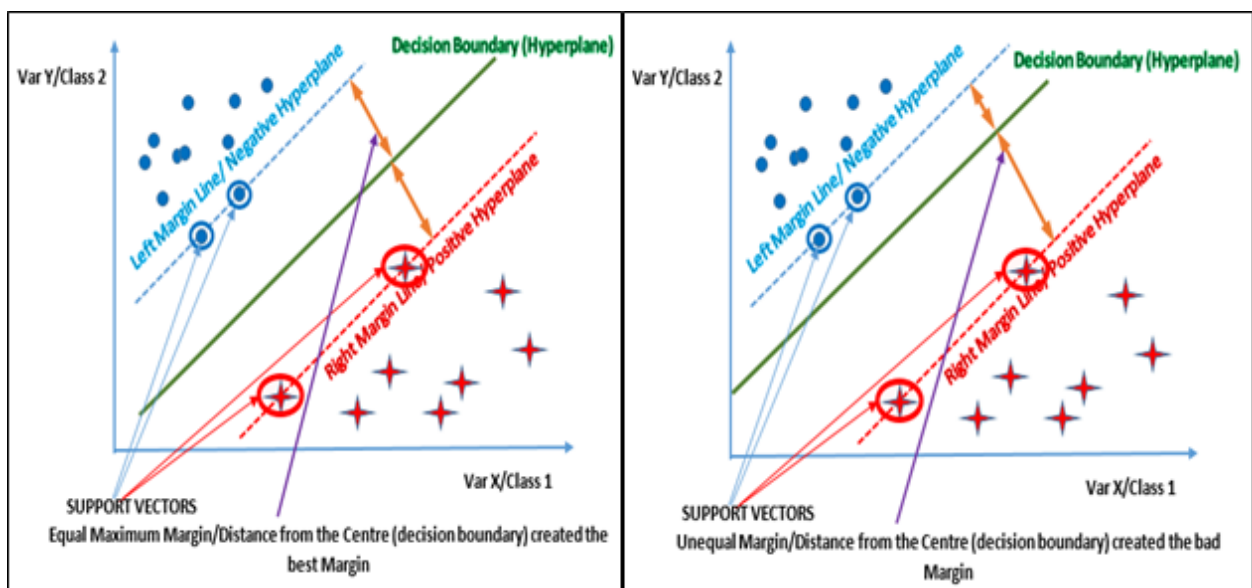


Figure 4: Best and Poor Margin Lines

The goal of the SVM is find the two hyperplane that can help in creating the decision boundary line that can divide the 2-D data space (two classes) and helps in placing the new data points in correct class. The process is iterative that create the best possible decision line between two categories or the groups. This decision boundary line is called the "maximum margin hyperplane" with negative hyperplane on the left hand side and the positive hyperlink in the right side on the support vectors of the two classes. [3]

### Types of Support Vector Machine Algorithms

The SVM methods can be divided in two categories, one is linear and other in non-linear method. In linear SVM method, data can be classified between two classes using one straight line, with this linearity, it is called the linear SVM and if data set cannot be divided

by using single straight line, then it will be known as the nonlinear vector machine classification.[2] [9]

### **Advantages of Support Vector Machines**

The support vector machine works best if the data is linear, different kernel functions [3] [7] can be used to deal with the non-linear data also. [9] Support vectors are the subset of the data those are considered for deciding the hyperplane and this is the reason that SVM efficiently utilize the memory. It effectively deals with the outliers with its penalty function and also works very well on high dimensional data. It has many advanced applications like bioinformatics, handwriting recognition, image categorization and hypertext recognition, intrusion detection, face detection, email classification, gene classification [1] etc. It can be easily implemented in the Python, MATLAB and in R [6]. The SVM performance is very high in the smaller data sets. It works very well with the structured and unstructured data. [7]

### **Disadvantages of Support Vector Machines**

Selecting the right kernel is not an easy task and the disadvantages of the kernel functions [3] are also applied in SVN. The SVM hyper parameters like the gamma and the cost-C is not easy to optimize. This SVM method not perform efficiently if the data is large and non-linear. If too many outliers are presented in input data sets, SVM is not good due to penalty. Selection of the kernel functions for the non-linear data, the over fitting and under fitting is also a big challenge. [7]

### **Conclusion:**

Significance of support vector machine lies in its handling of structured and unstructured data, support vectors subsets, iteratively finding the best hyperplane for decision boundary and mapping of non-linear data using kernel function. Though the mapping, selection of the kernel function, data tuning, and optimization requires memory space and time. The kernel methods are complex to understand, moreover the SVM performs less on large data sets. However, the linear methods of classification perform well and produce accurate results therefore, many real world applications use this algorithm for the classification and dealing the outliers.

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## **MAPPING VALUE CHAINS: A FRAMEWORK OVERVIEW**

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### **Introduction:**

A value chain is made up of all the tasks and services performed by an organization in order to provide a good or service to the public. A product or service's journey from inception to final use in a certain industry can also be described as a wide variety of activities, involving the addition of various values at each stage from input supply to production, processing, wholesale, and retail. Value-chain analysis seeks to increase production efficiency so that a company may offer the greatest amount of value for the least amount of money. The value chain consists of five processes or activities that enable a business to generate value above and beyond the cost of providing its clients with goods and services. The following are the five actions or steps:

- 1. Inbound Logistics:** the inventory control, warehousing and receiving are a part of it.
- 2. Operations:** the activities that transforms inputs into final products along with the creation of values.
- 3. Outbound Logistics:** all the activities that are required to get a finished goods to a customer.
- 4. Sales and Marketing:** the activities to know the buyer who can purchase the products.
- 5. Services:** the activities that enhances and maintains the product value with the help of customer support.

The value chain is profitable if there is a link between the products that the companies produce and the demands of the customers. A lot of focus is placed on areas like product testing, innovation, research and development and marketing just due to the value chain.

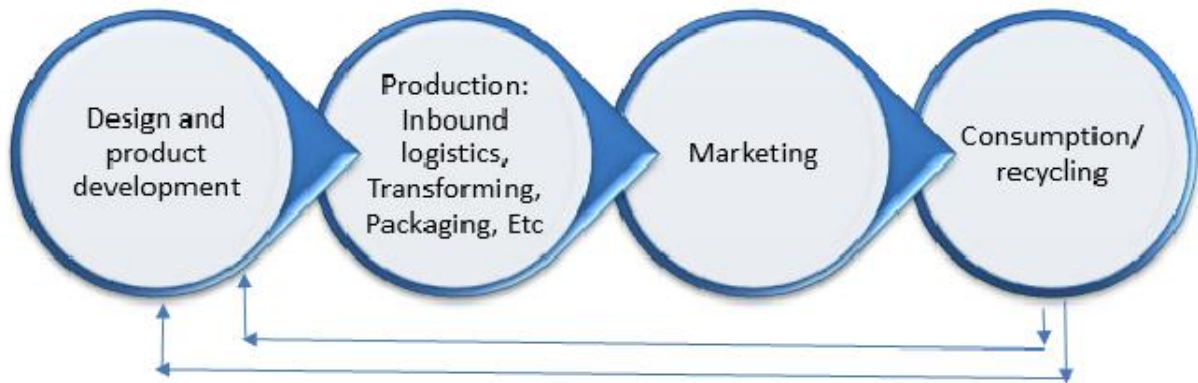
## **Concept of Value- Chain**

In his book *Competitive advantage: Creating and Sustaining Superior Performance*, Michael Porter coined the phrase "value chain" and used it for the first time in 1985. He claims that the "value chain" of a business represents its value-adding activities, which are dictated by its pricing and cost structure. As the product moves through the links in the chain, it is anticipated that its value would rise (Hellin and Meijer, 2006). This concept has been the subject of an increasing amount of management and economics research throughout time (Abecassis-Moedas, 2006). A value chain, broadly speaking, is the series of steps necessary to create a final product from its raw material (Chopra and Meindl, 2004). The idea of the value chain also recognizes the necessity of connecting output to demand and the importance of structuring the flow of opportunities from farmers to consumers (Porter, 1985). Value chains are sometimes referred to as marketing chains, supply chains, distribution chains, productive chains, or supply chains. They are composed of companies or individuals that work together to deliver goods and services.

According to UNIDO (2009), a value chain includes all of the steps required to take a product from the initial input-supply stage through multiple processing stages to its final market destination, including disposing of the product after use. According to them, value chains include input supply, handling, processing, storing, packaging, and distribution activities that occur at the farm or rural level. Value chain research has had two main focuses. Understanding how various value chain types provide competitive advantage by altering how a product is processed or sold has been one area of focus (Recklies, 2001). In addition, the analysis of value chains has been applied to comprehend the risks, advantages, and drawbacks that each link in the chain has from a socioeconomic perspective. This second method has proven effective in understanding the advantages of collecting non-timber forest products, particularly high-value commodities derived from plants and animals (Wynberg *et al.*, 2003). It has also been used successfully in discussions regarding the advantages of fair-trade products (Stiglitz and Myers 2006). In order to provide value to customers, a company's network of operations for converting inputs into outputs is referred to as its "value chain," according to Hill & Jones (2001). As shown in Figure 1, a basic value chain can be constructed.

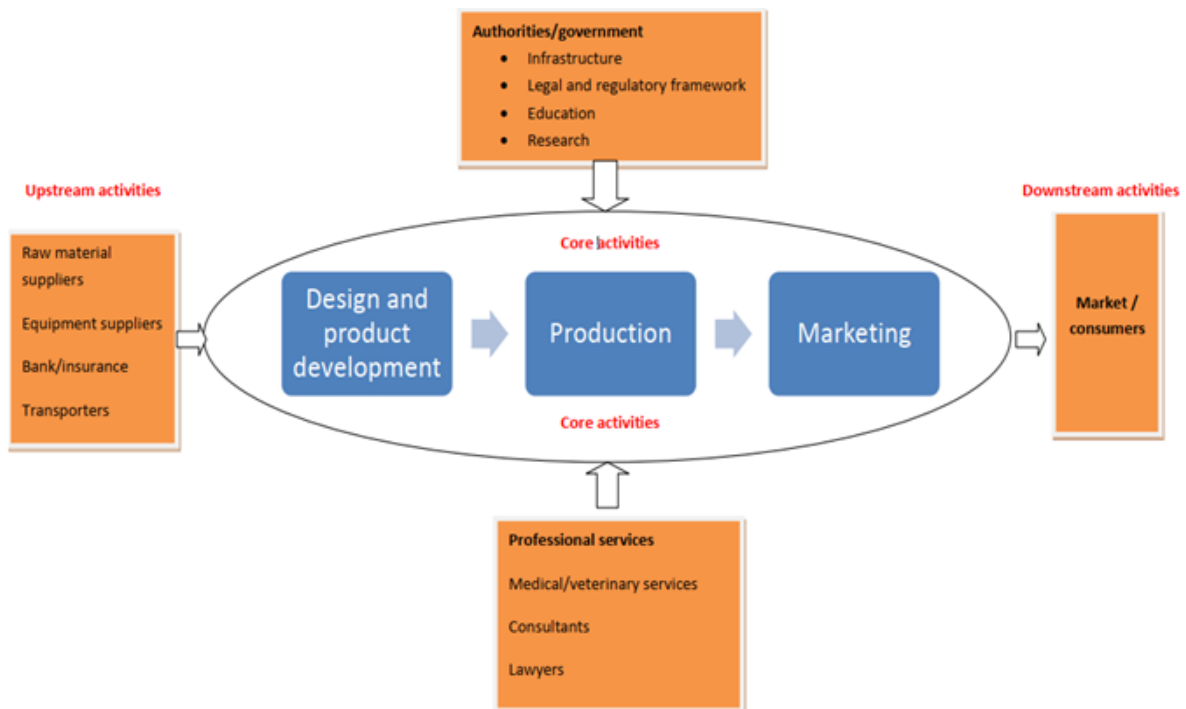
Applying the value chain method has several key implications, the most significant of which is that every decision taken at one stage of the process affects the actions that come after, and frequently these decisions may be irreversible. Value chains comprise all of

the services and operations required to move a good or service from its conception to its intended market—which could be regional, national, international, or global—and then sell it. The participants in the value chain include manufacturers, input suppliers, operators, processors, retailers, and consumers. They receive assistance from several suppliers of business, financial, and technological services.



**Figure 1: A simple value chain (Source: Creation by Author)**

**The Extended Value Chain:** In reality, value chains are far more intricate than this. As seen in Figure 2, there are typically a lot more links in the chain. Numerous external activities, also referred to as upstream and downstream activities, have an impact on activities that occur within the value chain. While downstream operations are concerned with the sector's outputs, upstream activities supply the industry with inputs.

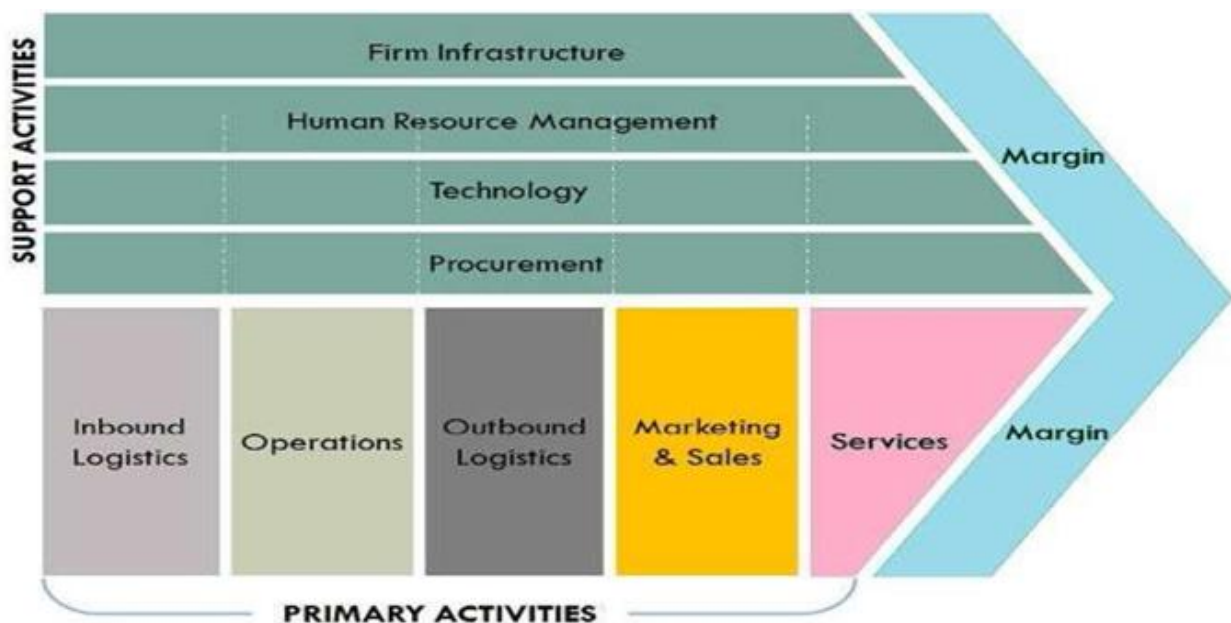


**Figure 2: The extended value chain (Source: Hempel, Nov 2010)**



### Value Chain Analysis Framework

Value chains can be divided into buyer-driven and producer-driven chains based on who is driving them. According to Abecassis- Moedas (2006), buyer-driven chains are typical of labor-intensive, consumer goods industries where major retailers, merchandisers, and trading companies have a significant influence in setting up production networks, usually in developing (exporting) nations. On the other hand, producer-driven chains are typical of capital-intensive, technology-oriented industries dominated by major transnational corporations that have a significant influence. Value chain analysis aims to expand a business's access to opportunities and resources by studying the dynamics of complex relationships inside a network, where value is created and captured in a value system that consists of partners, suppliers, distributors, and collaborators (Zott *et al.*, 2011). Value chain analysis (VCA) employs two methodologies: qualitative and quantitative. Apply a qualitative approach first, and subsequently a quantitative one. Surveys, focus groups, semi-structured interviews, and observation are helpful methods for forming an understanding of the many chain participants and their interactions, as suggested by Hellin and Meijer (2006). Porter separated business operations into two main categories: primary and support, for the purposes of Value Chain Analysis.



**Figure 3: Michael Porter's Value Chain Model**  
(Source Origin: Porter (1985), modified)

### **Primary Activities**

- **Inbound Logistics:** It handles the ingestion, distribution, and storage of data.
- **Manufacturing Operations:** Transformation of raw materials into completed goods.
- **Outbound Logistics:** It deals with the gathering, storing, and delivery of goods or services to clients.
- **Marketing and Sales:** Include public relations campaigns aimed at raising awareness of the product.
- **Services:** Everything that adds to the value of the goods or services.
- **Support Activities:** Infrastructure, technological development, procurement, and human resource management are some of the secondary operations that support the main ones.

### **Uses of Value Chain Analysis**

- ❖ A company's unique operations and their interactions with one another reveal the sources of its competitive edge.
- ❖ The value chain serves as a tool for methodically analysing a company's operations and how they interact to impact each other's performance and costs.
- ❖ When a company outperforms its rivals in these areas, it obtains a competitive edge.
- ❖ Aids in preventing you from entering the "No Profit Zone".
- ❖ Provides avenues for incorporation.

### **Importance/ Benefits of Value Chain Analysis**

- ❖ Encourage choices for a range of commercial endeavors.
- ❖ Systemic competitiveness has grown in importance due to the expanding worldwide dispersion of component production and the growing division of labor.
- ❖ Optimize tasks to increase productivity and reduce costs for the organization.
- ❖ Recognize your strengths and opportunities for development.
- ❖ Possibly establish a financial edge over rivals.
- ❖ Being efficient in production is merely a prerequisite for breaking into international markets.
- ❖ Comprehending the dynamic dynamics present throughout the entire value chain is necessary for entering global markets in a way that facilitates consistent revenue development, or maximizing the benefits of globalization.

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# CLIMATE CHANGE AND ITS IMPACT ON THE GLOBAL TEA INDUSTRY: A COMPREHENSIVE EXPLORATION OF CULTIVATION, ECONOMIC SIGNIFICANCE, AND ADAPTATION STRATEGIES

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## **Abstract:**

The abstract summarizes the key points of the topic on the impact of climate change on the tea industry and its adaptation strategies. It highlights the industry's global significance, challenges posed by climate change including shifts in temperature and precipitation patterns, and the economic, social, and environmental implications. Additionally, it emphasizes the need for adaptation strategies such as relocation, development of climate-resilient varieties, sustainable practices, technology integration, community engagement, policy support, supply chain resilience, and continued research and development. The abstract stresses the importance of collaborative efforts among stakeholders to ensure the sustainability of the tea industry amidst climate change challenges.

## **Introduction:**

Tea (*Camellia sinensis*) stands as the most widely consumed non-alcoholic beverage globally. With origins dating back 5000 years in south-western China, tea cultivation has evolved into a global industry, spanning over 58 countries and covering approximately 4.37 million hectares (www.statista.com). Key players in global tea production include China, India, Kenya, and Sri Lanka. The economic significance of the tea industry is profound, contributing to the livelihoods of millions, fostering rural development, ensuring food security, and serving as a crucial component of poverty alleviation strategies in many developing nations.

The tea industry has witnessed consistent growth, with projections indicating a compound annual rate of 4% to 5.5% from 2017 to 2024. In 2017, the retail value of the global tea market was estimated at around USD 50 billion, and forecasts suggest an

increase to over USD 73 billion by 2024 (Global Market report: Tea, 2019). India, a major player in the global tea market, has a significant stake in the industry, serving as a major employer, foreign exchange earner, and cultural cornerstone. With vast tea plantations covering 619,773.70 hectares, India ranks among the largest tea-producing nations globally (Tea board of India). Geographical diversity further underscores the industry's importance, with states like Himachal Pradesh, Uttarakhand, Assam, and West Bengal playing pivotal roles.

### **Climate Change and its Challenges:**

While the tea industry flourishes, it is not immune to the challenges posed by climate change. Global warming has led to noticeable shifts in climate patterns, including alterations in temperature, precipitation, and an increase in extreme weather events. The extreme weather events have led to destruction in many crop areas especially during the peak crop seasons (Dutta *et. al.*, 2023). These changes pose significant threats to tea cultivation, affecting growth, yield, and quality of tea plants. Climate change-induced stressors such as drought, erratic precipitation, rising temperatures, and extreme weather events, including floods and storms, have become decadal impacts affecting tea plants' extended life span.

Climate change introduces both biotic (pests and diseases) and abiotic stressors (UV irradiation, nutrient deficiency, ozone depletion), further impacting the sustainability of tea cultivation. Agrometeorological conditions in tea-producing areas experience variability, creating uncertainty and challenges for the eco-physiological requirements of tea. The consequences of climate change on tea cultivation extend beyond the economic aspects, affecting the social and environmental dimensions critical for smallholder farmers and the overall ecological balance of tea-producing regions.

### **Climate Change Impact on Tea Quality:**

To understand the intricate relationship between climate change and tea, research is imperative. This article delves into the impact of climate change on tea flavor profiles, chemical composition, and nutritional content. Tea, renowned for its diverse flavours, is highly influenced by specific temperature and altitude conditions optimal for its growth (Lin *et. al.*, 2003). Climate change-induced shifts in these factors can disrupt the delicate balance, affecting the synthesis of volatile compounds, essential oils, and other flavor-contributing elements. Higher temperatures and changes in altitude may lead to accelerated chemical reactions within tea leaves, potentially altering the equilibrium of compounds responsible for the distinctive aroma and taste of tea (Zeng *et.al.*, 2019). Such

changes pose a significant challenge, as the subtle flavor intricacies appreciated by tea enthusiasts are closely linked to the intricate balance of environmental factors.

Water availability is crucial for tea plant growth, influencing physiological processes, nutrient absorption, and overall development. Changes in precipitation patterns due to climate change can lead to either drought or excess water conditions, both of which pose challenges for crop cultivation (Kakoti *et.al.*, 2023). Insufficient rainfall can result in drought conditions, impacting water supply and hindering normal metabolic processes, affecting tea plant growth. On the other hand, excessive rainfall can lead to waterlogged conditions, adversely affecting the root system and compromising the health of tea plants. The delicate water balance essential for tea cultivation is disrupted, influencing the concentration of flavor compounds and ultimately shaping the taste and quality of the final tea product.

Climate change also affects the interactions between tea plants and their surrounding ecosystem, particularly in terms of pests and diseases. Rising temperatures create favorable conditions for the proliferation of pests, while altered climate patterns contribute to the emergence of diseases affecting tea plants. To combat these threats, farmers often resort to pesticides, which not only target pests but can also impact the overall composition of tea plants and their surrounding ecosystem (Hazarika *et al.*, 2023). The complex interplay between climate change, pest dynamics, and pesticide usage underscores the challenges faced by tea cultivation. Adapting to these changes requires a careful balance between managing agricultural threats and preserving the distinct qualities defining tea flavor profiles.

### **Impact on Tea Production:**

Climate change introduces both favorable and adverse effects on tea production. As a C<sub>3</sub> crop, tea plants benefit from increased CO<sub>2</sub>, temperature, and rainfall. Elevated CO<sub>2</sub> concentrations have been associated with biomass increment in tea leaves. However, rising temperatures beyond certain limits and changes in atmospheric conditions can reduce tea yields (Ahmed *et al.*, 2018). Tea plants are highly temperature-dependent, and temperatures beyond the optimal range can limit tea shoot growth and overall productivity.

The photosynthetic rate of tea is highest at average ambient temperatures between 18°C and 20°C. Increased temperatures beyond this range can lead to higher evapotranspiration, altering the surface and microclimate around tea bushes and subsequently reducing tea yields. Rainfall, a crucial factor influencing photosynthesis,

metabolism, and overall tea plant development, is also affected by climate change. Changes in rainfall patterns, including high, low, and uneven distribution, can significantly impact tea yields. Excessive rainfall can lead to waterlogged conditions, while insufficient rainfall can result in drought stress, both influencing tea growth and yield.

Drought stress, in particular, has been reported to cause considerable yield reduction, affecting tea growth and increasing the number of dormant/unproductive buds. Achieving optimum tea yield requires specific radiation intensity, humidity, and photoperiod conditions, all of which are influenced by climate change-induced factors. Changes in solar radiation reaching the Earth due to climate change further contribute to the complexity of tea production dynamics.

### **Economic Implications:**

Climate change has profound economic implications for the tea industry, influencing various stages of production from cultivation to processing and marketing. Traditional tea-growing regions may experience shifts in temperature and humidity, adversely affecting the quality and quantity of tea produced. Increased temperatures can lead to stressed tea plants, affecting flavor profiles and overall yield. The need for adaptation is evident, prompting considerations for the relocation of tea plantations to higher altitudes or different geographical locations with more suitable climate conditions.

The structure of the tea industry has undergone transformation, moving from large plantations to smallholder operations. Small Tea Growers (STGs) now play a significant role, with their numbers increasing in regions like Assam. However, climate change introduces additional challenges for these smallholders, affecting tea yield, quality, and overall profitability. Smallholder operations face hurdles such as reduced traceability, limited access to resources, and challenges in participating effectively in export-oriented supply chains. The economic implications extend beyond the tea producers to encompass the entire value chain, affecting stakeholders such as tea manufacturers, exporters, and retailers.

Addressing climate change challenges in the tea industry requires substantial financial investment. Implementing adaptive strategies, such as the relocation of plantations, introduction of climate-resilient tea varieties, and the adoption of sustainable agricultural practices, demands significant resources. The economic burden of these adaptations falls on both large plantations and smallholder farmers, further complicating the financial landscape of the tea industry. Moreover, the social and economic well-being of tea-producing communities is intricately linked to the industry. The tea sector is a major

employer, providing livelihoods for millions of people worldwide. Changes in the industry's economic dynamics due to climate change can lead to social challenges, including job losses, changes in workforce composition, and housing concerns for plantation workers. The social fabric of tea-producing regions is intricately woven with the industry's success, making it imperative to address the economic consequences of climate change for both large-scale and small-scale tea producers.

### **Adaptation Strategies:**

As the tea industry grapples with the challenges posed by climate change, implementing effective adaptation strategies is crucial. Several approaches can be considered to mitigate the impact of climate change on tea cultivation, ensuring the industry's sustainability.

- 1. Relocation and Altitude Adjustment:** Given the temperature sensitivity of tea plants, relocating tea plantations to higher altitudes with more favorable temperatures can be a viable strategy. This approach, however, comes with challenges, including land availability, economic feasibility, and potential impacts on local ecosystems.
- 2. Introduction of Climate-Resilient Varieties:** It is crucial to develop and introduce tea varieties that exhibit enhanced resilience to the impacts of climate change. Research and breeding initiatives should prioritize the creation of tea plants with increased tolerance to extreme temperatures, resistance against pests and diseases, and improved efficiency in water utilization. Numerous instances have demonstrated significant success in employing such resilient varieties (Dutta *et al.*, 2023).
- 3. Sustainable Agricultural Practices:** Enhancing the resilience of tea plantations can be achieved through the implementation of sustainable agricultural practices. This encompasses the adoption of organic farming methods, effective water management strategies, and the encouragement of agroforestry practices to establish diversified and robust ecosystems. Research by Talukdar *et al.* (2022) indicates that even subtle modifications in agricultural practices can yield notable changes in crop outcomes.
- 4. Technology Integration:** Leveraging technology can aid in monitoring and managing climate-related risks. Weather forecasting, remote sensing, and data analytics can provide valuable insights for farmers to make informed decisions about crop management and resource allocation.
- 5. Community Engagement and Capacity Building:** Critical to climate change adaptation in the tea industry is active engagement with local communities and the development of their capacity to cope with environmental shifts. The empowerment of



smallholder farmers through the provision of knowledge and resources becomes pivotal in bolstering their resilience, thereby fostering the overall sustainability of the tea sector. Furthermore, recognizing the evolving role of gender dynamics over the past decades and integrating gender-specific considerations is essential in this adaptive process (Dutta *et al.*, 2023).

- 6. Policy Support:** Governments and international bodies can play a pivotal role in supporting the tea industry's adaptation to climate change. Implementing policies that incentivize sustainable practices, provide financial support for adaptation measures, and promote research and development can create an enabling environment for the industry.
- 7. Supply Chain Resilience:** Strengthening the resilience of the entire tea supply chain is essential. This includes measures to ensure the traceability of tea products, diversification of markets, and the development of climate-smart logistics to mitigate disruptions caused by climate-related events.
- 8. Research and Development:** Continued investment in research and development is fundamental for understanding the evolving dynamics between climate change and tea cultivation. This involves studying the genetic basis of tea plants, analyzing the impact of climate change on tea quality, and developing innovative solutions to address emerging challenges.

### **Conclusion:**

In conclusion, the tea industry, a global economic powerhouse and cultural icon, faces unprecedented challenges due to climate change. The impact extends beyond economic considerations, affecting the intricate flavours cherished by consumers and the livelihoods of millions involved in tea cultivation. The interplay between rising temperatures, altered precipitation patterns, and extreme weather events demands urgent attention and comprehensive strategies.

Adaptation is key to ensuring the sustainability of the tea industry in the face of climate change. Relocation, development of climate-resilient varieties, sustainable agricultural practices, technology integration, community engagement, and policy support are integral components of a holistic approach. As the industry navigates these challenges, collaboration between governments, researchers, industry stakeholders, and local communities is essential.

The journey towards a climate-resilient tea industry requires a multifaceted and inclusive effort. Balancing the economic interests of large plantations and smallholder

farmers, preserving the rich cultural heritage of tea, and safeguarding the environmental sustainability of tea-producing regions are all integral to charting a course towards a future where tea continues to thrive despite the challenges posed by a changing climate.

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## **ROLE OF MOBILE COMMERCE IN MODERN BUSINESS DEVELOPMENT**

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### **Introduction:**

Mobile commerce is referred as m-commerce. It is a rapidly expanding field of commerce which focuses on the use of mobile devices for various commercial activities. It is a dynamic and evolving sector in today's economy. The concept of m-commerce was developed by Kevin Duffy in 1977. The main aim of mobile commerce is to provide wireless technology services to its customers.

Mobile commerce provides the various platforms to make transactions with the help of mobile, avoiding the risk and malpractices. Mobile commerce helps us to purchase everything without wasting our precious time and exploring the market in just one click. It is not only beneficial for businessmen but also customers.

As compared to traditional commerce, mobile commerce provides the updated services by using mobile technology. The users of mobile commerce are rapidly increasing due to its unique features i.e flexibility and mobility of funds. Mobile commerce provides services like mobile banking, mobile shopping, mobile entertainment, mobile advertising, mobile ticketing etc. On the contrary, people suffer from various difficulties while using mobile commerce like Internet speed, errors in device, transaction security and risk associated with commercial activities.

### **Services of Mobile Commerce**

#### **1. Mobile Banking**

It is a type of platform which provides services to their customers to handle their bank account at anytime from anywhere by using mobile devices. By using mobile banking, we can perform various banking activities such as money transfer, balance check, pay bills by using QR code, buy tickets etc. In today's economy mobile banking plays a vital role in detecting the errors and to stop the malpractices. While using mobile banking each and every transaction was recorded in the software. It is helpful for the banks as well as banks.

On the other hand, mobile banking also has some drawbacks like use only by literate people, transaction risk and safety etc. Nowadays, private sector banks like ICICI bank provide the foremost net banking related services. ICICI bank launch their own app to conduct their online transaction i.e. "I Mobile pay" which has been used by more than 28

million people. ICICI bank earned 9000 billion \$ in 2023 with the help of conducting transaction in online form. In the public sector, SBI provides the finest services. Recently SBI grabbed 6.07 crore digital customers.

## **2. Mobile Shopping**

Mobile shopping relates to buying products using mobile devices in association with an application such as Amazon, flipkart, Meesho, Myntra, Nykaa, etc. By using these applications, customers can buy anything from anywhere. These tools are useful for those people who don't have much time to explore the market and buy things. They can purchase easily with the help of mobile devices. It has some drawbacks such as customers feeling insecure due to the fact that they can't touch products physically.

According to a study of mobile commerce around 79% of people make purchases using mobile devices at least once in a duration of 6 months. Mobile commerce captures 60% of the total e-commerce market. Global Mobile commerce sales reached 5.8 trillion US dollars in 2023.

## **3. Mobile Payment**

Mobile payment is an extension of mobile banking. It is an application which helps to make online transactions, scan QR code, recharge, and bill payment. It includes buying a variety of products from different stores or to make transactions by using smart devices. Mobile payment includes various payment software like Google pay, paytm, phone pe etc.

Most of the customers in India use paytm app for digital payments. More than 160 million people use mobile payment in India. Approximately 77% of Indian people use the Paytm app for making transactions.

## **4. Mobile Advertising and Marketing**

In the digital era of marketing, entrepreneurs use mobile devices to promote their product or to aware people about their product. They refer to various applications such as E-mails, texts, SMS, notifications, customer calls. Mobile advertising includes banner ads, smartphone apps, video ads, on platforms like YouTube, social media campaigns on Facebook and Instagram.

## **5. Mobile Entertainment**

Mobile entertainment refers to the use of mobile for entertainment purposes. It covers a wide range of activities such as watching movies & videos, listening to audio, mobile gaming, social Media etc.

It plays a pivotal role to entertain people in this hard pressed world. In India mostly used applications for entertainment like jio cinema app Netflix, Amazon prime video, hot

star, YouTube etc. Jio cinema app was launched in India in Sept 2016 which was highest viewers app in India.

## **6. Mobile Ticketing**

Mobile ticketing is the process, where customers can book, order or buy tickets by using mobile devices. For ex: railway ticket, airline ticket, movie ticket, live concert ticket etc. By avoiding the use of paper, people can carry tickets on mobile devices also.

There are various apps for booking tickets like Make my trip app, UTS app, ixigo trains app etc. For the purpose of booking movie tickets, there is availability of applications like Book my show app, PVR cinema app etc.

### **Advantages of Mobile Commerce**

By using mobile devices, every person can make transactions as per their convenience. Make transactions even at midnight also. Mobile commerce provides easy access to entrepreneurs to reach a global marketplace beyond the country. It provides speedy, efficient, & safe transactions. By using mobile commerce shopping platforms, customers can get products in just two to three days. Mobile commerce provides an opportunity to build brand image and create product positioning in the mind of customers.

Mobile commerce provides various payment options to transfer funds. Compared to physical shopping, mobile shopping is less expensive. Mobile commerce provides various types of information regarding how to use their devices for transaction purposes with the help of mobile commerce. Entrepreneurs can make a large customer base or provide guidelines for retaining customers.

### **Disadvantages of Mobile Commerce**

There are some security related issues regarding transfer of funds while using mobile commerce. Internet connectivity and speed is another problem while using services related to mobile commerce. In the process of payment, people can face various types of challenges such as transfer of payment to one another, delay in payment etc. Many of customers face technical issues during transactions on mobile devices.

### **Examples of M-Commerce**

#### **1. Burger King**

Burger King is one of the famous fast food companies which was founded in 1954. It has 12000 restaurants in 75 countries. It grabbed 11 million customers. Burger king launched their own app to order their products from anywhere. With the help of this app they can get feedback from their customers regarding their food product, quality, taste and services etc. By using their app, customers can place orders from anywhere, explore their

menu & pay bills. Using mobile commerce in a company leads to increased customers, satisfaction of customers and helps to retain customers in today's digital market.

## **2. Flipkart**

Flipkart is another company who provides services related to mobile commerce. It is a company which was established in the year 2007 in Bangalore by Sachin Bansal and Binny Bansal. It is a well-known company in India. It provides a wide range of products such as cosmetics, electronics, home essential appliances, lifestyle products, groceries, etc. This company provides the services to their customers up to their doorstep. It provides services by detecting the personal algorithm, preferences, experiences, and past purchase history of customers. Other services are like same day or next day delivery. Customers are free to adopt any type of payment system.

## **3. KFC**

KFC provides various mobile commerce services to enhance their sales and consumer satisfaction. Kentucky Fried Chicken has more than 21000 branches all over the world. Before the adoption of the digital ERP system the managers of KFC faced various challenges regarding collection of data associated with their branches. But from the last few years they adopted a Digital ERP system in their business to monitor all branches. With the help of a digital system KFC can store information and use this information in their business to modify policies and plans.

Such types of food companies develop their own app to regulate their day to day operations related to their business. By using these types of apps the company helps to know the consumer's feedback about their product.

## **4. PayPal**

It is an American multinational financial technology company. Provides the various online payment services to the majority of countries. Founders of PayPal are Peter Theil, Max Levchin, Ken Howery, Luke Nosek, Yu Pan. Headquarter in the United States. It provides online money transfer services between parties. After PayPal IPOs, the company was acquired by eBay on Oct 3, 2002 for \$ 1.5 billion in eBay stock; more than 70% of eBay accepted PayPal payments. It provides fast, secure and online pay through mobile phones. It provides information related performance of mobile transactions and analyses the transaction.

## **5. Zara**

It is a Spanish multinational fast fashion company founded in 1975. Provides various range of products like clothing, accessories, beauty products, and perfumes. This company launched over twenty new product lines per year. Zara provides mobile app

applications through which customers can explore their products, make purchases, and make payments as per their convenience.

**Conclusion:**

Mobile commerce provides the vehicle to businesses to run their business smoothly and efficiently. It is the dynamic and evolving sector of the modern economy. Mobile commerce provides opportunities to businessmen to grow and expand their business. Large number of people in society take advantage by using various services provided by mobile commerce. It plays a significant role in today's innovative world.

Mobile commerce provides the opportunities to people to do their work in an easy manner. with the Increasing no of users of smartphones enhancing their features and providing better services. On the other hand, there are some challenges faced by people, but with the modification and innovation in software we can avoid these challenges. Mobile commerce provides the digital marketplace to the upcoming entrepreneurs.

By using various facilities of mobile commerce companies can increase the goodwill, sales and customer loyalty of their product. In today's era, companies provide various payment facilities to customers like Apple pay, Amazon pay, Google pay etc. That's Why customers pay more flexibly. By sending pop up notifications to customers' companies can engage or retain customers with their brand. By taking immediate feedback and review from customers they help to modify their product.

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## **A STUDY OF FACTOR INFLUENCING THE MARKETING ENVIRONMENT**

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### **Introduction:**

Marketing is the process of creating the product or services, promoting the product or services and distributing the products or services to the customer. Marketing helps to identify the needs of the customer, wants of the customer and creating the product as per the demand of the customer and satisfy the needs of the present and potential customers. In these activities, marketing managers have to put lots of ideas, efforts to create products as per the demand of the customers.

Marketing Environment is all about the Internal and External factors that are related with the business organization and market. In marketing Some factors are internally and some are externally. Internal factors can be overcome by the marketing manager by adopting some strategies, it means it is controllable factor but external factors are those factor that cannot be controllable and that factors directly or indirectly effect on the business organisation. Marketing manager analyses the situation that maybe arise in future and predict the future changes. These changes could present both challenges an opportunity for the business and from that changes marketers will decide the strategies and plans and by this way firm will going in long term success.

According to Philip Kotler, "A company's marketing environment consist of the actors and forces outside marketing that affect marketing management's ability to build and maintain successful relationship with target customers."

### **Features of Marketing Environment:**

#### **1. Complexity:**

Marketing environment is the mixture of internal and external factors that all are interlinked with one another if the change in one factor then ultimately will be the change another factor and to understand such type of conditions are the complex in nature and that's why it becomes a very difficult.

#### **2. Dynamic:**

Marketing environment is not constant it is ever changing process .as per the need marketers adopt the changes within an organization. But, to apply change within organisation that can become an expensive one.



### **3. Uncertainty:**

Marketing conditions are uncertain. What will be happen in future that can not be predictable in advance. If marketers are predicting in advance but we cannot consider that are accurately one. That's why good marketers are always working on this type of uncertain factors. So, he can apply the various effective strategies.

### **4. Storehouse of opportunities:**

It is another feature of the marketing environment. while marketers is going to collect the information about his product's feedback then the various opportunities will got by the feedback of customers and that reason an feedback can become as opportunities' for them.

### **5. Relativity:**

In Marketing Environment relativity explains the various reason for differences in demand in connection with the various countries. For example: India is the combination of cultures. In India, saree is the traditional dress for women and that is always in demand but in other countries such as western countries the demand for sarees may be low or zero.

## **Classification of Marketing Environment:**

### **1. Internal Marketing Environment**

Internal marketing environment means the environment which is within an organisation, for example value systems of the organization, objectives of the firm, organizational structure, human resources, physical resources, technology, etc., Internal factors are directly affecting on the organisation, they are controllable and that can be change within organisation

### **2. External Marketing Environment**

Marketing environment can be classified into two broad categories i.e. External Micro Environment and External Macro Environment

#### **a. External Micro Environment:**

Micro Environment means the External environment of the organization that is very closely related with the business and its operations .and directly affecting on the business operations for example: customers, competitors, intermediaries, Resellers, public, suppliers etc. And that factors are little bit controllable.

#### **b. External Macro Environment:**

External Macro Environment factors are the large level factors that cannot be controllable, uncontrollable factors are not directly impact on the business operations, by the change of the Macro factors marketers have to change within organisation. For example: Political factors, economic factors, social factors etc.

### **Factors Affecting on the Micro Marketing Environment:**

- **Competitors:**

Competitors means who have the similar business that provide the goods and services same in nature but in the marketing environmental factors competitors is not only the who have same business but other can be influence on the organisation that's why marketers have to create a product that is not available in the market and creates differentiate position in the market.

- **Suppliers:**

Suppliers means who supply the input to organisation or who provide the raw material to produce the goods and services for an organisation but not only the supply of raw material but also other components Provided by the supplier. that is an important factor in external micro environment of a firm that is suppliers of input. the profit margin is depended on the supply because raw material decides to final price of a product.

- **Customer:**

Customers are the king of the market .and customers are users of the product that use the product for final consumption and marketers have to know how the customers will satisfy. satisfaction of the customer is the main goal of the marketing. Hence, marketers have to analyse and the needs of the customers and takes the research and development activities.

- **Intermediaries:**

In any firm intermediaries play a very important role for selling of the product and distribution of the product to end user. It includes wholesaler, retailer, agent etc. It is interlinked between firm and customers. If marketers will reduce their cost, then they can eliminate the intermediaries and directly sale the product to the customers. Intermediaries work as middle men for the business.

- **Public:**

Public means is the any group that available but it is not present customer of the product but their potential interest will become the potential customer. It also affects on the business and also aim of the marketing is the attract new customer and capture the share of the market by providing the qualitative product to the customers. Public is very important factor in the marketing environmental factor.

### **Factors Affecting on Macro Marketing Environment**

Following factors affects marketing environment:

- **Political Factors:**

Political factors mean government factor. political policies of the government are greatly influenced over the business. Organisation needs to understand the changeable conditions of the organisation and that is current and future legislature and adjust their marketing policies accordingly to political factors. For example, government imposed new tax or duty that could change all revenue generating structures.

- **Economic Factors:**

Economic environment affects the organisations cost and consumers purchasing power. Purchasing power of the customer are depends upon the price of the product, income of the customer, saving habit of the customer etc. Economic factors is determined the success of the economy for example inflation. Prices of the products are increases; it results in the decreases of demand.

- **Social Factors:**

It includes the social climate of the market. such as pattern of culture, demographics, population of a country etc. In this, there is an involvement of society, the beliefs and attitude of the people. these factors are very important factor because they directly effect on the business organisation. marketers have to take care of these factors and understand it. for example: religions and beliefs. In India, various religious people are there and the beliefs also their own. Hence, marketers have to produce goods according of the religions and beliefs.

- **Technological Factors:**

Which type of technology used for business and for the production of the goods and services that is also important factor. They are also impact directly on the business and success of the business. technology includes which type of machine used, which technique used for production process etc. improvement in technology can become more favourable or unfavourable. Favorable effect like, increase in productivity. Therefore, technology development plays a vital role in the enhancing the competitive strength of a business organisation.

- **Environmental Factors:**

Environmental factor is the dynamic in nature. Because as per season environment is change and that is not in hand of the marketer to prevent or stop the environment in same situation. as the climate change environment is also changed. weather is also included in environmental factor and that is not controllable factor.

- **Legal Factors:**

Legal factors are the type of macro marketing environmental factor. That is out of the control of the organisation. legal factors are related with the health and safety of the consumers, Advertising Standards, rights of the consumer etc. marketers have to know what is favour or what is unfavour for the success of the business and protection of consumers also.

**Conclusion:**

Marketing Environment is the surrounding of the environment of the market that consists, internal and external factors that all factors are dynamic in nature and change in one factor ultimately change will be another factor. that all face by the marketers. if they are ready to face all the factors well in advance or company have strong, capabilities, to face challenges. the organisation goes to long term success. Marketers have to always updated related to changing situation of the market. So, they have to prevent that loss of the organisation in connection with the factors that are influencing on the firm various plans, ideas, innovations, strategies have to apply. And learn something new from previous experience that may be converted into the challenges.

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## **A STUDY OF THE ROLE OF FORENSIC ACCOUNTING IN DETECTING AND PREVENTING CORPORATE FRAUD**

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### **Abstract:**

As the volume of business is growing, risk of financial fraud is also growing. In the today's global business environment financial frauds can affect organization in many ways. Audit process may sometimes prove to be insufficient to detect and eliminate the fraud that has occurred. Therefore, Forensic accounting has emerged as a critical tool in combating fraud, combining accounting expertise with investigative skills to detect and prevent financial misconduct. This research paper shows light on the role of forensic accounting in identifying malicious activities thereby reduce financial risks. This research paper has examined the methods and techniques used by forensic accountants. It also analysed the impact of forensic accounting on fraud detection and prevention. This research paper also tries to highlights the challenges faced in implementing forensic accounting practices. The findings shows that forensic accounting largely improves fraud detection and prevention for companies. While applying forensic accounting techniques factors such as resource constraints, evolving fraud techniques, and regulatory complexities need to be considered. This paper concludes with recommendations for enhancing the role of forensic accounting in better financial management.

**Keywords:** Forensic Accounting, Financial Frauds, Corporate Fraud, Fraud Detection and Prevention

### **Introduction:**

Any organisation is susceptible to fraud and corruption especially in an era of increasing financial complexity. One of the important losses that financial fraud create is loss of public trust and questioning business integrity of any organization. Therefore, forensic accounting has come out as solution to detect, investigate, and prevent financial fraud. The basic requirement of forensic accounting is strong basic knowledge of accounting methods and auditing. But over and above knowledge of accounting forensic accountant must have great investigative skills. It is the role of forensic accountants to identify fraudulent activities and providing litigation support. In this study researcher has identified the role and challenges faced by the forensic accountant.

### **Problem Statement:**

In public and private sector financial frauds are important concern even after advancements in technology and regulatory mechanism. It has been observed that sometimes formal auditing methods fail to detect sophisticated fraud and fabricated and manipulated accounting. This raises a critical question: how effective is forensic accounting in detecting and preventing financial fraud? what are the challenges and limitations faced by forensic accountant in fraud prevention and detection?

### **Objectives**

1. To analyze the role of forensic accounting in detecting financial fraud.
2. To explore the techniques and methodologies used by forensic accountants in investigating fraud.
3. To examine how forensic accounting contributes to the prevention of financial fraud within organizations.
4. To identify the challenges and limitations faced by forensic accountants in their investigative roles.
5. To provide suggestions for improving the application of forensic accounting in fraud detection and prevention.

### **Research Methodology**

Researcher has relied only on secondary data. The references are taken from the books, scholarly articles and research papers online.

### **Discussion and Findings**

- 1. Effectiveness in Fraud Detection:** It was observed that forensic accounting is tested tool and proved to be highly effective in detecting various types of financial fraud. This financial fraud includes employee frauds as well as management frauds. Some examples are cash embezzlement, misappropriation of goods, internal control system overridden, improper implementation of management policies and hiding of events. Tools like advanced data analytics, fraud risk analysis, forensic auditing are commonly employed tools which are very effective.
- 2. Fraud Prevention:** For organisations it is important to prevent the possibility of happening of fraud. Installing a system that itself reduces the chances of occurrence of fraud is important. Forensic accounting plays a crucial role in establishing internal controls system that prevent the occurrence of fraud.
- 3. Litigation Support:** Apart from all the care taken by the organisation if fraud occurs it is important to prove those fraud in the court of law. Forensic accountants often provide

essential legal support in legal proceedings by offering expert testimony and providing evidence that can be accepted by the court.

### **Limitations**

- 1. Resource Constraints:** Forensic accounting involves employing experts from the field which is costly affair for micro and small organisations. They may lack enough resources to hire forensic accountants.
- 2. Evolving Fraud Techniques:** The tools and techniques used by the fraudsters are also updated over a period of time. For forensic accountant it is therefore important to update themselves to deal with more sophisticated methods of committing frauds.
- 3. Legal and Regulatory Barriers:** It is most important part of forensic accounting aprt from detection and elimination of fraud to prove those fraud in the court of law by providing evidences that can be accepted by the court. In the sophisticated frauds accumulating those evidences are not easy task. It become more evident in the cross border frauds.
- 4. Data Accessibility:** Some organizations have stringent data privacy policies which limit the scope of forensic accountant in detecting and preventing frauds.

### **Suggestions**

- 1. Investment in Technology:** It is suggested that companies should invest in advanced data analytics tools and artificial intelligence to improve the capabilities of forensic accountants.
- 2. Continuous Training:** Risk of fraud from insider and outsider remain concern for the companies. For risks from outside persons can be mitigated with regular training and professional development of internal staff of the company. For risk from inside the company from employees itself proper character assessment and continuous check on sensitive activity is important. Management should employ optimal internal control system and stringent following of rules and regulation.
- 3. Collaboration with Regulators:** Strong legal framework must be created by Governments and regulatory bodies collaboration. In cross border fraud activities this is more important to involve regulatory bodies and take help from them.
- 4. Strengthening Internal Controls:** Implementing and strict obeying of internal control system is very much necessary for the organizations. Every possible loop hole and weak points must be identified and mitigated.

### **Conclusion:**

Forensic accounting has become an indispensable tool in the fight against financial fraud. Its effectiveness in detecting fraudulent activities, supporting legal proceedings, and preventing

fraud makes it a key element of corporate governance and financial oversight. However, challenges such as resource limitations, evolving fraud tactics, and regulatory barriers must be addressed to maximize its impact. By investing in technology, enhancing training, and fostering collaboration between organizations and regulators, the role of forensic accounting in fraud prevention and detection can be significantly strengthened. Organizations that prioritize forensic accounting practices are better positioned to safeguard themselves against the financial and reputational damage caused by fraud.

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## **IMPACT OF CLEAR JOB DESCRIPTION AND SPECIFICATIONS ON ORGANIZATIONAL SUCCESS**

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### **Abstract:**

This research paper explores the impact of clear job descriptions and specifications on organizational success. A well-defined job description outlines roles, responsibilities, and expectations, providing clarity for both employees and employers. This study examines how precise job specifications contribute to employee performance, job satisfaction, and overall productivity, ultimately influencing the achievement of organizational goals. The paper draws on case studies and quantitative data to analyse how clear job definitions align talent with business strategies, reduce role ambiguity, and enhance communication within teams. Findings suggest that organizations with clear, well-communicated job descriptions experience higher efficiency, better employee engagement, and improved retention rates, all of which contribute to long-term success. The paper concludes by recommending best practices for developing and implementing effective job descriptions to optimize organizational performance.

**Keywords:** Job Description, Job Specification, Human Resource Management, Recruitment and Selection

### **Introduction:**

In today's competitive business environment, organizations are increasingly recognizing the importance of aligning employee roles with overall strategic goals. A key factor in achieving this alignment is the development of clear and comprehensive job descriptions and specifications. These documents serve as the foundation for recruitment, performance management, and organizational structure. By clearly defining roles, responsibilities, and required skills, job descriptions not only guide employees but also help managers ensure that the right talent is placed in the right positions.

Despite the critical role that job descriptions play in shaping organizational success, many companies struggle with vague or outdated job specifications, leading to role ambiguity, inefficiency, and employee dissatisfaction. Inaccurate or unclear job descriptions can result in poor

job performance, misaligned expectations, and high turnover rates, all of which negatively impact an organization's success.

This research paper examines the direct impact of clear job descriptions and specifications on various aspects of organizational success, including employee productivity, job satisfaction, communication, and retention. By reviewing case studies and empirical data, the study seeks to demonstrate how well-defined roles can enhance organizational efficiency, reduce misunderstandings, and foster a culture of accountability and collaboration.

Ultimately, the paper argues that investing in precise and dynamic job descriptions is not just a human resources practice, but a strategic approach that can significantly contribute to long-term organizational success.

### **Problem Statement**

Despite the importance of clear job description and job specification is known the organization, many companies struggle in selecting right candidates for the right job. Therefore, it is important to analyse impact of clear job description and job specification on the right candidate selection and his/her job satisfaction.

### **Objectives**

1. To analyse the role of clear job descriptions and specifications in enhancing organizational success.
2. To assess the impact of clear job description on employee productivity and efficiency.
3. To examine the relationship between job description and employee satisfaction and retention.
4. To identify challenges organisation face when developing clear job description and job specifications

### **Research Methodology**

Researcher has relied only on secondary data. The references are taken from the books, scholarly articles and research papers online.

### **Discussion and Findings**

The research on the impact of clear job descriptions and specifications on organizational success yielded the following key findings:

#### **1. Improved Employee Performance and Productivity**

Employees with well-defined job roles exhibited higher levels of productivity and performance. Clear expectations allowed them to focus on core responsibilities, reducing confusion and enhancing their ability to meet organizational goals efficiently.

## **2. Increased Job Satisfaction and Employee Engagement**

Employees who understood their roles and responsibilities reported greater job satisfaction. Clarity in job descriptions reduced workplace stress, leading to increased engagement and a stronger sense of purpose, which positively affected morale.

## **3. Enhanced Communication and Collaboration**

Clear job descriptions improved communication between employees and management, as well as among team members. Defined roles allowed for better coordination, minimized role overlap, and led to more effective collaboration across departments.

## **4. Lower Employee Turnover and Higher Retention Rates**

Organizations with clear job descriptions experienced lower employee turnover. Employees felt more secure in their roles, reducing frustration and confusion, which contributed to higher retention rates.

## **5. Alignment of Talent with Organizational Goals**

Clear job specifications enabled organizations to recruit and develop talent that closely aligned with their strategic objectives. This alignment ensured that employees' skills matched the demands of the job, leading to more successful project outcomes.

## **6. Reduction in Role Ambiguity and Job Conflicts**

Clear job descriptions significantly reduced role ambiguity and minimized job-related conflicts. Employees were more aware of their responsibilities, which prevented misunderstandings and improved organizational harmony.

## **7. Positive Impact on Organizational Efficiency**

Organizations with precise job descriptions saw overall improvements in operational efficiency. By eliminating redundant roles and tasks, businesses were able to streamline processes and make better use of available resources.

## **8. Challenges in Maintaining Updated Job Descriptions**

Despite the benefits, many organizations faced challenges in keeping job descriptions up to date due to evolving roles and technological advancements. Failure to regularly revise job specifications led to gaps between employee responsibilities and organizational needs.

### **Limitations**

#### **1. Lack of Comprehensive Documentation**

Much of the Indian Knowledge System (IKS) is rooted in oral traditions and ancient texts written in classical languages like Sanskrit, Prakrit, and Pali. Many of these texts are either fragmented, untranslated, or inaccessible to a broader audience, making it difficult to develop a comprehensive and systematic understanding of the entire knowledge system.

## **2. Challenges in Standardization and Validation**

IKS, being holistic and experiential in nature, does not always conform to modern scientific methodologies, which often rely on standardized empirical data. This presents a limitation in validating traditional practices such as Ayurveda and Yoga through modern frameworks, making it challenging to integrate IKS with contemporary science and technology.

## **3. Cultural and Linguistic Barriers**

The vast diversity of languages, regional traditions, and cultural practices within India itself creates challenges in understanding and representing IKS in its entirety. Many aspects of IKS are localized, and the lack of cross-disciplinary and cross-cultural scholarship can limit the broader applicability of findings.

## **4. Insufficient Contemporary Research**

While there is growing interest in reviving IKS, contemporary academic research on this subject is still limited. The scarcity of interdisciplinary studies that bridge ancient wisdom with modern knowledge systems leaves gaps in understanding how IKS can be applied to contemporary issues in fields like medicine, environmental sustainability, and education.

## **5. Bias in Historical and Colonial Narratives**

The colonial legacy has contributed to a bias in the way non-Western knowledge systems, including IKS, are viewed in academic and scientific circles. The marginalization of IKS within global educational and research institutions has led to an underrepresentation of its contributions, limiting its visibility and integration into mainstream academia.

## **6. Lack of Modern Educational Integration**

IKS has not been sufficiently integrated into modern Indian and global educational curricula. As a result, there is a disconnect between the younger generations and this traditional knowledge, limiting opportunities for innovation that could arise from the synthesis of IKS with modern disciplines.

## **7. Subjectivity of Experiential Knowledge**

Many aspects of IKS, particularly in the realms of spirituality, philosophy, and health, rely on subjective experiences that are difficult to quantify or measure. This limits the ability to conduct objective, empirical studies that could further validate or refine the knowledge in ways that are acceptable to modern scientific standards.

## **Suggestions**

Despite the valuable insights gained from this study, several limitations were identified:

**1. Limited Generalizability Across Industries**

The research focused primarily on specific industries where job roles are clearly defined, such as corporate, manufacturing, and service sectors. The results may not be fully generalizable to more dynamic fields, like startups or creative industries, where job roles tend to be more fluid and adaptable.

**2. Lack of Longitudinal Data**

The study relied on cross-sectional data, providing a snapshot of the impact of clear job descriptions at a single point in time. Longitudinal studies would be necessary to assess how changes in job descriptions over time affect organizational success and employee outcomes.

**3. Focus on Formal Job Descriptions**

The research primarily considered formal, written job descriptions and specifications. It did not fully account for the informal or evolving nature of roles in some organizations, where employees may take on additional responsibilities beyond their formal job descriptions.

**4. Variability in Implementation**

Organizations may have different approaches to writing and maintaining job descriptions, affecting the consistency of the findings. The study did not explore the impact of cultural or organizational differences in how job descriptions are developed and communicated.

**5. Subjective Measures of Employee Satisfaction**

Employee satisfaction, a key outcome in the study, was measured through self-reported surveys, which can be subject to bias. Factors unrelated to job descriptions, such as personal preferences or external conditions, may have influenced responses.

**6. Exclusion of External Factors**

The research focused on internal organizational factors but did not consider external influences such as economic conditions, market competition, or industry regulations, which could also impact organizational success and employee performance.

**7. Limited Exploration of Technological Impact**

While the study highlighted the importance of keeping job descriptions updated, it did not fully explore how emerging technologies, such as automation or AI, are altering job roles and descriptions, which could affect the applicability of the findings in rapidly evolving industries.

### **Conclusion:**

Despite the critical role that job descriptions play in shaping organizational success, many companies struggle with vague or outdated job specifications, leading to role ambiguity, inefficiency, and employee dissatisfaction. Inaccurate or unclear job descriptions can result in poor job performance, misaligned expectations, and high turnover rates, all of which negatively impact an organization's success.

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## **THE ROLE OF MANAGEMENT FUNCTIONS IN ORGANIZATIONAL SUCCESS IN DYNAMIC BUSINESS ENVIRONMENT**

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### **Abstract:**

In today's fast-paced and ever-changing business environment, the ability of organizations to adapt and succeed largely depends on the effective application of management functions. This research explores the role of key management functions—planning, organizing, leading, and controlling—in driving organizational success. It evaluates how these functions enable companies to respond to market fluctuations, technological advances, and evolving consumer preferences. The study draws on case examples and existing literature to analyze how management practices can be optimized for better performance. The findings suggest that while management functions are fundamental to success, their effectiveness is influenced by external factors, including market conditions and organizational culture. The study also highlights the limitations of traditional management approaches in dynamic environments and offers suggestions for enhancing management practices to ensure sustained success.

**Keywords:** Basic Functions of Management, Planning, Organizing, Directing, Controlling

### **Introduction:**

The functions of management—planning, organizing, leading, and controlling—form the cornerstone of effective organizational operations. In a dynamic business environment characterized by rapid technological advancements, global competition, and shifting consumer demands, the role of these management functions becomes increasingly critical. Organizations must be agile, adaptive, and proactive to maintain a competitive edge. Management's ability to coordinate resources efficiently and guide organizational efforts toward strategic goals is key to achieving success in this challenging environment. This research aims to explore how management functions contribute to organizational success and how they can be applied more effectively in a constantly changing business landscape.

### **Problem Statement**

While management functions are universally recognized as essential to organizational success, their application in dynamic and uncertain business environments is often met with

challenges. Traditional approaches to management may not always be adequate in addressing the complexities of rapid technological changes, global competition, and evolving customer expectations. This raises the question: how can organizations optimize the use of management functions to ensure success in a dynamic and unpredictable business environment? Additionally, what are the limitations of conventional management practices in such settings?

### **Objectives**

1. To analyze the role of the four key management functions—planning, organizing, leading, and controlling—in organizational success.
2. To explore how these management functions are applied in dynamic business environments.
3. To identify the challenges and limitations of traditional management functions in rapidly changing markets.
4. To suggest strategies for enhancing the effectiveness of management functions in ensuring organizational success.

### **Research Methodology**

Researcher has relied only on secondary data. The references are taken from the books, scholarly articles and research papers online.

### **Discussion and Findings**

1. **Planning:** Strategic planning plays a vital role in helping organizations anticipate market trends and prepare for potential challenges. In dynamic environments, flexible and adaptive planning approaches are crucial for maintaining a competitive edge.
2. **Organizing:** Effective organizing allows companies to allocate resources efficiently, ensuring that teams and processes align with the organization's goals. Agile organizational structures, which promote cross-functional collaboration, are more effective in fast-changing environments.
3. **Leading:** Strong leadership is critical for motivating employees, fostering innovation, and guiding the organization through uncertainty. Transformational leadership styles, which focus on adaptability and inspiring change, are more suited to dynamic business environments than traditional, authoritative styles.
4. **Controlling:** Control mechanisms, such as performance monitoring and feedback systems, are essential for ensuring that organizational objectives are met. In dynamic environments, real-time data analytics and performance metrics provide managers with the insights needed to make quick adjustments.



5. **Challenges:** Traditional management functions often assume stable and predictable conditions, which can limit their effectiveness in dynamic settings. Rigid planning and control processes, in particular, may stifle innovation and delay decision-making in fast-paced markets.
6. **Adaptability:** Organizations that adopt flexible management practices, such as adaptive planning, decentralized decision-making, and continuous feedback systems, are better positioned to thrive in dynamic environments.

### **Limitations**

1. **Rigidity of Traditional Approaches:** Traditional management functions, especially planning and controlling, may be too rigid to respond effectively to rapid changes in the market. This limits their applicability in dynamic environments.
2. **Resource Constraints:** Implementing adaptive and flexible management practices requires significant resources, including investment in technology and employee training, which may not be feasible for smaller organizations.
3. **Leadership Challenges:** Not all leaders possess the transformational leadership qualities necessary to navigate dynamic environments effectively. The absence of strong, adaptable leadership can hinder the success of management functions.
4. **Uncertainty in Dynamic Environments:** Even with adaptive strategies, the inherent unpredictability of dynamic business environments can pose significant challenges for management, as future conditions remain uncertain.

### **Suggestions**

1. **Adopt Agile Management Practices:** Organizations should move toward more agile management practices that allow for greater flexibility in planning, organizing, and controlling. This includes iterative planning cycles, decentralized decision-making, and responsive organizational structures.
2. **Invest in Leadership Development:** Organizations should invest in leadership development programs to cultivate transformational leaders who can inspire innovation, adaptability, and resilience in the face of change.
3. **Leverage Technology for Control and Feedback:** Real-time data analytics and automated performance monitoring tools should be integrated into control processes to provide managers with timely and accurate information for decision-making.
4. **Foster a Culture of Continuous Improvement:** Encouraging a culture of continuous learning and improvement within the organization will help teams stay innovative and responsive to changes in the business environment.

- 5. Enhance Employee Engagement:** Engaged employees are more likely to contribute to the success of dynamic organizations. Implementing strong communication channels and empowering employees to take ownership of their roles can boost engagement and improve organizational performance.

**Conclusion:**

The role of management functions—planning, organizing, leading, and controlling—is integral to organizational success, particularly in dynamic business environments. However, traditional approaches to these functions may not always be effective in dealing with the challenges posed by rapid technological advancements, shifting markets, and evolving consumer preferences. To ensure continued success, organizations must adopt more flexible and adaptive management practices. Strong leadership, innovative planning, and the use of technology for real-time feedback are critical for maintaining agility and responsiveness. By adapting their management functions to the changing landscape, organizations can enhance their ability to navigate uncertainty and achieve sustained success.

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# Research and Reviews in Literature, Social Sciences, Commerce and Management

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