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Editorial

Dhaka International University (DIU) gives due importance for research and development (R&D) works of high standards and has been publishing a peer reviewed and indexed Journal (ISSN: 2077-0111) twice in a year with research and scholarly articles received from the faculties of this University as well as from other Universities and Organizations at home and abroad on verities of subjects such as Business Studies, Computer Science & Engineering, Civil Engineering, Electrical, Electronics & Telecommunication Engineering, English Language and Literature, Law, Pharmacy, Sociology, Economics and Political Sciences. The present Volume-12, No-1, 2022 of DIU Journal contains **10 (Ten)** articles on difference disciplines. We appreciate very much for the assistance and co-operation received from our colleagues, authors, reviewers, members of Editorial Board, Patrons, Chief Advisor, Honorary Advisors and the authority of DIU for publication of our Journal.

Prof. Dr. Md. Sana Ullah
Director
Research & Publication Cell
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Contents

A Desolate World of Spiritual Barrenness:
A Study of T. S. Eliot's Selected Poems

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Abstract: Being a poet of religiously inclined T.S. Eliot openly rebukes the spiritual dryness deeming it to be the root cause of the restlessness of the modem world. With unrivaled craftsmanship, Eliot illustrates the reality of the modern faithless universe just after the destructive world wars and heightens the common aimlessness of humanity. His poetic creation centers round this diagnosis of the spiritual problem and overtones the salvation just by dint of saturated religious faith. The portrayal of life is here full of sickening monotony intensified by agonizing boredom. The life then was "a heap of broken images" perfectly expressed by the Shakespearean phrase "walking shadow" which seems to be "full of sound and fury" but "signifying nothing".[1] Here humanity is devoured by the greedy materialism, conjugal life becomes mechanical in absence of genuine feelings just confined within the territory of physical saturation, and religion becomes nothing but the celebration of some common rituals. Thus, his corpus of poetry entirely presents before us a panorama of suffering due to the lack of spiritual rigidity. In this paper, there is an attempt to delineate the inferno of spiritual suffering as versified in Eliot's major poetry.

Keywords: bareness, spirituality, degradation, degeneration, modernity, sterility.

Introduction

Thomas Stearns Eliot (1888-1965), a poet of versatile genius, is widely known as a poet, a critic, a classicist, a mystic, a playwright, and a philosopher at the same time. His poetic career is stretching over almost 55 years. In the field of literature, he contributed immensely to different genres including poetry, essays, plays, literary criticisms, etc. T.S. Eliot, one of the most influential figures among the modernist poets, is the master of vivid imagery portraying the crucial social issues of the war-affected British community. "The poet, an American by birth and a British by choice, called himself classicist in literature, royalist in politics and Anglo Catholic in religion."[2]

'Due to his approval to Anglican Christianity, a note of repentance in most of his verses, looking for spiritual peace along with the significant suggestion to the mystical, liturgical and biblical religious literature.'[3]

Basically, the emotional and spiritual sufferings of the modern people of the post-war era find an exquisite outlet in Eliot's poetry. Here, the focus is on abstract issues like apathy, death, faith, trust, and emptiness of emotion. In this way, Eliot's poetry explores the spiritual numbness of contemporary society with an overtone of the poet's personal Catholic faith.

Eliot, like other modernists, "saw nothing but anarchy and chaos, nihilism and irreverence, tastelessness and arrogance, in those who were practicing modernist techniques and utilizing modernist ways of thinking that eschewed authoritarianism and absolutes and advocated in their place relativistic ways of thinking and perceiving reality".[4]

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Problem Statement

T. S. Eliot, in his selected poems delves deep into the spiritual barrenness of so-called modern society. However, a comprehensive study examining the implications of the disillusionment of the modernity along with its spiritual emptiness is seriously lacking. Here it is an attempt to fulfill the gap just by exploring the crisis of existentialism and the predominant moral decay portrayed in the Eliot's poetry shedding light on the ramifications of a desolate world which is completely devoid of spirituality.

Rationale

It is really crucial for both the literary scholars and the enthusiasts to understand the underling themes of barren spirituality and its impacts on Eliot's poetic works. Our artistic vision of the existing hollow modernity by its social, cultural, and philosophical milieu reaches its maturity by the insightful study of Eliot's poem. Furthermore, such an analysis will surely provide us with valuable insights into the universal condition of humanity and the dire consequences of a society detached completely from its spiritual roots.

Research Questions

What picture of modernity does Eliot portray in his selected poems?
How does T. S. Eliot's selected poetry reflecting the theme of spiritual barrenness?
What are the consequences of spiritual emptiness depicted in Eliot's poems?
How does Eliot's portrayal of a desolate world contribute to his overall artistic vision?
Is there any solution suggested by Eliot for the whole modern community to come over these adverse situations?

Objectives: The of objectives of this study are as following;

To explore the manifestation of spiritual barrenness in T. S. Eliot's selected poems.
To examine the implications and consequences of spiritual emptiness within Eliot's works.
To analyze the relationship between Eliot's depiction of a desolate world and his artistic vision.
To justify the suggested solutions from the emancipation of the spiritual plague of modernity.

Literature Review

The literature review will encompass a comprehensive analysis of scholarly articles, books, and critical essays that focus on T. S. Eliot's poetry, specifically examining the themes of spiritual emptiness, disillusionment, and moral decay. It will explore various interpretations and critical perspectives, providing a foundation for the present study.

Methodology

This study will adopt a qualitative approach, employing textual analysis as the primary method. A systematic examination of T. S. Eliot's selected poems will be conducted to identify instances and patterns that reflect spiritual barrenness. Close reading and thematic analysis will be employed to interpret and extract meaning from the texts. The findings will be supported by relevant textual evidence and critical insights.

Theoretical and Conceptual Framework

The study will draw upon existentialist, modernist, and religious literary theories as the conceptual framework. It will explore how Eliot's work engages with existential crises, disillusionment, and the loss of traditional values. Additionally, the study will investigate the influence of religious and philosophical ideas on Eliot's portrayal of spiritual emptiness.

Significance of the Study

This study holds significance in multiple ways. It provides a comprehensive analysis of T. S. Eliot's selected poems, highlighting the theme of spiritual barrenness, which has been relatively understudied. The findings will contribute to the existing body of knowledge on Eliot's poetry and offer fresh insights into his artistic vision. Moreover, the study's exploration of the consequences of a desolate world devoid of spirituality holds broader implications for understanding the contemporary human condition and the role of spirituality in society.

Discussion

Basically Eliot's poetry visualizes the very pathetic reality of the post-war European society especially the society of England in which people lost their connection to divinity and that ultimately brings mutual faithlessness as well as mental restlessness. His poetry not merely reflects the personal depression but also highlights the total spiritual emptiness which overwhelms the modern world as a whole. His wonderful poems "Gerontion", "The Hollow Men", "The Waste Land", "The love Songs of J Alfred Prufrock" "Sweeney among the Nightingales"are the direct disposition of this crucial issue.

In the earliest poem, **'The Love Song of J Alfred Prufrock'** Eliot very successfully delves deep into the tormented psychology of Prufrock, a common representative of the sophisticated man of the modern era. He portrays Prufrock as neurotic, highly showing cultured, fastidiously conscious, emotionally disrupted, highly desperate in search of a woman to love as well as to be loved by. He completely represents the modern man with too much experiencein practical life with elusive emotion.

> "The Love Song of J Alfred Prufrock" is, therefore, an essay of the soul which takes place in a world of illusions, suffering and hypocritical self-deception. Oddly enough, this world is the world that we as readers consider real. These allusions, however, indicate a reality which lies behind the shadow of the world of illusion and deceit" that both the poem and the epigraphs of the poem allude to".[5]

Though Prufrock is emotional, he is highly aware of his health growing old.

> "I grow old . . . I grow old. . . .
> I shall wear the bottoms of my trousers rolled.
> Shall I part my hair behind? Do I dare to eat a peach?
> I shall wear white flannel trousers." (115-18)

These are the proofs of Prufrock's disturbed psychology. His emotional outburst is barred by the consciousness of physical drawbacks of which he is well aware. His declining health condition plays a game of hide and seeks with his tenderness of emotion. He knows well that the modern world is materialistic where there is no place for his mental tenderness. This picture of moral vacuum is the fatal disease of post-war modernity and it is dramatically represented in this poem.

Prufrock's preference of the hotels which are cheap and avoidance of crowded roads and the acceptance of the secluded ones are clear proofs of the deformity of the modern man in taste and values. The opening comparison "Like a patient etherized upon a table" becomes the perfect symbol of the emotional numbness of Prufrock's psyche representing the modern man as a whole. A man with complete despair, with fragmented hopes, and finally with utter frustration. His mental war between desire and difficulties, indecisiveness, as well as disintegration, intensifies pathetically his bleak mental state. His visions and revisions of hundred times in taking simple action of proposing a lady show his psychological weakness. He considers himself to the matter of others' laughter. He takes one step forward and two steps backward. He frequently asks himself; "Do I dare?" and, "Do I dare? (38)

"Do I dare/Disturb the universe?" (45-46), "So how should I presume?/And how should I presume?" (65-66). He goes on asking;

> "Is it perfume from a dress
> That makes me so digress?
> Arms that lie along a table, or wrap about a shawl.
> And should I then presume?
> And how should I begin?" (70-75)[6]

His random asking of himself is the clear disposition of his split-self, a very weak psyche that swallows his volition and confidence. The indecisive propensity of the crisis of the modern man is heightened here. His opinion "In the room the women come and go/Talking of Michelangelo." (13-14) clearly shows the spiritual hollowness of the modern fashionable lady tending to evaluate the great divine artist like Michelangelo with sheer shallow talks. Thus, Prufrock becomes the complete embodiment of the spiritual exhaustion of the post-war European culture as a whole. "Eliot probes subtly into the world of the tormented psyche of the sophisticated modern man—highly cultured, extremely involved with details of his existence, neurotic, emotionally disturbed, thirsty for love and craving for fulfillment."[7]

Again, in the poem **"The Hollow Men"** Eliot portrays a bleak world where there is no anchor, no crutch for so-called modern civilization. The title of the poem itself suggests the severity of the paralyzed world of spiritual hollowness. The plurality in the title heightens the intensity of the modern disease which victimizes all people in general. The deserted settings of the poem multiply the impact. Life here is compared to the meaninglessness of the scarecrow in the desolate land. The speaker finds no significance of life and identifies himself as one of "the hollow men" or "the stuff men" who are forceless to move as it is nothing but "filled with straw" inside. The reality of modern European life is wonderfully sketched with the following embittered voice;

> "Shape without form, shade without colour,
> Paralysed force, gesture without motion;"[6] (11-12)

The life of the people of the post-war society devoid of spirituality is inert. There is no power of their voice. It is nothing but "wind in dry grass" without emotion and passion. Here humanity itself lost its entity. There is no hope but despair and distress before. The deserted spirituality has no greenery but with the cactus which is prickly, suggesting unending difficulties. The image of "broken column" implies the awkwardness of Greek and Roman temples suggesting the declining tendency of the religious faith. Even the inability to pray before God ultimately denies the possibility of salvation for the modern infected people in near future. The poet ends by saying;

> "This is the way the world ends
> Not with a bang but a whimper."[6] (97-98)

The people just lead a life without meaning. Death is as fruitless as life which fails to create any impression in others. The poet dreadfully anticipates that our existence will play no role to the whole world of humanity and will be terminated itself not with a great sound of destruction but with the complete carelessness of whimpering sound. Thus, the poem becomes an extended metaphor of the declining European cultures signifying nothing as a whole for humanity.

The poem **"Gerontion"** opens with the description of the career of Gerontion, an infamous old man, and his bleak surroundings. He is almost blind living in a rented decayed house in the dry season expecting rain. This seasonal dryness metaphorically represents the spiritual barrenness of the

civilization he belongs to just the during post-war time and the expectation of rain implies divine grace. He reminisces of his own past life and evaluates it to be futile. He has no mentionable achievement even he did not participate in any war to be so-called glorious. His disillusionment of achievement turns out to be a hard slap towards seeming modernity. Now, Gerontion generalizes his problem to be the problem of community which is full of corruption, disunity, alienation, and meaninglessness generated from the spiritual hollowness. To him, the rational outlook towards religion creates doubt and destroys spiritual potentials. Jews ask Christ for signs or miracles to believe in, even the Christians today ask the same. "It is spiritual faith, which is now missing, that gives human beings a feeling of security and a sustaining sense of relatedness that modern life has failed to provide. Moreover, Gerontion is frustrated spiritually and sexually."[8]

The people of the modern community fashionably visit the church just to maintain formality. Even the women in Church whisper scandal as if they were in a club or pub. Gerontion repines for the loss of true faith which seems to him is the root cause of such spiritual restlessness. His physical and spiritual decadence is the embodiment of the sterile society. He concludes by saying "I have lost my sight, smell, hearing, taste and touch." (59) "He sets on his religious odyssey to attain a state spiritual equilibrium."[9]

"In 'Gerontion' Eliot exposes a civilization based on materialistic values and secular ideologies with no spiritual communion or sense of human society, of irritated nerves, mental exhaustion, emotional fossilization and spiritual petrifaction."[10]

Eliot's masterpiece '**The Waste Land'**, skillfully sketches the socio-cultural norms of the war-affected British community blatantly and sometimes in the guise of mythical figures. The spiritual degenerations and moral degradations are brought into focus with a high satiric tone here

"The Waste Land' implies to the both society and individual's chaotic life in the 20th century; it further reveals the disenchantment and despair of the generation of post-World War I. Eliot, in "The Waste Land", portrays an image of a divinely and rationally lost faith of the world. The poem is not just a reflection of individual despair and desolation, rather an outlook of overall spiritual tiredness that has gone pass the modern world."[11]

The title **"The Waste Land"** itself is highly suggestive of the barrenness of western land paving a way for the befitting settings regarding the spiritual hollowness of that time. The seemingly fragmented structure of the poem becomes highly suggestive of the moral decay, lifelessness in mutual relation, fragmentation of the social life and also of the political turmoil prevalent in that society. It highly visualizes a society that is left barren intellectually, morally and also spiritually as the dire consequence of the world war-I which causes millions of death and mass destruction worldwide.

The poem consists of 434 lines divided into five parts entitling individually as "The Burial of the Dead", "A Game of Chess", "The Fire Sermon", "Death by Water," and "What the Thunder Said". Each section of the poem adds a different flavor but with the unchanged tone of social criticism representing the degradation and moral vacuity.

Eliot dramatically presents the incidents one after another through the speech of multiple speakers including Tiresias, a prominent blind prophetic figure in Greek mythology. As the all-knowing foreteller, Tiresias suits the best for serving the purpose. The random references or allusions to the Bible and other literary works make the impression reach the highest level of intensity.

The first part bearing the title **'The Burial of the Dead'** seemingly may have a religious fervor. Apparently, it refers to the funeral formalities of Anglican Christianity but it ultimately turns out to be

the distressed voice of the living dead. This part opens with the distorted reference to April, the symbol of regeneration and rejuvenation but in 'The West Land' the hopeful advent of this month brings no hope rather it is termed as 'the cruelest month'. Thus, the very beginning of the poem successfully intensifies the impression of the disillusionment of the people of European modernity.

Here Marie, a simple girl is sexually violated by her dear cousin. Being raped in an early age her dreamy life turns to be nightmarish one. She very painfully speaks out of her condition; "I was neither Living nor dear / And I knew nothing / Looking into the heart of light, the silence" (38-40). Marie here represents the typical European wretched girls in common whose lives are darkened by the brutality of sex-maniac men.

This part presents some more characters naming Madame Sosostris, Belladonna, Stetson, and one-eyed merchant. Eliot presents them to highlight the same theme of moral decay and spiritual degeneration of western society. Madame Sosostris has been portrayed as fortune-teller "with a wicked pack of cards". The subsequent card reference of "Phoenician Sailor" "Belladonna, the Lady of the Rocks", "one-eyed merchant" are all suggestive of the dark future lingering on the forehead of the European people. Finally the absence of 'The Hanged Man' in the card pack suggesting the missing of the advent of Jesus Christ which affirms no possibility of regeneration or resurrection in the near future. However, the reference to her to be the wisest woman of Europe and her feebleness with cold and the fear of police in the practice of fortune-telling make her character paradoxically ridiculous. "The consultation with Madame Sosostris that follows shortly thereafter represents the pathetic bankruptcy of modern life."[12]

However, finally with utter bitterness the poet termed London as 'unreal city'. The modern materialistic city life in London seems to him robotic where none is concerned with others. The first part ends with sarcastically slashing voice against the war-mongers who cause millions of deaths in the First World War for nothingness.

In the second section of the poem entitled **'A Game of Chess'**, Eliot explores the unhappy conjugal life by illustrating two different women, one from the upper rich class and another from the middle class. There is no mutual understanding between the lovers rather a mechanical one. Marriage becomes a trap in which the women are the wretched preys. The first woman is with profuse riches displayed by her well-furnished room. The illustration 'burnished throne' 'Glowed on the marble' 'fruited vines' 'golden Cupidon' 'seven branched candelabra' 'the glitter of her jewels' 'rich profusion' 'vials of ivory' 'synthetic perfumes' 'coffered ceiling' 'carvéd dolphin' 'sylvan scene' makes her feel to be a queen like Cleopatra. But what does the external aristocracy matter if there is no presence of a genuine feeling of heart? Here there is no response to the emotional call of the wife to her husband who is careless and busy with the trifling thoughts of his own. Thus, these riches could not make them happy. Rather they describe their deathly life as

> "I think we are in rats' alley
> Where the dead men lost their bones."[6]

Again the rich sculpture of Philomel's distressed condition reminds us of the tortured women whose lamentations find no outlet to the male-dominated patriarchal society. Here, in the Wasteland, none pays any heed to the painful cry of the women caused by the men themselves.

The story of Lil, a middle-class wretched woman is dramatically presented by her friend while gossiping with another friend in a pub. By the unutterable condition of the typical married women who suffered because of marriage-lock are highlighted here. Here Lil is only thirty-one in age but looks like an old lady with the loss of teeth. Lil describes her pretty bad condition is due to her five childbirth and

the subsequent taking of the abortion pill. In that vulnerability, she has to spend her money for her treatment rather than buying artificial teeth or other decorative things. Even in that pitiable condition, society is demanding her to bear more and more children and serving her husband to offer physical pleasure otherwise her husband may choose another woman leaving her aside. Thus, there is a clear picture of the rotten society where women are considered machines just to serve men and society continuously sacrificing their lives. Thus, marriage and mutual relations become a game of chess where there is no place of emotion rather one party especially the man takes the opportunity in trapping women in distress.

In the third section **"The Fire Sermon"** Eliot seems to become more critical towards the mechanical sex relation. At the very outset, he indicates the derailed sons of the wealthy leaders of the city of London. These young sons become experts to have extramarital relations with namely Nymphs leaving no trace behind. This is a clear indication of the degradation of the new generation. The homosexual practice, the deformed way of satiating physical need is presented here by introducing the rich merchant named Mr. Eugenides. The description of the typist girl and her mechanical and off course extramarital relationship with her boyfriend upholds that sex is just routine work whether she feels it or not. Like the typist girl, the majority of the western girls have no value of chastity or virginity. The reference to the relationship between Sweeny and Mrs. Porter has nothing of legality but loveless physical satisfaction. In the last part of the section, the poet introduces the daughter of the Thames who told us their story of being seduced and their impression of losing virginity. Eliot portrays "a society immersed into filth and disintegration."[13]Again, the poet also explores here the true Waste Land where there is no move of human but rat and bones. London is termed as an unreal city again and normal lives are disturbed here by the sound of motor cars. The speaker repines for the polluted water of the River Thames are the direct outcomes of industrialization. Again, The concluding repetitions of the word 'Burning, burning, burning, burning' and the urges of St. Augustin to the Lord to take away from the Earth imply that the whole of Europe is on the fire of lustrous passion which immediately needs to get rid of. Eliot's critical voice here reaches its climax against the heartlessness of the sex-maniac western people.

Section four, **"Death by Water"** is the shortest one consisting only of 10 lines. Here the poet precisely reminds us of the destruction of the corporal body and warns us that all the worldly pleasure and wealth will come to nothing soon. The reference to the terrible demise of the Phoenician sailor named Phlebas heightens the tragic forecasting of Madame Sosostris in the opening section 'Fear death by water'. During his lifetime, Phlebas had been passing life of worldly enjoyment just satiating animalistic pleasure. He has at least a glimpse of his wrong way of life just before his ultimate dooms but of no use. All his life is wasted in veins. The poet terminates the section with a clear warning to the power-monger worldly leaders saying "O you who turn the wheel and look windward,/ Consider Phlebas, who was once handsome and tall as you".

The concluding section **'What the Thunder Said'** mingles the physical dryness and the dryness of the spirit. Here the spiritual dissertation of the post-war generation is intensified by incidents of the crucifixion of Jesus Christ and his subsequent resurrection. Like them, the heartless people of modern Europe fail to feel the presence of Christ. Here the physical dryness with the absence of water successfully symbolizes spiritual sterility. The pathetic outcry of the Fisher King are the evidence of the intensity of it;

> "Shall I at least set my lands in order?
> London Bridge is falling down falling down falling down" (426-427)

Finally, the poet still finds hope of getting out of the infernal situation and prescribes from the Upanishad of Hindu mythology, Da Da Da, or Datta, Dayadhvam, Damyate the message from God by Thunder. Datta meaning 'to give', Dayadhvam meaning 'compassion', Damyata meaning 'to control'. Here these are the keys to the spiritual emancipation of the modern people.

> "Eliot sees the root of the modern world's unhappiness and alienation in the fact that people are unable to bring together the different areas of their experience to make a complete whole. Their social, sexual and religious experiences are fragmentary and not unified."[7]

> "The Waste Land' (1922) reveals an artist who has experienced profoundly, and contemplated prudently upon the collapse of religious faith and loss of spiritual orientation in the twentieth-century world. "The Waste Land" is really considered as the defining articulation in modernist literature of that apocalyptic collapse and loss of a civilization." [14]

Thus, throughout the poem "The Waste Land" Eliot mirrors the war-affected European world where society becomes physical, ethically, emotionally, and spiritually barren as a whole. Materialism, corruption, and lustrous passion engulf the whole human sense. Artificiality, unloving physical relation, deformity in sex nearly destroy the family bond and accelerate the collapse of western values.

> "Throughout The Waste Land, Eliot holds a mirror to the society and the mirror reflects the predicaments of modern life in a physical, moral, emotional and spiritual waste land where promiscuity, materialism and corruption were widespread and where there was a lack of communication and interaction between individuals."[15]

The poem **"Sweeney among the Nightingales"** tunes the same with the common theme of spiritual hollowness. It presents a rotten man called Sweeny who is full of animalistic spirit. He has been compared to a vile ape always hunkers after sex anyway with anyone anywhere. Life bears no significance to him but of drinking wine and having sex even with the rotten women. Sweeney represents the beastly vagabond western society of that time. Again the widespread culture of prostitution and the shamelessness of the rotten lady in attracting men towards mechanical sex amplify the degradation of the social, moral, and religious values. On the other hand, the murder motif sharply contrasts with that of the past. Here one is conspiring ant the other are accomplishing to murder the other with very trifling causes, sometimes with no cause just out of fun or simple jealousy. Here the poem explores "a nostalgic rebuke to drab materialism in contradistinction to the vanished glories of a remote epoch when culture rested on ritual and religion, on piety and faith"[8]

Findings
This paper entitled as   "A Desolate World of Spiritual Barrenness: A Study of T. S. Eliot's Selected Poems" delves deed into the profound exploration of spiritual dryness and desolation in the works of the poet T. S. Eliot, the leading poet of modernity. Eliot's body of work, particularly his masterpieces like 'The Waste Land,' 'The Hollow Men,' 'The Love Song of J. Alfred Prufrock' 'Gerontion' and finally 'Sweeney among the Nightmare" presents a bleak and desolate vision of the modern world. The poet very skillfully captures the fragmented nature society especially the post-war era, where individuals struggle to find meaning and purpose amidst dire spiritual aridity. Through vivid and often dissonant imagery, Eliot portrays a world devoid of connectivity and fully plagued by moral decay. The themes of alienation, isolation, and the loss of traditional values predominate Eliot's poetic world. He delves into the spiritual vacuum of the modern era and explores the utter consequences of a society detached from its roots. Eliot creates a tapestry of disillusionment and a hopeless world of despair,

invoking a sense of profound unease in the reader just by attaching various cultural and religious references. The use of fragmented narratives, multiple voices, and inter-textuality mirrors very tactfully the fragmented nature of the modern world. He creates a massive impact masterfully by the stylistic presentation of the external framework, by employing a range of techniques to enhance the impression of atmospheric desolation in his poems. Just through the manipulation of linguistic approach, he creates a discordant harmony which reflects the disarray and spiritual bankruptcy of the modern society. Furthermore, Eliot's poem successfully demonstrates a deep engagement with philosophical and theological concepts. His works often delve into existential questions, in grappling with issues of faith which ultimately demand redemption and the search for spiritual enlightenment. The poet presents a critique of materialistic society indulged completely in secularism, urging the reader to seek transcendence in an era seemingly devoid of meaningful value. That is why his final suggestions justify just a world when Christ arrives and calls all humanity towards emancipation.

Conclusion

T.S. Eliot very skillfully strikes the spiritual barrenness which centers on the degeneration of the war-affected modern western community. Each of his poems adds different renewed flavors intensifying the common theme from individual to universal perspective. The poem 'The love Sons of J. Alfred Prufrock' judges the individual dilemma to face the reality. 'Gerontion' examines the communal problem from more matured outlook. 'The hollow Men' generalizes the emptiness and the meaninglessness of human existence due to the loss of religious faith. 'The Waste Land' examines society with a larger canvass and criticizes with the minute observation from individual to the different social institutions. "Eliot, in his poems like 'The Love Song of J. Alfred Prufrock', 'Gerontion' and 'The Hollow Men' expounds critical maladies of humanity."[16]One common theme which thematically unifies the poems is the spiritual numbness of post-war modernity due to materialism and the loss of religious faith. This soulless materialistic outlook subdues the angelic nature of human beings and instigates the carnal horse which madly drives the community astray as a whole.

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Language and Psychology: Conflict between Mrs. Rawlings and Susan in Doris Lessing's To Room Nineteen

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Abstract: If the discourses that use a certain language does not acknowledge an individual's desired identity, that person will face identity crisis while attempting to express themselves through the language. One major reason of female identity crisis is the patriarchy-dominated discourse that does not even recognize the desires of a woman in language. As this discourse is the very source of ideology, rationality, and normalcy, any desire beyond it is considered as abnormal, crazy, and even sinful by the very female individual who would make the desire. This paper aims at exploring how in Doris Lessing's "To Room Nineteen", patriarchal language impacts the protagonist in a manner that her 'self' gets divided into a conflict between Mrs. Rawlings and Susan which leads to her psychological breakdown and ultimate death. It will be framed upon Lacan's theory of the relationship between language and the unconscious, Horney's theory of the ideal and the despised self, Foucault's theory of knowledge/power/discourse, and Althusser's theory of ISAs.

Key Words: Patriarchal language, Psychoanalysis, Knowledge/Power/Discourse, ISAs, Ego ideal vs. Ideal ego, Imaginary order vs. Symbolic order, Female identity, Split personality

Introduction

An individual has to depend upon the discourse for their identity formation in a language. If the discourse that uses a certain language does not acknowledge an individual's desired identity, that person will face identity crisis while attempting to express themselves through the language. One major reason of female identity crisis is the patriarchy-dominated discourse that does not even recognize the desires of a woman with words or phrases or language. As this discourse is the very source of ideology, rationality, and normalcy, any desire beyond it is considered as abnormal, crazy, and even sinful by the very female individual who would make the desire. In "To Room Nineteen", patriarchal language impacts the protagonist in a manner that her 'self' gets divided into a conflict between Mrs. Rawlings and Susan which leads to her psychological breakdown and ultimate death. Susan cannot accept the socially imposed role of Mrs. Rawlings that deprives her of her much-desired freedom, nor can she go beyond the much-appreciated rationality, backing up that feminine role, which is dominated and shaped by the very same patriarchal society. When the identity of 'Susan' is absent in the patriarchal language and discourse after her marriage, she finally has to become non-existent in that system, too. Nobel-winning author Doris Lessing tells, here, a tale of the failure of rationality, a gap in the language, and the fall of a self.

Methodology

This paper critically analyzed Doris Lessing's short story "To Room Nineteen" with secondary data sources. The critical theories include Lacanian psychoanalysis based on acquiring language in symbolic order, and the conflict between ideal ego and ego ideal in mirror stage, Horney's

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psychoanalytic theory of desired vs. despised self, Freud's Theory of Repression Foucault's theory of Knowledge/Power/Discourse, Althurers's ISA and Butler's gender performativity.

Theoretical Framework

Language and Psychology

According to Lacan, the core of the self is the unconscious. He argues that "the unconscious is structured like a language," a differential system.[1] Lacan offered a linguistic model to understand the human subject's entrance into the social order.[2] For this, he used Ferdinand de Saussure's semiotic theory.[3] It shows that as a system language can make sense only within its own internal logic of differences and networks of signifiers.[2] When one acquires language, one enters into this "symbolic order" and gets reduced into an empty signifier ("I").[2] This field of language and culture is priorly determined by 'Others'.[4] Once a subject construct his sense of "reality" in the realm of language, forever afterward, his perception of the world around him is determined through it, and from then on, he keeps going through an endless misrecognition of the material world.[1] This subject becomes so much dependent on this linguistic and social version of ordered "reality" to make sense of everything in his life that even when he faces the chaos of pure materiality, be it an external event or an internal impulse, he becomes traumatized by it.[2] Thus, going beyond the linguistic order remains always troublesome for him.

Ego Ideal and Ideal Ego

Even before entering into language, according to Lacan, one's self is divided into the ideal ego and the ego ideal as an infant enters into the imaginary order with its first experience of recognizing its image in the mirror.[5] It feels for the first time the completion of its body in an outside image in the mirror. From then on, this 'other' in the mirror, the ideal ego, becomes a more perfect version of itself to the watcher, the ego ideal.[6] Karen Horney simplifies these two selves as the two versions of a person – 'what should be' and 'what it is'. The first version actuates the second version ceaselessly even though reaching the ideal ego is ultimately impossible.[7] But, if one's ideal ego fails to actuate the ego ideal, one may become neurotic and may start to hate or even destroy the self.[7]

Gender Performativity

"One is not born, but rather becomes, woman. No biological, psychic, or economic destiny defines the figure that the human female takes on in society;" Beauvoir's book *The Second Sex* speaks of socially constructed gender identities for women.[8] An additional proof to this, Louis Althusser suggests that every human being becomes subject to ideologies that ensures that they would serve the purposes of the people in power willingly, considering those purposes as their own life aims.[9] Ideological state apparances (ISA) can be shape this ideologies throught the education system family and other social institution, That is, ideology can be used to deprive a person of their rights without any resistance on their part. Here, according to Freud, the superego which upholds acquired ideologies will repress the person's id, his instincts.[10] Also, Michael Foucault believes that there is a direct relationship between knowledge and power.[11] That is, the people in power control the discourse which creates knowledge and ideology. Knowledge, on the other hand, creates newer discourses enforcing the powerful authority cyclically.[11] Ultimately, a person's knowledge and ideologies can be used against him in this way so that he himself will advocate for the one who is dominating over him.

Discussion

Knowledge/Power/Discourse

As Susan is an intellectual person, she has accepted the existing patriarchal rationalities as her own ideology. Just as Althusser suggests that ISA makes one the subject to existing ideologies, Susan considers her gendered identity and roles as attributes of her own personality. She constantly fights for

upholding these rationalities and in the name of intellect suppresses any thoughts against them, even the ones of which she never speaks aloud. Here, also, she does not understand that the wisdom and intellect she gathers throughout her life is not impartial but is dominated and shaped by the part of the society which is in power just as Foucault believes, and it intends to give patriarchy power over her, making her powerless in the process. The language with which her unconscious is formed only permits the certain patterns of thoughts that supports patriarchy. Her desires of any other kinds are totally non-existent in her language, and in the discourse built upon that language.

Language and the Unconscious

Her independent and self-reliant position as 'Susan Something' prior to her marriage is totally replaced by her pregnancy, and, later, rearing up four children, and looking after the large white house and gardens. Apparently, it is 'normal' and 'rational' for her to leave her job, and 'natural' for her husband to sleep with a few girls when she sticks to her mother role. This rationality that she upholds only creates an ever-increasing gap between the husband and the wife's reciprocal respect for each other's equal rights that they were celebrating at the primary stage of their marriage. Meanwhile, Mrs. Rawlings keeps waiting for the day when the children will be 'off her hands' and she could live the 'life of her own', her suppressed desire.[12] But only when all the children are in school, and the time for freedom comes, she faces the reality that patriarchal language has betrayed her. There is no such thing as 'Susan' anymore, and 'off her hand' is an ultimately meaningless phrase. Although Mrs. Rawlings has been sensing this failure to express her exact feeling or condition in language for a long time, such as the words 'confession' or 'forgiveness' disturbed her, she faces for the first time the strong conflict between her two selves after being alone in the home. Here, the unconscious, structured like a language, fails to utter her desires properly as that expression is absent in the language of a man's world.

Identity Crisis

Mrs. Rawlingus searches for loneliness, a personal space, something like which is mentioned in Virginia Woolf's 'A Room for One's Own' as a pre-requirement for any creative woman.[13] In a similar condition, she can't prepare herself for the job nor can she find a way to be herself again in the large garden house where she is nothing other than a wife and mother. Her obsession with loneliness symbolizes her desire to escape from the imposed identity of Mrs. Rawlings into her past, and lost, identity of Susan. In this split personality situation, Susan cannot ask for the support of her 'dear Mathew' as she feels that her desire is 'absurd' and her patriarchal intellect does not permit such language. Soon, she starts loathing this desire as 'madness' and starts to feel the loneliness as 'demonic'. Afterward, she finds refuge in the vacuum of language in the room nineteen where patriarchal rationality could not reach her. But, whenever she starts to talk to Mathew or anyone else, she feels the non-existence of 'Susan', the free woman, in language, and the absurdity and irrationality of that part of her 'self'.

Split Personality

When the Rawlings' agreed upon hiring an au pair girl, Susan begins to see her ideal ego in Sophie who actually plays the role in the house that Susan believes she 'should' play. But, it fails to assist her in changing her desire, her 'craziness', her real self, unlike Horney's theory about a psychologically healthy person. Finally, the patriarchal identity reaches her silent room nineteen, and Susan understands that there is no place beyond the language where she is Mrs. Rawlings, mother of four, and she can never find a space where she is only Susan. She commits suicide in this conflict of identities where her desired one will always be defeated as it is non-existent in the language of father, and irrational in the intellect that she so much reveres.

Conclusion

"... The inner storms and quick sands were understood and charted. So everything was all right. Everything was in order. Yes, things were under control." It is only the order of the patriarchal society and it can control 'everything' for Mrs. Rawlings as long as the only right things to do were placing her family's rights over the ones of hers. So it was alright with the inner storms which were charted in the language of Father and the discourse under his law. Only after the gaps and failures in finding out the proper words to express some of those quick sands did she feel that she did not understand her inside well and there is some 'other' demonic self, waiting there. Lacan would call it the split self in the symbolic order and Horney would name it the despised self against the ideal one. Lessing's "To Room Nineteen" brought forth 'a story… about a failure in intelligence' which presents a woman's inner conflict, the inability to maintain a balance between her rational self, well appreciated by the society, and her desired self, completely non-existent in her language. Neither her intelligence permits her to talk about her desires to become a free woman as the rationality itself represents the male point of view of the world nor could she find the words to express it as language and discourse are controlled by the patriarchal authority. Her ultimate refuge, the silence of room nineteen, the only place where she can escape from this patriarchal language and discourse, and the identity of Mrs. Rawlings who feels constant guilt for not being happy in the large house with garden and husband and children, is finally invaded. Ultimately, the protagonist understands that 'Susan' can never be a speaking self nor can her desire be met with. She, then, commits suicide in room nineteen as a silent Susan.

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Postmodern Reading of the Film Adaptation of Tarashankar Bandopadhyay's *Saptapadi*

Asma Binti Hafiz[1], Sumon Chandra Shell[2]

Abstract: Classics of world literature that have enjoyed appreciation for centuries are finding a different level of expression and criticism through their film adaptations from the opening of the twentieth century. With the rapid growth and gigantic popularity of film industry throughout the century, it has already become a discipline of academic interest, and today film adaptations of literary texts are critically analyzed with established theories from a postmodern perspective. But, there is still a lack of literature in studying the adaptations of Bangla films from postmodern critical approaches. This paper aims at reading the film *Saptapadi* by Ajay Kar based on Tarashankar Bandopadhyay's novel of the same name as a product and process of adaptation from postmodern point of views of Hutcheon, Barthes, Woolf, and Mandal.

Key Words: Adaptation, Postmodernism, Auteorship, Third meaning, Consumerism

Introduction

Classics of world literature that have enjoyed appreciation for centuries are finding a different level of expression and criticism through their film adaptations from the opening of the twentieth century. As a relatively new medium, films were heavily depending upon celebrated books for business success at the initial stage. But, with the rapid growth and gigantic popularity of film industry throughout the century, it has already become a discipline of academic interest, and today film adaptations of literary texts are critically analyzed with established theories from a postmodern perspective. *Saptapadi,* a movie directed by Ajay Kar in 1961, is such an example of a successful adaptation of Tarashankar's novel *Saptapadi* (1958) that have drawn the interest of critics from multiple dimensions. Even in a small difference of three years after the publication of the novel, this film has recreated the author's storyline in a manner that could attract the contemporary movie-going audience who were comparatively modern than the readers of the novel. Linda Hutcheon's ideas of 'salvation' and 'appropriation' are found in the adaptation process of this film. Besides, the 'filmic' expression that Barthes observed is explored by Kar on screen. *Saptapadi* (1961) proves Virginia Woolf wrong regarding her concept that a film adaptation victimizes a novel. It rather meets her final expectation about the potential success of film as an art beyond the ability of a written text. Actually, it is one of the earliest examples of the practice of independence of a film from the literary text by the auteurs of the subcontinent that Somdatta Mandal indicated to.

Methodology

This paper critically analyzed the film *Saptapadi* by Ajay Kar based on Tarashankar Bandopadhyay's novel of the same name as a product and process of adaptation with secondary data sources. The postmodern critical theories include works by Linda Hutcheon, Roland Barthes, Virginia Woolf, and Somdatta Mandal.

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Theoretical Framework

Adaptation: Product and Process

As Linda Hutcheon says, "... As a process of creation, the act of adaptation always involves both (re-)interpretation and then (re-)creation," the film *Saptapadi* (1961) indeed has made beautiful alterations in the book's storyline.[1] Yet, it keeps the vital messages intact - the appeal to humanity, the darkness of imperialism, and the thriving of love. Truly, the film deserves to be claimed as a creation on its own right, and, yet, it is an amazing adaptation of the book regarding its ideology. Linda Hutcheon's theory suggests that a film adaptation always has to care about the broader audience, and their emotion. So, the literary text is subtracted or expanded in a way that would help the business success of the film in a postmodern consumerist culture.

Likewise, the tragic saint hero of Krishna Swami is replaced by only an even more lovable and loving human hero of Uttam Kumar who would embrace a fallen soul with the warmth of embers. On the other hand, a supremely committed, sacrificing Suchitra Sen is brought to replace the dark and broken Rina Brown, rotting with resentment. It seems Ajay Kar felt the necessity of an equal play of passion, honor, and oath keeping for both his hero and heroine to touch his vast and diverse audience, the millions of movie-goers from all the walks of Indian society, and even beyond. On the contrary, Tarashankar Bandopadhyay might have targeted the readers who would relate to his book's base upon truth as there indeed was a saint of a teacher and a ghost of a prostitute girl in the author's personal experience. Maybe a similar reason turns Krishnendu's father from the heart-breaker yet loving and responsible father[2] into a regretting old man with a letter of utmost importance in the movie. Again, the great change of John Clinton is simply absent by dismissing him as Rina's friend. [3] Even the very ending is altered into one 'happily ever after' to match with the expectations of the audience. So, this film successfully represent salvation and appropriation from the book. The book itself is 'tested and trusted' for its popularity and business success. The name of the movie is same as the book, and, so, it enjoys an auto popularity. In that way, an adapted product is always palimpsestuous carrying the memory of the literary text.

Third Meaning

The 'third meaning' of Roland Barthes speaks of a certain type of emotion that can only be visible on a screen but cannot be described through language.[4] Barthes calls it 'filmic' as these type of signifiers are only the property of a film and are totally absent in the literary text. Barthes's 'filmic' beauty kept playing its games of emotions with the watchers throughout the length of *Saptapadi*, leaving the movie even more indelible, and the Uttam-Suchitra couple more adorable. Roland Barthes says "... The third meaning structures the film differently without ... subverting the story ... The third meaning ... the 'filmic' finally emerges … where language and metalanguage end… where another language begins ... something *touching* … or *sensitive* … the obtuse meaning carries a certain emotion ... which simply designates what one loves, what one wants to defend: an emotion value ..."[4] When Rina accidentally sees Krishna Swami's face after all the years, her drunken words come to a sudden halt, and the way her facial expressions change is not describable in words.[3] The movie screen facilitates the portrayal of those complex emotions which are absent in the linguistic dimension. Many of the poststructuralist theorists like Barthes himself or Derrida agree with this limitation of language to fix meaning to a certain signifier.[5] This type of signifiers does not have any fixed signified, and, so, they can have varying effects on different audience.

Potentials of Film Adaptation

The film *Saptapadi* has really proved the potentials of which Virginia Woolf foretold, "We should see violent changes of emotion produced by their collision. The most fantastic contrasts could be flashed before us with a speed which the writer can only toil after in vain; ... No fantasy could be too far-

fetched or insubstantial."[6] As Rina looks at the mirror, and the passing train shakes the cottage, and the mirror image of Krishnendu in the process,[3] Kar expresses through the camera the inner earthquake and shattering down of glass walls for Rina in a manner that would take futile labor and pages of the book only to leave the readers to their imagination. The scene of the bombarding planes for a mere minute, too, brings the terror of the war in a tangible image that the book failed to create with the description of a whole chapter. Thus, the film adaptation of the novel *Saptapadi* has materialized the potential strength of this new visual art that Virginia Woolf expected from this technology at the very beginning of twentieth century even before it properly flourished. And, unlike her prior comment, it is not a 'parasite' to fall on the 'prey', a 'victim' of a novel, whose characters are only to be watched and not felt by the watcher.[6] This modern argument of hers around the fidelity of a film adaptation was already countered by herself from a postmodern point of view where there grows a mistrust on the meaning of a text or narrative's surface through language. Rather the author is dead in a film, being unable to describe the mind's space or 'res cogitans'[1] of a character of which Woolf regretted earlier. On the other hand, a character or their actions, and even thoughts, are only a collection of visual symbols and signs which depend upon the audience's decoding or meaning-making. Woolf, though, appreciated this strength of visualization.[6]

Auteorship

Somdatta Mandal referred to towering film directors or auteurs like Satyajit Ray to enforce her opinion on the independence of a film adaptation from its literary text.[7] Ray considers himself as an artist to express his own point of view in a film which may oppose the one of the novelist.[7] Auteur theory suggests that a director of a film is like an author of a novel having an equal freedom to write an adapted text as a film with his camera, just as the author writes with a pen.[7] Tagore, too, wanted a strong independent film industry to give voice to newer ideas. *Saptapadi* as a film has successfully met this criteria of auteorship as the director has altered many of the author's perspectives regarding misogyny, religion, and love.[7]

Conclusion

Creating a film adaptation of *Saptapadi* (1958) has an interesting resemblance with the event of Kalachand's name-changing in the novel.[2] He turns into Krishnendu to suit the urban taste in bigger premises of life, and, yet, the meaning of the name is unchanged. Similarly, the film adapts its storyline and characterization to create appeal to a larger and more diverse audience although the theme and the messages it carries remain as humane and beautiful as ever. This film adaptation, released only halfway through the twentieth century, is surprisingly pillared upon a wealth of postmodern ideas, a number of which have come as theories much later. Actually, any successful visual adaptation promotes the poststructuralist idea of mistrust in language, and the games of open-ended signifiers where meanings are not fixed. *Saptapadi*, especially, focused more on emotions than words. The strength of visualization, added to the power of auteorship of Ajay Kar, has turned the already popular novel into a box office success.

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Exploring AI Based Digital Tools for Academic Writing of Tertiary Level Students

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Abstract: Academic writing can be a great way to start a successful scientific career, but it's often seen as a difficult, emotional, and complicated process some students and even for some academicians. Academic English writing is an integrative endeavor for both native and international students where they need an expertise. Furthermore, the issue is compounded for English as a Second Language Learners (ESL) by language and educational hurdles. Artificial Intelligence, on the other hand, has the potential to make digital language learning truly individualized for each learner, decreasing the time, anxiety, cost and aggravation associated with completing online or app-based courses. As a result, the current study aims to investigate the usefulness of Artificial Intelligence-Powered Digital Tools for creating English academic papers, as well as their evaluation, particularly from the perspective of university students. The study uses a secondary data-based content analysis approach in order to research and analyze the literature, characterize AI and the tactics for its use in writing English.

Key Words: Artificial Intelligence, English Academic Writing, Remove Barrier, Effectiveness

Introduction

Artificial Intelligence has always annoyed people's interest around the world. Artificial Intelligence (AI) is the ability of machines to do cognitive tasks such as thinking, perceiving, learning, problem solving, and decision making. It is based on how individuals use their brains to perceive, learn, reason out, and make decisions. Alternatively, engaging pupils with various sensitive traits is a big problem in instructional technology integration. In addition, there is currently a scarcity of understanding of how technology influences attitudes and learning behavior. Educational psychology and sciences findings have received less attention in study. The purpose of this study was to assess the efficacy of a group format of an Artificial Intelligence (AI) driven writing tool for tertiary level students in the context of English academic writing.

Machines are growing increasingly complicated, fast-processing, and intelligent as time goes on. Although being able to deduce, infer, and make decisions in the same way that humans can still a long way off; some amazing advances in the application of Artificial Intelligence (AI) techniques and machine learning have lately been recorded.

It is true that professional writing is difficult. To stay at the top of the field as a blogger, journalist, reporter, academic writer, scientists, researchers, analysts, and other professionals, we must face a number of problems. We need to stay current remain updated with the latest advancements while writing timely, intriguing, and distinctive material. Things are not getting any simpler with the daily cascade of information being published on the internet.

If a writer wants to reach his target audience, he must balance speed, style, quality, and content at the same time. Artificial intelligence for writing could be a simple and effective answer for writers in this area. The relevant education departments are increasingly paying attention to and recognizing English teaching and learning. The environment of English teaching and learning is undergoing extraordinary

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changes as a result of the constant improvement and extension of teaching level and scale, as well as the growth of Internet information technology. In the realm of English academic writing, figuring out how to successfully mix AI with English writing and create compound abilities for society has become an increasingly pressing issue.[1]

Objectives

The researcher accomplishes the research study highlighting the following objectives.

- To measure the levels and effectiveness of the employment of AI applications for English Academic writing from the university students' perspective.
- To prepare a conceptualization for the employment of AI applications for teaching/learning English.

Methodology

The present study is a qualitative research. It focuses on the question that how the things work, so it surrounds 'How' and 'Why.' The output of this research is in the detailed descriptive form. In this study a secondary source of knowledge has been consulted. It is an empirical study. A good number of magazines, articles, reports and research articles have been considered for this article. Both exclusion and inclusion criteria were followed to adjust with the overall objective of the study.

Definition of Artificial Intelligence

Artificial Intelligence (AI) is a multidisciplinary field that attempts to replicate human intelligence. It primarily simulates and replicates the human thought process. In 1956, the phrase "artificial intelligence" was coined at the Dartmouth Society. The term "Artificial Intelligence" was defined as a discipline by four scholars: John McCarthy, Marvin Minsky, Allen Newell, and Herbert Simon. Its primary goal is to develop a theory of intelligent information processing and then create computing systems that can approximate human intelligence. The ability of robots to execute cognitive functions like as thinking, perceiving, learning, problem solving, and decision making is referred to as AI in the National Strategy for Artificial Intelligence.

AI is the software engine that propels the Fourth Industrial Revolution, according to the World Economic Forum. As machine learning (ML) advances, the scope and scale of AI's deployment across all aspects of daily life expands, and as the technology learns and changes on its own, multi-stakeholder collaboration is required to maximize accountability, transparency, privacy, and impartiality in order to build trust.[2]

AI is defined by Encyclopedia Britannica as a digital computer's or a computer-controlled robot's ability to do tasks normally associated with intelligent beings.

AI encompasses a wide range of topics and applications, and it is projected to have a significant impact on all fields in the future. Overall, the goal is to create computers and algorithms that can do computational tasks that would otherwise necessitate human-like brain capabilities.

The Significance of Artificial Intelligence Technology in English Teaching and Learning

Artificial Intelligence (AI) is a computer-based simulation of human intelligence. AI is permeating all facets of public life due to the ongoing enhancement of information processes. Education is the engine that propels and supports societal progress. Nowadays, English is one of the most widely spoken languages on the planet. As a result, artificial intelligence machine learning, intelligent search, and natural language processing can be used to successfully boost English teaching and learning reform. It has the potential to improve Bangladeshi people's capacity to communicate in English while also improving the quality of English classroom instruction. AI has the potential to not only improve the efficiency and fairness of education, but also to disrupt people's old learning techniques and thinking conceptions. Traditional science and technology development and innovation are out of reach in

people's daily lives, but the introduction of artificial intelligence brings science and technology closer to people's lives while increasing the temperature. It can be a huge help to those who are still trying to figure out how to write well.[3]

Understanding of Natural Language

Human beings' most crucial and basic intelligent behavior in social life is language. It can stimulate the expansion and interchange of ideas among individuals, as well as assist people better grasp natural laws, through the use and expression of language. Natural language comprehension, also known as natural language processing in artificial intelligence, is the emulation of human language by a computer system. We can transmit the function of language in the same way that humans do through the use of natural language by computer systems. As a result, its application value in education and instruction is growing, particularly in writing.

Power of Artificial Intelligence in Writing

Artificial Intelligence assists people in a variety of ways when it comes to the question of writing decent English. Artificial Intelligence is gaining traction in the sector by offering intelligent document summaries. Salesforce researchers built an AI algorithm that generates snippets of text that describe the substance of long texts. Though text summarization tools have been around for a while, Salesforce's approach uses machine learning to outperform the competition. Other algorithms, such as Algorithm's Summarizer, provide libraries that make it simple for developers to include text summary features into their product.

These tools can assist authors in skimming through a large number of articles in order to locate interesting topics to write about. It can also assist editors in sifting through the plethora of emails, pitches, and press releases they get on a daily basis. They will be in a better position to determine which emails require more attention. This trend has been aided greatly by advances in Natural Language Processing. NLP aids robots in comprehending the basic meaning of text as well as the relationships between various elements and entities.**[4]**

High-quality and relevant information might be rendered useless if a writer is unable to connect with the intended audience. Unfortunately, outdated keyword-based search algorithms encouraged web writers to pack their work with keywords to make it more relevant to search engine crawlers.

"Although with Page Rank, Google did a great job in organizing the web, it also created a web where keywords ruled over content," says Gennaro Cuofano, growth hacker at WordLift, a company that develops tools for semantic web. "Eventually, web writers ended up spending a significant amount of time improving the find ability." The trend resulted in poor quality writing getting higher search ranking.

"Currently, the web is a place where how-to articles, tutorials and guides are dominant," Cuofano says. "This makes sense in an era where people are still in charge of most tasks. Yet in a future where AI takes over, would not make more and more sense to write about 'why' we do things? Thus, instead of focusing on content that has a short shelf life, we can focus again on content that has the capability to outlive us."**[5]**

The Advantages of Using an AI Writer

Two advantages of utilizing an AI writer, those are essential for any marketer, business, or freelancer.

Saves Time

One of the most compelling arguments for utilizing an AI writer is that it will save time. Small writing jobs are delegated to AI, allowing humans to focus on more important matters. For example, if a writer needs to create a 2000-word essay in less than 3 minutes, an AI writer can help him with keyword inclusion, outline, draft, final edits, and pre-format release.[6]

Saves Money
- When it comes to researching, writing, and reviewing documents, writers who use some of the AI technology outlined above have higher levels of efficiency and overall accuracy.
- Artificial intelligence systems can allow humans to focus on what they do best: think, feel, provide context, and be creative, and so on. Humans will be able to add more thought and talent to what they write and create if they are not required to undertake repetitive jobs.
    - Intelligent machines and systems will learn what humans care about and what they want to read about, allowing writers to produce better and more relevant content.

From assessing articles to designing and campaigns, all copywriters are capable of a wide range of jobs. This implies that they are capable of conducting research when it comes to analyzing, revising, and comprehending quality content. If someone wants to learn more about competitive research, they can start by asking an AI content generator about common questions.[7]

Because AI gets information from all over the place, a writer can come up with dozens of topics to write about. Poems, novels, news stories, and any other type of content can be written by AI authors, and they can do it all over the world. This data is not location-specific, nor is it based on current demographics; it is available worldwide. That's a lot of data for a substantial piece of information. [8]

The most noteworthy ways in which artificial intelligence is altering the world of literature.

The writing style can be changed in a flawless manner as a result of the following process.

Speech-to-Text and Language Translation
There are numerous tools that can instantly translate written text into multiple languages, such as Google Translate. Inclusion of lots of popular word processing tools with speech recognition features allow a user to talk into a microphone and have a computer transform words for him. While some speech recognition programs still have space for improvement, they are becoming far more complex and advanced than they were previously. Accents, colloquialisms, and slang, as well as inappropriately utilized phrases and terms, are frequently recognized by them.

Proof reading and automatic editing
There are a variety of editing and proof reading software solutions available, and the majority of them attempt to correct grammar errors. However, they would never be able to take the place of editors and proof readers.

Detection of Hand writing
Now a writer can insert a hand written document into a device that has hand writing recognition software, and the application will decode the words on the page and transform them to typed text. The applications are also capable of interpreting many styles of hand writing, with some even being able to turn cursive hand writing into typed text.

Detection of Plagiarism
There are systems that can scan text in a typed document to detect if it has been plagiarized by comparing it to other search engines and web sources. Such software can typically detect plagiarism in virtually any field or industry, including publishing, media, academia, visual art and design, and source code for computer programs and development.

Document Summaries
There are now AI tools that can help writers summarize large documents. It will be a valuable asset in the digital age of information overload. They will scan any paper and then summarize the material in short bits for the readers to read, and they do so with remarkable precision. Sales force researchers created the initial AI algorithm, which is gradually gaining traction. This kind of technology will

transform academics, research, governance, and policy making, as well as how we study and comprehend medical and the legal system, among other things. Now, writers, whether amateur and professional, will be able to devote far more time to composing papers than to reading hundreds of pages in a range of varied and thick formats.

Journalism and Content Creation Assisted by Artificial Intelligence

Writing bots and chatbots are the most prominent and concerning examples of AI's potential impact on writing. Bots and systems are being programmed to write breaking news stories and other types of content all over the internet, including a lot of marketing content and in bound content like blog posts and landing pages.

As research is a crucial aspect of writing, clever searching tools are increasingly becoming the go-to research tools. AI helps writers find what they need quickly via search engines. We can find relevant and high-quality sources using custom search. Because artificial intelligence (AI) continues to have a big impact on professional writing, a writer should be aware of how this affects their work.[9]

How Artificial Intelligence Aids Educators with Time Management

Ecree's AI writing software is built around this concept, and it's also included in Writable's Revision Aid. The technology behind Ecree promises to provide students with immediate formative feedback on their writing. This criticism focuses on the foundations of good writing: organization, reasoning, evidence, and analysis. The most common rubric components used to judge student writing are listed below. Ecree's AI isn't looking for "new" things; it's simply doing what humans do with rubrics: grading student work based on the standards of good writing.[10]

The benefit of using technology such as Ecree or Revision Aid is simple: it saves time for teachers by automating a time-consuming aspect of the learning process. Ecree is not intended to replace teachers, which is a crucial distinction to keep in mind. Ecree, like other AI, is limited by the capabilities of the human brain. More nuanced and intellectual involvement from teachers will always be needed, such as clarifying why students' ideas in a paper are important to their lives outside of the classroom. Ecree's AI writing program is intended to save teachers time on jobs that a computer can handle, allowing them to focus on the tasks that a machine cannot.

Faster-responding feedback loops

As a result of improved speed, student achievements improve. When it comes to learning, students adhere to a set of guidelines. The more positive feedback loops on student writing that can be supplied, the more probable it is that the student will learn the underlying skills that those feedback loops are meant to address. The influence of feedback will be perceived sooner if feedback loops can be constructed faster.

The faster we can give pupils feedback, the better. Students who use Ecree or Revision Aid receive immediate feedback on their writing, allowing them to correct errors as they occur. This has the potential to be just as powerful and meaningful as a teacher's well-informed remarks.[11]

Evolution of a Teacher

Students receive formative aid from Ecree's AI, which a teacher can employ in Writable with Revision Aid, resulting in a better piece of writing for the teacher to give comments on. Because the teacher does not have to spend time combing through the sentences and determining whether or not the student has connected evidence to the point being argued, the teacher may focus on those aspects of the student's work that AI cannot evaluate.

Ecree's AI writing software is designed to help teachers make the most of the limited time they have with their students. The deeper the foundation of education will be, the more of these targeted encounters AI can benefit.

Free online writing classes are a fantastic method to improve writing skills. The courses included here cover a variety of creative writing styles, such as poetry, essay writing, and fiction writing.[7]

A. Widely used Writing tools Common Errors and Grammatical Errors

The following methods can be used to detect common errors and grammatical errors:

i. **Common English Errors:** A compilation of common English errors, each with extensive explanations and descriptions.

ii. **Dr. Grammatical's Frequently Asked Questions:** Answers to typical English grammar questions, with examples and extra explanations.

   i. **English Grammar FAQA:** a compilation of frequently asked questions about English grammar and how to solve them.

   ii. **Hyper Grammar:** The University of Ottawa's Writing Centre offers a comprehensive electronic grammar course.

   iii. **Mignon Fogarty's Grammar Girl:** Quick and Dirty Tips for Better Writing Grammar Girl gives a quick, pleasant advice on how to improve writing.

   iv. **The Guide to Grammar and Writing:** An older, but still very useful site for improving writing on the level of words and sentences, paragraphs, and essays and research papers.

   v. **Jack Lynch's Guide to Grammar and Style:** These notes are a miscellany of grammatical rules and explanations, comments on style, and suggestions on usage put by Jack Lynch.

B. Copywrite

The following tools can be adapted to copywrite the materials.

i. **An Introduction to Copywriting (Copywriting 101)**
   In ten simple steps, this tutorial will get up and running with the fundamentals of writing outstanding copy. Following that, a writer will receive recommendations for professional copywriting training as well as links to lessons on SEO copywriting and creating great headlines.

ii. **The Ultimate Cheat Sheet:** This cheat sheet includes a variety of Web copy resources that copywriters can utilize to learn the greatest writing tips and ideas.

iii. **Copy Blogger:** Brian Clark's well-read site offers copywriting advice, guidelines, and ideas.

iv. **Write to Done:** Leo Babuta's blog about writing as a craft and an art. Journalism, blog writing, freelance writing, fiction, non-fiction, landing a book deal, the business of writing, and the habit of writing are just some of the themes covered on the blog. This page is updated twice a week.

v. **Darren Rowse's blog:** among other things, helps bloggers add money streams to their blogs; Darren also offers hundreds of valuable articles on copywriting.

Tom Chandler, a freelance writer, runs a copywriting blog called The Copywriter Underound.

C. Inprove and Rectify the Construction

The following methods can be used to improve and Rectify the Construction.

   i. **Pro Writing Aid blog:** From fast lessons on commonly misspelled terms to in-depth analyses of pleonasms, the Pro Writing Aid blog is an excellent resource for learning about the English language.

   ii. **Writing Forward blog:** Created by a dedicated writer, the Writing Forward blog features a variety of entries on creative writing, grammar, and other topics.

iii. **5 Minute English:** 5 Minute English makes up for its lack of elegance with rapid, practical instruction. Because the lessons in 5 Minute English are geared toward non-native speakers, they cover some of the most difficult language concepts, such as parallel verbs and reflexive pronouns.

iv. **Daily Grammar:** Described as a "fun, convenient method to learn grammar," Daily Grammar is a self-described "fun, convenient way to learn grammar." Daily Grammar is a complete training tool for anyone who wants to improve their English grammar.

v. **Lousy Writer's:** Lousy Writer's main goal is to help anyone to become a better writer as rapidly as possible.

vi. **Purdue OWL (Online Writing Lab):** The Purdue OWL (Online Writing Lab) has over 200 free materials on writing, teaching writing, grammar and mechanics, ESL, and style guides.

vii. **Grammar Ninja:** With Grammar Ninja, learners can play games that reinforce the grammar rules they've learned.

D. Plagiarism

The following websites can be used to check for plagiarism.

i. Dupli checker: A free spelling and grammar checker.

ii. Plag Scan: This program is designed for students, although it also works well for internet content.

iii. Plagiarism Checker : This website containing this checker is outdated – like seriously. However, it's easy to use straight from the homepage.

iv. Quetext: By far the best looking and easiest to use checker tool.

E. Article Rewrite
Any kind of article can be Rewritten with the help of following spinners.

i. Spin Rewriter 11: Spin Rewriter 11 is a powerful article rewriter and spinner that makes use of convolution neural networks and ENL technology to spin articles.

ii. Clever Spinner: In this roundup, Clever Spinner is the best and cheapest article spinner software/rewriter tool. It rewrites any text, sentence, or paragraph using advanced artificial intelligence (AI) and natural language processing (NLP) technologies. As a result, it can edit information as quickly as a human writer.

iii. The Best Spinner (version 4.0): It is a downloaded program that is compatible with MAC, PC, and Tablet computers.

iv. Word AI: Alex Cardinell created Word AI in December 2011 as another one of the greatest article spinner tools.

v. Spinner Chef 6: It has the ability to generate a large number of unique articles in a short period of time.

vi. Chimp Rewriter: It can rewrite a sentence or an entire paragraph in a fraction of a second while maintaining the sense.

vii. Word tune: This is one of the list's newest and greatest free article spinners. AI21 labs established it in 2018. It employs cutting-edge artificial intelligence and language models to recognize the meaning and context of original content.

F. Tools the following tools can be adapted

i.   One Look Dictionary Search: The One Look search engine indexes more than 13,5 million words from more than 1024 online dictionaries, allowing users to find, define, and translate words all in one place.

ii. Visuwords: Look up words to see what they mean and how they relate to other words and concepts. Create diagrams that resemble a neural network. Learn how words are linked together.

iii. Visual Dictionary: The Visual Dictionary Online is an innovative interactive dictionary. The Visual Dictionary Online is a one-stop shop for everything from images to words and definitions.

iv. One Look Reverse Dictionary: The reverse dictionary in One Look helps to define a notion and receive a list of words and phrases that are connected to that concept.

v.   Online Spell Checker: Free online spell checker with instant and accurate results for texts in 28 languages (German, English, Spanish, French, Russian, Italian, Portuguese etc.).

vi. GNU Aspell is a Free and Open-Source spell checker that is intended to eventually replace Ispell. It can function as a library or as a standalone spell checker. Its key characteristic is that it outperforms almost every other spell checker for the English language when it comes to providing suitable replacements for misspelled words.

vii. World Web: It's an offline search engine that can also look for words in online resources like the Wikipedia encyclopedia. Definitions and synonyms, proper nouns, 150 000 root words, and 120 000 synonym sets are all included in the free version.

viii. Word counter: Another option is to use Text Statistics Generator, which provides a fast study of the number of word occurrences.

xi. Text Analyzer (Advanced): (Requires registration) This free tool analyzes texts, estimating the amount of words, lexical density, words per sentence, character per word, and readability, as well as doing word, phrase, and graded analysis.

Artificial Intelligence Systems for Writing have Numerous Limitations

• AI programs for writing still have many limitations when it comes to language processing and understanding, and should never be utilized without supervision.

   • There is still no one AI program that can handle all of the functionalities, therefore authors will need to use numerous programs to take advantage of all of the AI in writing features described above. Not only is this inefficient, but it can also be very costly.

   • AI programs will never be able to replace human writers' creativity and reasoning processes.

Conclusion

Involvement of Artificial intelligence in Academic English has not only ensured educational reform but also opened up the digital platforms as the means of a development tool in academic writing. Apart from paying attention to the practice and application of AI in English teaching learning process, it has become a requirement to adopt an integrated approach combining AI and English teaching-learning activities promote a healthy and modified field of English education. As a result, the rise of artificial intelligence is not only a useful method of English teaching and learning, but also a significant demonstration of science and technology's ability to drive societal change.

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Child Labour in Bangladesh: Issues & Legal Protection

Dr. Abdullah-Al-Monzur Hussain[*]

Abstract: The current status of child labour in Bangladesh has recently recieved significant attention in both national and international arena. This study has tried to highlight the present scenario of child labour. The case studies of this paper have clearly provided evidence as the supportive documents about the sizable role of the child labour in the present labour market. Eliminating child labour from society is obviously required, although it is arguable whether doing so would be beneficial for any particular civilisation (such as Bangladesh). As a socioeconomic fact, the issue of child labour in the country cannot be ignored. As a result, efforts must be made to gradually diminish child labour rather than to completely eradicate it. It is crucial to remember that if child labour is completely eradicated from the country, the lives of young workers and their families may be in danger. These solutions are presented as suggestions at the paper's end in an effort to develop strategies to gradually decrease the use of child labour. For instance, it presents a current picture of the deficiencies in the legal system regarding child labour.

Keywords: Child labour, Circumstance, Multinomial Logit Model, Bangladesh

Introduction

The stage of adolescence is the most guilt-free one in a person's life. It is during this stage of development that a child is free from any stress. A child plays and picks up new skills at that age. Additionally, children at that age are quite close to all of their relatives. It is hardly surprising that everyone has heard the kids' stories. According to the Bangladesh Bureau of Statistics, child workers are defined aschildren in the age group of 5–14 years who were found to be working in the latest survey.[1] However, many young people leave their formative years with heavy burdens. Even if the innocent child is very beloved by his family, it is untrue that he is a purchasing machine working all day to meet their needs. Currently, there is a debate over what constitutes "youth work." The past reveals that child labour has existed in some form since the dawn of humankind's collective history. On one hand, it was said that "To a greater or lesser extent, they participate in those financial activities which are crucial in the event that the gathering to which they have a place is to make due." It has been shown that agricultural countries with rapid population growth employ young people more frequently. In non-industrialized countries, child labour is a result of family poverty. Guardians of children from poor homes make an effort to lower their costs by engaging them in various types of work. Children are used for their own strength and to support their families. The socioeconomics of the populace in Bangladesh can likewise be an indicator of youngster work frequency rates. Kids in provincial regions are bound to work than youngsters in metropolitan regions. This might be because of the farming history of Bangladesh and the practice of youngsters working close by grown-ups in the fields. However, young men are more likely than young women to work, and most child workers are between the ages of 12 and 14, both in rural and urban environments. Relationship complexities also impacted children's work rates. When all the adult bodies do the house-hold work, the children must work in anobliged way. These findings by Salmon (2005) demonstrate that children act as a form of revenue, since families that increase all human resources will typically be households with rates of child employment.

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Conceptual Framework

According to the recent studies, immense reasons are directly responsible to violate the child rights. Many children work in a variety of jobs, such as weeding, planting, harvesting, moving, fishing, sailing, brushing steers, ranch assistants, homegrown specialists, trash pickers, waste authorities, metal workers, cowhide and tannery workers, flask young men, lodging young men, shoeshine young men, electroplate labourers, paper dealers, cart pullers, every day workers[2]. Parents who send their children to work to increase their chances of survival may not realise the long-term negative consequences of a youthful job for their own loved ones, even if they are acting sanely. Due to the conflict between school engagement and competence and the need to collect (or under-accumulate) human resources, students who are sent out to work miss out on the opportunity to develop both their usefulness and their future earning capacity. As a result, their future families will earn less money, increasing the risk that their offspring may lose their jobs. Thus, from one age to another, neediness and child labour are provided for. On August 1, 2010, this entry was published[3].

Present Status of Child Labour in Bangladesh

A man's youth is the happiest and most rewarding period of his life. Many of the world's kindest children are sacrificing their lives in war during this momentous time period that will see three billion children from around the globe engaged in military service. Child labour continues to be a common occurrence across the country. Child labour is a common occurrence in the early years of a child's life. The separation of the young person's end of the workplace from the adult end is an absolute necessity. So, the world's objective is to eradicate or remove child labour. A second national child labour survey was conducted by the Bangladesh Bureau of Statistics (BBS) from 2011 to 2012. (NCLS). As a result of Bangladesh's ratification of the International Labor Organization's (ILO) Worst Forms of Child Labor Convention (No. 182) 1999, this review was carefully crafted and executed. According to a recent study, there are about 4.9 million working-age children in the United States, or 14.2 percent of the total of 35.06 million children in this age range. The total number of working children between the ages of 5 and 17 is 7.9 million.

- In the age range of 5 to 17 years, there are, respectively, 73.5 percent and 26.5 percent of young male and female child labourers;
- The total number of working children aged 5 to 17 in rural areas is estimated to be 6.4 million, compared to 1.5 million in urban areas.
- 93.3 percent of all working children between the ages of 5 and 17 are employed in the casual sector. 4.5 million (56.4 percent) of children are connected to farming, compared to 2 million (25.9 percent) who are drawn to the government and 1.4 million (17.7 percent) who are drawn to industry;
- A total of 1.3 million teenagers are estimated to work 43 or more hours every week. Across all age groups, more young males than women are employed in this sort of child labour.

Approximately 74 million children are involved in financial activities. Approximately 59 percent of the children are aged 10 to 14, which is a sizable proportion. Young men make up the majority of them, at over 75%, while agriculture employs a sizable portion of them, at about 56%. Approximately 69 percent of children contribute financially to their families. Approximately 33% of young people involved in financial activities attend school. Over the course of seven days, 13 million children work an additional 43 hours. 33 percent of child labourers working in such hazardous conditions are aged 12 to 14, while 57 percent are aged 15 to 17.[4]

The opportunities for rural compensation employment, which is also a crucial source of income for provincial households (it represents the primary source of income for 23% of the families in the study region), increase significantly during these significant farming activities. In order to weed the Aus and Jute crops, interest among men is highest in late April or early May. The two genders' progeny are used

around the same time for chili harvesting. A little child needs about two days or even longer to choose one maund of bean stew.

Rural Bangladesh is rife with poverty. Both boys and girls face this obstacle, and it is one of the primary reasons why so many people in the nation lack access to food. Rural children are more exposed to a wide range of illnesses that may lead to physical and mental disabilities and distortions because of their poor health and sometimes physically demanding work schedules. It is common knowledge that young workers are preferred over adult professionals in rural business settings because they incur fewer costs, are more amenable to management, and have a higher sense of responsibility.

Child Labour in Bangladesh

More over 5% of the world's working-age population resides in Bangladesh. Bangladesh is home to over 3.2 million child labourers, according to the ILO's definition. Working kids are a common sight in Bangladesh, where they are seen serving tea by the side of the road, or winding between cars, offering goods for sale to drivers. Additionally, children often labour in places where their job is hidden from plain sight, such as in the kitchen, making it difficult to keep tabs on safety standards. The average week for a young worker is 55.8 hours (9.3 hours every day and 6.02 days week by week). As much as 38 percent of the working population works over 10 hours each day, while roughly 65% believe that their labour is not socially acceptable (Abul et al., 2007). Overall, teenagers labour 28 hours a week and earn 3.3 USD a week for their efforts. Most domestic helpers in their twenties and thirties are typically between the ages of 12 and seventeen. However, very young children as little as 5 or 6 years old have been spotted working, and a study on homegrown children has been conducted. About 38% of the workers were between the ages of 11 and 13, while about 24% were between the ages of 5 and 10. As of January, 2003, the Bangladesh Bureau of Statistics estimated that there were 42.4 million kids between the ages of 5 and 17 in the country, of which 35.1 million were in the age group 5-14 and 7.3 million were between the ages of 15 and 17. 22.7 million young males and 19.7 million young women were found in the total population of 5-17-year-olds.These young people in Bangladesh work in several professions that are regarded as harmful and endanger their ability to develop physically and mentally. In 2009, the UN Committee on the Rights of the Child was worried about how many Bangladeshi children still worked in welding, auto studios, street transportation, battery recharging, and tobacco production.[5]

The Committee likewise raised considerations towards the way that the requirement and observing of youngster work regulations isn't up to the norms and the attention to public in the general public with regards to the adverse consequences of kid work isn't adequate. Kids in Bangladesh are occupied with the most terrible types of kid work, essentially in perilous exercises in farming and homegrown assistance. Youngsters working in farming play out an assortment of assignments and might be presented to dangers like hazardous apparatus and instruments, destructive pesticides and weighty burdens. Kids, for the most part young ladies, fill in as homegrown workers in private families in Bangladesh. Some kid domestics work in manipulative circumstances and are defenseless against misuse, including sexual maltreatment. Kids participate in hazardous work that incorporates welding, carpentry, cart pulling and car fix. Kids are likewise engaged with the development of salt, cleanser, matches, blocks, cigarettes, footwear, steel furniture, glass, jute, cowhide and materials. They usually work in small studios or houses where they are exposed to risks such as working for extended periods of time with dangerous synthetic materials and sharp objects in cramped environments with poor illumination. Children also work, breaking large boats down into smaller parts. Children lack the real strength needed for transport and pose a risk of exposure to dangerous synthetic substances. Children have also been seen playing on the streets, picking up rubbish, asking questions, and distributing items.

They may have to deal with dangers like extreme weather, car accidents, and criminal elements. Children who work in hotels and cafés may be subjected to abuse and have long shifts. Children are forced to work in Bangladesh. Young people work under contract or constraint conditions drying fish.

In the corporate sex industry, Bangladeshi children are also exploited; some are sent to India and other countries for sexual abuse. Young men and women, especially those who reside in cities, are routinely exploited for illegal activities including sneaking and exchanging weapons and drugs.

Causes of Child Labour in Bangladesh
Youth is the most significant period of human existence in all ways and according to all considerations. This period of life is regarded as the foundation of life because the entirety of human existence depends on how youth is nourished to provide the firm foundation of a person's earthly existence. The future of every country depends on the proper upbringing of its children. Therefore, this idea is not just limited to individual life but also pertains to the existence of the nation or society as a whole. The following list of common justifications for young people working in the public includes a few.

Poverty
As has previously been established, the primary justification for young people working is financial need or neediness. When parents or guardians recognise that sending young children into dangerous situations is inappropriate, they are forced to do it out of sheer endurance. Financial obligations, the need for food, shelter, and clothing push their children into the trap of untimely work.

Over Population
The majority of the nations in Asia and Africa are overpopulated. Children work in many different jobs because there aren't enough resources and there are more people to feed.

Absence of compulsory education at the primary level
Child labour can also be attributed to the fact that there is no primary level schooling that is obligatory to complete. Every child has the right to get an education that is both complete and of high quality.

Parental Illiteracy
Parents who are illiterate or unaware of the importance of their child's physical, cognitive, and emotional well-being are unable to provide this for him. They don't understand the necessity of education for their children since they themselves aren't educated or well-informed. "The lack of access to education and the prevalence of poverty are the main reasons why children in Bangladesh are forced to work. Families often send their children to work to supplement their income or pay off debts"[6]

Urbanization
The downside of the industrial revolution is also a downside. Many multinational corporations (MNCs) and export sectors (especially the garment industry) often employ these labourers in developing countries.

Unemployment of Elders
Getting a job might be particularly challenging for the elderly. Employing children is a viable business strategy for manufacturers and factory owners. Paying less and getting more work is a win-win situation for both parties. Unions will not have an issue with them either.

Demand of Child Labour Employer
For a variety of reasons, the firms prefer hiring youthful labourers over labourers who are older. The majority of businesses believe that hiring children as labourers is more advantageous than hiring adults because children are generally seen as modest workers. The younger generation has no concept of prestige and never questions whether or not to complete any tasks. They work quickly and experience less sluggishness. The kids are flexible beyond compare, humble, and efficiently under control. More fully developed, the children are freed from a variety of undesirable traits and lack a worker's organisation to hinder management decisions.[7]

Willingness to Exploit Children

Even if a family is very impoverished, the likelihood of its children being forced to work is quite minimal unless there are others who are prepared to take advantage of them. There are also other reasons of child labour –

• Social aloofness and resilience of kid work.
• Obliviousness of the guardians about the antagonistic outcomes of kid work.
• Insufficient requirement of the legitimate arrangements relating to youngster work.
• Non-accessibility of and non-openness to schools.
• Insignificant and non-alluring school educational program.
• Businesses incline toward kids as they establish tweet work and they can't arrange themselves abuse.

Constitutional Provisions for Child Rights in Bangladesh

Every culture considers children as the blossoming flowers. They are every society's true assets. The right growth of children is crucial for the future of every community and the entire world. The constitution of a country makes sure that children are safe from the bad effects of any bad situation. This is where all laws that protect children come from."Despite the existence of laws and policies aimed at protecting children from labor exploitation, enforcement remains weak, and many children continue to work in hazardous conditions, including in the garment and leather industries, brick factories, and as domestic workers."[8]

The People's Republic of Bangladesh's Constitution does not go beyond the principles that guarantee a friendly environment for healthy childhood development[9]. In other words, all of the resources for our children's physical, mental, intellectual, and social growth come from our constitution. The following are provisions contained in our constitution that pertain to children:

Article -14

As stated in Article 14 of the constitution, it is the duty of the state to liberate the oppressed masses, such as the peasants and workers, as well as the backwards sectors of the population.

Article -15

According to Article 15 of the constitution, the state has a fundamental duty to ensure that its residents are provided for by increasing productive forces and raising peoples' standards of living in both the material and cultural spheres through planned economic growth.

   a) The provision of life's essentials, such as food, clothing, shelter, education, and medical care.
   b) The right to reasonable rest, recreation, and leisure;
   c) The right to work, which is the right to guaranteed employment at a fair wage taking into account the quantity and quality of work;
   d) The right to social security, which is the right to public assistance in cases of undeserved need brought on by unemployment, illness, or disability; suffered by widows, orphans, or in old age; or in other cases of this nature.

Article-17

The state shall adopt effective measures for the purposes of:

   a. establishing a uniform, mass-oriented, and universal system of education;
   b. extending free and compulsory education to all children to such stage as may be determined by law; and relating education to societal needs and producing citizens who are well-trained and driven to meet those needs.
   c. Eliminating illiteracy within the time frame that the legislation may specify.

Article-18
Article 18 of Bangladesh's constitution says that the government must put improving public health and nutrition at the top of its list of priorities. It also says that the government must take specific steps to stop people from drinking alcohol and other intoxicating drinks and eating poisonous frogs, unless it is done for medical reasons or other legal reasons.

The provisions of this article can be seen as a strengthened step given the prevalence of broad state of malnutrition among youngsters in Bangladesh.

Article- 28
Article 28 of the constitution says:
1. The state can't treat any citizen unfairly because of their religion, race, color, national origin, sex, or where they were born.
2. This article doesn't stop the state from making special arrangements for women, children, or any other group of citizens who aren't as well off.

In this article, the facilities and needs of children have been given the most attention so that they can grow up in a safe place and develop a full personality so that they can be valuable members of society.

Existing Laws Relating to Child Labour in Bangladesh
A lofty idea like the non-existence of child labour is unquestionably a myth in Bangladesh's economically backward society. Therefore, despite the fact that children in Bangladesh are denied rights to freedoms under both the law and the constitution, the inevitability of child labour has now become a phenomenon of great concern in the context of harsh economic realities. One of the most important parts of the state's strategy is that it is the state's job to take care of the basic needs of children and give them a good place to grow up.[10]

Bangladesh Labour Act, 2006
The most striking regulation in the country for directing kid work is the Bangladesh Labor Act, 2006, which remembers a section for kid work. In the previous regulations, the expression "youngster" was utilized to mean an individual who had not finished 16 years old and the expression "youngster" was utilized to mean and incorporate both the kid and juvenile. Under the prior regulation, even a youngster might have gotten a wellness authentication to find a new line of work in a production line. Yet, in the new regulation, kid implies an individual who has finished their fourteen years old and juvenile means the individual who has finished sixteen years and has not finished eighteen years old.

National Child Labour Elimination Policy, 2010
"Child labor in Bangladesh is not only a violation of children's rights but also a hindrance to the country's economic and social development. To address this issue, a comprehensive and coordinated approach is needed that involves government, civil society, and the private sector."[11]

Government of Bangladesh passed in March 2010 the "National Child Labor Elimination Policy 2010" (NCLEP) after a lengthy process that involved foreign development partners. The Ministry of Labour and Employment (MoLE) devised a policy with the ambitious objective of ending all forms of child labour by the year 2015. In order to do this, ten methods have been identified. Specific goals, relevant duties, and implementation entities are laid forth in the policy. Development and implementation of institutional structures and policies; education; health and nutrition; raising of social awareness and motivation; enforcement of the laws; employment and the market for workers; preventing and safeguarding against child labour; social and familial reintegration; research and training; and evaluation are some of the key strategic areas. Removing working children "from all types of child labour, including dangerous employment and the worst kinds," is one of the policy's primary objectives. Different sorts of actions, like stipends and grants to enable working children to re-enter the

classroom, were devised for this goal. The policy recognizes that more needs to be done to help native children and children with physical disabilities get back to a "congenial environment."

The goal of the policy is to pass "pragmatic laws" and strengthen the country's institutions so that these laws can be enforced. This is called the legal and institutional framework.

119) Later, the National Plan of Action (NPA) was unveiled to put the major NCLEP 2010 issues into practice. 120. Additionally, it was acknowledged that closing this gap is necessary because child labour is a serious issue, particularly in the unorganized sector. The "Child Labour Unit," which was already created in 2009, is another resource that the NPA uses.

The Constitution of the People's Republic of Bangladesh

While preserving the people's fundamental rights, Article 34 of the Bangladeshi Constitution outlaws any form of forced labour. Article 34 says that all kinds of forced labour are illegal, and if this rule is broken, it is a crime that can get you in trouble with the law.

The Children Act, 2013

UN Convention on Child Rights, 1989 was one of several international criteria that were not met by the former Children Act, 1974. The Children Act 2013 abolished this law and brought it into compliance. Section 4 of this Act states that, despite any other legislation now in effect, any individual under the age of 18 is considered a child. Though the law does not explicitly ban child work, it prohibits and punishes several significant acts against children, such as the exploitation of minors (section 80).

Problems Regarding Child Labour in Bangladesh

> ➤ Kid work are expanding because of little learning, destitution and absence of familiarity with the guardians.

> ➤ Kid work is additionally expanding due to non accessibility of schooling materials, absence of chance for instruction and unconcerned mentality of guardians in regards to the adverse consequence of youngster work.

> ➤ Regular disasters like riverbank disintegration, floods, dry seasons, storms and flowing floods, tremors and so forth drive kids towards more serious dangers of being occupied with actual labour.

> ➤ The public authority has taken drives yet it is expected to expanded and successful by regulations and request.

> ➤ Various laws of the nation have given the meaning of youngster diversely yet till now a reasonable meaning of the terms 'kid work' or 'kid workers' isn't found anyplace.

> ➤ *The Child Labour Act, 2013* proposed for most elevated five years detainment and Taka one lakh fines for any savagery on youngsters as well as giving a rule for raising the kids in a favorable climate.

> ➤ The discipline isn't adequate to give a youngster appropriate equity.

Recommendations

A fundamental review of the event of young person work in the monetary perspective of Bangladesh, may glare up both positive and pessimistic impact. An additional compensation obtained by a functioning young person for a defenseless family wherein brief necessities eclipse everything, may be looked at with high need from the smaller than usual level thought about the family. In such circumstances, the pace of child work shows up too bear positive hint. However, from full scale level idea, particularly to the extent that difficulty of data and capacity getting, the event of youth work has every one of the reserves of being similarly as becoming stirred up in the present dismissing the possible destiny of a nation and besides implies monetary increments of managers to the detriment of

physical, mental, insightful and moral improvement of children who include the replacements of the country."Child labor is a pervasive problem in Bangladesh, with an estimated 4.9 million children between the ages of 5 and 14 engaged in work that is often hazardous, exploitative, and detrimental to their health and well-being"[12]

Measures to be taken

Disregarding the way that removal of child work is charming anyway it's an irksome endeavor in certifiable term. For successful removal, worked with, steady and predictable undertakings can be supported. Regardless, stage by stage removal of child work may be possible of the going with centers are considered.

Identifying Child Workers

Recognizing kid workers is essential for such an organizing. In any case it is troublesome recognize all adolescent workers in the country. So planned regions should be taken up rapidly and tries ought to continue from government, NGO's and social activities.

Enhancing Educational Program

Formal and non-regular guidance through full-time and low upkeep schools, proficient planning activities may be updated. Compulsory fundamental tutoring should be ensured and advancing uncommon load on female guidance should be continued.

Strict Actions

Government should take actions to serious execute measures to stop kid work and to make school interest moderate. The approval machines should be supported similar to work and vital assistance.

Legal Measures

Existing young person work regulations ought to be maintained effectively. The power equipment should be ready and honed with regards to the child work, significant regulations and rules and need for rebuffing the transgressors.

Assistance to Families

As remarkable poverty urges children to go to work, methodologies to decrease the squeezing element of melancholy on the defenseless nuclear family should be embraced. Additionally, some friendly assistance may be given by capable social workers, purposeful affiliations, or even severe bodies. Clinical consideration, pay and business age plans, credit workplaces, composed desperation easing up, and neighborhood organizations should be considered here.

Motivational and Publicity Campaign

The youth workers themselves, their people, their supervisors, the public power, without a doubt, all portions of the people should be made aware of the wickedness of child work. Care-age should be conceivable through open missions, public get-togethers, media openness, studios, neighborhood, etc.

Replacing Working Children

Displacing working children with jobless family members should be considered. The sluggish, standard, and youthful economy, the social affiliations, and the traditional attitude of the overall population combine to support the current issue of child work. So, this issue aims to get the economy to grow quickly enough to get rid of child labor.

Responsibility of Non-Government Organization

Put pressure on the government to enforce the law in a proper manner. Discover the best procedure for obtaining elective measures, and launch a small, proactive venture for those in need in rural areas. Put pressure on the government to offer a comprehensive grant programme throughout Bangladesh's provincial and urban areas. Parents should encourage their children to get at least an auxiliary degree in education. Join the worldwide association's mass mindfulness campaign. ILO and COL might come

up to the plate and present distant learning programmes with a broad reach to clear the child labour from Bangladesh. This programme will involve involvement from professionals with expertise in child work, education, and distance learning. Starting in 1992, the time-bound programme run by the ILO and IPEC (Program of the End of Kid Work) has made extensive use of educational and skill-building breaks. The greatest locations for this time-bound programme might be Bangladesh, Pakistan, India, and Sri Lanka.

Conclusion

In conclusion, the plight of children in Bangladesh is a pressing issue that demands immediate attention. Despite being a forgiving group, children rarely speak up, even within the confines of their homes, leading to immense suffering and losses due to various forms of violence. The Children Act of 1974, although intended to safeguard young individuals, falls short in its implementation. Moreover, the existing legal structure, including the criminal justice system and law enforcement agencies, often treat children akin to adult criminals, exacerbating the problem. To put an end to violence against children, it is imperative that the legal authorities, policymakers, guardians, and caretakers familiarize themselves with the Convention on the Rights of the Child and the laws pertaining to children's welfare. Efforts must be made to shield children from private interest groups, and any discrimination against children during societal protests should be justly addressed in accordance with the law. Bangladesh, with its high population density, faces numerous challenges, including child labor, with a significant portion of the metropolitan workforce comprising children under 15 years old. The majority of these children are engaged in industries such as manufacturing, transportation, and domestic labor, while those in rural areas often rely on agricultural work. Regrettably, many of these working children are deprived of education and face a multitude of issues, from harsh working conditions and meager pay to limited access to healthcare and inappropriate behavior. Resolving these challenges requires a comprehensive approach that ensures the protection, rights, and well-being of children in Bangladesh.

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Pharmacological Properties & Phytochemical Constituents of *Dillenia indica* As A Potential Medicinal Tree: An Overview

Farhana Rahman*

Abstract: *Dillenia indica* which is commonly known as Elephant apple and is familiar mainly for its fruit. It is named differently in different areas, the vernacular names include Chalta, Chulta, Karambel, Bhavya and Ramphal. It is found in Bangladesh, Nepal, China, Indonesia, Assam, West Bengal and many other region of India. It has long been used in Indian traditional and ayurvedic medicine to treat a variety of ailments affecting the digestive, respiratory, and central nervous systems. The data was compiled using the literature that was reviewed. Traditionally different parts of *Dillenia indica* have been used for the relief of indigestion, asthma, influenza, dysentery, jaundice, weakness and rheumatic pain. Apart from this extractives also showed significant cytotoxic, CNS depressant and free radical scavenging activity. Wood obtained from the bark of the plant has been used for preparing rafters, tool handles, cupboard and house pots. It is interesting to know that bark of *Dillenia indica* is used for production of charcoal. Microspheres of metformin hydrochloride and novel mucoadhesive buccal tablets of oxytocin were also prepared from *Dillenia indica*. When large-scale plant multiplication is required, in vitro propagation is used, whereas micropropagation is considered. Phytochemical studies have showed partial presence of polyphenols, tannins, alkaloids and flavonoids which are responsible for the various pharmacological activities. Major chemical constituents present in the plant are botulin (pentacyclic triterpenoid) and betulinic acid that show wide spectrum of pharmacological activities which include anti HIV, anti inflammatory, anti cancer, anti malarial etc. Moreover *Dillenia indica* is found to possess analgesic, anti diabetic, anti-microbial, anti-bacterial, antioxidant, antiproliferation, antidiarrhoeal, anti- implantation, cytotoxic, wound healing and hair waving activity.

Key words: *Dillenia indica* Linn, Phytochemical profile, Traditional uses, Pharmacological properties, Ethnopharmacology.

Introduction

Bangladesh is a diverse five and dime flea market of medicinal and aromatic plants and has a well accomplished local healthcare heritage that is still present in the indigenous health care system. In developed countries, the use of traditional medicines is customary in treating diseases. The isolation of active principles of the medicinal plant is necessary for the benefits of human being. It is interesting to know that more than 500 medicinal plants have been reported to exhibit medicinal properties in Bangladesh and many other countries; *Dillenia indica* f. *elongata* (Miq) is one of them. It is the most edible species among them. *Dillenia indica* belong to Dilleniaceae family. The genus Dillenia has 60 species, some of them are *D. pentagyna*, *D. suffruticosa, D. papuana, D. excels, D. serrate, D. ovate, D. phillipinensis, D. pentagyna* (Roxb) from which *Dillenia indica* f. *elongata* (Miq.) and *D.*

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suffruticosa has been reported to be used to treat cancerous growth. However there are only two plants *Dillenia indica* f. *elongata* (Miq.) and *D. pentagyna Ro* which are found in Bangladesh. The fruit of *Dillenia indica* f. *a* (Miq) is used intreating laxative problems, abdominal pain and for enhancing the flavor of rural cuisine. Bark and leaves possess astringent properties, the alcoholic extract of leaves had been reported to impart CNS depressant activities, seeds have been reported to possess antimicrobial activity and fruits of *Dillenia indica* f. *elongate* (Miq) have been found to be rich in showing anti-oxidant activity [8,1]

Taxonomical Classification:
According to the botanical scheme of Englar, the classification of the plant Dillenia indica is like: [7,10]

Kingdom	: Plantae
Subkingdom	: Tracheobionta
Division	: Phanerogamae
Subdivision	: Angiospermae
Class	: Dicotyledonae
Subclass	: Polypetalae
Order	: Dilleniales
Family	: Dilleniaceae
Genus	: *Dillenia*
Species	: *indica* (Linnaeus) or *speciosa* (Thunberg)

Regional and other names/vernacular names: [54]

Bengali/vernacular name: Chalta, Chalita

Tribal Name: Ulugach, Dabrusi (Chakma), Kra Aning (Marma)

English: Elephant Apple, Indian catmon, Hondapara Tree, Ma-tad

Hindi: Chalta, Gimar

Sanskrit: Avartaki, Bhavya, Ruvya

Assamese: Outenga

Gujarati & Marathi: Karambel or Karmal, Kambel, Mota karmal, Motakarambal

Uriya: Uvu, Chalota, Ou, Rai

Telugu: Peddakalinga

Tamil: Akku, Ugakkay, Uva, Uvav, Uvatteku

Kannada: Betta Kanigala, Kondukanagala

Malyalam: Chalitha, Punna, Syalitha, Valapunna

Konkani: Corombol

Burma: Thabyu, Thibuta, Zinbrun, Zinpyunngan

Monghyr: Chilta

Nepali: Ramphal, Panchphal, Panchkule

China: Wu ya gua

Botanical Description

Plant Appearance

Medium sized, semi deciduous evergreen trees up to 30m tall, trunk is straight but not much high, branches are spreading and forming round- shady head. Bark is reddish brown in color, exfoliating; young branchlets is brown pubescent, glabrescent and contains leaf scars. Leaves are fasciculate at the ends of branches,20-30 cm long, sharply serrate [25,26]. Flowers are solitary, 12-20cm in diameter, bud is more than 5cm in diameter. Sepals are 5 in number, approximately rounded, orbicular, concave, 4-6 cm in diameter, thickly and fleshy. Petals are 7-9cm in size, white, obovate. Stamens in 2 distinct groups: outer very numerous, slightly curved in bud, apically reflexed outward in bud; anthers dehiscing with 2 pores. Carpels are 16-20 in number; stylodia spreading; ovules many per carpel [24]. Flowers occur in May-June. Fruits, which are made of ripened carpels and enclosed by greatly enlarged and thickened imbricating sepals, are aggregate globose, 10-15 cm in diameter, are large, somewhat rounded or broadly ovoid, yellowish green hard and tough.17-20 Seeds are numerous and compressed, with a hairy margin [4,6,47].

Geographical Distribution

It was first introduced in the Philippines in 1908.

Dillenia indica is a species of *Dillenia* native to southestern Asia, from India, Bangladesh and Sri Lanka, east to southeastern China (Yunnan) and Vietnam and south through Thailand to Malaysia and Indonesia [54].

Cultivation & Collection

A plant of the humid tropics, where it is found at elevations up to 1,100 metres. It grows best in areas where annual daytime temperature is within the range 30ºC but can tolerate 7-47ºC.Plants can survive occasional, short-lived forests with temperatures down to about -2ºC [47]. It prefers a mean annual rainfall in the range 3,000-4,000 mm, but tolerates 2,000-5,500 mm. Prefers a sunny position, but plants can stand shade very well- vigorous sapling have been found in dense shade. Prefers a well drained sandy loam and a sunny position [20].

The dispersal of the seeds is said to be affected by animals, among others by elephants, with current water. In the further case the seeds may germinate in the fruit, which is left behind on the bank of the river, often partly fielding up with mud, which gives a favorable substratum for the germination.

Seeds are sown in open in May, in drill 3 feet apart, barely covered. Sown thinly, as the plants attain a good size and grow freely from seed. Thin out the young plants to a distance of 12-15 inches between each plant in the drill. The soil should be kept free from weeds in the early stages. If the summer is hot and dry, give a mulching of rotted cow-manure. If grown for leaf crop, the capsule should be picked off as soon as formed, as in a wind the spines tear the leaves. In August the plant reaches to the height that bear flowers and fruits. In the end of August stems with leaves and flowering tops are collected and dried as soon as possible at 45- 50ºC. The leaves and fruits are collected and thus they are cultivated[5].

Leaves of *Dillenia indica* L. are collected in September. Then they are dried at room temperature under shade and powdered using a mixer grinder. The powder is continuously extracted suing, Soxhlet extractor with petroleum ether to remove oils, fats and chlorophyll present. The powder is then extracted with methanol using Soxhlet extractor for 24 hours at 40-50°C. After complete extraction, methanolic extract of *Dillenia indica* (DIM) is concentrated under a vacuum to obtain a thick extract that is then dried in a hot air oven to get a free-flowing powder [9].

Ayurvadic Application

The various parts of *Dillenia indica* used in curing ailments are as follows:

Leaf (Fig 1): For hydrocele and contraception, a few pieces of root are knotted around the waist. One young plant leaf along with a small amount of rice is soaked in water over night to be used as a contraceptive. Pithas (flattened and steamed food items) are cooked from macerated rice and leaves in the morning and are consumed on an empty stomach. For dysentery, one cup of juice obtained from squeezed young leaves is taken twice daily for 7 days [12]. Decoction and leaf juice are used to treat breast cancer in women as well as fever, coughing, constipation, and chest pain[36].

Fig 1: Leaf (*Dillenia indica)*

Seed (Fig 2)

For better digestion dried and powdered seed 1 teaspoonful can be used [40].

Fig 2: Seed (*Dillenia indica)*

Fruit (Fig 3)

Dillenia indica fruit is beneficial for assessing better appetite, improving weakness and rheumatic pain, and is used as an indigenous ayurvedic medicine to cure nervousness [18]. Furthermore, it is used as a cosmetic for dandruff prevention [45].

Fig 3: Fruit (*Dillenia indica)*

Bark (Fig 4)

To treat dermatological issues, the paste of its bark is applied to the skin. It is also used in the production of charcoal [27,28].

Fig 4: Bark (*Dillenia indica).*

Ethnopharmacology

In Bangladesh different types of medicinal plants are used for primary healthcare and for other purposes. *Dillenia indica* has its edible use among all ethnic people along with its medicinal uses.

The fruit (raw or cooked): It is usually used in curries, preserves, drinks or fermented into vinegar and are used in abdominal disorder. The fruits have a similar taste and flavor to unripe apple. The bulk of the fruit actually consists of the very thick sepals, which have a very sour taste. The smaller

juicy fruits inside are also sour. This fruit is widely used as pickle over the Indian region. Calyces raw or cooked: Fleshy, with an agreeable acid flavor, through the large amount of fiber they contain is objectionable. They can be used in curries or made into drinks, jellies and sherbet [8].

Other uses

The fruits can be rubbed in water to make a soap. The pulp is used as a hair wash. The leaf juice is applied to the scalp to prevent baldness. The dried leaves are used to polish ivory. The wood ash is added to clay bricks to increase their fire resistance. Whereas a Red dye is obtained from the tree bark. The light brown sapwood is slightly soft. It is little used. The wood which is moderately hard and has a durability under water of around three years, is sometimes used for house-building or gunstocks [10].

Phytoconstituents

- Fruit contains 86.4% water and is very watery, also 10% insoluble matter and very little amount of nutritions present.

- Calyces of the fresh ripe fruit contains moisture 86.4%, alcoholic extract 3.0%, water extract 0.37% and insoluble matters 10.23%.

-an alcoholic extract composed of: moisture 8.20, tannin 1.40, glucose 12.15, mallic acid 2.21, petroleum ether soluble (fats, etc.) 0.72, albuminoids 0.85, ash

12.63 and pectous matter etc. [53,54]
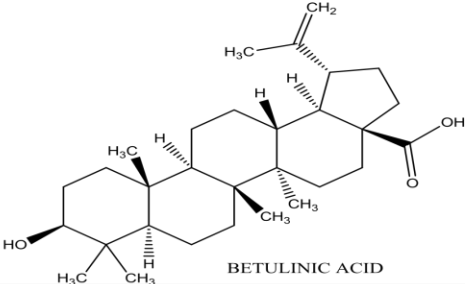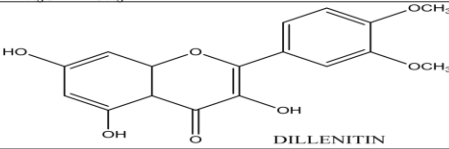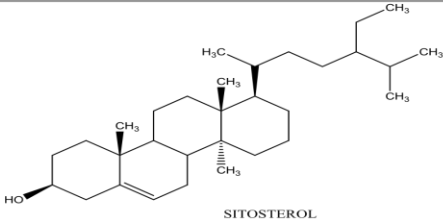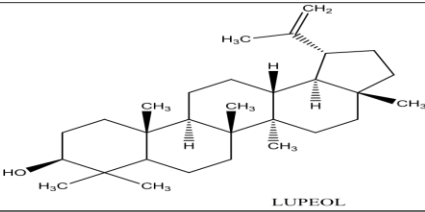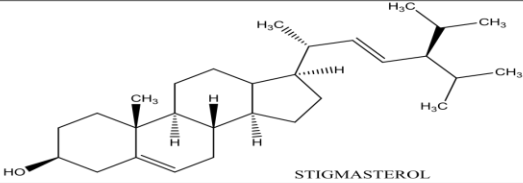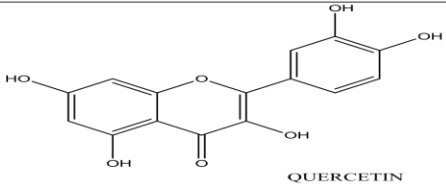
S.No	Name of Phytoconstituent	Structure of phytoconstituent
1.	Betulinic acid	 BETULINIC ACID
2.	Dillenetin	 DILLENITIN
3.	Sitosterol	 SITOSTEROL
4.	Lupeol	 LUPEOL
5.	Stigma sterol	 STIGMASTEROL
6.	Quercetin	 QUERCETIN

Fig 5: Phytoconstituents [48] (*D. indica*)

Pharmacological   properties

Anti-inflammatory and Analgesic activity

Because of the adverse side effects of NSAIDs, such as gastric lesions, dyspepsia, nausea, vomiting, renal insufficiency, neuropathy, and hepatotoxicity, and the tolerance and dependence induced by opiates, the use of these drugs as analgesic has not been successful in all cases. Traditional plant-based medications have received a lot of interest in the hunt for innovative analgesics because they are affordable, have few side effects, have a wide pharmacological profile, and are easy to get. As per WHO still about 80% of the world population rely mainly on plant-based drugs. *Dillenia indica*'s leaves and bark have analgesic properties. Different analgesic activity models were used to assess both central and peripheral analgesia. The hot plate approach is effective for central analgesia, and the acetic acid-induced belly stretching response was used to assess peripheral analgesic effectiveness [22]. The results showed that DIM significantly inhibited stretching behavior at all dosage levels.

Anti-diabetic activity

Diabetes mellitus is a metabolic condition caused by a problem with insulin secretion, insulin action, or both. A lack of insulin causes chronic hyperglycemia and abnormalities in the metabolism of proteins, fats, and carbohydrates. Worldwide, total number of people with diabetes is projected to increase from 171 million in 2000 to 366 million in 2030 [21,27]. The pathogenesis of diabetes mellitus is managed by insulin and oral administration of hypoglycemic drugs such as sulfonylureas and biguanides [16]. Unfortunately, having numbers of side effects, they are not suitable for use during pregnancy [23]. Plants are well known in traditional herbal medicine for their hypoglycemic activities and available literature indicates that there are more than 800 plant species showing hypoglycemic activities [23,21]. A useful alternative for the management of diabetes mellitus is the use of plants in traditional medicine. Plant resources are therefore continually being examined and researched for their potential as hypoglycemic agents.

The results indicate that the DIEE is effective in decreasing the blood glucose level in diabetic animals and also have beneficial effect on lipid profile [27,28]. The possible mode of action of the plant extract might be by potentiation of the insulin effect by increasing the pancreatic secretion of insulin from ß-cells of islet of Langerhans or its release from the bound form or regeneration of the cells.

Antioxidant activity

Fruits are the main sources of antioxidant vitamins, vitamin E, vitamin C, precursor of vitamin A, which acts as free radical scavengers, making these foods essential to human health [17,31,32,34]. *Dillenia indica* fruit extracts was investigated through some in vitro models such as antioxidant capacity by phosphor molybdenum method, β-carotine-linolete model system and radical scavenging activity using α- diphenyl-β-picrylhydrazyl (DPPH) method. The anti-oxidant activity of the *Dillenia indica* bark extract was assessed using a variety of in vitro techniques. D. indica's bark was extracted using 70% aqueous acetone. By using the Folin-Ciocalteu method, the total phenolic content was determined, and the antioxidant activity was measured using a variety of in vitro techniques, including the phosphor molybdenum method, the deoxyribose method, the hydroxyl radical scavenging activity method, and the phenazine methosulphate/NADH-nitroblue terazolium system. The extract has a 54 percent total phenolic content expressed as tannic acid equivalents. The extract's total antioxidant capacity was determined to be 3.12 m moles/g, which is equivalent to ascorbic acid at a concentration of 50 ppm. According to these findings, *D. indica* bark extracts included significant amounts of phenolic and is potent anti-oxidant. [1,28]

Antimicrobial and Antibacterial activity

Both leaves and barks of *Dillenia india* has antimicrobial and antibacterial activity.[36]

The crude methanolic extract of D. indica leaves has been investigated for the evaluation of

antimicrobial and cytotoxic activities. Organic solvent, n-hexane, carbon tetrachloride and chloroform, fractions of methanolic extract and methanolic fraction (aqueous) were screened for their antimicrobial activity by disc diffusion method. Besides, the fractions were screened for cytotoxic activity using brine shrimp lethality bioassay. Among the four fractions tested, n-hexane, carbon tetrachloride and chloroform fractions showed moderate antibacterial and antifungal activity compared to standard antibiotic, kanamycin. The average zone of inhibition was ranged from 6-8 mm at a concentration of 400 µg/disc. But the aqueous fraction was found to be insensitive to microbial growth. Compared to vincristine sulfate (with LD50 of 0.52 µg/ml), n-hexane and chloroform fractions demonstrated a significant cytotoxic activity (having LC50 of 1.94µg/ml and 2.13 µg/ml respectively). The LC50 values of the carbon tetrachloride and aqueous fraction were 4.46 µg/ml and 5.13µg/ml, respectively. This confirms the moderate antimicrobial and potent cytotoxic activities of leaf extracts. [3]

Antidiarrheal activity
Dillenia indica leaf and fruit extracts have antidiarrheal activity. A study on the antidiarrheal activity of a plant extract was completed successfully. Antidiarrheal activity was determined using ethanolic extracts of the leaf and fruit as the experimental sample. The plant parts showed antidiarrheal activity which was measured by castor oil induced method and charcoal plug method. [39]

Anxiolytic-like Activity
Anxiety affects one-eighth of the global population and has emerged as a major area of research interest in psychopharmacology over the last decade. The development of new anxiolytes has been a focus in recent years. In various parts of the world, various types of herbal medicines have been used as anxiolytic agents. *Dillenia indica* leaves exerts anxiolytic-like activity. It shows effect on various models of experimentally-induced anxiety in mice at dose of 200mg/kg and 400mg/kg but does not give any statistically significant at the dose of 100 mg/kg. Though that presents a promising approach which can be considered as a complementary remedy for anxiety.[30,31]

Antitussive activity
The whole plant of *Dillenia indica* can provide antitussive activity on sulfur oxide gas induced cough reflex. Regular use of antitussive medicines brings out side effects such as increase in mucous viscosity, decrease of expectoration, hypertension and constipation and drug dependence. Therefore in recent years much effort has been made to search for natural plants with nil adverse effects. The ethanol extract of D. indica whole plant can be used in sulfur dioxide gas induced cough reflex. An experiment with strong evidence took place where the model is mice. Results revealed that the ethanol extract of the whole plant was found to produce significant antitussive activity when compared with control and codeine phosphate in a dose dependent manner. The extract produced 51.1 and 29.2% inhibition of sulfur dioxide induced cough at doses of 250 and 500 mg/kg respectively the standard antitussive drug codeine phosphate (10 and 20 mg/kg) showed 45.2 and 25.3% inhibition respectively [35].

Protective effect in cardio-toxicity
Recent researches show that *Dillenia indica* leaves extracts have protective effect on doxorubicin induced cardiotoxicity in rats. So, they have a cardioprotective effect due to its anti-oxidant activity [17].

Anti-cancer activity
Betulinic acid was isolated from the MeOH extract of the aerial part of Vietnamese Orthosiphon stamineus and tested for its cytotoxicity towards highly liver metastatic murine colon 26-L5 carcinoma cells[25].It was found that betulinic acid shows the cytotoxicity with an ED50 value of 75.4 µg/ml. by bioassay-guided isolation and was tested for its cytotoxic and apoptosis inducing activities against the K562ncell line[38].Betulinic acid showed an inhibitory activity on the growth of K562 tumor cell line with IC50 value of 6.25 µg/ml and also induced 35% apoptosis at 25µg/ml.

Hair waving activity

The mucoadhesive agent obtained from fruits have been used in gel formulation[30]. The waste hair collected were directed to purified sap for the time period of 12h and the final results were achieved by using Fourier Transfer Infrared Spectroscopy (FTIS) for documenting evidence for keratin degradation. The experiment was accomplished at room temperature 25ºC under dark conditions and good hair waving activity was noticed. Further the deterioration was confirmed by thermo gravimetric analysis (TGA) and scanning electron microscopy (SEM)[43].

Wound healing activity

A glycolic extract of *Dillenia indica* prepaed from the mature fruits of the plant which showed significsnt wound healing activity alone or in combination with microcurrent stimulation to skin wounds surgically induced on the back of Wister rats. Moreover, due to presence of flavonoids *D. indica* works well in healing of wounds[2,15].

Anti-implantation activity

Biological screening of 50% ethanolic extract of stem bark of *D. indica* revealed anti-implantation activity in rats. CNS effects were not favored. LD (50) of the extract was >1000 mg/kg i.g. in mice and significant results for anti-implantation activity was achieved[4].

Anti- HIV activity

Dillenia indica also possess anti-HIV activity due to presence of betunilic acid[51]. Betulinic acid was isolated from the extract of leaves and was tested on HIV-1 replication in H9 lymphocyte cells. It was found that betulinic acid showed an inhibitory activity with an EC50 value of 1.4 µM and inhibited uninfected H9 cell growth with an IC50 value of 13 µM.

Conclusion

The extensive literature survey as well as reports on research revealed that *Dillenia indica* are highly regarded to have good potential in the herbal medicine detailed pharmacological description will give an overview about the identification of this plant in Bangladesh.

From available reports it has been observed that different parts of *Dillenia indica* have curing properties like wound healing, diabetes, bone fracture, in cut and burns, abdominal pains and many more but scientific evidence of these reports is yet not much developed. Few pharmacological investigations have been done using different parts like leaves are having various activities like antioxidant, antimicrobial, antidiarrheal and anxiolytic. Others parts like seeds are antimicrobial, fruits used as antileukemic. It is evident from the available reports and literatures that this plant belonging to family Dilleniaceae possesses adequate therapeutic potential and could be explored further for chemical and pharmacological investigation.

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Measuring the Awareness and Impact of Green Human Resource Management Practices Among Stakeholders:
A Study on Selected Organizations in Bangladesh

Mohammad Rezaur Rahman[*]

Abstract: The purpose of the study is to assess the impact and extent of awareness of Green Human Resource Management Practices among different stakeholders in various organizations in Bangladesh. Descriptive and quantitative research design has been used in the present study which is qualitative in nature. Convenient sampling technique used where 100 respondents has been surveyed through structured survey questionnaire. Descriptive statistics has been applied to measure GHRM awareness and implementation among stakeholders. In testing the hypothesis linear regression technique applied. The study reveals that organizations are lacking behind in respect of GHRM applications in their strategic and operational practices. Awareness level of GHRM is moderate among stakeholders. After regressing the model of the research, it is found that GHRM practices have a significant impact on organizational effectiveness. Organizations are recommended to adopt green initiatives to achieve excellent organizational performances. Future research can be initiated in the manufacturing organizations.

Keywords: Green HRM, Organizational effectiveness, Green Awareness, Green Implementation.

Introduction

Since the previous few decades, Green Human Resource Management has received a lot of attention from academics, corporate organizations, and researchers. And we are continually confronting a lot of environmental tragedies as a result of our own actions that have a huge impact on our planet.[1] Greening is a comprehensive process aimed at more efficient energy use, lower costs, and less waste through the use of sustainable resources or recyclable materials for end products. Studies have stated that turning green is beneficial to the economy, where there is a direct impact on bottom line profitability, and it actually improves the return on investment.[2] In today's business world, it's all about efficiency, reducing energy usage, and implementing green policies and practices to make better business decisions. Green Human Resource Management is becoming increasingly significant in all industries as a means of resolving issues. By implementing green HR policies, practices, and training, you can help the environment.

This causes changes in the climate and culture of the company, as well as it reduces trash management, pollution, and carbon footprints, among other things. It yields the best results. Employees must be aware of energy issues as a result of their better use of resources, conservation, carbon emission reduction, and eco-friendly products.[3] The aim of this study is to know the awareness of the green human resources management practices in organizations in Bangladesh.

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Literature Review

Milliman and Clair were among the first to suggest that HRM plays a significant role in environmental management. They created an environmental HRM model. There are four basic steps in these procedures. First and foremost, a company necessitates a legal entity as a framework for developing its strategy, where company uses its environmental vision. Second, staff must be educated about the company's mission through its goals and ideology of environmental vision strategy. Third, employee environmental performance needs to be assessed using a suitable appraisal approach in accordance with these objectives. Fourth, recognizing environmentalists' actions that take place at the workplace.[4]

Given the importance of Asian economic development for environmental management, there is a significant vacuum in the Green HRM literature that has to be filled in future studies.[5]According to Paillé et al, HRM is intimately linked to environmental concerns and, eventually, environmental performance in organizations.[6] Furthermore, Cherian and Jacob, discovered that businesses needed to apply Green HRM in order to enhance their employees' attitudes toward environmental stewardship.[7]

Companies can include the Green HRM idea into each HRM function, which includes tasks such as employee recruitment and selection, staff training and development, performance management, reward and punishment, and employee empowerment .[8] Renwick, Redman, and Maguire, stated that environmental management training intended to raise employees' awareness, abilities, and competence on environmental concerns in the training and development role. Companies, for example, can offer their staff with adequate information and skills on environmentally responsible behavior through training programs tailored to this subject.[9] The performance management system complements Green HRM practices by developing environmental performance standards and indicators. For example, companies can link their performance evaluation with their environmentally-friendly goals and explicitly specify the goals and tasks in the job description.[10] Specifically, companies need to communicate their environmentally-friendly schemes to all levels of staff through a performance appraisal scheme. Also, it is necessary to set targets for managers/employees to be environmentally friendly.[11] Several studies have shown that organizations with a higher level of environmental management system reap larger benefits and improve their environmental performance.[12] The application of Green HRM increased resource efficiency and economic impact at the organizational level,[13] improved public perception and brand recognition,[14] generates long-term competitive advantages, [15] as well as enhanced organizational and environmental results.[16,17]

To secure a sustainable environment and create a competitive advantage in the twenty-first century, HR practitioners should include practices into standard HR responsibilities.

Table1: Important literature Review

Author	Year	Impacts and Results
Milliman and Clair	1996	HRM can be incorporated into environmental management
Cherian and Jacob	2012	GHRM enhances environmental stewardship
Alhadid, A. Y., & A. H. Abu-Rumman.	2014	GHRM has impacted resource efficiency and economic impact
Jafri, S.	2012	Going green beneficial to Economy
Aykan, E.	2017	Generated competitive advantages

Source: Summarized by Researcher

Rationale of the Study

Bangladesh as a developing country has not been up to the mark in respect of providing quality and safe working environment for employees. GREEN HRM is the means by which organizations can protect both the environment and employees. This study explores the current state of Bangladeshi organizations in the application and awareness of GREEN HRM Practices.

Statement of the Problem

In the context of recent phenomenon in industrial and service sector working environment in Bangladesh, it is high time that we should invest our time and knowledge to improve working and environmental conditions. The study is to explore the current state of organizations in respect to green environmental and organizational commitment. The nature of the study is explorative and descriptive. The ultimate focus of the study is to measure the Green HRM awareness and Impact among the stakeholders. Several organizations have been studied by the researcher to explore and realize the present Green HRM practices. In the process of researching the problems the researcher has tried to cover the gap of previous studies and laid the foundation of future research.

Objectives of the Research

The objectives of the study are:
1. to explore the perception and awareness of stakeholders about Green HRM.
2. to know the GHRM implementation state in Bangladeshi organizations.
3. to measure the impact of Green HR Practices on organizational effectiveness.

Methodology

This is a descriptive and explorative research in which quantitative method has been used. Several organizations have been taken for sample from the population. The respondent/stakeholders consists of full-time employees, mangers, customers, owners. The convenient sampling technique is used to choose the sample. The sample included 30 Owners, 20 management body, 15 customers and 35 employees. In this study both primary and secondary data has been used. Primary data are collected by administering GHRM self-administered questionnaire to the stakeholders. Five-point Likert's Scale is used to measure the effect of independent variables on dependent variable and to explore current state of GHRM awareness and practices. Secondary data are collected through books, journals, websites and office records of the organizations. The data collected are analyzed using appropriate statistical techniques such as frequencies, Arithmetic Mean, Standard Deviation, independent t-test, and Regression Analysis.

Sample Selection

The sample for the research is as follows:

Table 2: Sample selection with specifications

Sector	Number of Banks selected as sample	Number of respondents
Public Banks	10	52
Private Banks	15	48
Total	**25**	**100**

Source: Source: Field work, 2021

Data Sources

The data used in the research is mostly primary type. The major source of information for the research work is the direct responses of the respondents. The literature of the research is developed from prior related research work by various researchers.

Research Hypotheses:

H_0: Green HRM Practices has no significant impact on organizational effectiveness.

H_1: Green HRM Practices has significant impact on organizational effectiveness.

Research Model

To test the hypothesis, following regression model is being used-

$OE = a + b_1 GE, GO, GE_O, + \varepsilon$

Where,

OE = Organizational Effectiveness

a = Constant;

b_1 = Regression Co-efficient

GE = Green Employee, **GO** = Green Office, **GE_O** = Green Environment,

ε = Error

Theoretical Model of the Study
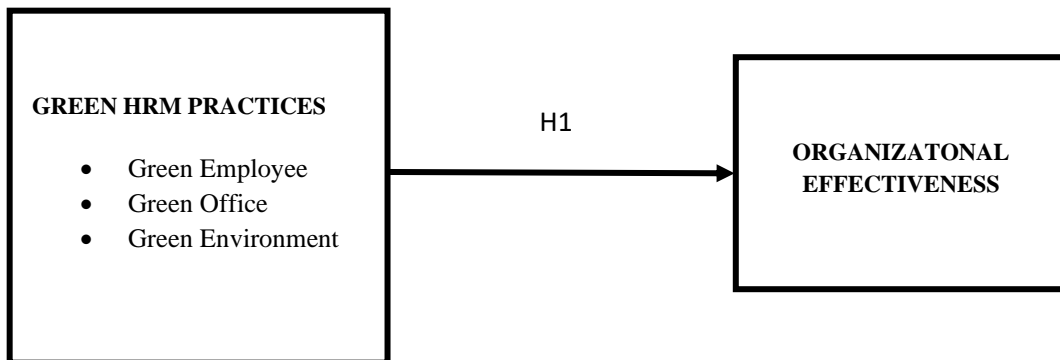
Theoretical Model: 1 Framework of data analysis
Source: Developed by Researcher

It is observed from the above figure that the researcher used independent variable to measure the dependent variable. Here in this model Organizational effectiveness is dependent on three GHRM practices.

Results and Discussion

A total number of twenty-five organizations have been researched. The sample selection is influenced by the objectives of the study and is constrained by the availability of the time and access. The research methods involved a primary scrutiny of the GHRM items. The responses were carefully examined and analyzed to find out the actual level GHRM Practices and awareness. Given the time and resource constraints, the nature of the study tends to be mainly exploratory and descriptive.

Reliability Test

The items in the survey questionnaire have been scrutinized by using the Cronbach Alpha Model to test the consistency and stability of independent variables used in the present study.

Table 3: **Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.774	.765	16

Source: Field work, 2021

The overall mean value of the test is 0.774 which is higher than 0.70. So, the degree of reliability of the factors taken for the study is high.

Respondent Demographics

The following table is the demographic details of the respondents:

Table 4: Demographic Information

Demographics	Category	Frequency	Percentages (%)
Gender	Male	54	54
	Female	46	46
Age	20-30 Yrs	63	63
	31-above Yrs	37	37
sector	service	46	46
	manufacturing	54	54
Education	H.S.C	7	7
	Honors	52	52
	Masters	34	34
	PHD	7	7
Experience	0-5 Yrs	74	74
	6-above Yrs	26	26
Organization	Private	48	48
	Public	52	52
Designation	Manager	15	15
	customer	17	17
	worker	18	18
	owner	18	18
	employee	32	32
Total		**N=100**	**100%**

Source: Field work, 2021

It is evident from the above table that among the respondents both the male and female are present. It can also be inferred that employee outnumber other respondents. It can also be observed that both public and private organizations have been researched. Both manufacturing and service organizations has been studied to get green awareness level of both the sector.

Descriptive Analysis of the Study

Table 5: The following table describes the awareness and perception level of respondents regarding GREEN HUMNAN RESOURCE MANAGEMTN(GHRM).

Table 5: Descriptive Statistics

	N	Mean	Std. Deviation
awareness of GHRM	100	3.10	1.133
Benefits of green products	100	3.01	1.322
traditional HRM	100	3.75	1.123
Embracing green HRM	100	3.08	1.203
Happiness with green products	100	4.14	.792
green mission	100	3.93	1.166
Valid N (listwise)	100		

Source: Field work, 2021

Table **5:** illustrates the descriptive statistics of data collected from respondents about green perception and awareness. When asked about green awareness, respondents mean scored (3.10) which indicates a lack of proper green practices understanding. Majority of the respondents is not sure about benefits of green products (3.01). Respondents at least agreed that green HRM is better than traditional HR practices (3.75). Organizations are not totally ready to embrace green practices in their daily business processes (3.08). However, happiness with green products and inclusion in the mission statement about green practices show a better mean score (4.41 and 3.93), which indicates a positive perception of green HRM.

Table 6: The following table describes the GHRM and its effectiveness on organizations

Table 6: Descriptive Statistics

	N	Mean	Std. Deviation
green initiatives	100	4.06	1.023
green office mgt	100	4.34	1.027
competitive advantage	100	3.82	1.058
loyalty and retention	100	3.88	1.113
increase profit and reduce cost	100	3.99	.810
Valid N (listwise)	100		

Source: Field work, 2021

Table **6:** illustrates the descriptive statistics of data collected from respondents about green HRM effectiveness. It is very much evident from the table that, respondents believed that green activities will improve social commitment towards environment (4.06). They also strongly confessed that green

office will definitely create a safe and healthy working environment (4.34). Respondents professed that green HRM can be instrumental in achieving competitive advantages (3.82), loyalty and retention of employees (3.88), and profit/cost efficiency (3.99).

Table 7: The following table describes the GHRM implementations state in organizations

Table 7: Descriptive Statistics

	N	Mean	Std. Deviation
green adaptation	100	2.90	1.307
green job description	100	2.96	1.333
green envt. training	100	2.84	1.212
green targets	100	3.07	1.208
green reward	100	3.04	1.470
Valid N (listwise)	100		

Source: Field work, 2021

Table **7:** illustrates the descriptive statistics of data collected from respondents about green HRM implementation in organizations. It is very surprising that organizations have not adopted (2.90) green practices fully even though they confessed it is important. In respect of green employee management, the mean score is very low in green job description (2.96), green environmental training (2.84), green targets (3.07), and green reward (3.04).

Frequency Distribution of the study:
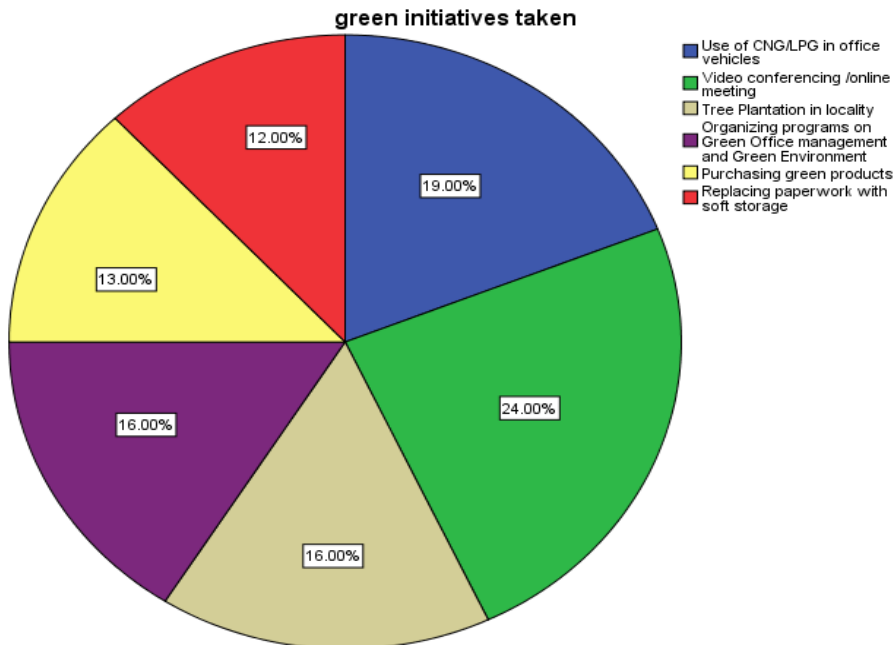
Figure: 1 Green Initiatives statistics
Source: Field work, 2021

From the above figure-2 it can be said that organizations are trying to improve their green commitment. The figure describes organizations are doing online activities (24%) more than any other types of green practices. Use of environment friendly Gas is in the second position (19%), both the green office management and tree plantation score (16%). It is also evident from the table that organizations are purchasing green products only (13%) and not using soft papers and storage (12%) at a satisfactory level.
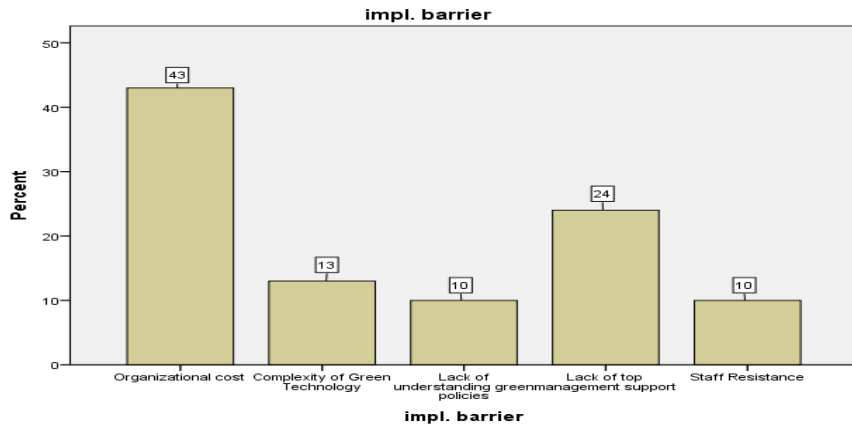
Figure: 2 Green HRM Implementation Barrier statistics
Source: Field work, 2021

Figure-3 demonstrates the barriers which organizations are facing in implementing the green initiatives. The most significant barrier that organizations face is related to cost in implementing GHRM (43%). Respondent confessed that top management concern (24%) is not positive toward green practices. The table indicates that lack of understanding green policies (10%), staff resistance (10%), complexity of green technology (13%) is not a major concern in implementing green HRM practices in organizations.
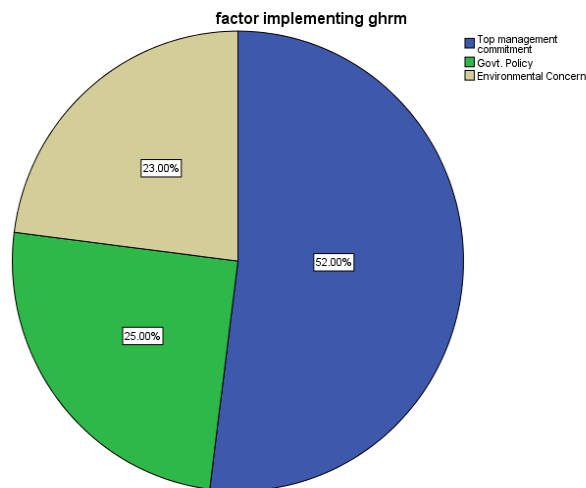
Figure: 3 Factors Responsible for Green HRM Implementation
Source: Field work, 2021

Figure-4 illustrates the factors that are responsible for implementing GHRM in organizations. Majority of respondents expressed that if top management commitment (53%) towards GHRM is positive and active it will become easy to adopt green practices in organizations. They think that government policies (25%) can also play some role in that regard. It is surprising that environmental concern (23%) is least in their confession.

Regression Model Summary and Discussion

Table: 08 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.622[a]	.587	.556	5.859

a. Predictors: (Constant), Green Employee Mgt, Green Office Mgt, Green Environment mgt

b. Dependent Variable: organization effectiveness

Table: 09 ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	43.812	5	8.762	50.877	.000[b]
Residual	69.348	94	.738		
Total	113.160	99			

a. Dependent Variable: organization effectiveness

b. Predictors: (Constant), Green Employee Mgt, Green Office Mgt, Green Environment mgt

Table- 08, 09: The correlation as indicated by R= 0.622 tells that the dependent variable is positively and moderately correlated with independent variables. This means green HRM practices and organizational effectiveness would move in the same direction. The R- Square value is 0.587, which indicates the coefficient of determination shows that 58.7% data can be explained by the dependent variable. Hence a good proportion of the organizational effectiveness depends on the GHRM practices. The adjusted R square value is .556 or 55.6% which is close to R- Square value. Thus, we can say that the sample size if changed will have same effect on dependent variable.

ANOVA table reveals that the p value 0.000 is lower than the significance level of 0.05 adopted for the test. So, it can be inferred that the null hypothesis in this case cannot be accepted. Therefore, it can be concluded that the green HRM practices are positively impacting organizational effectiveness.

Conclusion

According to the study, the majority of organizations in Bangladesh from various businesses sector are somewhat aware of Green Human Resource Management. However, organizations are not ready and willing to adopt green HRM into their core business processes. Hence, green environmental training and seminars are important tools in raising knowledge about green human resource management at all levels in the organizations. Government should incorporate green human resource management policies into Bangladesh labor law as a way to improve green human resource management practices. Furthermore, firms should adopt strategic human resource management policies based on the Green HRM idea, promoting green employees in particular. The most significant challenge facing HR

practitioners is recognizing the capacity and depth of green HRM in transforming their enterprises into green units. In this context, it is the obligation of current generations of HR managers to raise awareness among the human resources about greening the organizations and environment through green movement, natural resource utilization, and assisting the corporation in maintaining a healthy environment, and keep natural resources for future generations.

Recommendations

1. Employees should be motivated and encouraged to undertake green practices by HR managers.

2. Managerial persons should be provided with enough training in order to implement Green HR practices to make employees aware of green practices.

3. Employees who do not follow the norms of green practices may face disciplinary action.

4. Employees should be rewarded financially for being environmentally conscious.

5. Employees have been given the opportunity to adapt or establish new environmentally friendly processes within the organization's framework and policies.

6. Customer awareness must be raised by public and private promotional activities of green products use.

7. Top management must patronize the green budget to implement the green initiatives in organizations

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Appendix-1: Questionnaire

Section: (A): Demographic Information

Gathering information on Green Human Resource Management, this survey asks questions about your perception and awareness about GHRM and its implementation. The survey questionnaire is only administered for research purpose. Thank you for sharing your opinions.

Please, respond to all items given below by putting a **tick (√)** in the appropriate space.

No.	Personal Information	Response				
		Green HRM Awareness and Perception				
1.	Gender	Male ( )			Female ( )	
2.	Age	20-30 (yrs) ( )			31-Above (yrs) ( )	
3.	Your organization sector	Service ( )			Manufacturing ( )	
4.	Experience	0-5 (yrs) ( )			6-Above (yrs) ( )	
5.	Type of organization	Private ( )			Public ( )	
6.	Designation	Manager	Customer	Workers	Owner	Employee
		Be Specific:				
7.	Educational Qualification	H.S.C ( )	Honours ( )	Masters ( )	Phd. ( )	

Section: (B) GREEN HUMAN RESOURCE MANAGEMENT QUESTIONNSIRE

Please, respond to all items given below by putting a **tick (√)** in the appropriate space using the following scales: **1 = strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = strongly Agree**

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	Green HRM Awareness and Perception					
08.	I am very much aware of the term "GREEN HR"	1	2	3	4	5
09.	I know the benefits of green products well	1	2	3	4	5
10.	I feel traditional HR practices are harmful for environment	1	2	3	4	5
11.	Our company/institution is perfectly ready to embrace green HR practices	1	2	3	4	5
12.	I would be happy to use green products if provided	1	2	3	4	5

13.	Organizational mission must include Green HR	1	2	3	4	5
	Effectiveness/Impact /Importance of Green HRM					
14.	**Green Environmental** Initiatives promotes social responsibility toward environment	1	2	3	4	5
15.	**Green office management** ensures healthy and safe working environment.	1	2	3	4	5
16.	Green HRM helps in achieving competitive advantages	1	2	3	4	5
17.	Green HRM practices increase employee loyalty and talent retention	1	2	3	4	5
18.	Green Practices Reduce cost and increase profitability	1	2	3	4	5

Green HRM Implementation						
No.	**Questions**	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
19.	Your organization have adopted green HRM	1	2	3	4	5
20.	My Job Description include environmental commitment	1	2	3	4	5
21.	Environmental training is given periodically	1	2	3	4	5
22.	I am clear about my green targets	1	2	3	4	5
23.	Reward is given when green targets fulfilled	1	2	3	4	5
24.	Which factor is highly responsible for implementing green HR practices	o Top management commitment o Govt. Policy o Environmental Concern				
25.	Please tick the Green initiatives which your organization is currently practicing (you can select more than one)	o **Use of CNG/LPG in office vehicles** o **Video conferencing /online meeting** o **Tree Plantation in locality** o **Organizing programs on Green Office management and Green Environment** o **Purchasing green products** o **Replacing paperwork with soft storages**				
26.	Which one of the factors is mainly responsible for not implementing GREEN HRM properly in your organization? (Select any three)	o Organizational cost o Complexity of Green Technology o Lack of understanding green policies o Lack of top management support o Staff Resistance				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
27.	I think Green HRM Methods and Practices surely improve organization effectiveness	1	2	3	4	5

Factors Affecting Tourist Satisfaction: A Study in Sajek Valley

Mesheta Sheikh[*]

Abstract: This paper investigates the main elements that affect tourist satisfaction while visiting in Sajek valley Bangladesh. The emphasis of this study is on Chittagong hilly region sajek, where there are many natural and cultural attractions. The data were collected from questionnaire survey as it was developed and distributed randomly to the tourists who visit Sajek valley in between January 2019 to November 2019. The quantitative data were analyzed by applying simple Pearson correlation coefficients and multiple linear regression models. The study finds that the correlation between tourist satisfaction and satisfaction factors are statistically significant. The result indicates that the factors like hospitality, environment, attraction and accessibility positively correlated with satisfaction of tourist to visit in Sajek. Cost is weakly correlated with other variables. SPSS Version 20 is used to analyze the data.

Key words: Tourist Satisfaction, Attraction, Hospitality, Environment, Cost.

Introduction

Bangladesh is a land of impressive natural beauty. Rivers, coasts and beaches, archaeological sites, religious places, hills, forests, waterfalls, gardens surround it. To expand the tourism sector in the hilly region, the government set up various tourist spots in CHT, including Sajek Valley in khagrachari, nilgiri in bandarban and happy island in rangamati. Sajek valley is an emerging tourist spot in Bangladesh. It is situated among the hills of the kasalong range of mountains in Sajek Valley union, baghaichhari upazila in rangamati district. The valley is 2000 feet above sea level. Deep clouds, the beauty of nature, serenity and tranquility are the main attraction of the Sajek valley. The valley is surrounded by the mountains, dense forest and grasslands hilly tracks. So Sajek valley is known is as the queen of hills and roof of rangamati. The name of sajek has come from the Sajek River which is flowing as a border between Bangladesh and India. Sajek is a union located in north of chittagong hill tracts under rangamatizilla. It is situated 67 km north-east from khagrachari town and 95 km north-west from rangamati city. The border of Bangladesh and Mizoram of India is 8 km east from Sajek. Sajek valley is small beautiful towns in the hills. People consider this area a natural paradise of Chittagong hill tracks. A journey to Sajek valley will be a journey to heavenly place because passing sky touching mountain with dense forest and extensive grassland the curvy hilly roads, small rivers among the hills makes this place thrilling. Earlier nobody explore this place, but recently there is a rush of tourist here and explored a lot. The deep forest, grassland, hilly areas makes it a wonderful tourist spot and one of the best choices among the traveler, adventure lover and digital nomads. To understand the emerging acceptance of Sajek valley as a tourist spot, it is important to study factors affecting tourist satisfaction. Oliver (1981) mentioned that tourist satisfaction can be seen as a tourist post-purchase evaluation[7]. Zeithaml et al. (2013) defined that satisfaction is the customer's evaluation of a product or service in terms of whether that product or service has met the customer's needs and expectation[12].

Objectives

The main objective of this study is to find out the impact of certain factors on tourist satisfaction in Sajek valley. This study emphasizes to explore of at least two objectives. They are:

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1. To find out the relationships among satisfaction and others satisfaction factors (Hospitality, Attraction, Accessibility, Environment, and Cost).

2. To analyze the most important issues that affect the satisfaction of visiting Sajek.

Literature Review

Suthathip(2014) identify that most significant factor affecting the overall satisfaction is the cost of staying, and other significant factors are hospitality, attractions and accessibility and infrastructure[10]. Athula(2015)tried to identify the international tourist perceptions and satisfaction on their holiday stay and its implication for destination management with reference to Srilanka[3]. According to Hasan and Shahnewaz(2014) tourist are mostly satisfied with amenities related destination management, with a natural attraction to the beach and relaxation facilities provided by the destination, but the lack of any facilities was the reason for disappointment such as health and emergency services, transportation services, tour guides, information services and night life[5]. Pawasker and Goel(2016) find out that if the tourist are satisfied then they will revisit or recommend e destination and the researchers also developed a post-visit model that focuses on evaluation of consumer's internal and external satisfactions factors and their influence on destination loyalty in terms of revisit and recommendation[8]. Valentina et al. (2014) investigate the main elements that can influence tourist satisfaction[1]. The attribute that is used in various studies is shown below:

Table-1

Attribute	Item	Literature on tourist satisfaction using this item
Hospitality	Varieties of food, Warm and welcoming local people, Attractive accommodation facilities, willingness of staff to help tourist	Vallentina et al (2014), Munir et al(2013),Ahmad et al (2011),Mohammad and shahnewaz(2014), Prodip et al(2013),Athula (2015),Suthathip(2014)
Attraction	Cultural program of tribal people, Varieties of nature, Hill Trekking, Photography,	Vallentina et al (2014), Munir et al(2013), Ahmad et al (2011), Mohammad and shahnewaz(2014),Prodip et al(2013), Athula (2015), Suthathip(2014)
Accessibility	Transportation facility to travel throughout the destination, Basic medical treatment, Electricity facility, Communication facility.	Vallentina et al (2014), Munir et al(2013), Mohammad and shahnewaz(2014), Prodip et al(2013), Athula (2015), Suthathip(2014)
Environment	Weather condition, Air quality, level of noise, Cleanliness environment, personal safety and security	Vallentina et al (2014), Munir et al(2013), Ahmad et al (2011), Mohammad and shahnewaz(2014), Prodip et al(2013), Athula (2015), Suthathip(2014)
Cost	Accommodation cost, transportation cost, food and beverage cost, other expanses.	Vallentina et al (2014), Munir et al(2013), Athula (2015), Suthathip(2014)

Methodology

Method of Approach and Data collection: Researcher uses different measures to analyze the effects of attributes on tourist satisfaction. So to identify the appropriate attribute this study, review the literature in the works related to tourist satisfaction. This study is quantitative in nature and is survey research. So the survey is done by means of questionnaire survey for tourists who visit the Sajek during the time of research in January to November 2019.

Population and sample: The population is the tourists that visited in the Sajek in the year 2019, January to November and the total (41) sample is collected randomly from this population those are visited in this time frame.

Research Instrument: Instrument used to collect and record data for this study is surveying questionnaire. The questionnaire consists of two parts. Part A consists of five items for collecting demographic data such as age, gender, income, occupation and marital status. Section B consists of items which address the information about 5 factors of tourist satisfaction in Sajek. The section B used a 5 point Likert scale ranging from one to five 1 stand for Highly dissatisfied, 2 stands for dissatisfied ,3 stands for neither satisfied nor dissatisfied, 4 stands for satisfied, and 5 stands for very satisfied. The collected data were analyzed using Statistical Package for Social Science (SPSS) version 20.

Reliability of Instrument

Cronbach's alpha is the most common measure of internal consistency ("reliability"). It is most commonly used when we have multiple Likert questions in a survey/questionnaire that form a scale and to determine if the scale is reliable. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. The closer the coefficient is to 1.0, the greater is the internal consistency of the items (variables) in the scale. George and Mallery (2003) provide the following rules of thumb: "_ > 0.9 – Excellent, _ >0 .8 – Good, _ > 0.7 – Acceptable, _ > .6 – Questionable, _ > .5 – Poor, and_ < .5 – Unacceptable"[4].

Table-2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.819	.824	6

Table 2 shows that Cronbach's Alpha (for 6) items for reliability statistics is 0.819 suggesting that the items have relatively high internal consistency showing the instrument is reliable .

Hypothesis: Hypothesis developed for this study is:

Null Hypothesis (H0): There are no significant relationship between satisfaction and five satisfaction factors.

Alternative Hypothesis (H1): There are significant relationship between satisfaction and five satisfaction factors

Data Analysis and Findings
Descriptive statistics

Following Table shows that the mean and standard deviation of satisfaction, hospitality, cost, environment, attraction, accessibility. The descriptive statistics presented in table 3 shows that out of

five satisfaction factors(Hospitality, cost, environment, attraction, accessibility) tourist showed satisfaction on three factors (Hospitality, Environment, Attraction).Highest mean value indicates that tourist are mostly satisfied on these factors (Hospitality=4.12, environment=4.29, Attraction=4.60).Tourists are satisfied on attractions that means the item that is included on attraction –Cultural program of tribal people, varieties of nature, hill trekking, photography all these items is very much attractive to tourists. Mean value of cost and accessibility are 3.41 and 3.14 that means tourists are neither satisfied and nor dissatisfied about this factor. And the mean value of satisfaction is 4.29 that means considering most important issues tourists are satisfied about the visit in Sajek.

Descriptive Statistics

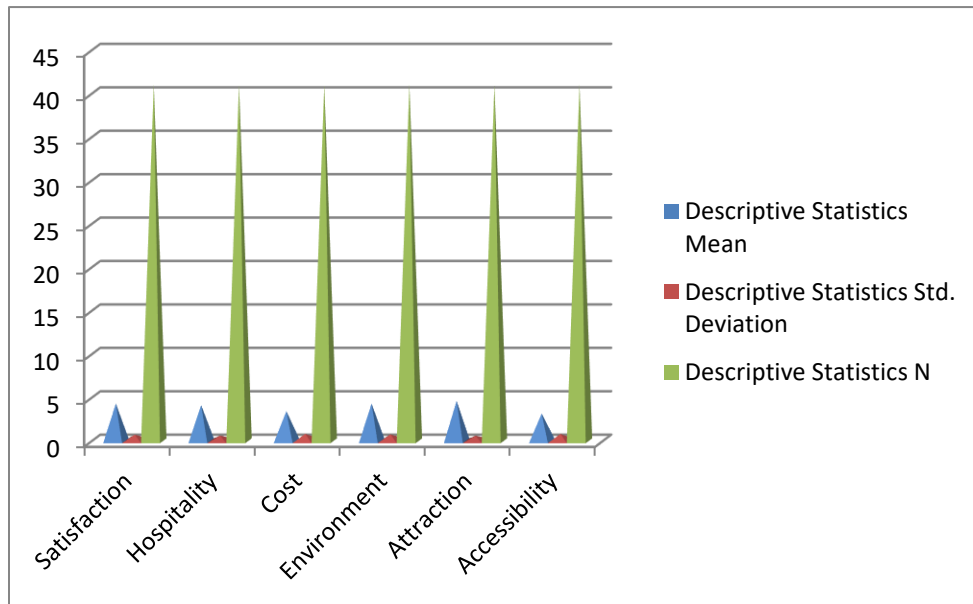|	Mean	Std. Deviation	N
Satisfaction	4.2927	.71568	41
Hospitality	4.1220	.59980	41
Cost	3.4146	.80547	41
Environment	4.2927	.74980	41
Attraction	4.6098	.58643	41
Accessibility	3.1463	.79250	41

Figure-1

The Mean value and standard deviation of the satisfaction factors is shown in the above figure.

Correlation Matrix Analysis: Correlation measures the degree of the linear relationship between two variables. In this paper table 4 shows the correlation coefficient among satisfaction and influencing factors (hospitality, cost, environment, attraction and accessibility).

Table- 4

Correlations						
	Satisfaction	Hospitality	Cost	Environment	Attraction	Accessibility
Satisfaction	1					
Hospitality	.439** (.004)	1				
Cost	.391* (.011)	.100	1			
Environment	.582** (.000)	.530**	.581**	1		
Attraction	.696** (.000)	.423**	.351*	.721**	1	
Accessibility	.407** (.008)	.172	.412**	.473**	.287	1
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						
(…) parenthesis indicates the p-value.						

The factors like hospitality, environment, attraction and accessibility positively correlate with satisfaction of tourist to visit at Sajek (99% confidence level). Cost has the weakest correlation (r=.391) among all variable but it is significant at 95%. So we can conclude that all evidence of satisfactory factors is satisfied the alternative hypothesis significantly where null hypothesis is not accepted.

Multiple Regression Analysis: The main rationale of the multiple regression analysis is to learn more about the relationship between independent variables (factors related to the satisfaction) and the dependent variable (tourist satisfaction). From statistical point of view, the estimated regression line fits that data well. Table 5 shows the satisfaction factors that are entered into the regression model had a combined correlation of R=0.755 with the dependent variable. In this model the value of the coefficient of determination R^2 is .570 which means that about 57% of the variations in satisfaction of the tourists are explained by the Accessibility, Hospitality, Cost, Attraction and Environment.

Table-5

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.755a	.570	.509	.50169	1.522

a. Predictors: (Constant), Accessibility, Hospitality, Cost, Attraction, Environment

b. Dependent Variable: Satisfaction

Table-6

ANOVAᵃ

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	11.678	5	2.336	9.280	.000ᵇ
Residual	8.809	35	.252		
Total	20.488	40			

    a.   Dependent Variable: Satisfaction
    b.   Predictors: (Constant), Accessibility, Hospitality, Cost, Attraction, Environment

In Table 6 (Analysis of Variance-ANOVA), The F value of 9.280 indicates that R^2 statistically significant at p=0.000 which means there exist a multiple regression model between Y (Tourist satisfaction) and the independent variables (Satisfactionfactors-Hospitality, Accessibility, Cost, Attraction, environment) at the 1% level of significance. Hence we can say that there is a significant correlation among predictors and dependent variable which supports our alternative hypothesis. Finally, it can be concluded that the null hypothesis is not supported and thus not accepted.

The results of regression equation are as follows:

Satisfaction: $-.600+0.261X_1+.150X_2-.157X_3+.737X_4+.185X_5$

Std Error   = (.767)   (.164)   (.129) (.206) (.197)   (.116)

R square   =.570   F value=9.280   DW-1.522

Table-7

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.600	.767		-.782	.439
Hospitality	.261	.164	.219	1.592	.120
Cost	.150	.129	.169	1.160	.254
Environment	-.157	.206	-.164	-.762	.451
Attraction	.737	.197	.604	3.737	.001
Accessibility	.185	.116	.205	1.591	.121

The regression equation shows that Hospitality (X_1), Cost (X_2), Attraction (X_4) and Accessibility (X_5) have a positive impact on tourist satisfaction because the sign of the regression coefficients are all positive. The regression coefficient of hospitality is 0.261 which suggests that an increase in one unit of hospitality would raise the satisfaction by 0.261 units holding all other variable constant. The coefficient of attractions has the highest impact on the satisfaction which indicated that increase in one unit of attractions leads to increase in satisfaction by 0.737 units assuming other variables remain constant. On the other hand, the coefficient of environment(x_3) does not have a positive impact on satisfaction indicating that the variable is inversely related to satisfaction which is quite unrealistic.

Conclusion and Recommendations:
In conclusion, this study identifies the factors that affect the tourist satisfaction in visiting Sajek Valley. So this study revealed the information that can be useful for the tourism industry to improve the service quality in Sajek valley, Bangladesh. Finally the study indicates the most influential factor is

cost. Cost includes the cost of accommodation, cost of transportation, cost of food and beverage, and other expanses. So policy makers should concern about this issue. Factors like hospitality, environment, attraction and accessibility positively correlate with satisfaction of tourist to visit in Sajek valley. Attraction and hospitality is one of the important factors that influence tourist to visit is Sajek. Tourists are very much satisfied about the attractive nature, hill trekking of Sajek valley. Accessibility is also another influencing factor because there is a lack of basic medical treatment and electricity facility and communication facility in Sajek valley. So government and other policy makers should take this issue in their concern in developing Sajek valley as one of the emerging attractive tourist spots.

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Determinants of Income Diversification: Evidences From Households In The Selected Charlands of Bangladesh

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Abstract: The present study focuses on determining the factors that affect the level of income diversification of the people living in the char lands in Rangpur district. For accomplishing this objective, this study collects 155 samples from three charlands in Kaunia upazila of Rangpur district using random sampling method. This study applies Simpson Diversification Index (SDI) for measuring income diversification and utilizes Ordinary Least Square (OLS) method for identification of key determinants. The result reveals that educational level ($p<0.1$), dependency ration ($p<0.01$), poverty status ($p<0.05$), farm income ($p<0.05$), number of dependents present in family ($p<0.05$) and land holding by the household ($p<0.01$) are the key significant determinants of level of income diversification. This study also recommends the policies regarding this issue.

Keywords: Income diversification, dependency ration, poverty status, simpson diversification index

Introduction

Bangladesh is highly populated and agriculturebased country. A large part of the economy of Bangladesh depends on the rural economy. Two reasons for this are that about 70 percent of the people live in villages and about 77 percent of the total workers are from villages. Besides, two-thirds of the people living in the villages are involved in agriculture. Moreover, about one-third of the income of about 87 percent of the people comes from the agricultural sector[1]. The dependency of the livelihood related to agriculture and farming by people living in rural areas is not only for these reasons by also for the benediction of fertile soil, available water and favorable climate, adequate rainfall, ground water and parental land holdings with traditional status. There are also some exceptions such as in dry season lack of enough rainfalls and sudden break out of natural disasters may raise difficulties for the farmers but farmers are also clannish with these adverse apocalypses done by environment[2]. This study aims at examining the socioeconomic characteristics of the people living in the char lands in Kaunia upazilla, Rangpur district. Char land is a territory enclosed by the aqua of ocean, sea, loch, or water reservoir. It usually approaches any addition in river firth or path. It consists of all sorts of bars having adjacent (point-bars) and interim (braid-bars). Erosion on one side of the river and falling sand on the other side of the river is the cause of char formation (Banglapedia). There are about 6.5 million people living in the Char lands which are about 5 percent of the total population of Bangladesh. And the total

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areas covered by the char lands are 7200 square kilometer[3]. These total areas were 1722 square kilometer in 1993. These areas of char lands rise during the period of 1989-1993 which was estimated at 36000 hectare, indicating a 25 percent of those areas in 1984. From the total char lands, about 5345 square kilometer (63%) was used to produce agricultural production in 1992-93. These chars are characterized by low level of education, high agricultural dependency, and high food insecurity, deprived of minimum health services, low capital assets and so on[4]. Income diversification mainly emphasizes the earnings from different sources. It includes both the farming and non-farming incomes contributed to the aggregation of the persons' income. The main objective of this study focuses on identifying factors that affect the income diversification of the people living in the char lands in Kaunia upazilla, Rangpur district. For accomplishing this objective this study uses quantitative approach followed by several past studies.

Literature Review

There are several past studies which tried to identify the factors associated with the income as well as livelihood diversification in different regions in the world. Most of them are based on the primary data and applied limited variable and censored variable analysis for their estimation. Some of them are discussed below in brief. Nazir *et al.* (2018)[5] examined the determinants of income diversification decision taken by farm households by applying probit model. Their study concluded that about 69% farms household are engaging off farm activities for maintaining livelihood. In addition, they also provide evidence that low interest loans should be introduced for farmers, especially for small and marginal farmers to create their own non-agricultural source of income. At the same time enable farmers to improve, earn more, improve living standards and reduce poverty. By applying Diversification Index and OLS regression Vatta and sidhu, (2007)[6] examined the types of employment and income diversity, its determinants and the potential impact on poverty and income distribution in rural households in Punjab. They found the relationship between income diversification and rural household income shows that the plight of relatively poor families is multifaceted, but their family income has not improved significantly. Pieniadz *et al.,* (2009)[7] applied a Tobit model to detect the indicators those had impact of income diversification of household farmers in Germany. Their study also referred that accessibility of resources plays a vital role in tapping diversified economic performances. Le *et al.,* (2020)[8] Surveyed on the determinants of the heterogeneity of earnings in remote areas of Vietnam, where they captured the pull and push factors affecting the diversification. They used panel data of thirteen years from 1993 to 2006 taken from Vietnam General Statistics Office (VGSO) and subdivided them into two panels. They used both tobit and Ordinary least square method for factor identification and labor capacity, size of the family, price of paddy, total assets and farm size have been found as the key (statistically significant) drivers of income diversification.

Households living in remote areas and low educated household head dominated have less diversification of income rather than that of their counterpart[9]. The diversification of income level also affected by the level of asset holding by household, strategy toward livelihood, infrastructure related activities, education of the children[10]. Diversification off income is also influenced by the local institutional activities, high return on non-farm wage out country remittance and household distance from local market[11,12,13]. In addition, Age, number of years of education, female headed households, household income per capita, credit access, membership of the organization, number of extension visits, productive assets owned and nature of road were found to be significant in determining income diversification of farm households[14,15,16,17,18]. This study uses

Simpson diversity index for estimating diversification of income and uses multivariate OLS regression for identifying factors that affect the diversification of income.

Methodology

Methodology of any study is considered as the core part of that study. An appropriate methodology cannot only increase the validity of the study and results but also it paves new ways to the future study. It also contributes to the development of new ideas and thinking or corner of ideas prevailing in the study.

Conceptual Framework

The conceptual framework shown in figure 1 below reveals the determinants of the income diversification. Generally, there are four determinants of the income diversification of rural households which includes demographic factors such as age, sex, education, household size etc; economic factors consisting of poverty, total assets, earning members of households etc; climate such as river erosion, floods, etc; and others category that also includes distance to market, mode of communication, media access, NGOs and other institutional activities etc. All these factors affect the level of income diversification in the model one and which in turn affects the welfare of household. For example, most of the people suffer much from natural calamities such as flood, river erosion etc which has great financial loss to the households and to recover these loss households move toward diversification of income. Similarly incase of economic factors such as poverty, earning members and low level of total asset which push households to search diversified income sources for securing their level of income as a whole. Similarly other factors also push the households toward income diversification, as the level of income secured by the diversification, it causes the household to maintain a standard level of income with resulting a welfare situation for household in absolute term. This frame clearly indicates an direct path or effect analysis among the factors of income diversification in this study.

Study Areas

This study has been done on the three char lands (namely Char Rajib, Char Bishanath and Char Ganai) of 6 no. Tepa Madhupur Union which is situated in Kaunia Upazila, Rangpur. Tepa Madhupur Union located at latitude of $25^0 44'7''$ N and longitude of $89^0 27'5''$ E. According to information from the office of Kaunia Upazila, this upazila has started its journey in 1983 with converting from Thana to upazila in that year of 1983. The activity of as a Pourosava had been started 1st January, 1991. Total population of this upazilla is now 2,43,405 form which Tepa Madhupur has 35,398 consisting of 17,867 is male and female is 17,531, whereas population density is 1649 person per square Killometer (According to the office of Kaunia Upazila, 2020). The population growth of this upazilla is 1.39%; education rate is 40% and about 80% of people living in this upazilla ia involved in agriculture. From the perspective of religion, about 90% of population is muslim, 7% for Hinduism and 1% for others.
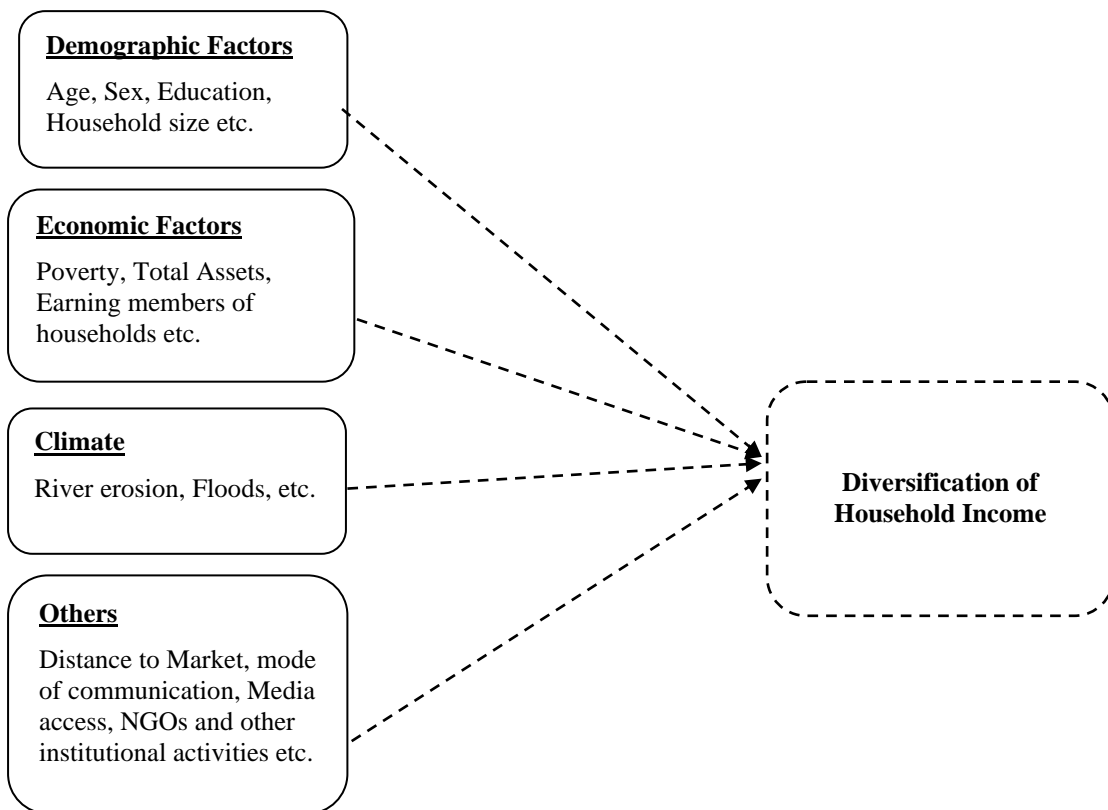
Figure 1. Conceptual framework of the study

Sample Size

Determining the size of samples from a universe or population is the priory for any kind of research and an appropriate sample size is the pre-requirement for a better outcome from research project[18]. Appropriate size of the sample for this study is determined by the formula proposed by Yamane (1967)[19] as calculated below in equation (1).

$$n = \frac{N}{1 - N(e^2)} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ (1)$$

Where,

n = Sample size; N = households existing or population size; e = Level of precision

In our study, N = 35398 households; due to a remote areas it is assumed to hold e = 0.08.

Then, by putting these values in the equation (1) we have;

$$n = \frac{(35398)}{1 - (35398)(0.08)^2} = 155$$

Therefore, the sample size is 155 for this study.

Data Collection

This study uses primary data to analyze the objectives and secondary data for background information and discussion. Primary data were collected from face to face interview with a pre- tested

questionnaire during the whole month of August, 2021. The questionnaire was prepared in Bangla for easier to understand by the interviewers. The questionnaire had three parts; first part for climate adoption strategy, second part was for Gender study and the final part was for Income diversification study and except from them another part was socioeconomic and demographic information regarding the respondents. After preparing a primary questionnaire a pilot survey was made by a team leading with a senior scientific officer of Bangladesh Rice Research Institutes (BRRI), Joydebpur. After correcting errors from pilot survey, a final questionnaire was prepared suitable for the study areas, and then a team of 13 persons went to collect data. The interviewers collected data from 9 am to 5 pm and it took 10 days for completion of the data collection. A total sample of 150 was collected from three chars: Rajib and Gania of Kaunia Upazilla, Rangpur. There 76 households were taken from Char Gunai and this is anout 49 % of the total sample size whereas 63 (40.65%) respondents were taken from Char Rajib and only 16 households were collected from Char Bishanath. Most of the data were collected from Char Gunai and Rajib due to the large number of population lied in these two villages and the inhabitants living in Char Bishanath is small, that is why the households considering this chars ia also small compared the other two.

Measurement of Income Diversification

Diversification of income means the addition of the income sources or maintains a certain level of income from varying income generating activities. Most of the people use it as an alternative insurance or a strategy for securing their desired level of earnings[20]. There are several methods or approaches to measure diversification of income such as Index of Maximum proportion (MI), Simpson Diversification Index (SDI), the square of the shares of income generating activity, the entropy and Herfindahl index. Edward H. Simpson first postulated a formula for capturing the degree of intentness while persons are divided into classes. Orris C. Herfindahl brought to light similar index for measuring diversity in 1950. On the contrary, German economist Albert O. Hirschman inseminated first a measure of the square root of the index for measurement of diversity in 1945. These measures are named after their introducers such as first is known as Simpson Diversification Index (SDI) in ecology, second is known as Herfindahl index for diversity or Herfindahl-Hirschman index (HHI) which are originally used in economic branches[21]. From these measurements, Simpson Diversification Index (SDI) is widely used and easy to interpret in general, that is why this study uses SDI as a measure for diversification of income which is calculated as below (equation 2).

$$SDI = 1 - \sum_{i=1}^{n} p_i^2 \qquad \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (2)$$

Where,

SDI = Simpson Diversification Index which is used to measure the diversity of income for individuals;

n = total number of income sources;

P_i = Proportion of income generating from the ith income source;

The value of the SDI ranges between 0 and 1. If the source of income is only one that is $P_i = 1$, then SDI is zero. If the number of earning source rises, the portion of P_i falls, alike to the case of the amount of square, implies that SDI moves near to one. For income source of k, the expected worth of SDI ranges between 0 and 1-(1/k). If the value of SDI is closer to zero, this signifies a more specialization for earning source. On the contrary, if the value of SDI is closer to 1, this implies that higher level of diversification for the households. In other words, the lowest level of diversification is indicated by the value near to zero since it is the minimum value of the index and for the highest level of the diversity is indicated by the value closer to 1 since it is the highest probable value of this index.

Factors Affecting Diversification of Income

For analyzing the determinants of the income diversification, ordinary least square approach is used by the researcher where the diversification level is measured by the Simpson Diversity Index (SDI) ranging between 0 and 1. After dropping some of the variables due to data unavailability, the model for determinants of income diversification can be written as:

$$lnDiv_i = \beta_0 + \beta_1 Em_i + \beta_2 Dep_i + \beta_3 Edu_i + \beta_4 Poor_i + \beta_5 FarmInc_i + \beta_6 Dm_i + \beta_7 Pos_i + \beta_8 Lo_i + \beta_9 Percon_i + \beta_{10} Exp_i + \beta_{11} Cre_i + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots. (3)$$

Where,

lnDiv = Natural log of the income diversification; Em = Number of earning members in the family; Dep = Dependency Ratio; Edu = Educational level of the household head measured in years of schooling; Poor = Household is poor as a dummy variable 1 for living below poverty line and 0 for otherwise; FarmInc = Income from agriculture sector measured in taka; Dm = Distance to market measured in kilometers; Pos = Any family member holding a social or political position measured as a dummy variable, 1 for holding a socially or politically important position and 0 for no. Lo = Land ownership pattern measured in decimal. Percon= Consumption expenditure per capita measured in taka (Yearly); Exp = Farming experience of the household head measured in years of farming; Cre = Credit access of household measured as a dummy variable 1 for having credit access and 0 for otherwise; ε = Stochastic disturbance term and i represents numbers such as 1,2,3,……,n and β's are the unknown parameters to be estimated.

Result and Discussion

This paper involves in discussion of demographic and socioeconomic characteristics of the respondents as well as a whole of their household size, the primary determinants of the diversification as well as the effect of the diversification with imposition of the instrumental variables for accomplishing the third and forth objectives of this study. It also suggests relative policy implication regarding the situation of the households.

Income of the Households

Following Table 1 shows that most of the households has income of 195,484 Taka for operating their farming activities in a year which is also 63.85 percent of the total income earned by that household in that year, indicating a significant share of the income of total income in a year. This is because of two reasons, most of the people living in the study areas are living on agriculture and they have probably very few alternative for agriculture since they have no other skills for shifting from agriculture to non agricultural profession for a sudden. The average minimum share of income from the farming to the total income is 3000 Taka and 1200000 taka for maximum amount that implies that a household can have a highest contribution of taka 1200000 into the total income for a year average.

Table 1. Average income of the households

Income source	Taka/Year	Minimum	Maximum
Farm income	195484 (63.85)	3000	1200000
Non-farm income	110682 (36.15)	00.00	905500
Total	306166 (100)	36000	1200000
Per Capita	66933	7200	300000

Source: Authors' own calculation from field survey, 2021

For non farming income this contribution is 110,628 Taka on average for a year by a household which is only 36.15 percent of the total income. This clearly indicates that the most of the sampled household depends on income from the farming activities. Per capita income which is measured by ratio of the aggregate income earned by the population living in a specific area to the number of people living in that area is estimated as 66933 composed of smallest amount as 7200 taka and the largest amount of Taka 300,000 for a given year. It indicates that most of the people living in the sample areas are middle class and poor because their income is just above the poverty line threshold that is about 58140 taka for a year (According to World Bank), which is $1.90 per capita for daily earning.

Dependents, Earning Members and Dependency Ratio Distribution of the Households
Table 2 shows the average dependents, earning members, dependency ratio distribution of the households. Average number of dependent of the household is 2 which is a very good sign due to representing most of the families have earning members rather than dependents persons including maximum number of dependents as 5 persons where the average earning members are 3 for the households including maximum of 9 and minimum of 1 person in a family. And the dependency ratio is 0.592 which is not quite satisfactory indicating that about 41 % were dependents.

Table 2. Dependents, earning members, dependency ratio distribution of the households

Items	Average	Minimum	Maximum
Number of dependents	2	0	5
Number of earning members	3	1	9
Dependency Ratio	0.592	0.00	3.00

Source: Authors' own calculation from field survey, 2021

Consumption Expenditure Structure of Household
In the below Table 3, 17.42% respondents' households spent less than one lac for consumption purpose in a year, whereas 51.61 percent household expensed within one to three lacs Taka yearly. Around one-fifth farmers' household (19.36) cost above three lac to six lac in a calendar year. Notably, 11.61% households spent above 6 lac.

Table 3. Consumption Expenditure structure of households

Consumption Expenditure (Tk./Year)	No.	%	Average (years)	Minimum	Maximum
≤ 1 Lac	27	17.42			
1 – 3 Lac	80	51.61			
>3 – 6 Lac	30	19.36	307717	31100	1919900
> 6 Lac	18	11.61			
Total	155	100.00			
Per capita			68213	5183	601500

Source: Authors' own calculation from field survey, 2021

Furthermore, the table also depicts that average yearly consumption cost is 307717 taka while minimum and maximum values are 31100 and 1919900taka, respectively. More specifically, per capita cost counted for minimum 5183 to maximum 601500.

Factors Affecting Diversification of Income

Table 4 shows the determinants of the diversification of households' income. The R squared is a statistical measure that explains the proportion of the variance for a dependent variable that's explained by explanatory variables. The R-squared value of 0.301 implies that explanatory variables together explain 30 percent variation of the dependent variables. Another concerning matter is the adjusted R-squared. R-squared shows how well terms (data points) fit a curve or line.

Table 4. Factors that affect Simpson Diversification Index (SDI)

Variables	Coefficients	St.Err.	t-value	P values	Significance
Constant	-2.196	0.795	-2.76	0.006	***
Em	0.119	0.109	1.09	0.279	
Dep	0.086	0.015	5.72	00.00	***
Edu	0.02	0.012	1.69	0.093	*
Poor	0.78	0.358	2.18	0.031	**
FarmInc	0.137	0.053	2.57	0.011	**
Dm	-0.030	.011	-2.56	0.011	**
Pos	0.003	0.112	0.02	0.982	
Lo	0.143	0.053	2.66	0.009	***
perCon	-2.55e-07	7.22e-07	-0.35	0.724	
lexp	0.20	0.195	1.02	0.308	
Cre	0.043	0.114	0.37	0.709	
Extra Statistics					
R-squared	0.301				
Adjusted R^2	0.246				
F-test	5.553***				
Prob > F	0.000				
Number of obs	155.000				

Note: Asterisks indicate for 1%, 5% and 10% level of significance respectively

The table 4 shows that the dependency ratio has a positive significant ($p<0.01$) effect on the level of income diversification. This generally implies that an increase of the ration of dependency will lead an increase in the level of diversification. This finding is similar to that of Olale and Henson (2012)[14] and Agyeman et al., (2014)[13]. Likewise, education level has also significant ($p<0.1$) positive impact on level of income diversification. This finding supports the outcome of Dev et al., (2016)[12], Rehan et al., (2019)[18], Le et al., (2020)[16] and Saba et al., (2022)[15]. Poverty or being poor status is positively

associated (p<0.05) with the income diversification. Income from farming activities with coefficient of 0.137 has significant (p<0.01) positive impact on the level of income diversification. This implies that a 1 increase in the level of income will lead to a 13.7% increase in level of income diversification. Land ownership is also positively (p<0.01) associated with the level of income diversification. This finding is similar to the finding of Olale and Henson (2012)[14] and Sherf-Ul-Alam et al., (2017)[17]. On the contrary, number of the dependents existing in the families with coefficients of 0.143 has significant (p<0.05) negative relation with the level of income diversification. This clearly indicates that a 1% increase in the level of number of the dependents in the family results in 14.3% increase in the level of income diversification on average.

Heteroskedasticity Test

Heteroscedasticity in data may cause due to several reasons such as misspecification of model, incorrect data transformation etc. Breusch-Pagan test is widely used to detect heteroscedasticity[22,23] .This paper applies Breusch-Pagan test to diagnose heteroscedasticity. The hypotheses for this test are as below.

H_0 : There is no heteroscedasticity presence or constant variance or homoscedasticity;
H_1 : Presence of heteroscedasticity

Table 5. Heteroskedasticity test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	chi2	Prob > chi2	Accepted Hypothesis
	0.83	0.3614	Null hypothesis

The result for Breusch-Pagan is shown in below table where the result is prob>chi^2 = 0.3614 that is greater than α = 5% or 0.05 (Table 5). Therefore null hypothesis is accepted that the model is free from heteroscedasticity problem.

Specification Error Test

Ramsey introduced the RESET test in 1969. It is used to capture omitted variable bias and inappropriate functional form. This test is based on the Lagrange Multiplier rules and critical values of F-distribution[24].

H_0 : The model is correctly specified or has no omitted variable bias;
H_1 : The model is not correctly specified

Table 6. Specification Error Test

Ramsey RESET test	F	Prob > F	Accepted Hypothesis
	0.52	0.6719	Null hypothesis

The result of prob> F = 0.6719, that is greater than α = 5% or 0.05 (table 6). Therefore null hypothesis is accepted that the model is free from specification error or omitted variable bias.

Conclusion and Recommendations

This study has identified what factors are really affecting the level of diversification. The study highlights various aspects of diversity and some specific training on specialized skills such as driving, fish cultivation, computer and mobile phone servicing, automobile servicing etc. may be developed, they can be improved themselves financially and socially as well as their family welfare can be ensured. On the other hand, the socio-economic characteristics indicate having poor position of the people living in the char areas and their socio-economic development requires with proper plans. The findings of this study reveal that the educational level, land holdings by the respondents, the poverty

status, dependency ratio, number of the dependents and income from farm are the key driving factors that affect the level of income diversification.

Recommendation of this study is introduced based on the result and discussion in the earlier section of this paper. Following steps can be taken for the betterment of the people living in the study areas.

i) Since most of people living in the char lands are poor and depends on the agriculture, they should diversify their agricultural production systems and can introduce modern agricultural technology for increasing output level.

ii) Training on different technical jobs such as driving, electrical technicians, tailors, computer mechanics etc can be provided for their future job security.

iii) Training on self employment such as fish cultivation in ponds and bio-fish cultivation, small business etc can be provided which may influence them for diversifying their income generating activities.

iv) The better availability of credit has influential effect not only on the farmers' production but also on income diversification. Farmers who have access to credit start a new business or self-employment easily. In the present study, a few persons have received this facility due to legal obligations and formalities with documents. So, institutional credit should be made more flexible for them. Besides, the interest rate for credit should reasonably be low.

v) Land ownership drains farmers living in char areas and their income and livelihood diversify to better yields of agricultural land then farmers invest their profits elsewhere or expand their current occupation which breeds their legs and brings aesthetics to diversity and of course family. Welfare is ensured so if the government and khas lands are handed over to them or they are somehow on those uncultivated lands then it will be beneficial for them. In addition, since they are frozen, due to river erosion, they cannot properly hope throughout the year, so they can produce more productive crops in the fallow land at the time they have the opportunity to cultivate the land, Bangladesh Rice Research Institutes (BRRI) and Bangladesh Agricultural Research Institutes (BARI) produce more productive seeds, if these seeds can be distributed to them free of cost, it will play a huge role in the development of their agriculture.

vi) Most of the farmers in the char areas do not keep in touch with the agricultural officers as they are not aware of the latest information technology and development of the agricultural sector. And if a friendly relationship develops between the agriculture officers, it is hoped that the production system will be better which will increase their productivity as well as contribute to their socio-economic development and family welfare as well as income diversification and development.

vii) Social and political position has emerged as one of the elements which play a vital role in the socio-economic development of the individual so this major importance is immense. Individuals in socio-economically important positions not only have access to their own welfare or their own development, but also to social development which is not possible for the common man. So those who hold important social, political and economic positions, if they look kindly on the people living in the chars, then their welfare. It is easier to accelerate the development so that they can carry out various activities at the individual level and organizationally for the welfare of the neglected rural families and their families and they can do various social works such as road construction job opportunities new innovative activities and much more.

In addition, their development activities will motivate other influential people in the society to take part in social development work, so people in socially and politically important positions should take initiative to work for the development of rural char areas.

Conflict of Interest

Second part of this study was presented in the 2nd International Conference on Business and Economic Challenges (2022), which was organized by Faculty of Business Studies, Hajee Mohammad Danesh Science & Technology University and received best paper award.

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The bivariate GARCH Model: Incorporating Transmissions of Volatility between the Oil Price and Inflation in Bangladesh

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Abstract: This paper explores the impact of crude oil price on inflation in Bangladesh. The study takes data from July 2011 to December 2021 for oil price and inflation and uses BEKK-GARCH model to figure out the volatility and the persistence of volatility and the transmission mechanism of oil price to inflation. The estimated results and the Granger Causality test's results corroborate the proposition that oil price uniquely granger cause to inflation.

Keywords: Inflation, Oil price volatility, ARCH, GARCH.

Introduction

The impact of oil prices on macroeconomic variables, particularly inflation and economic growth, has been a topic of discussion among researchers and policymakers alike. Higher oil price generally creates challenges to the policymakers in choosing the optimum solution level between lower inflation and economic growth stability in the presence of oil shocks. The increase in oil price may create monetary authorities to increase the interest rate to restrain inflation which at the same time will have a negative impact on investment as well as on economic growth.

The oil price has significant impacts on almost every sector of the economy. Firstly, oil is an essential input in the production of nearly every industry. Firms' marginal costs are affected by oil price volatility. A firm whose future marginal costs will be higher because of the high volatility of oil prices in the past will charge more fees if it anticipates its future marginal costs will be higher. This effect is visible in the textile sector and garments in Bangladesh. Secondly, oil is used in almost every transport vehicle in Bangladesh. An increase in oil prices will cause an increase in transport costs. Thirdly, oil price shocks impact economic activities such as inflation, growth, trade balance, and others. The general consensus is that the increased oil prices are associated with the slow economic growth the majority of Bangladesh crude oil needs are met by imported oil. Any increase in the oil price due to either global oil price increased demand or decrease in the supply by oil producing countries is likely to increase the domestic price level of an oil importing countries like Bangladesh. However, its enormity will depend on the monetary policy action while facing external oil price shock. Eventually, the higher price of oil results in inflationary pressures and thus pose a threat of stagflation At the same time, the higher inflation affects the production cost and thus the price of output in the economy. Thus, time-varying mark-ups result, variable capital utilization results, and the wealth is reallocated.

The effect of oil prices on inflation depends on the economy's structure and the macroeconomic policies. This paper aims at investigating oil-inflation relationship in Bangladesh. Given its limited influence over the global economy, Bangladesh is a shock absorber for external shocks as it is such a small economy with an open economy. In this paper, we follow a time series analysis that helps us to analyze the asymmetric effect of oil price shocks. For our purpose, we use an exponential GARCH (EGARCH) model. This model enables us to find the asymmetric correlation of oil price shocks over

time. When oil price increases, inflation also increases. But when oil price decreases, inflation does not decrease.

The rest of the paper is outlined as follows: after the introduction, Section 2 reviews the literature, Section 3 describes how data is used in this study and describes the model, and section 4 discusses the findings. Finally, the paper concludes with the conclusion.

Objectives of the study

Inflation is a pressing concern right now. In this paper, we tried to find out the impact on oil price shocks on the inflation rate of our country.

Literature Review

In general, a rise in oil prices is the result of an increase in inflation and a decrease in economic growth. When it comes to inflation, prices of commodities derived from petroleum are directly affected. The price of oil also has an indirect effect on costs such as transportation and manufacturing.

In Pakistan, the price of crude oil was proven to have an empirical link with inflation by Saleem Saba et al. (2015). In that study, time series data from 1979 to 2012 were utilized to examine how the price of crude oil affected the GDP deflator. Data research from 1979 to 2012 revealed that indirect taxes, the money supply, the price of crude oil, the currency rate, and the interest rate are all factors in inflation. As a result, as real gross domestic product increases, inflation tends to decrease over the medium and long terms.

A study published in 2020 titled "Empirical Investigation of Relationship between Oil Price and Inflation: The Case of India" discovered that the Johansen co-integration method may be used to assess both the short- and long-term effects of oil prices on inflation in India. Data from 1970 to 2017 were used in the study. Additionally, the findings revealed a favorable association between domestic pricing and oil prices, which suggests that the government should support and advance energy-saving technology in order to lessen its reliance on oil and increase access to alternate sources of energy.

Based on how the volatility of oil prices affects inflation, Lu Wen Cheng et al. (2010) examined the results. They used the bivariate GARCH model. In their analysis, they established the Granger-cause of the fluctuation in oil prices. Inflation can be predicted using past volatility in oil prices. The BEKK GARCH model indicates that the volatility of the oil price persists for a very long time. He conducted a study in which it was discovered that delayed innovation had large and quantifiable ARCH effects on changes in oil prices.

According to Davari Hamid et al. (2017), the drop in oil prices was highly connected with inflation rise. However, there was no connection between inflation and the rise in oil prices. This study uses an autoregressive distributed lag (ARDL) methodology with data from 2003 to 2015. This study employed the nonlinear ARDL model to capture the impact of changes in oil prices on CPI for both the asymmetric short-term and long-term links between oil price and CPI. This analysis comes to the conclusion that slowing the increase of oil revenues lowers inflation rates over time. However, the increase in oil revenues seems to have minimal impact on inflation.

The price of crude oil has a causal effect on inflation, according to Subhani Muhammad Imtiaz and colleagues (2012) in the International Research Journal of Finance and Economics. The data for crude oil prices and the consumer price index for the years 1980 to 2010 were used to demonstrate the findings, which indicated that there is a unidirectional causal relationship between the price of crude oil and inflation.

From 1970 to 2014, Lacheheb Miloud et al. (2016) examined the relationship between changes in oil prices and inflation rates in Algeria using the nonlinear ARDL approach. Modeling showed that oil price impacts inflation in a nonlinear way. It was found that oil price increases increase inflation both

in the long-run and the short-run in Algeria, but oil price decreases appear to have no impact on inflation.

With the ARDL (4,4,0) model, Lawal Ganiyu Omoniyi et al. (2015) tested the existence of a single-level relationship between Nigeria's exchange rate, crude oil prices, and inflation rate. According to the findings of this study, in the long run, the exchange rate in Nigeria is slow to respond to shocks in crude oil prices and inflation rates. Both oil price and inflation experienced a long-term positive relationship in this paper, but evidence for the short-term relationship was mixed.

According to Salisu Afees A. et al. (2017), certain oil exporting and oil importing countries may experience an unbalanced relationship between the price of oil and inflation. Quarterly data from 2000 to 2014 were utilized. In this analysis, there was inconsistent evidence for short-term correlations between oil prices and inflation but significant long-run positive relationships. On the other hand, compared to their peers who export oil, net oil importing countries have had a greater long-term influence from oil prices on inflation.

The nature and reasons of oil price pass-through into inflation in the short- and long-term were explained by Ali Abbas Abounoori et al. (2014) in a research paper titled "Oil Price Pass-Through into Domestic Inflation: The Case of Iran". The findings showed positive and partial short- and long-term pass-throughs of oil prices into inflation. The Dynamic Error Correction Model is the foundation for the data gathered between March 2003 and March 2013.

Data

The Point-to-Point Inflation and Crude Oil Price data are used in the paper. The inflation data is collected from Bangladesh Bureau of Statistics and the oil price data are collected from the month series of Pink Sheet published by The World Bank. The report provides data for different crude oil prices from which West Texas Intermediate (WTI) crude oil price series is taken as the WTI series because it is one of the benchmark for estimating oil price. The date frequency is monthly and the sample space is July 2011 to December 2021. The first difference data of Point-to-Point Inflation and Oil price showed the mean reverting series and conditional heteroskedasticity in the series.

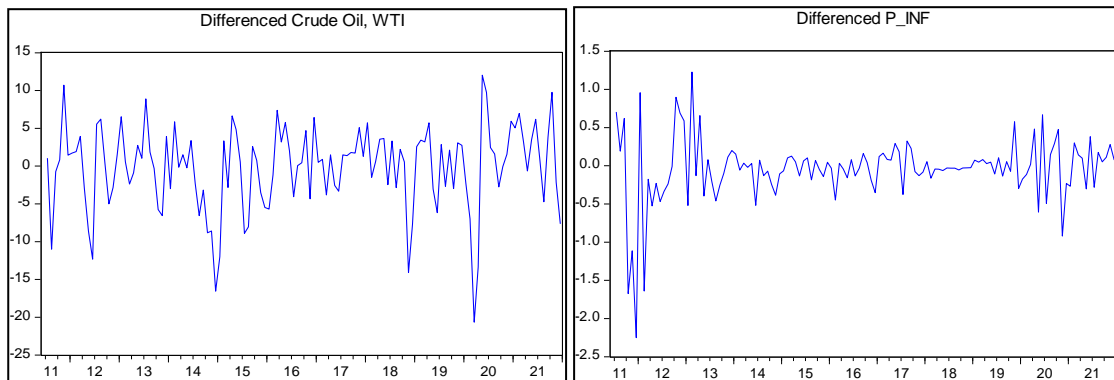Figure 1: First Difference of Oil and Inflation Series

Table 1 presents the basic statistics of oil price and point-to-point inflation series and the standard deviation value of oil price indicates the higher volatility in the data and while point-to-point inflation's standard deviation value is small and thus the volatility is also small as the inflation incorporates all the price of the goods that typically consumers uses and thus a single commodity's impact seems to dissipates in the consumer price index.

Table 1: Summary Statistics

	Oil Price	PInflation
Mean	67.18907	6.320774
Median	60.84	5.884612
Maximum	106.5464	12.65898
Minimum	16.52	4.960225
Standard Deviation	22.61858	1.39976

Research methodology

If the series are non-stationary, any time series model using these variables gives us misleading inferences for the estimated parameters. The augmented Dickey-Fuller (ADF) test is widely used to detect the stationarity of a series.

$$\Delta x_i = l_0 + l_1 x_{i-1} + \sum_{i=1}^{n} b_i \Delta x_{i-i} + v_i \ , i = 1,2 \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

x_i denotes inflation and the oil price, v_i is residual term and a constant or drift term is captured by l_0.

The null hypothesis involves testing whether $l_1 = 0$ or $l_1 \neq 0$. If we can reject the null hypothesis of unit root, the series regard as stationary and thus, any time series model can be estimated then.

The volatility and persistence of volatility spillover can be examined using a bivariate GARCH model, while in this paper, we have used BEKK GARCH model introduced by Engle, Baba, Kraft and Kroner. The 14 squares and cross products of innovation ε_t and volatility H_t for each market lagged one period are required for the variance-covariance matrix of equations. The advantage of this model allows co-variances and the conditional variance to influence each other. Moreover, a few parameters are required in the process of estimating variables. The structure of a bivariate BEKK GARCH model is described below;

Firstly, we need to construct two mean equations for two variables, which are given

$$\Delta p_t = l_{10} + l_{11}\Delta p_{t-1} + \varepsilon_{1t} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(2)$$

$$\Delta \pi_t = l_{20} + l_{21}\Delta \pi_{t-1} + \varepsilon_{2t} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

the percentage changes in the oil price and inflation are denoted by Δp_t and $\Delta \pi_t$ respectively. And then, the BEKK GARCH model can be written to examine the transmission process of possible volatility and the persistence of volatility between the series and also the spillover effect on the variables.

$$H_t = C'C + \sum_{k=1}^{p} A_k' (\varepsilon_{t-1} \varepsilon_{t-i}') A_k + \sum_{k=1}^{p} B_k' H_{t-k} B_k \ \dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

A, B and C are 2 are 2×2 matrices as the two variables are in this model. Therefore, the model can be written as follows;

$$\begin{bmatrix} H_{11,t} & H_{12,t} \\ H_{21,t} & H_{22,t} \end{bmatrix} = C'C + \begin{bmatrix} l_{11} & l_{12} \\ l_{21} & l_{22} \end{bmatrix} \begin{bmatrix} \varepsilon_{1,t-1}^2 & \varepsilon_{1,t-1}\varepsilon_{2,t-1} \\ \varepsilon_{2,t-1}\varepsilon_{1,t-1} & \varepsilon_{2,t-1}^2 \end{bmatrix} \times \begin{bmatrix} l_{11} & l_{12} \\ l_{21} & l_{21} \end{bmatrix} + \begin{bmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{bmatrix}$$

$$\begin{bmatrix} H_{11,t-1} & H_{12,t-1} \\ H_{21,t-1} & H_{22,t-1} \end{bmatrix} \times \begin{bmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{bmatrix} / \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(5)$$

$$h_{12} = \rho_{12}\sqrt{(h_{1,t}h_{2,t})} \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(6)$$

Where $H_{11,t}$ and $H_{22,t}$ denote the conditional volatility of Δp_t and $\Delta \pi_t$, respectively. The specification for the conditional covariance is described in Equation (6), where h_{12} is the conditional covariance and ρ_{12} is the correlation of the standardized residuals between the oil price and inflation. The variance-covariance matrix are derived in the last three equations (from equation (5) to (6)). In addition, $\Delta p_t(\Delta \pi_t)$ depends on $\Delta \pi_{t-1}(\Delta p_{t-1})$ and the unexplained shock $\mathcal{E}_{1t}$ ($\mathcal{E}_{2t}$). the transmission process of volatility incorporating a direct route of transmission are prescribed in equations (4) and (5), where $H_{i,t}$ responds to $H_{i,t-1}$ and to $H_{j,t-1}$ (volatility in the other variable) for i≠j, i and j = 1, 2.

l_{11} and l_{22} are the coefficients to inspect because in the BEKK GARCH model, these coefficients regarded as ARCH coefficients which intend to capture volatility in the squares of the residual terms $\mathcal{E}_1$ and $\mathcal{E}_2$. In addition, the GARCH coefficients, i.e., the coefficients of the variance-covariance terms $H_{11,t}$ and $H_{22,t}$. l_{12} and l_{21} measure the degree of innovation from oil price changes (Δp_t) to inflation ($\Delta \pi_t$) and inflation (Δp_t) to oil price changes (Δp_t), respectively are captured by β_{11}, and β_{22}. The volatility spillover from the movement of oil price to inflation and inflation to oil price are captured by the elements of off diagonal matrix of B_{ij}, here B_{ij} is 2×2 square matrix.

Using the assumption that the errors are normally distributed the model log-likelihood function can be obtained and to produce the maximum likelihood parameter estimates and their corresponding asymptotic standard errors, The BHHH (Bern, Hall, Hall and Hausman) algorithm is then used.

Empirical Analysis
The Test of Stationarity
The summary of the Augmented Dickey-Fuller (ADF) test for stationary for each variable in the model are shown in Table 2. Initially, the test are performed using the variable's level data and if the test results shows that null hypothesis of unit root cannot be rejected then we need to perform the test again at their first difference and the test results shows that oil price and point-to-point inflation are non-stationary at level data and after taking first differences, the two variables become stationary.

Table 2: The Result of ADF Test

Variable	Intercept		Intercept and Trend		Order
	T-statistics	P- Value	T-statistics	P-Value	
Oil	-1.6918	0.4329	-1.84979	0.6743	
PInf	-1.70028	0.4284	-1.61759	0.7801	
Δ Oil	-7.79756*	0.0000	-7.76748*	0.0000	I(1)
Δ PInf	-7.26584*	0.0000	-7.31157*	0.0000	I(1)

Note. *,**,*** indicates 1%, 5%,10% significance level, respectively. Δ denotes First Difference

BEKK-GARCH (1, 1) Estimation
In order to find out the appropriate lag length, we have estimated VAR process and choose a lag length 7 using the Akaike Information Criterion and then we estimate the BEKK GARCH model. The coefficient of mean equations of the models are statistically significant at 95% of confidence interval implying that oil price and inflation depends on their own lags. Hence, we would like to capture the volatility spillover effect among variables. Moreover, ARCH affects measure the impact of previous

information of the volatility of the price and inflation and GARCH effects show the persistence of the volatility.

$$GARCH1 = M(1,1) + A1(1,1)^2*RESID1(-1)^2 + B1(1,1)^2*GARCH1(-1)\ldots\ldots (7)$$

$$GARCH2 = M(2,2) + A1(2,2)^2*RESID2(-1)^2 + B1(2,2)^2*GARCH2(-1)\ldots\ldots..(8)$$

$$COV1\_2 = A1(1,1)*A1(2,2)*RESID1(-1)*RESID2(-1) + B1(1,1)*B1(2,2)*COV1\_2(-1)\ldots.(9)$$

As the A1(1,2) estimates the innovation from oil price to inflation. While A1(1,1) shows the effect of its own lagged value of the squared residual term $\varepsilon^2_{1,t-1}$ on the present volatility of the oil price (H_1). Similarly, the coefficient A1(2,2) estimates the effect of its own lagged value of the squared residual term $\varepsilon^2_{2,t-1}$ on the present volatility of the inflation (H_2). In table 3, the value of A1(1,1) and A1(2,2) are significant at the 5% level of significance implying the presence of a strong ARCH effect of oil price changes and inflation. Figure 2 (in appendix) shows conditional variance between two variables and the interdependence between the variables.

The element B_{ij} measures the persistent volatility spillover form Δp_t to $\Delta \pi_t$. When B1(1,1) measures the effect of its own lagged volatility persistence on the present volatility of Δp_t and B1(2,2) measures the effect of its own lagged volatility persistence on the present volatility of $\Delta \pi_t$. The estimation results of B1 (1,1) is negative and volatility persistence is statistically insignificant inferring oil price volatility persistence is negligible which validates the controlled oil price movement phenomenon. The result of B1(2,2) is statistically significant and the persistence is very high implies the inflation expectation can lead to the higher inflation. Covariance equation (9) incorporates the ARCH coefficients represent of the previous information to the current covariance and GARCH coefficients show the persistence regarding the covariance of their volatility. The impact of common information can be captured by the all off diagonal parameters. As we expect that large innovation in oil price, have proportionally larger effects. The increased oil price may have a larger impact on the inflation.

Table 3: BEKK-GARCH (1,1) Estimation

Mean Equation Coefficient				
Variables	**Coefficient**	**Std. Error**	**Z- Statistics**	**P-value**
C(1)	3.0315*	1.5997	1.8950	0.0581
C(2)	0.9627***	0.0214	44.9013	0.0000
C(3)	0.4265***	0.1400	3.0455	0.0023
C(4)	0.9233***	0.0236	39.1430	0.0000
Variance Equation Coefficient				
M(1,1)	15.8263	14.5104	1.0907	0.2754
M(2,2)	0.0024*	0.0015	1.6508	0.0988
A1(1,1)	0.3361**	0.1493	2.2504	0.0244
A1(2,2)	0.5401***	0.1242	4.3473	0.0000
B1(1,1)	-0.5952	0.4454	-1.3364	0.1814
B1(2,2)	0.8325***	0.0534	15.5953	0.0000

Note. *,**,*** indicates 1%, 5%,10% significance level, respectively.

Therefore, we conducted the bidirectional causality test between Point-to-Point Inflation changes to oil price changes. Theoretically, we expect that sudden oil price shocks have considerable impact on domestic inflation. The Table 4 provides the F- statistics for the Granger-causality test using 7 lags,

while lags are determined by Akaike Information Criterion. The Granger cause of an inflation change to oil price changes results shows that a change in inflation cannot bring any shock to oil price, which is as expected. Meanwhile, the Granger cause of change in oil price to change in inflation rate results rejects the null hypothesis of no causality and the tests evidently defines that causation exclusively runs from oil price changes to inflation.

Table 4: Granger Causality Test

	F-Statistics	P-Value
Δ PInf → Δ Oil	1.2021	0.3082
Δ Oil→ Δ PInf	1.8372***	0.0878

Note. *,**,*** indicates 1%, 5%,10% significance level, respectively. Δ denotes First Difference

Conclusion

The impact of oil price volatility and the persistence of volatility on inflation in Bangladesh has been analyzed in this paper. The empirical results provide robust evidence that the volatility from oil price does have an impact on inflation that explains the lag impact of oil price volatility can influence inflation rate. Meanwhile, Granger causality test shows that the inflation cannot influence the oil price volatility. As Bangladesh is heavily depended on oil import, the results corroborate our hypothesis and the Granger causality tells that causation distinctively runs from oil prices to inflation. The BEKK-GARCH model shows the volatility of oil price is present and high and while the persistence of oil price volatility is not significant and negative. However, the inflation volatility is present and persistence of volatility inflation is significant and high. The Granger causality tests shows that oil price can uniquely granger cause inflation with a lag impact that corroborate the regulated oil price movement in Bangladesh. Yet, the study examines the only two dimensional impact of inflation without considering the transmission mechanism oil price to inflation rate and the central bank's policies to contain inflation at a tolerate rate.

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Appendix

Figure 2: Conditional Covariance of Oil price and Inflation
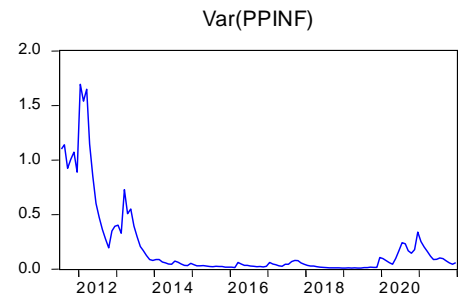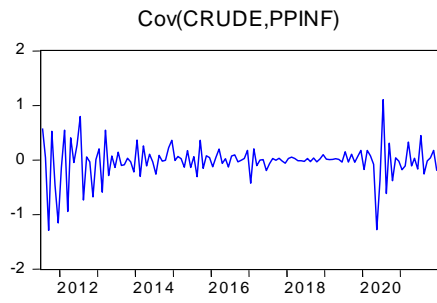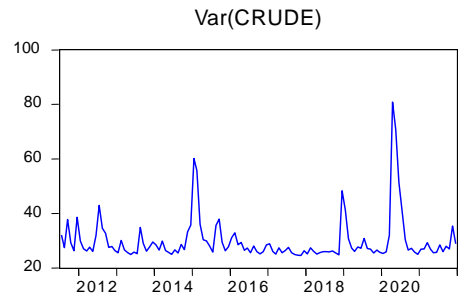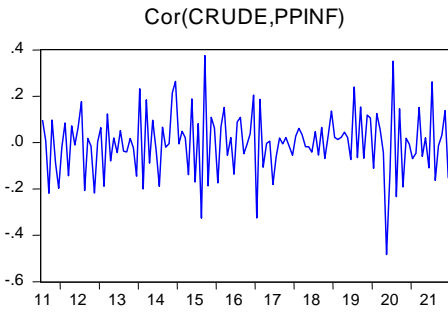
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