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Chakdaha College
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Rabindra Nagar, Chakdaha, PIN - 741222, Nadia,
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EDITORIAL

I feel immense pleasure to publish the eightteenth issue (Vol. IX, No. 2) of '**RAY: International Journal of Multidisciplinary Studies**', (E-ISSN: 2456-3064) on behalf of Chakdaha College, Nadia, West Bengal, India. It's a blind peer reviewed, Indexed (DRJI) International Journal to be published biannually (April - October). The aims and objectives of the Journal are to publish the valuable empirical and experimental studies that have significant contribution towards developing theoretical and practical knowledge in multiple disciplines like Physical Science, Bio-Science, Social Science, Behavioural Science, Engineering Science, Medical Science, Business Studies, Humanities, and Literature, etc.

I avail myself of this opportunity with great pleasure in acknowledging my deepest sense of gratitude to all concerned with and related to this endeavour, particularly Editorial Board Members, Advisory Board Members and Reviewers who tendered their painstaking efforts throughout the period of preparation of this journal.

No doubt, I am personally indebted to the authors who have contributed their valuable contributions to this journal. In the present issue we are publishing six research articles. I convey my heartfelt gratitude to all respected authors.

Utmost care has been taken to prepare the present issue of the journal, in spite of that we are always liable to apology for any unwanted mistakes. Any comment, any suggestion for improvement of the journal is always appreciable.

I wish its every success in all respect.



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পুরাণে পরিবেশচিত্তন; একটি বিশ্লেষণ

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Structured Abstract:

সারসংক্ষেপ: পুরাণসাহিত্য হল সমগ্র ভারতবর্ষকে জানার মূল চাবিকাঠি। ব্যাসদেব রচিত পুরাণে সৃষ্টিতত্ত্ব থেকে শুরু করে গাছপালা, পশু-পাখি, ফুল-ফল ইত্যাদি পরিবেশ সংক্রান্ত যে ভাবনার প্রতিফলন ঘটেছে তা সত্যিই অনবদ্য। পঞ্চমহাভূত হল পরিবেশের অজৈব উপাদানের মধ্যে অন্যতম। সমগ্র জীবের প্রাণের উৎস জল, সেই জলের মাহাত্ম্য বর্ণনা করতে গিয়ে জলকে ভগবান হরির সঙ্গে তুলনা করা হয়েছে এবং জলাশয় সংরক্ষণের বিধানও দেওয়া হয়েছে শিবপুরাণে। পরিবেশের প্রয়োজনীয় বস্তুর মধ্যে অন্যতম হল বৃষ্টি তার আলোচনাও রয়েছে। বৃক্ষরোপণ, ফুল-ফল, অশ্বখ বৃক্ষের মাহাত্ম্য, ভেষজরূপে বৃক্ষের প্রয়োজনীয়তা এগুলির যথাযথ আলোচনা পাওয়া যায় পুরাণগুলিতে। ভবনের কোন দিকে কোন বৃক্ষ থাকা উচিত তার আলোচনাও এখানে পাওয়া যায়। এছাড়াও বিভিন্ন পশুপাখির আলোচনা এবং অনিচ্ছাবশত পশুপাখি হত্যার জন্য প্রায়শ্চিত্তের বিধানও রয়েছে পুরাণসাহিত্যে। বাস্তবনির্মাণ পরিবেশ সুরক্ষার জন্য অপর একটি গুরুত্বপূর্ণ অঙ্গ সেই আলোচনা পুরাণে পাওয়া যায়। পৌরাণিকগণ পরিবেশ সংক্রান্ত বিষয়ে অনেক বেশী সচেতন ছিলেন। পরবর্তীকালে পরিবেশের ভারসাম্য বজায় রাখার জন্য কিছু আইন প্রণয়ন হয়। অর্থাৎ পুরাণে বর্ণিত প্রাকৃতিক পরিবেশ এবং পরিবেশের ভারসাম্য বজায় রাখা হল প্রতিটি মানুষের কর্তব্য।

সাংকেতিক শব্দ (Keywords): পুরাণসাহিত্য, পঞ্চমহাভূত, অপ, বৃক্ষ, পরিবেশ।

প্রণালী (Methodology): আলোচ্য গবেষণাপত্রটি তুলনামূলক এবং বর্ণনামূলকভাবে লিখিত হয়েছে। পুরাণসাহিত্যের ওপর ভিত্তি করে পরিবেশসংক্রান্ত বিষয়ে তথ্যভিত্তিক ধারণার দ্বারা যথাযথ আলোচনা এখানে করা হয়েছে।

প্রকল্প (Hypothesis):

- পুরাণ অনুসারে পরিবেশের বিভিন্ন উপাদান।
- পরিবেশ সংরক্ষণ।
- পরিবেশের অন্তর্গত পশুপাখির আলোচনা।

পরিদৃশ্যমান জগতসংসারকে পরিবেষ্টন করে যে প্রাণী, উদ্ভিদ, পশু-পাখি, আকাশ, বাতাস, গ্রহ-নক্ষত্র ইত্যাদি রয়েছে তাই হল পরিবেশ। অর্থাৎ সমগ্র জগতসংসারে রয়েছে সজীব ও জড় বা অজীব

উপাদান। বিপুল সংখ্যক জনসংখ্যার দৰুণ বৰ্তমান যুগে পৰিবেশের যে দূষণ, অস্বাস্থ্যকর পৰিবেশ, ভারসাম্যহীনতা পরিলক্ষিত হয় তা কখনই কাম্য নয়। সমগ্র মানবজাতির উচিত পৰিবেশের ভারসাম্যহীনতার প্রতি দৃষ্টিপাত করা এবং যে যে সমস্যা জনিত কারণে পৰিবেশ দূষিত হচ্ছে সেইদিকে রেখাপাত করা। সংস্কৃত-সাহিত্য আপামর জনগণের নিকট অমূল্য সম্পদ রূপে পরিচিত। যদি এই সংস্কৃত সাহিত্যের দিকে দৃষ্টিপাত করা যায় তাহলে দেখা যাবে যে পৰিবেশ রক্ষার চিন্তাভাবনা প্রাচীন যুগেও ছিল। বেদ, উপনিষদ, রামায়ণ, মহাভারত, পুরাণ, স্মৃতিশাস্ত্র, অর্থশাস্ত্র, কাব্য প্রভৃতি আকর গ্রন্থগুলি যদি পর্যালোচনা করা যায় তাহলে দেখা যাবে যে প্রতিটি গ্রন্থেই পৰিবেশ ভাবনার অত্যন্ত সুন্দরভাবে প্রতিফলন ঘটেছে। যেহেতু এখানে আলোচনার বিষয় হল পুরাণসাহিত্য তাই এখানে পৰিবেশ সংক্রান্ত বিষয়ে কি কি ভাবনার প্রতিফলন ঘটেছে তা আলোচনা করা যাক।

পুরাণসাহিত্য হল সম্পূর্ণরূপে ধর্মীয় রচনার বহিঃপ্রকাশ। পুরাণ হল প্রাচীনকালে ঘটিত ঘটনা। বিভিন্ন দার্শনিক তত্ত্ব, নানাধি উপাখ্যান, দেবদেবীর ব্রতকথা, তীর্থমাহাত্ম্য, সাংখ্যতত্ত্ব, সৃষ্টিতত্ত্ব, তুলসী মাহাত্ম্য, গৃহসম্ভার প্রভৃতি বিবিধ বিষয় পুরাণগুলিতে আলোচিত হয়েছে। কিংবদন্তী অনুসারে বলা হয় যে, বেদবিভাগের রচয়িতা এবং মহাভারতের রচয়িতা ব্যাসদেব হলেন আঠারটি পুরাণ এবং উপপুরাণের রচয়িতা। এই ১৮টি পুরাণের নাম বিষ্ণুপুরাণে পাওয়া যায় (বিষ্ণুপুরাণ, ৩/৬/২১-২৪)। অষ্টাদশ পুরাণগুলি যথাক্রমে ব্রহ্মপুরাণ, পদ্মপুরাণ, বিষ্ণুপুরাণ, শিবপুরাণ, ভাগবতপুরাণ, নারদীয়পুরাণ, মার্কণ্ডেয়পুরাণ, অগ্নিপুরাণ, ভবিষ্যপুরাণ, ব্রহ্মবৈবর্তপুরাণ, লিঙ্গপুরাণ, বরাহপুরাণ, স্কন্দপুরাণ, বামনপুরাণ, কূর্মপুরাণ, মৎস্যপুরাণ, গরুড়পুরাণ এবং সর্বশেষ ব্রহ্মাণ্ডপুরাণ। এই ১৮টি পুরাণকে মহাপুরাণ বলা হয়ে থাকে। সাত্ত্বিক, রাজসিক এবং তামসিক এই ত্রিবিধ গুণ অনুসারে পুরাণগুলিকে বিভাজিত করা হয়েছে যার পুঙ্খানুপুঙ্খ আলোচনা মৎস্যপুরাণে পরিলক্ষিত হয় (মৎস্যপুরাণ, ৫৩/৬৭-৬৮)। যেহেতু পূর্বেই উল্লেখ হয়েছে যে মহাপুরাণের ন্যায় উপপুরাণগুলির সংখ্যা আঠারটি এবং এগুলির নাম কূর্মপুরাণে লিপিবদ্ধ আছে (কূর্মপুরাণ, পূর্ববিভাগ, ১/১৭-২০)। অপরদিকে বৃহদ্রমপুরাণে উপপুরাণের যে তালিকার উল্লেখ রয়েছে সেগুলি হল আদি, আদিত্য, বৃহন্নারদীয়, নারদীয়, নন্দীশ্বর, বৃহন্নন্দীশ্বর, সাম্ব, ক্রিয়াযোগসার, কালিকা, ধর্ম, বিষ্ণুধর্মোত্তর, শিবধর্ম, বিষ্ণুধর্ম, বামন, বারুণ, নারসিংহ, ভার্গব এবং বৃহদ্রম। অন্যান্য পুরাণে এই পুরাণগুলির নামের পার্থক্য পরিলক্ষিত হয়। উপপুরাণগুলি মূলতঃ পুরাণের খিল অংশ। এগুলি মূলত পুরাণগুলি অপেক্ষা অর্বাচীন। পুরাণগুলির লক্ষণ প্রসঙ্গে বলা হয় যে -"সর্গশ্চ প্রতिसর্গশ্চ বংশো মন্বন্তরাণি চ। সর্বেষুতেষু কথ্যন্তে বংশানুচরিতঞ্চ যৎ।।" (বিষ্ণুপুরাণ, ৩/৬/২৫ এবং বায়ুপুরাণ, ৪/১০) অর্থাৎ পঞ্চলক্ষণ যথাক্রমে সর্গ (সৃষ্টি), প্রতिसর্গ (প্রলয়ের পরবর্তী সৃষ্টি বা নতুন সৃষ্টি), বংশ (দেবতা এবং ঋষিদের বংশবলী), মন্বন্তর (প্রতিটি মনুর শাসনকাল) এবং পঞ্চমটি হল বংশানুচরিত (রাজবংশ ইতিহাস)। পুরাণ সাহিত্যে সৃষ্টিতত্ত্ব, কখনও পানীয়, প্রকৃতি অর্থাৎ বৃষ্টি ও মেঘ প্রসঙ্গে, কখনও বা পশু-পাখি, বৃক্ষরোপন, ফুল-ফল প্রসঙ্গে বর্ণনা করতে গিয়ে পৰিবেশ-চিত্তনের যে দিকগুলি ফুটে উঠেছে তা সত্যই অনবদ্য।

শিবপুরাণে সৃষ্টিতত্ত্ব প্রসঙ্গে আলোচনা করতে গিয়ে দেখা যায় (শিবপুরাণ, জ্ঞানসংহিতা, ২/৩১) সৃষ্টির আদিতে শুধুমাত্র প্রকৃতি এবং পুরুষ বিদ্যমান ছিল। সেই অব্যক্ত প্রকৃতি থেকে মহতত্ত্ব, মহতত্ত্ব থেকে অহঙ্কার, অহঙ্কার থেকে ষোলটি বিকার অর্থাৎ মন, পঞ্চজ্ঞানেন্দ্রিয় (চক্ষু, কর্ণ, নাসিকা, জিহ্বা, ত্বক), পঞ্চকমেন্দ্রিয় (বাক্, পাণি, পাদ, পায়ু, উপস্থ), পঞ্চতন্মাত্র (শব্দ, স্পর্শ, রূপ, রস, গন্ধ) এবং এই পঞ্চতন্মাত্র থেকে পঞ্চমহাভূত (ক্ষিতি, অপ্, তেজ, মরুৎ, ব্যোম)

উৎপন্ন হয়ে থাকে। পুরুষকে যদি যুক্ত করা হয় তাহলে এটি হয় পঞ্চবিংশতি তত্ত্ব। সাংখ্যদর্শনেও এই পঞ্চবিংশতি তত্ত্বের পরিচয় মেলে, শ্লোকটি নিম্নরূপ - "প্রকৃতের্মহাংস্ততোহহঙ্কারস্তস্মাদগণশচ ষোড়শকঃ।

তস্মাদপি ষোড়শকাৎ পঞ্চভ্যঃ পঞ্চ ভূতানি।।" (সাংখ্যতত্ত্বকৌমুদী, কারিকা ২২)। বিষ্ণুপুরাণেও পুরুষোত্তম অর্থাৎ সর্বেশ্বর বিষ্ণুর দ্বারা সৃষ্টির বর্ণনার উল্লেখ রয়েছে (বিষ্ণুপুরাণ, ১/২/৩১-৪১)। "অতোহস্মি লোকে বেদে চ প্রথিতঃ পুরুষোত্তমঃ" (শ্রীমদ্ভগবদগীতা, ১৫/১৮) অর্থাৎ সমগ্র জগতে ও বেদে তিনি পুরুষোত্তম নামে পরিচিত। যিনি বিষ্ণু তিনি শ্রীকৃষ্ণ এবং তিনি হলেন দেবাদিদেব মহাদেব। অগ্নিপুরাণেও সৃষ্টিতত্ত্ব প্রসঙ্গে প্রায় একই আলোচনা মেলে। সেখানে বলা হয়েছে ভগবান বিষ্ণু তিনি হলেন নিগুণ ব্রহ্ম কিন্তু জগৎ সৃষ্টিতে তিনি সগুণ রূপ ধারণ করেছেন। ভগবান শ্রীকৃষ্ণ অর্জুনকে সগুণ ব্রহ্ম প্রসঙ্গে বর্ণনা করতে গিয়ে বলেছেন –

"অজোহপি সন্নব্যয়ান্না ভূতানামীশ্বরোহপি সন।

প্রকৃতিং স্বামধিষ্ঠায় সন্ত্বাম্যাত্মমায়য়া।।" (শ্রীমদ্ভগবদগীতা, ৪/৬)

অর্থাৎ তিনি হলেন জন্মরহিত, অবিনাশী। তিনি প্রকৃতি হন যোগমায়া দ্বারা। অগ্নিপুরাণে প্রকৃতি থেকে মহতত্ত্ব এবং সেই মহতত্ত্ব থেকে অহঙ্কারের উদ্ভব ঘটেছে। অহঙ্কার প্রসঙ্গে বলা হয়েছে অহঙ্কার যথাক্রমে দুই প্রকার বৈকারিক এবং তামসিক। বৈকারিক অহঙ্কার থেকে উৎপন্ন হয়েছে শব্দতন্মাত্র আকাশ এবং এই আকাশ থেকে স্পর্শতন্মাত্র বায়ু তারপর বায়ু থেকে রূপতন্মাত্র অগ্নি, অগ্নি থেকে রসতন্মাত্র জল এবং এই জল থেকে গন্ধতন্মাত্র পৃথিবী সৃষ্টি। অপরদিকে তামসিক অহঙ্কার থেকে তৈজস দশেন্দ্রিয় এবং দশেন্দ্রিয়ের অধিষ্ঠাতা দশ দেবতা ও মন উৎপন্ন হয়ে থাকে, এই মন যথাক্রমে একাদশ ইন্দ্রিয় নামে অভিহিত (অগ্নিপুরাণ, ১৭/৩-৬)। অপরদিকে মার্কণ্ডেয়পুরাণে সৃষ্টিতত্ত্ব আলোচনা অগ্নিপুরাণের অনুরূপ (মার্কণ্ডেয়পুরাণ, ৪৫/৩২-৫৫)। কিন্তু এখানে সাংখ্যদর্শনের ন্যায় অহঙ্কার হল ত্রিবিধ; সাত্ত্বিক, রাজস এবং তামস। বরাহপুরাণের দ্বিতীয় অধ্যায়ে, গরুড়পুরাণের পূর্বখণ্ডের চতুর্থ অধ্যায়ে সৃষ্টিতত্ত্ব প্রসঙ্গে আলোচনা করা হয়েছে। অপরদিকে কূর্মপুরাণের পূর্বভাগের চতুর্থ অধ্যায়ে পঞ্চমহাভূত প্রসঙ্গে আলোচনা করা হয়েছে। এগুলি হল পরিবেশের অন্তর্গত অজৈব উপাদান।

পঞ্চমহাভূতের মধ্যে অপ্ বা জল হল অতীব প্রয়োজনীয় বস্তু। যেকোন ধর্মীয় অনুষ্ঠানে, সন্ধ্যাবন্দনায়, তর্পণে, শ্রাদ্ধকল্পে জলের প্রয়োজন অবশ্যস্বাভাবী। অগ্নিপুরাণে জলের মাহাত্ম্য প্রসঙ্গে বর্ণনা করতে গিয়ে বলা হয়েছে অপ্ বা জল হল ভগবান হরি। এখানে কূপ, বাপী, তড়াগ প্রতিষ্ঠার কথা বর্ণনা করা হয়েছে। এমনকি এই পুরাণে বাপী, পুষ্করিণী, তড়াগ ইত্যাদি নির্মাণের ক্ষেত্রে কতটা পরিমাণ গভীরতা হওয়া প্রয়োজন তার যথার্থ বর্ণনা রয়েছে।

"অশ্বমেধসহস্রাণাং সহস্রং যঃ সমাচরেৎ।।

একাহং স্থাপয়েৎ তোয়ং তং পুণ্যমযুতায়ুতম্।।" (অগ্নিপুরাণ, ৬৪/৪২-৪৩)

অর্থাৎ সহস্র অশ্বমেধ যজ্ঞ করলে যে ফললাভ হয়ে থাকে যদি একাহ সলিল নির্মাণ করা হয় তাহলে অশ্বমেধ যজ্ঞ অপেক্ষা অযুতায়ুত ফললাভ হয়। অপ্ বা জল হল ঋগ্বেদে দেবতাবিশেষ। অপ্ দেবতার উদ্দেশ্যে যে মন্ত্রটি রয়েছে সেটি হল –

"আপো হিষ্ঠা ময়োভুবন্তা ন উৰ্জে দধাতন।

মহে রণায় চক্ষসো।" (ঋগ্বেদসংহিতা, ১০/৯/১)

অর্থাৎ এখানে অপ্ দেবতার উদ্দেশ্যে বলা হয়েছে যে, তিনি হলেন সুখের আধার। তিনি যেন অন্ন সঞ্চয় করে দেন। তিনি যেন বৃষ্টি দান করেন।

অগ্নিপুৰাণে সপ্তষষ্টিতমোহধ্যায়ে ভগ্ন-জীর্ণ কূপ, বাপী, তড়াগ এগুলি উদ্ধার বা সংস্কারের মাধ্যমে মহাফললাভের কথা বর্ণিত হয়েছে। ব্রহ্মপুরাণে ভারতবর্ষ প্রসঙ্গে আলোচনা করতে গিয়ে সমগ্র দেশের অন্তর্গত যে যে নদীর কথা বলা হয়েছে সেগুলি হল শতদ্রু, চন্দ্রভাগা, নর্মদা, সুরমা, তাপী, পয়োষী, কাবেরী, গোদাবরী, ভীমরথী প্রভৃতি। এখানে বলা হয়েছে যে, এই নদীগুলি নাম শ্রবণের মাধ্যমে জীবগণের পাপ দূরীভূত হয় (ব্রহ্মপুরাণ, ১৯/১০-১২)। নদীর প্রসঙ্গে আলোচনা বরাহপুরাণেও পাওয়া যায়। সেখানে উল্লেখযোগ্য নদীগুলি হল সীতা, অলকানন্দা, চক্ষু, ভদ্রা, ব্রহ্মপুত্র ইত্যাদি। এখানে বলা হয়েছে ব্রহ্মপুত্র নদীর জল পান করলে আরোগ্য প্রাপ্তি হয় (বরাহপুরাণ, ৮২/২)। অন্তঃতট রচিত তর্কসংগ্রহ গ্রন্থে অপ্ প্রসঙ্গে বলা হয়েছে, জল হল শীতস্পর্শ বিশিষ্ট। যেটি হল দুই প্রকার নিত্য এবং অনিত্য। নিত্য প্রসঙ্গে বলা হয়েছে এটি হল পরমাণুরূপ অপরদিকে অনিত্য হল কার্যরূপ। এই কার্যরূপ জল তিনপ্রকার। সেগুলি যথাক্রমে শরীর, ইন্দ্রিয় এবং বিষয়। শরীর প্রধানত বরণলোকে প্রসিদ্ধ হয়ে থাকে। জিহ্বার অগ্রে অবস্থিত জলীয় ইন্দ্রিয় রসনা। অপরদিকে জলাশয়, নদী, সমুদ্র ইত্যাদি জলীয় বিষয় রূপে অভিহিত (তর্কসংগ্রহ, পৃষ্ঠা ৩৭)। "বিশ্বস্য মাতরঃ সর্বাঃ সর্বাঃ পাপহরাঃ স্মৃতাঃ" (মার্কণ্ডেয়পুরাণ, ৫৭/৩১) নদী হল মাতৃস্বরূপা ও পাপনাশক। এছাড়াও মৎস্যপুরাণের অষ্টপঞ্চাশোহধ্যায়ে পুষ্করিণী, কূপ, তড়াগ, সরোবর প্রভৃতি নির্মাণের কথা বর্ণনা করা হয়েছে। সমস্ত দানের মধ্যে জলদান হল উত্তম দান। যদি কোন ব্যক্তি জলাশয় নির্মাণ করেন সেই ব্যক্তির কূল পাপমুক্ত হয় (শিবপুরাণ, ধর্মসংহিতা, ২২/১-৩)। যিনি তড়াগ নির্মাণ করেন তিনি সর্বদা পূজিত হন এবং সূর্যলোকে গমন করেন। অপ্ প্রসঙ্গে বর্ণনা করতে গিয়ে জলের উৎস হিসাবে বৃষ্টির প্রসঙ্গ এসেছে। বিষ্ণুপুরাণে বলা হয়েছে বিশ্বব্রহ্মাণ্ড রক্ষার জন্য বৃষ্টির প্রয়োজন অবশ্যম্ভাবী। বৃষ্টির জল প্রাণীকুলের জীবনদায়ী ওষধিগণের পোষণকারী। মেঘ থেকে নির্গত জলের মাধ্যমে ওষধিগণ বর্ধিত হয় তার ফলে প্রজা সকলের ঐহিক এবং পারলৌকিক কল্যাণসূচকের কারণ হয় (বিষ্ণুপুরাণ, ২/৯/১৯-২০)। অপরদিকে অতিবৃষ্টি অনেকসময় পরিবেশে বিপর্যয় ডেকে আনতে পারে। বৃষ্টির জলের দ্বারা যে শস্য উৎপন্ন হয় তার দ্বারা মানুষ জীবনধারণ করে (মৎস্যপুরাণ, ১২৬/৩৭)।

পরিবেশের অন্তর্গত প্রাণীজগৎ এবং উদ্ভিদজগৎ হল অত্যন্ত উল্লেখযোগ্য। পশু-পাখি প্রভৃতি রক্ষণাবেক্ষণ এবং সুস্থ ও সুন্দর পরিবেশের জন্য বৃক্ষরোপণ একান্ত কর্তব্য। যদি পুরাণগুলির দিকে আলোকপাত করা যায় তাহলে দেখা যাবে যে পুরাণসাহিত্য এ বিষয়ে যথেষ্টই সচেতন। পৌরাণিক বিশ্বকোষ নামে পরিচিত অগ্নিপুৰাণে গো-সম্পর্কে আলোচনা করতে গিয়ে বলা হয়েছে যে, "গাবঃ পবিত্রা মঙ্গল্যা গোষু লোকাঃ প্রতিষ্ঠিতাঃ" (অগ্নিপুৰাণ, ২৯২/১)। অর্থাৎ বলা হয়েছে যে গাবঃ বা সকল গো হল পবিত্র এবং মঙ্গলদায়ক এবং সকল লোক গো-এর মধ্যে প্রতিষ্ঠিত। পদ্মপুরাণে ভিন্ন ভিন্ন বর্ণযুক্ত গো-দান করলে কি কি ফললাভ হয়ে থাকে তার যথাযথ বর্ণনা পাওয়া যায়। এই প্রসঙ্গে ব্রহ্মা বলেছেন যদি কেউ ব্রাহ্মণকে শ্বেতবর্ণা গাভী দান করেন তাহলে সেই মানব ঐশ্বর্যশালী হন, তিনি প্রাসাদে বসবাস করেন এবং ভোগী হন। ধূস্রবর্ণা গাভী হল পাপনাশক। কপিলা বর্ণযুক্ত গাভী দান করলে অক্ষয় ফল লাভ হয়ে থাকে। অপরদিকে কৃষ্ণবর্ণা গাভী হল অবসাদ বিমোচক। জগৎসংসারে দুর্লভ গাভী হল পাণ্ডুরবর্ণা। গৌরবর্ণা গাভী কুলে বা বংশে আনন্দ প্রদান করে। যিনি

ৰূপকামী ব্যক্তি তিনি রক্তাক্তী গাভী ও যিনি ধনকামী ব্যক্তি তিনি দান করবেন নীলবর্ণা গাভী। সমগ্র জীবনে বাচিক ও মানসিক পাপ বিনষ্ট হয় কপিলা বর্ণা গাভী দানে (পদ্মপুরাণ, সৃষ্টিখণ্ড, ৪৮/১৬৭-১৭১)। মানুষের বন্ধু হল গো-গণ। যে ব্যক্তির গৃহে গো নেই তিনি হলেন বন্ধুরহিত। "গিরিযজ্ঞস্তুয়ং তস্মাদেগায়জ্ঞশ্চ প্রবর্ত্যতাম্" (ব্রহ্মপুরাণ, ১৮৭/৪৯) অর্থাৎ গো-সম্পদ হল মানবগণের কাছে বিবেচিত। ভগবান শ্রীকৃষ্ণের গো-যজ্ঞ হল তার সর্বোৎকৃষ্ট প্রমাণ। এই অধ্যায়ে বলা হয়েছে যে, সমগ্র গো এবং গর্জনকারী বৃষভের দল যজ্ঞের অস্তিমে গোবর্ধন পর্বত পরিক্রমা করেছিলেন (ব্রহ্মপুরাণ, ১৮৭/৫৮)। এমনকি ইন্দ্রের পূজা পালিত না হওয়ার দরুণ ইন্দ্রের কোপে একটানা সাতদিন প্রবল বারিবর্ষণের মাধ্যমে গো-সকল এবং গোপ-গোপিনীদের জীবন পীড়িত হয়। ভগবান শ্রীকৃষ্ণ তাঁর অঙ্গুলির দ্বারা গোবর্ধন পর্বত তুলে ধরে সমগ্র গোকুলকে রক্ষা করেছিলেন (ব্রহ্মপুরাণ, ১৮৮/১৪)। বিষ্ণুপুরাণেও অনুরূপ কাহিনী পাওয়া যায়। পদ্মপুরাণে বিভিন্ন বন্য জীবজন্তুর আলোচনা পাওয়া যায় (পদ্মপুরাণ, সৃষ্টিখণ্ড, ১৮/২৮০-২৮৩)। অগ্নিপুরাণে ছাগ, ঐরাবত, মৃগ, শশ, বানর ইত্যাদি পশুদের পূজার কথা এবং দেবতার উদ্দেশ্যে তাদের উৎসর্গের কথা বর্ণিত হয়েছে (অগ্নিপুরাণ, ৩৩/৪৬-৪৮)। এই পুরাণে বিভিন্ন গ্রাম্য এবং বন্য পশু-পাখি সম্বন্ধে আলোচনা রয়েছে (অগ্নিপুরাণ, ২৩১/১১-২০)। বিভিন্ন পাখির আলোচনা প্রসঙ্গে পুরাণে কথিত আছে যে, সত্যযুগে দৈত্যরাজ হিরণ্যকশিপু রাজ্যে সরোবরে বিভিন্ন পক্ষী বিরাজ করত। প্রিয়দর্শন, কারণ্ডব, চক্রবাক, সারস, কুরুর এবং অন্যান্য স্ফটিকের ন্যায় পাখি। এমনকি সেখানে হংসেরা গান করছে ও সেই গান শুনে সারসরবে সরোবর আরও মুখরিত হচ্ছে (পদ্মপুরাণ, সৃষ্টিখণ্ড, ৪৫/৫১-৫২), প্রকৃতির কি অপরূপ মেলবন্ধন ঘটেছে এই পুরাণে। মার্কণ্ডেয়পুরাণে কর্মফলজনিত কারণে মানুষ পরজন্মে কি কি রূপে জন্মগ্রহণ করতে পারে তার বর্ণনা দিতে গিয়ে বিবিধ পশুপাখির আলোচনা এসেছে। যেমন বলা হয়েছে; কোন পতিত ব্যক্তির অর্থ চুরি করলে ব্রাহ্মণের জন্ম হয় গর্দভ রূপে, তারপর উপাধ্যায়ের কাছে ছল করলে বা তার ভার্য্যা বা তার কোন বস্তুতে যদি অভিলাষ জন্মায় তাহলে কুকুর জন্ম হয়ে থাকে, যদি কোন ব্যক্তি মাতা-পিতার অবমাননা করেন তাহলে সে গর্দভ হয় ইত্যাদি (মার্কণ্ডেয়পুরাণ, ১৫/১-১৭ এবং ২৪-২৯)।

বিভিন্ন পাখির বর্ণনা পাওয়া যায় পুরাণগুলিতে। ব্রহ্মাণ্ডপুরাণে বলা হয়েছে যে সমগ্র বৃন্দাবন জুড়ে রয়েছে পাখির কলরব। সারস-সারসী, চক্রবাক-চক্রবাকী, হংস-হংসী প্রভৃতি পাখির কলতানের যুগলবন্দী এ যেন প্রকৃতির অপরূপ দৃশ্য। মৎস্যপুরাণেও বিভিন্ন কাহিনীর মধ্য দিয়ে পশুপাখি ও অসংখ্য জন্তুর আলোচনা পাওয়া যায়। উল্লেখ আছে যে মদ্রদেশের অধিপতি পুরুরবা গিরীন্দ্রপাদদেশে উদ্যান দর্শনের সময় প্রচুর পশুপাখি দেখেছিলেন। এখানে মহর্ষি অত্রির আশ্রম অবস্থিত ছিল। মদ্রপতি সেখানে অসংখ্য পশুপাখি এবং অসংখ্য জন্তু দর্শনে অত্যন্ত বিস্ময়ভাবাপন্ন হয়েছিলেন (মৎস্যপুরাণ, ১১৮/৪৮-৬১)। কূর্মপুরাণে যে সমস্ত পাখির হত্যা ও ভক্ষণ নিষিদ্ধ সেগুলি হল; বক, হাঁস, দাত্যহ, কলবিষ্ক বা চড়াই, শুক, কুরুর (চিল জাতীয় পাখি), জালপাদ, কোকিল ইত্যাদি (কূর্মপুরাণ, উপরিভাগ, ১৭/৩১-৩২)। যে যে পশুহত্যা নিষিদ্ধ তার পুঙ্খানুপুঙ্খ আলোচনা রয়েছে এই পুরাণে (কূর্মপুরাণ, উপরিভাগ, ১৭/৩৩-৩৪)। বায়ুপুরাণে বলা হয়েছে যে যদি কোন ভিক্ষু অনিচ্ছাকৃতভাবে পশু ও মৃগাদির হিংসা করেন তাহলে তিনি কৃচ্ছাতিকৃচ্ছ চান্দ্রায়ণ ব্রতের অনুষ্ঠান করবেন। এই প্রসঙ্গে যে শ্লোকটি রয়েছে সেটি হল –

"অকামাদপি হিংসেত যদি ভিক্ষুঃ পশুন মৃগান।

কৃচ্ছাতিকৃচ্ছং কুবীরীত চান্দ্রায়ণমথাপি বা।।" (বায়ুপুরাণ, ১৮/১৬)।

এই প্ৰসঙ্গে বেদান্তসারে বলা হয়েছে যে, "প্ৰায়শ্চিত্তানি পাপক্ষয়মাত্রসাধনানি চান্দ্ৰায়ণাদীনি" (বেদান্তসার, পৃষ্ঠা ২৯) অর্থাৎ প্ৰায়শ্চিত্তের উল্লেখযোগ্য দৃষ্টান্ত হল চান্দ্ৰায়ণ ব্রত। অর্থাৎ যে ব্রতের ক্রিয়া হল চন্দ্ৰের ন্যায় হ্রাস-বৃদ্ধিশীল। পুরাণগুলিতে বিভিন্ন পশু-পাখির হত্যার নিষেধ প্ৰসঙ্গে যে আলোচনা পাওয়া যায় তা থেকে এটি স্পষ্ট যে পৌরাণিক যুগে পশুপাখি সংৰক্ষণ বিষয়ে মানুষ যথেষ্ট সচেতন ছিল। পরবর্তীকালে পুরাণসাহিত্যের তত্ত্বকে কেন্দ্র করে পৰিবেশের সার্বিক সংৰক্ষণের জন্য কিছু আইন প্ৰণয়ন হয় যেগুলি বন্য পশু প্ৰাণীদের রক্ষার জন্য প্ৰযোজ্য; সেগুলি হল বন্যপক্ষি-ৰক্ষণ আইন ১৯০৫, বন্যপ্ৰাণী (ৰক্ষণ) আইন ১৯৭২ ইত্যাদি।

বৃক্ষ হল পৰিবেশের অমূল্য সম্পদ। পুরাণগুলির দিকে যদি আলোকপাত করা হয় তাহলে দেখা যাবে যে; পৌরাণিকগণ বৃক্ষ সংক্রান্ত বিষয়ে অত্যন্ত সচেতন ছিলেন যার প্ৰমাণ হল বৃক্ষৰোপণ, বৃক্ষের মাহাত্ম্য প্ৰভৃতি সম্পর্কে বিস্তৃত আলোচনা। ব্ৰহ্মপুৰাণে উল্লেখ রয়েছে যে নৈমিষারণ্য হল অতীব পবিত্ৰ স্থান এবং সেখানে বিভিন্ন বৃক্ষ, পুষ্প বিৰাজিত। সেগুলি হল শাল, কৰ্ণিকার, পনস, খদির, আম্র, জম্বু, কপিথ, ন্যাগ্ৰোধ, দেবদারু, অশ্বথ, পారిজাত, চন্দন, অগরু, পাটল, বকুল, সপ্তপৰ্ণ, পুন্নাদ নাগকেশর, তাল, তমাল, নারিকেল, অৰ্জুণ এবং চম্পকাদি বিবিধ বৃক্ষ (ব্ৰহ্মপুৰাণ, ১/৩-৭)। গৃহের কোন দিকে কি কি বৃক্ষ রোপন করা উচিত তার যথাযথ বৰ্ণনা পাওয়া যায় পুৰাণে। সেগুলি হল ভবনের উত্তরদিকে প্লক্ষ বৃক্ষ, পূর্বদিকে থাকবে বট বৃক্ষ, দক্ষিণদিকে আম এবং পশ্চিমদিকে অশ্বথ বৃক্ষ রোপন করা অত্যন্ত কল্যাণকর। কন্টকক্রম বৃক্ষ যদি গৃহের নিকটে দক্ষিণদিকে উৎপন্ন হয় তাহলে তা শুভ বলে গণ্য। এমনকি বাসগৃহের মধ্যে উদ্যান বা পুষ্পিত তিলশস্য বিৰাজের কথা বলা হয়েছে (অগ্নিপুৰাণ, ২৮২/১-২)। এমনকি বৃক্ষগুলি রোপনের মধ্যে কতটা পৰিমাণ ব্যবধান থাকবে তার আলোচনাও রয়েছে এই অধ্যায়ে। মৎস্যপুৰাণেও বাসগৃহে কোন কোন বৃক্ষ শুভ বা অশুভ তার উল্লেখ পাওয়া যায় (মৎস্যপুৰাণ, ২৫৫/২০-২৪)। বৃক্ষ থেকে উৎপন্ন আয়ুৰ্বেদীয় বিভিন্ন ওষুধ যার দ্বারা রোগ নিৰাময় হয় সেই আলোচনা রয়েছে অগ্নিপুৰাণের ২৭৯ তম অধ্যায়ে এবং ২৮০ তম অধ্যায়ে সৰ্বরোগের নাশের ওষুধ সম্পর্কে আলোচনা করা হয়েছে। বিষুপুৰাণেও ঔষধীর আলোচনা পাওয়া যায় সেগুলি হল ব্ৰীহি, যব, গোধূম, অণু বা ক্ষুদ্ৰধান্য, তিল, প্ৰিয়ঙ্গু, উদার, কোরদূষ (কেদার ধান্য), চীনক, মাষ, মুদগ, মসূর, নিষ্পাব (শিজ্যা), কুলথক, আঢ্যক্য বা অড়হর, চণক বা ছোলা এবং শণ এই সতেরো প্ৰকার ঔষধি হল গ্রাম্যা ব্ৰীহি, যব, মাষ, গোধূম, অণু, তিল, প্ৰিয়ঙ্গু, কুলথক, শ্যামাক, নীবার, জৰ্ভিল (বন্য তিল), গবেধুক (দেধান), বেণুযব এবং মৰ্কটক গ্রাম্য ও আরণ্য এই চোদ্দ প্ৰকার ঔষধী যজ্ঞীয় অর্থাৎ যজ্ঞনিষ্পত্তির কাজে ব্যবহৃত ও যজ্ঞ হল এই উভয়বিধের পৰম হেতু (বিষুপুৰাণ, ১/৬/২১-২৬)। যেহেতু পুৰাণগুলিতে দেবদেবীর উপাসনা, বিভিন্ন দেবদেবীর মাহাত্ম্য, বিভিন্ন পূজার নিয়ম ইত্যাদি সংক্রান্ত বিষয় অধিক মাত্ৰায় সমাদৃত হয়েছে, তাই বিভিন্ন দেবতার অর্চনা প্ৰসঙ্গে বিবিধ ফুলের উল্লেখ রয়েছে। ভগবান শিবের আৰাধনা প্ৰসঙ্গে শিবপুৰাণে যে যে ফুলের কথা রয়েছে সেগুলি যথাক্রমে- অৰ্ক, প্ৰতাপ, কুঞ্জ, জবাকুসুম, করবী, বন্ধুক, জাতী, অতসী, মল্লিকা, যুথিকা, কৰ্ণিকার, নিগুণ্ডী ইত্যাদি। এমনকি উপরিউক্ত পুষ্প সহযোগে শিবের আৰাধনা করলে কি ফলপ্ৰাপ্তি হয় তার আলোচনাও করা হয়েছে (শিবপুৰাণ, জ্ঞানসংহিতা, ২৯/২৬-৩০)। অপরদিকে মৎস্যপুৰাণেও ভগবান শিবের পূজা প্ৰসঙ্গে বিভিন্ন ফুলের নামের উল্লেখ আছে (মৎস্যপুৰাণ, ৬০/৩৮-৩৯)। বায়ুপুৰাণে ৩৮ তম অধ্যায়ে সিদ্ধ সেবিত গিরিশ্ৰেণী দক্ষিণদিকে অবস্থিত তাদের মধ্যে অচলেন্দ্র শিশির এবং পতঙ্গ উভয় পৰ্বতের মধ্যবর্তী স্থানে উদুম্বর বন বিৰাজমান। সেই বনে নানা প্ৰজাতির বিহঙ্গ, বৃক্ষ রয়েছে। এই দুই পৰ্বতের মধ্যভাগে তাম্রবৰ্ণ সরোবরের পূর্বতীরে আম্রবন বিদ্যমান। গন্ধৰ্ব, কিন্নর, যক্ষ, নাগ এবং বিদ্যাধরগণ আম্রবন পান করেন। কৃষ্ণ ও পাণ্ডু নামক শৈলবরের মধ্যবর্তী স্থানে যে দেশটি বিৰাজমান সেখানে

অবস্থিত সরোবরে স্থল-পদ্মিনী বিদ্যমান এবং সেখানে রয়েছে ন্যগ্রোধ বৃক্ষ (বায়ুপুরাণ, ৩৮/৪৯-৫৫)। পদ্মপুরাণের সৃষ্টিখণ্ডে অশ্বখ বৃক্ষরোপণ এবং বৃক্ষটির মাহাত্ম্য প্রসঙ্গে যথাযথ আলোচনা রয়েছে। কথিত আছে যে –

"অশ্বখেনৈব ভক্ষ্যেণ রোপণেনৈব যৎফলম্।

তদ্বৈ ক্রতুশতৈর্নৈব পুত্রৈরেব শতৈরপি।" (পদ্মপুরাণ, সৃষ্টিখণ্ড, ৫৮/৮)

অর্থাৎ, ভক্ষ্য অশ্বখ বৃক্ষরোপণে যে ফল লাভ হয়ে থাকে শত যজ্ঞ বা শত পুত্র দ্বারাও অনুরূপ প্রাপ্তি হয় না। এই অধ্যায়ে আরও বলা হয়েছে যে প্রখর তাপে যদি কোন প্রাণী, দেব, দ্বিজ, পশুগণ এই বৃক্ষের আশ্রয় নেয় তাহলে বৃক্ষ রোপন কর্তার অক্ষয় স্বর্গপ্রাপ্তি হয়। এমনকি এখানে এটিও বলা হয়েছে যে স্নানাদির পর যদি কোন ব্যক্তি এই বৃক্ষ স্পর্শ করে তাহলে তিনি পাপ থেকে মুক্ত হন। এই বৃক্ষের মূলে রয়েছেন বিষ্ণু, মধ্যে অবস্থিত এবং অগ্রভাগে ব্রহ্মা (পদ্মপুরাণ, সৃষ্টিখণ্ড, ৫৮/২০)। ভগবদগীতায় ভগবান শ্রীকৃষ্ণ বলেছেন পরমেশ্বর হলেন মূল, ব্রহ্মা হলেন প্রধান শাখা। অর্থাৎ সংসাররূপ অশ্বখ বৃক্ষ হল অবিনাশী এবং বেদসমূহ হল এর পত্র। যে ব্যক্তি (ব্রহ্ম) অশ্বখ বৃক্ষকে জানেন তিনি হলেন বেদবিৎ (শ্রীমদ্ভগবদগীতা, ১৫/১)। কঠোপনিষদেও সংসাররূপ অশ্বখ বৃক্ষের কথা বলা হয়েছে, যার শাখাগুলি নিম্নদিকে অবস্থান করে এবং যার মূল হল ব্রহ্মা যিনি সর্বলোকের আশ্রয়দাতা (কঠোপনিষদ, ২/৩/১)। বিষ্ণুপুরাণে কথিত আছে যে ব্যক্তি অকারণবশত বৃক্ষচ্ছেদন করে সেই ব্যক্তি অসিপত্রবন নরকে গমন করে (বিষ্ণুপুরাণ, ২/৬/২৩)।

পরিবেশ ভাবনার অপর একটি গুরুত্বপূর্ণ বিষয় হল গৃহাদি বাস্তু নির্মাণ। এক, দুই, তিন, চার, আট শালা এই ধরনের গৃহগুলি মূলতঃ কোন দিকে নির্মিত হবে তার যথাযথ বর্ণনা পাওয়া যায়। এমনকি পাকশালা, পশুশালা, শয়নগৃহ প্রভৃতি গৃহের কোন দিকে নির্মিত হবে তার আলোচনাও রয়েছে (অগ্নিপুরাণ, ১০৫/ ২৩-৩২)। অপরদিকে মৎস্যপুরাণে ২৫৪ তম অধ্যায়ে চতুঃশাল বাস্তুর স্বরূপ এবং সেগুলির কি কি নাম সেই আলোচনা পাওয়া যায়।

উপরিউক্ত আলোচনা থেকে এই সিদ্ধান্তে উপনীত হওয়া যায় যে পুরাণসাহিত্যে পরিবেশ ভাবনা অধিক মাত্রায় সমাদৃত হয়েছে। পুরাণসাহিত্য গুলিতে জলের ব্যবস্থা, পশু-পাখি, গাছপালা, বাস্তুনির্মাণ এগুলির আলোচনার মাধ্যমে বোঝা যায় পৌরাণিক যুগে মানুষ পরিবেশ সংরক্ষণ বিষয়ে অত্যন্ত সচেতন ছিলেন। প্রাচীন যুগে জনসংখ্যা ছিল অনেক কম। ধীরে ধীরে নগরায়ন, শিল্পায়ন হওয়ার সাথে সাথে বন্যপক্ষী, পশু, গাছপালা এগুলি বিষয়ে সতর্কতা বাড়তে থাকে। পুরাণে পরিবেশ সচেতনতার কথা মাথায় রেখেই পরবর্তীকালে পরিবেশবিদরা পরিবেশ সংক্রান্ত বিষয়ে বিভিন্ন আইন প্রণয়ন করেন যা আগামী দিনে সমগ্র পৃথিবীকে সুস্থ ও সুন্দরভাবে গড়ে তুলতে সহায়তা করবে।

গ্রন্থপঞ্জি

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Use of ChatGPT in the Library Services: Prospects and Challenges

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Structured Abstract:

Purpose: This article aims to analyze the growing trend to implementation of ChatGPT an AI driven chatbot in library services and explore its prospects and challenges.

Design / Methodology / Approach: This study integrates a range of research articles and conceptual frameworks to identify and analyze how ChatGPT might influence library services. The methodology used here involves comprehensive review and synthesis of existing literature and empirical analysis related to the use of artificial intelligence in libraries while focusing on various aspects such as user experience, information retrieval, and the role of librarians.

Findings: The study reveals several promising issues with ChatGPT integration within library services. It leads to an increase in service accessibility, expansion of working hours, and more individualized user assistance. In addition, information retrieval may be significantly augmented and librarian routine work mitigated by using ChatGPT chatbot. However, this analysis also shows several challenges such as accuracy issues, security concerns, privacy threats etc. in order to implement ChatGPT in library services.

Utility / Significance: This study adds value towards the framing of future research work and directing practical plans for incorporating ChatGPT into library services. This article tries to highlight on the appropriate use of AI technologies in a contemporary library space.

Keywords: ChatGPT, Chatbots, Library Services, Artificial Intelligence, User Experience, Information Retrieval, Prospects, Challenges, Ethical Considerations

Type / Nature of Article: Conceptual Paper.

Introduction

Libraries have long been recognized as repositories of knowledge, serving as hubs for learning, research, and community engagement. However, with the advent of the internet and digital technologies, the role of libraries has expanded beyond their physical walls. The digital era has ushered in a paradigm shift in how information is accessed, consumed, and shared. Consequently, libraries have embraced digitalization to stay relevant in the

contemporary information landscape. One of the latest technological advancements poised to revolutionize library services is the integration of artificial intelligence (AI), particularly conversational agents such as ChatGPT. The purpose of this study is to investigate the potential applications and difficulties of ChatGPT in library services.

The digital era has brought several major changes in the pattern of library services. These include several key trends:

Online Catalogs and Databases: Traditional card catalogs have been replaced by online databases and catalogs, offering users convenient access to vast collections of digital resources.

E-resources and Digital Libraries: Libraries now provide access to a wide array of electronic resources, including e-books, journals, databases, and multimedia content, catering to the diverse information needs of users.

Remote Access and Virtual Services: With the proliferation of internet connectivity, libraries have expanded their services beyond physical locations, offering remote access to resources, online reference services, and virtual programming.

Despite these advancements, libraries continue to face challenges in meeting the dynamic information needs of users in an increasingly digital environment. One such challenge is the need to provide personalized and efficient assistance to patrons navigating the vast sea of information available online. It is within this context that AI-powered conversational agents like ChatGPT hold significant promise for transforming library services.

What is ChatGPT

ChatGPT is built on the GPT i.e., Generative Pre-trained Transformer architecture, and the acronym highlights the important features of this AI model:

Generative: Using the patterns and context they have learnt from training data, GPT models are able to produce new content. They are able to write meaningful, contextually appropriate material that sounds human.

Pre-trained: The models have learned a vast range of linguistic patterns, grammar, facts, and context thanks to pre-training on enormous amounts of text data from numerous sources. The foundation for their ability to generate excellent work is laid by this pre-training procedure.

Transformer: The Transformer architecture, a neural network model appropriate for natural language processing applications, serves as the foundation for GPT models. The

Transformer design uses parallel processing and self-attention techniques to achieve this.

The emergence of ChatGPT begins with the development of artificial neural networks and the broader field of natural language processing (NLP). As early as the 1950s, researchers were exploring ways to teach computers to understand and generate human language. However, significant breakthroughs in deep learning, fueled by advances in computational power and data availability, paved the way for more sophisticated language models.

One pivotal moment came with the introduction of OpenAI's GPT architecture in 2018. This groundbreaking model demonstrated remarkable capabilities in understanding and generating human-like text based on large datasets. It marked a significant leap forward in NLP and laid the groundwork for subsequent iterations, including ChatGPT. ChatGPT chatbot was launched on November 30, 2022 which allows users to fine-tune and guide a conversation towards a desired duration, format, style, level of detail, and language based on a large language model. Prompt engineering is the practice of considering each dialog stage as a context while providing a series of prompts and replies. ChatGPT gained over 100 million users by January 2023, making it the fastest-growing consumer software application in history. This helped to elevation OpenAI's valuation to \$29 billion. Following the launching of ChatGPT, similar AI chatbots such as Gemini, Ernie Bot, LLaMA, Claude, and Grok were also released. Experts were expressed their concern regarding ChatGPT's and related applications' ability to undermine or atrophy human intelligence, facilitate plagiarism, or spread false information.

As ChatGPT has progressed, it has undergone several iterations, each introducing enhancements and improvements to its capabilities. Let's delve into the journey of ChatGPT through its various versions, uncovering the evolution of this transformative technology.

ChatGPT v1.0: The Pioneering Stage

The first iteration of ChatGPT laid the foundation for future developments. When ChatGPT v1.0 was unveiled as an experimental prototype, it demonstrated how large-scale pre-training could be used to support natural and interesting user chats. This version, however basic in comparison to later versions, showed the potential of AI-driven dialogue systems and generated enthusiasm both inside and outside of the academic community.

ChatGPT v1.5: Refinement and Enhancement

ChatGPT v1.5 built on the achievements of its predecessor, represented a major advancement in conversational AI development. Improvements to answer quality, coherence, and context awareness were made in this iteration. ChatGPT v1.5 further blurred the boundaries between human and machine communication by delivering more nuanced and contextually appropriate interactions by utilizing advances in training methodologies and model design.

ChatGPT v2.0: Expansion and Diversification

The platform had a significant increase in its functionalities and applications with ChatGPT v2.0. With the improvements made in this version, user interactions are now more fluid and dynamic and can support multi-turn talks. Additionally, ChatGPT v2.0 expanded its customer service and industry reach to include education, mental health support, and language acquisition, among other domains and sectors. This version's adaptability cemented ChatGPT's standing as a game-changing instrument for improving user experiences and spurring innovation.

ChatGPT v2.1: Iterative Improvements

A phase of iterative enhancements aimed at resolving user feedback and improving performance was represented by ChatGPT v2.1. This version included optimizations to increase comprehension of complex questions, reduce contextual inconsistencies, and improve response coherence. Furthermore, measures were taken to reinforce privacy safeguards and alleviate any possible ethical issues related to conversational agents powered by artificial intelligence.

ChatGPT v3.0: Advancing the State of the Art

ChatGPT developed in tandem with the advancement of AI technology. Version 3.0 brought new developments meant to push the limits of natural language creation and understanding. In order to adapt and learn from user interactions in real-time, this iteration made use of cutting-edge approaches, such as fine-tuning on domain-specific datasets and implementing feedback mechanisms. In the search for conversational agents that are more intelligent and contextually aware, ChatGPT v3.0 marked a significant advancement.

ChatGPT v3.5: Enhancing Responsiveness and Robustness

ChatGPT, version 3.5 adds improvements to improve responsiveness and resilience while building on the framework set by its predecessors. To provide more precise and cohesive

results, this version integrates improvements in model architecture, training approaches, and data pretreatment techniques. Furthermore, ChatGPT v3.5 places a high priority on user privacy and security, putting strong measures in place to stop the spread of false information and lessen any hazards connected to content generated by artificial intelligence.

ChatGPT v4.0: Looking Towards the Future

The most recent version is ChatGPT version 4.0. The most sophisticated language model ever created, the GPT-4, serves as its foundation. Compared to Legacy ChatGPT v3.5, ChatGPT v4.0 is quicker and more precise. All of the features available in previous ChatGPT versions are still present in ChatGPT v4.0, however it operates faster and more accurately. At the moment, paying users can access it.

Objective of the Study

The objectives of this article as follows:

- ❖ To clarify the possible advantages of using ChatGPT in libraries, such as better user experience, easier access to information, and faster response times for user questions.
- ❖ To recognize and handle the different challenges that could appear, like ethical issues, accuracy constraints, and user acceptability.
- ❖ To provide significant perspectives on the efficient application of ChatGPT in library environments, consequently promoting the progress of inventive technologies in the field of information services.

Scope of the Study

ChatGPT technology can be incorporated into different library services, such as knowledge sharing, information retrieval, and user support. There are possible advantages of using ChatGPT in libraries, including increased user engagement, efficiency, and accessibility.

Limitations of the Study

Since ChatGPT is still a relatively new technology in the field of LIS, there is a dearth of empirical study on the topic that is explicitly focused on its use in library services. The article may not adequately examine the sustainability and long-term consequences of ChatGPT integration in library services. The study might have overlooked unforeseen difficulties or

unintended repercussions that might result from ChatGPT being widely used in library settings.

Review of Literature

Lund, B. D., Khan, D., & Yuvaraj, M. (2024) clarifies ChatGPT's uses in medical libraries and addresses pertinent issues. ChatGPT's integration with medical library services has the potential to improve user experience and information retrieval for the benefit of both library patrons and the larger medical community.

Kirtania, D. K. (2023) examined the possible advantages of ChatGPT for library and information science (LIS) professionals. Author asked ChatGPT three insightful questions: How might information science and library professionals benefit from ChatGPT? How can ChatGPT help patrons of libraries? What obstacles and constraints does ChatGPT encounter when offering library services? The responses given by ChatGPT show that it can help library professionals and users in a number of ways, including information management, research support, language assistance, reference assistance, and access to library resources. The answer to the third question discusses some of the difficulties and issues that the study also identifies, including accessibility, lack of personalization, accuracy and reliability, and limited scope.

Mali and Deshmukh (2023) explore the benefits and challenges associated with the use of Chat GPT in library services. This could involve discussing how Chat GPT enhances accessibility, improves efficiency in handling user inquiries, and expands the reach of library services. On the other hand, they may also address potential drawbacks such as limitations in understanding complex queries, inaccuracies in responses, and concerns regarding user privacy and data security. The article likely provides insights into the integration of Chat GPT in library services, offering recommendations for maximizing its effectiveness while mitigating potential challenges.

Aithal, S., & Aithal, P. S. (2023) discussed artificial intelligence (AI) technology are predicted to either supplement or replace a wide range of services across numerous industries. All industry sectors can benefit from the professional information that AI-based GPTs can offer. It is therefore decided to investigate the possibilities of replacing the traditional libraries of higher education institutes with ChatGPT. Some recommendations are presented on the usage of AI-GPTs in Higher Education based on its advantages and benefits to the

readers of physical or intangible resources provided in libraries, based on study, comparison, and assessment of ChatGPT with traditional and digital library systems. It is discovered that in terms of offering specialized information support, AI-based GPTs are anticipated to be a supplement to conventional libraries.

Yamson (2023) focused on evaluating the limitations associated with the utilization of ChatGPT in library services, particularly concerning the concept of immediacy. Immediacy refers to the ability to provide prompt and timely assistance to users' inquiries and needs.

Xiao, H. (2023) highlighted ChatGPT has garnered a lot of attention within the library service. With substantial benefits that could upend the library sector in the future, ChatGPT is trained on sophisticated model building and is capable of producing natural and fluid text chats as well as effectively comprehending human language. The technical aspects of ChatGPT are examined in this study, along with their implications, difficulties, and solutions for libraries' operations. The study intends to foster innovation and advancement in library work as well as better comprehension and utilization of ChatGPT in libraries.

Verma, M. (2023) discussed the subset of human general intelligence patterns, trends, attitudes, or biases that have an effect on the socio-digital imprints of human activity is thought to comprise AI-based data. AI-based data is meant to emulate the virtual equivalent of karmas seen in web 3.0 avatars, as well as the mining of big data's linked notions in everyday life. With the simplicity of language convergence, AI-based data can greatly enhance the substance and application of context, allowing for the modification of sustainable aims. The introduction of AI-based digital chatbots with data veracity has substantially improved the digital library concepts of 24/7 days of continuous voluntary activity of data sharing and retrieval with digital search with varied activities.

Prathibha and Shilpa Rani (2021) advocated for the adoption of ChatGPT as a valuable tool for modernizing library services and meeting the evolving needs of library users. It contributes to the discourse on the integration of AI technologies in libraries and provides insights into the opportunities and considerations associated with deploying ChatGPT in this context.

Prospects of Using ChatGPT in Library Services

The integration of ChatGPT into library services offers several benefits that enhance user experiences and optimize service delivery. Some of the key advantages include:

- **24/7 Availability:** ChatGPT enables libraries to provide round-the-clock assistance to patrons, irrespective of operating hours. Users can access information and support at any time, enhancing convenience and accessibility.
- **Instant Responses:** ChatGPT delivers instantaneous responses to user queries, reducing wait times and improving overall efficiency in addressing patron needs. This quick turnaround time enhances user satisfaction and engagement.
- **Personalized Assistance:** Through natural language processing capabilities, ChatGPT can offer personalized assistance tailored to individual user preferences and requirements. By understanding user queries in context, ChatGPT can provide more relevant and customized responses, enhancing the user experience.
- **Enhanced Information Retrieval:** ChatGPT streamlines the process of information retrieval by quickly identifying relevant resources and delivering targeted recommendations to users. Its ability to comprehend natural language queries enables more effective and efficient access to library resources and services.
- **User Engagement:** ChatGPT facilitates conversational interactions that mimic human communication, thereby promoting user engagement and interaction with library services. Users may feel more comfortable asking questions and seeking assistance through a chat interface, leading to increased usage of library resources.
- **Scalability:** ChatGPT's scalability allows libraries to handle a large volume of user inquiries simultaneously without significant resource constraints. As user demand fluctuates, libraries can easily scale up or down their ChatGPT deployment to meet evolving needs.
- **Cost-Effectiveness:** Implementing ChatGPT in library services can be cost-effective compared to traditional service delivery methods. By automating routine tasks and inquiries, libraries can optimize staff resources and allocate personnel to more complex and value-added tasks.
- **Multilingual Support:** ChatGPT's multilingual capabilities enable libraries to cater to diverse user populations with varying language preferences. Libraries can provide support and services in multiple languages, thereby enhancing inclusivity and accessibility for all patrons.
- **Data Analytics and Insights:** ChatGPT generates valuable data and insights about user interactions, preferences, and frequently asked questions. Libraries can leverage this data to gain a deeper understanding of user needs and behaviors, informing service improvements and resource allocation decisions.
- **Innovative Service Delivery:** Integrating ChatGPT into library services demonstrates a commitment to innovation and technology adoption, positioning libraries as modern, forward-thinking institutions. It allows libraries to stay relevant in an increasingly digital world and attract tech-savvy users.

Overall, the benefits of using ChatGPT in library services contribute to improving user satisfaction, efficiency, and accessibility while enabling libraries to adapt to changing user expectations and technological advancements.

Challenges Using ChatGPT in Library Services

While ChatGPT offers several advantages in library services, its integration also presents certain challenges that should be carefully considered. Some of the key challenges include:

- **Limited Understanding of Context:** ChatGPT may struggle to accurately interpret complex or nuanced user queries, leading to misunderstandings or irrelevant responses. Its lack of contextual understanding can result in inaccurate or incomplete information being provided to users, diminishing the quality of service.
- **Accuracy Limitations:** Despite advancements in natural language processing, ChatGPT may still exhibit inaccuracies or errors in understanding and responding to user inquiries. Misinterpretations or incorrect information provided by ChatGPT can undermine user trust and confidence in library services.
- **Ethical Concerns:** The use of ChatGPT raises ethical considerations regarding data privacy, user consent, and transparency. Libraries must ensure that user data collected through ChatGPT interactions is handled ethically and responsibly, adhering to relevant privacy regulations and guidelines.
- **Bias and Fairness:** ChatGPT may inadvertently perpetuate biases present in the data it was trained on, leading to biased or unfair responses to user queries. Libraries must address issues of bias and fairness in ChatGPT's training data and implementation to ensure equitable access to information and services for all users.
- **User Dependency:** Over-reliance on ChatGPT as a primary means of user interaction may discourage users from seeking assistance from human librarians or exploring alternative resources. This dependency on ChatGPT can limit user engagement and interaction with library staff, potentially hindering the development of meaningful relationships and personalized support.
- **Technical Challenges:** Implementing and maintaining ChatGPT in library services requires technical expertise and resources, including software development, integration with existing systems, and ongoing maintenance and updates. Libraries may encounter technical challenges such as system downtime, compatibility issues, and scalability constraints.
- **User Acceptance:** Some users may be hesitant or resistant to interacting with ChatGPT due to unfamiliarity with AI technology or concerns about privacy and security. Libraries must address user perceptions and preferences to promote acceptance and adoption of ChatGPT among patrons.
- **Complexity of Queries:** ChatGPT may struggle to handle complex or specialized queries that require domain-specific knowledge or expertise. Users seeking in-depth research

assistance or specialized information may find ChatGPT's responses inadequate, necessitating escalation to human librarians or alternative resources.

- **Maintenance and Updates:** Keeping ChatGPT up-to-date with relevant information and addressing evolving user needs requires ongoing maintenance and updates. Libraries must allocate resources and personnel to ensure the continued effectiveness and relevance of ChatGPT over time.
- **Cost Implications:** Implementing and maintaining ChatGPT in library services may involve significant upfront and ongoing costs, including software licensing fees, development expenses, and staff training. Libraries must carefully assess the cost-benefit ratio of ChatGPT deployment and consider alternative investment options.

Finding and Suggestion

The Future research directions and recommendations for the use of ChatGPT in library services should focus on the improvements in integration, multimodal features, domain-specific knowledge, AI ethics, user-friendly design, personalization, user retention, and developer and other stakeholder involvement, evaluation criteria, and scalability and sustainability. Complementing these areas, researchers and practitioners will be able to benefit from the full power of ChatGPT and ensure the library services deliver the best user experience in the digital era.

Conclusion

The integration of ChatGPT within library services presents a noteworthy opportunity to increase user experiences, improve the access of information, and modernize the delivery of services. This research paper has comprehensively discussed the possibility and challenges attached to the use of ChatGPT in libraries. chatGPT have the ability to provide 24/7 services, it can give recommendations that will fit the patrons' needs as well as easy and first-hand interaction with patrons. Additionally, ChatGPT puts significant impact to library services, which ensures the growth of the workforce to meet the requirements.

However, the adoption of ChatGPT in library services is not without its drawbacks. Accuracy limitations, ethical considerations, user acceptance issues, and technical complexities pose significant obstacles that libraries must navigate. Ensuring the ethical use of ChatGPT, addressing biases and fairness concerns, and maintaining user trust and privacy are critical considerations that require careful attention.

Nevertheless, there are certain challenges involved in the implementation of ChatGPT in library services. Libraries are expected to face accuracy limitations, ethical dilemmas, user resistance, and technical limitations. The ethical use of the AI tool should be a top priority for libraries due to biases and other fairness issues that may arise. At the same time, librarians should strive to maintain user trust and privacy to promote the acceptance of ChatGPT. Despite the challenges, the benefits of ChatGPT exceed the limitations when properly implemented. Therefore, the tool should help libraries improve user experience and extend the range of services.

Looking ahead, in the field of library services the AI like ChatGPT have lot of space for research, creativity, and cooperation. Future research might look into new uses for ChatGPT, create best practices for using it, and deal with newly raised ethical and technological issues. We can make sure that libraries stay at the forefront of innovation in the digital era and continue to serve as vibrant, responsive centers of information and knowledge for everyone by continuing to investigate the potential and difficulties of ChatGPT in library services.

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The Nexus of Employment Generation, Poverty Alleviation and Microfinance: A Study of Bandhan Bank's Impact in India (2015-2023)

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Structured Abstract:

Purpose: This paper investigates the impact of the largest Microfinance Institute (MFI) on poverty reduction in India from 2015-16 to 2022-23. It reviews key determinants such as banking physical assets, employment and financial performance during this period.

Design / Methodology / Approach: The study is based on secondary data from 2015-16 to 2022-23, chosen due to the new central government's development policies starting in 2014. Simple arithmetic methods are used to calculate annual and average growth rates.

Findings: The banking physical control system showed a high average growth rate (12%) for branches and ATMs. The customer and employee engagement rates grew by 20% and 19%, respectively. Financially, the MFI experienced a 278% average growth in net profit and a 39% growth in bank deposits.

Research Limitations / Implications: This study's use of secondary data and focus on one MFI limits generalizability. Future research should include multiple MFIs and primary data.

Originality / Value: This study highlights the significant role of MFIs in poverty reduction through effective banking administration and financial performance.

Keywords: Microfinance Institute, Poverty Reduction, Banking Performance, Employment Growth, Women Empowerment.

Introduction

In developing countries like India, inclusive growth is essential for sustainable development. Financial inclusion plays a critical role in this process, especially given that a large portion of the population depends on the agriculture sector. Agricultural productivity in India is generally low, which translates to lower per capita income for those involved in this sector. Additionally, a significant part of the Indian population is poor and lacks access to essential financial resources. In such a scenario, microfinance emerges as an effective tool for combating poverty and promoting economic development.

One notable institution in this field is Bandhan Bank, which has shown remarkable performance and continuous growth in extending its activities while maintaining a sound financial position. Bandhan Bank is recognized as the largest microfinance institution in India, dedicated to alleviating poverty and empowering women by promoting self-dependence through financial inclusion.

Bandhan Bank received in-principle approval from the Reserve Bank of India (RBI) to set up a universal bank in April 2014. The bank's headquarters are located in Kolkata, West Bengal, making it the first bank to be established in the eastern region of India post-independence. The bank was inaugurated by the Honourable Finance Minister of India, Shri Arun Jaitley, on August 23, 2015, in Kolkata. At its inception, Bandhan Bank started with 501 branches, 50 ATMs, and 2,251 banking units.

Since its launch, Bandhan Bank has shown impressive growth. By 2022-23, the number of branches had increased to 1,411, serving over 3 crore (30 million) customers across India. The bank's deposits surpassed Rs 108,069 crore as of March 31, 2023. The institution employs 69,702 people, providing world-class banking services to customers in urban, semi-urban, and rural areas.

Bandhan Bank originated from a microfinance institution established by Mr. Chander Shekhar Ghosh in 2001. The primary objectives of this institution were to alleviate poverty and empower women. The bank began with an initial capital of Rs 2 lakh, collected by Mr. Ghosh from his friends and relatives. Over the years, Bandhan has transformed into India's first and the world's second-largest microfinance institution, according to Forbes in 2007. By 2009, Bandhan had launched its 1,000th branch and its client base had reached 2 million.

The name "Bandhan," meaning togetherness, reflects the bank's vision of unity and collective growth. As the largest microfinance institution in India, according to Forbes' list of top 50 microfinance firms, Bandhan has maintained its commitment to financial inclusion. Initially operating as an NGO named Bandhan Konnagar, the institution focused on providing financial support to disadvantaged women in rural and urban areas. The emphasis on women stems from the belief that women typically utilize their income and savings more productively, investing in their children's education and improving their families' standard of living through better management of household expenses.

Bandhan Bank's focus on women's empowerment and poverty alleviation has significantly impacted the lives of many in India. By providing financial resources to women, the bank has enabled many to start small businesses, improve their families' economic status, and contribute to their communities' overall development. The inclusive approach of Bandhan Bank ensures that even the most marginalized sections of society have access to financial services, fostering economic growth and stability.

In brief, Bandhan Bank stands as a beacon of financial inclusion in India, demonstrating how microfinance can be an effective tool for poverty alleviation and women's empowerment. Its continuous growth and commitment to serving the underprivileged make it a crucial player in India's journey towards inclusive and sustainable development.

Review of Literature

This section reviews the findings of various scholars who have conducted micro-level studies on Bandhan Bank, discussing their field study experiences and insights.

Nilakantan et al. (2013): In their survey titled "The Impact of Microfinance on Women Empowerment: Evidence from Eastern India," Nilakantan and colleagues explored the effects of microfinance on women's empowerment. Their findings indicated that increased access to microfinance, measured by the long duration of treatment, was associated with no significant or even negative empowerment effects. This challenges the assumption that microfinance universally leads to positive empowerment outcomes for women.

Kohli (2015): Kohli's research emphasized the accessibility of Bandhan Bank to the rural poor, which is a significant feature distinguishing it from other financial institutions. According to Kohli, the large customer base of Bandhan Bank is due to its commitment to providing loans to the poor in both rural and urban areas. The bank maintains a balanced strategy, ensuring that both rural and urban customers have access to financial services.

Thomas and Dave (2015): In their study, "A Successful Microfinance to Bank: A Case Study of Bandhan," Thomas and Dave analyzed the operational structure of Bandhan as a financial institution. They concluded that Bandhan's transition from a microfinance institution to a bank would not be difficult due to its 13 years of experience in microfinance. Their analysis highlighted Bandhan's robust operational framework and its readiness to operate as a full-fledged bank.

Mardikar and Sahana (2016): Mardikar and Sahana's study, "A Case Study on Bandhan – An Organization of Hope for the Poor," examined whether Bandhan benefits the poor. They highlighted that Bandhan's simplified model, standardized operations, and efficient decision-making processes have increased its client portfolio and ensured credit access for the poor. However, they also noted the high cost of lending associated with Bandhan's services, which could be a potential drawback for its clients.

Jagtap (2017): Jagtap's research focused on the key aspects of Bandhan's progress and its transformation from a financial unit to a bank. The study found that Bandhan was the first microfinance institution in India to transform into a bank. This transformation process was highlighted as a significant milestone in the history of microfinance in India.

General Observations - Based on the literature reviewed, several general observations can be made about Bandhan Bank: a. Rapid Transformation: Bandhan Bank successfully transformed from a microfinance institution to a full-fledged bank within a short period. b. Largest Microfinance Institution: Currently, Bandhan is the largest microfinance institution in India. c. Support for the Poor: Bandhan has significantly helped the poor by providing essential banking facilities. d. High Cost of Lending: Despite its benefits, Bandhan's services come with a high cost of lending. e. Poverty Alleviation and Human Development: Bandhan has played a crucial role in alleviating poverty and promoting human development in India.

In brief, Bandhan Bank has made substantial strides in financial inclusion, particularly for the poor and marginalized sections of society. While challenges such as the high cost of lending remain, the overall impact of Bandhan Bank on poverty alleviation and women's empowerment is significant. Its journey from a microfinance institution to a major banking entity underscores its pivotal role in India's financial landscape.

This paper is structured as follows: Section 1 provides an analysis of the introduction. Section 2 addresses the objectives, methodology, and survey design. Section 3 discusses the performance of physical management in banking. Section 4 explores employment management performance. Section 5 examines financial management performance. Finally, Section 6 presents the summary and conclusions.

Objectives

1. To assess the impact of the largest Microfinance Institute on poverty reduction in India from 2015-16 to 2022-23.
2. To review and identify key determinants of the banking physical, employment and financial performance of the Microfinance Institute from 2015-16 to 2022-23.

Methodology and Survey Design

This study relies on secondary data sources, specifically the annual reports of Bandhan Bank from 2015-16 to 2022-23. The eight-year period was selected to coincide with the tenure of the new government that came to power in 2014. Various determinants are used to assess different aspects of performance, including banking physical, employment, and financial metrics.

For banking physical performance, the study considers the number of bank branches and ATMs of Bandhan Bank across India. Employment performance is evaluated based on the number of customers and staff members. Financial performance is measured by examining total deposits, total income, and profit after tax. The annual and average growth rates for these metrics are calculated using simple arithmetic methods.

Banking Physical Management Performance

Bandhan Bank stands out as the first microfinance entity in India to transform into a full-fledged bank. It commenced operations on August 23, 2015, with 501 branches, 50 ATMs, and 2,200 Doorstep Service Centres (DSCs) across India. The growth trajectory of Bandhan Bank can be evaluated using three key indicators: the number of states and union territories covered, the expansion of branches, and the number of ATMs.

One of the key measures of Bandhan Bank's physical management performance is its geographical reach. The bank's coverage has expanded significantly from 29 states and union territories (UTs) as of March 31, 2016, to 34 states and UTs by March 31, 2023. This expansion reflects the bank's objective to provide banking services to people across India, leveraging microfinance loans to enhance financial inclusion.

The second indicator is the expansion in the number of branches. Bandhan Bank has made it easier for people to access financial services, particularly microfinance loans for self-

employment schemes, which are provided without requiring collateral. The bank's staff collects monthly interest payments directly from customers' doorsteps, making the process convenient for borrowers.

As seen in Table 1, the number of branches has grown steadily from 556 in 2015-16 to 1,411 in 2022-23. The annual growth rate has remained positive but fluctuated, with a maximum growth rate of 28% in 2016-17 and a minimum of 3% in 2019-20. On average, the branch expansion rate has been 12% over the past seven years.

Automated Teller Machines (ATMs) are critical to modern banking, allowing users to conduct transactions without needing bank representatives. Bandhan Bank offers both basic ATMs, which provide cash withdrawal and balance checking services, and complex ATMs, which offer additional services such as cash deposits and credit card services.

According to Table 1, the number of ATMs of Bandhan Bank increased from 228 in 2015-16 to 487 in 2020-21. However, there was a slight decline in the number of ATMs over the past two years, likely due to the pandemic in India. Despite this, the average growth rate of ATMs from 2015-16 to 2022-23 was 12%, matching the average growth rate of branch expansion.

Graph No. 1 illustrates that the annual growth rate of ATMs was positive until 2019-20, reaching 0% in 2020-21, and then turned negative in the following two years due to pandemic-related challenges.

Bandhan Bank's physical management system has proven robust over the years. The bank has successfully expanded its number of branches and ATMs at a high average annual growth rate of 12% over the past seven years. This growth reflects the bank's ability to meet customer demands and enhance service accessibility. The strong physical management performance is a positive indicator for the development of the banking system and suggests a promising future for increasing customer base and financial inclusion.

Bandhan Bank's strategic expansion efforts have not only broadened its reach but also strengthened its position as a pivotal player in India's banking sector. This comprehensive growth in infrastructure supports its mission to alleviate poverty and promote human development through accessible financial services.

Employment Management Performance

One of the primary objectives of Bandhan Bank is poverty alleviation through microfinance. The bank began as a modest not-for-profit microfinance enterprise in 2001 with the goal of significantly contributing to poverty alleviation by empowering women. Bandhan operated as a non-banking finance company from 2006 until it became a bank on August 23, 2015. Bandhan Bank's strategy to combat poverty involves providing loans to the poor without requiring collateral. The majority of borrowers include small business owners, workers, and hawkers who use these loans as capital for their businesses. Each customer, effectively a small business owner, often involves family members in their enterprise, creating a process of employment generation. This enables them to increase their income and achieve empowerment.

In this section, we focus on two economic variables: the number of customers and the number of employees at Bandhan Bank, as displayed in Table 2. The number of customers has increased steadily from 0.84 crore in 2015-16 to 3 crore in 2022-23. This rise indicates that more individuals are engaging in economic activities and earning money from their businesses. The annual growth rate peaked at 27% in 2018-19, then declined to 22% in 2019-20 and further to 14% over the last three years (2020-21 to 2022-23). The average growth rate for the period 2015-16 to 2022-23 was a robust 20%.

This growth can be attributed to Bandhan's transformation into a bank in 2015, which enabled it to reach a broader customer base. According to the annual report for 2018-19, microloans accounted for 86.24% of Bandhan's total assets, indicating that microfinance is a significant part of its operations. By providing these loans, Bandhan Bank has helped many poor individuals lift themselves above the poverty line.

Bandhan Bank not only supports poor people but also generates job opportunities across the country. As the number of branches expanded to 34 states and union territories, the number of employees increased correspondingly. The bank's internal employment has shown remarkable change from 20,548 employees in 2015-16 to 69,702 employees in 2022-23.

The annual growth rate of employees has also followed an upward trend. Starting at 15% in 2017-18, it peaked at 24% in 2020-21 before marginally decreasing to 22% in 2021-22 and 16% in 2022-23. This slight reduction was primarily due to the pandemic and the resulting lockdowns across India.

Graph No. 2 illustrates that the average annual growth rate of Bandhan Bank's staff was 19% from 2015-16 to 2022-23. Notably, in 2019-20, the annual growth rate of employees (23%) surpassed that of customers (22%). However, both rates began to decline due to the pandemic, with the decrease being more pronounced for customers than for employees. Despite this, the average growth rate for customers (20%) over the last seven years remained higher than that for employees (19%).

Bandhan Bank has played a crucial role in reducing poverty and unemployment rates in India. As a financial institution that has achieved banking status, it has gained greater trust and credibility in society. This status has enabled Bandhan to offer a range of economic benefits to its customers, including increased asset creation, enhanced saving and borrowing habits, higher incomes, and improved social lives.

Asset Creation and Savings - Bandhan Bank's microfinance loans have enabled many poor individuals to create assets, such as starting small businesses or expanding existing ones. This asset creation is a critical step in breaking the cycle of poverty. Additionally, the bank's emphasis on savings has helped customers build financial resilience and plan for the future.

Income Generation and Employment- By providing capital for small businesses, Bandhan Bank has facilitated income generation for many poor families. This increase in income not only improves their standard of living but also contributes to overall economic growth. The employment opportunities created through these small businesses further reduce unemployment rates.

Social Empowerment- Beyond economic benefits, Bandhan Bank's focus on empowering women has had significant social impacts. Women who receive microfinance loans often invest in their children's education and improve their households' living conditions. This empowerment leads to better social outcomes, such as improved health and education levels within communities.

Bandhan Bank has demonstrated a strong performance in employment management, contributing significantly to poverty alleviation and employment generation in India. By providing collateral-free loans to poor individuals, especially women, the bank has enabled many to start or expand businesses, thereby increasing their income and economic independence. The steady increase in both the number of customers and employees reflects Bandhan's successful strategy and its positive impact on society.

Despite challenges such as the pandemic, Bandhan Bank's average growth rates for both customers and employees remain high, indicating its resilience and continued commitment to its mission. The bank's comprehensive approach to financial inclusion and poverty alleviation through microfinance has not only improved the economic conditions of its customers but also contributed to the broader socio-economic development of the country.

In summary, Bandhan Bank has effectively used microfinance as a tool to reduce poverty and create employment opportunities, demonstrating the potential of financial institutions to drive inclusive growth and development in developing countries like India.

Financial Management Performance

This section examines the financial performance of Bandhan Bank from 2015-16 to 2022-23. The analysis focuses on four economic variables: deposit amount, advances amount, total income, and profit after tax. In the present context, we will concentrate on two of these indicators: deposit amount and profit after tax.

The deposit amount is a critical indicator of a bank's financial health and its ability to attract and retain customers' funds. Bandhan Bank has shown a remarkable increase in its deposit amount over the years. Starting at Rs 12,089 crore in 2015-16, the deposit amount surged to Rs 108,069 crore by 2022-23. This significant growth underscores the bank's ability to gain customers' trust and expand its deposit base substantially. However, while the absolute deposit amount has consistently increased, the annual growth rate has not followed a uniform trend, displaying fluctuations throughout the period. Despite these variations, the average growth rate of deposits from 2015-16 to 2022-23 stands at a high 39%, as shown in Table 3. This robust average growth rate highlights Bandhan Bank's strong performance in attracting deposits, which is essential for its lending and investment activities. The advances amount, representing the total loans and advances provided by the bank, is another crucial indicator of financial performance. Bandhan Bank's advances increased from Rs 15,593 crore in 2015-16 to Rs 109,122 crore in 2022-23. This growth indicates the bank's expanding role in providing credit to individuals and businesses, thereby supporting economic activities and contributing to poverty alleviation.

Total income reflects the overall revenue generated by the bank from its various activities, including interest earned on loans, investments, and other services. Bandhan Bank's total income has shown a consistent upward trend, rising from Rs 1,083 crore in 2015-16 to Rs

11,728 crore in 2022-23. This steady increase in total income demonstrates the bank's ability to maintain a sustainable income level over the years, even in competitive markets.

Profit after tax is a critical measure of a bank's financial performance and sustainability. For any institution, profitability is vital for growth, expansion, and the ability to hire more employees. Bandhan Bank's profit after tax has shown significant growth, from Rs 275 crore in 2015-16 to Rs 2,195 crore in 2022-23. However, the pandemic in 2021-22 severely impacted profits, reducing them to Rs 126 crore.

The annual growth rate of net profit has fluctuated, reflecting the challenges and opportunities faced by the bank. During the pandemic, the annual growth rates of -27% and -94% represented the worst situations. However, a remarkable rebound occurred in 2022-23 with an annual growth rate of 1,642%. This dramatic recovery illustrates the bank's resilience and effective management in navigating through economic crises.

The average growth rate of profit after tax from 2015-16 to 2022-23 is an impressive 278%. This exceptional growth rate indicates the effectiveness of Bandhan Bank's financial strategies and its robust banking administration system. The high profitability not only strengthens the bank's financial position but also enables it to expand its operations, hire more employees, and offer better services to its customers.

The steady increase in deposits and advances, coupled with the substantial growth in total income and profit after tax, underscores Bandhan Bank's significant role in financial inclusion and poverty alleviation. By providing accessible financial services to underserved populations, particularly in rural and semi-urban areas, Bandhan Bank has contributed to economic development and the upliftment of poor people.

The bank's ability to attract a high volume of deposits reflects the trust it has built among its customers. This trust is crucial for its long-term sustainability and growth. Additionally, the increase in advances indicates that Bandhan Bank is effectively channeling funds into productive activities, thereby supporting small businesses and entrepreneurship, which are key drivers of economic growth and employment.

Bandhan Bank's financial management performance from 2015-16 to 2022-23 demonstrates its strength and resilience as a financial institution. The substantial growth in deposits,

advances, total income, and profit after tax highlights the bank's success in achieving its objectives of financial inclusion and poverty alleviation.

The bank's impressive average growth rates in key financial indicators reflect its effective management and strategic vision. By expanding its reach and providing critical financial services to underserved populations, Bandhan Bank has played a vital role in promoting economic development and reducing poverty in India.

The financial performance of Bandhan Bank not only showcases its success as a microfinance institution turned bank but also emphasizes the importance of financial inclusion in driving sustainable economic growth. Through its continued efforts, Bandhan Bank is poised to make even greater contributions to the socio-economic development of the country, supporting the livelihoods of millions and fostering a more inclusive financial system.

Summary and Conclusions

This study, based on secondary sources of information, delves into various aspects of Bandhan Bank's performance, including its physical management system, employment generation, and financial management as India's largest microfinance institution. The findings highlight the bank's significant achievements and its vital role in promoting financial inclusion and poverty alleviation.

The analysis reveals that Bandhan Bank's physical management system has been robust over the past seven years. The bank has managed to achieve a high average growth rate of 12% in both the number of branches and ATMs. This expansion is a positive indicator for the development of the banking system, suggesting that the bank is effectively reaching more customers and enhancing its service delivery network. The continuous growth in branches and ATMs not only facilitates better customer service but also promotes financial inclusion by making banking services accessible to remote and underserved areas.

Bandhan Bank has made substantial contributions to employment generation, both directly and indirectly. By providing microfinance loans without collateral, the bank has empowered small business owners, workers, and hawkers to start or expand their businesses. This has led to increased employment opportunities as these small enterprises often hire family members and other workers. The bank's customer base has grown at an average rate of 20% over the

past seven years, indicating that more people are being economically engaged and empowered.

The bank's own employment growth has also been impressive, with the number of employees increasing at an average rate of 19%. This growth reflects the bank's expanding operations and its role as a significant employer in the financial sector. The creation of jobs within the bank itself contributes to reducing the unemployment rate and provides stable employment opportunities for many individuals.

Bandhan Bank's financial management performance has been exceptional. The deposit amount has increased from Rs 12,089 crore in 2015-16 to Rs 108,069 crore in 2022-23, with an average growth rate of 39%. This impressive growth in deposits indicates strong customer trust and the bank's ability to mobilize financial resources effectively. A larger deposit base allows the bank to extend more credit and support economic activities, furthering its mission of financial inclusion.

The profit after tax, a critical measure of financial health, has also shown remarkable growth. Despite the setbacks during the pandemic, the bank's profit after tax surged to Rs 2,195 crore in 2022-23, with an average growth rate of 278% over the study period. High profitability enables the bank to reinvest in its operations, expand its services, and create more employment opportunities. Profits also enhance the bank's stability and its capacity to absorb economic shocks.

Bandhan Bank's operations have brought significant economic and social benefits to its customers. By providing accessible financial services, the bank has facilitated increased asset creation, improved saving and borrowing habits, and higher incomes for its customers. These financial benefits translate into improved living standards and enhanced social well-being. The bank's focus on empowering women, in particular, has had a positive impact on household welfare and community development.

Finally, Bandhan Bank has demonstrated exemplary performance in its transition from a microfinance institution to a full-fledged bank. Its strong physical management system, effective employment generation strategies, and robust financial performance underscore its critical role in reducing poverty and unemployment in India. The bank's success is a testament to the effectiveness of microfinance as a tool for economic empowerment and development. Bandhan Bank's journey and achievements offer valuable insights into how

microfinance institutions can evolve to play a more significant role in the formal banking sector. By continuing to expand its reach and enhance its services, Bandhan Bank is well-positioned to contribute further to financial inclusion and socio-economic development in India.

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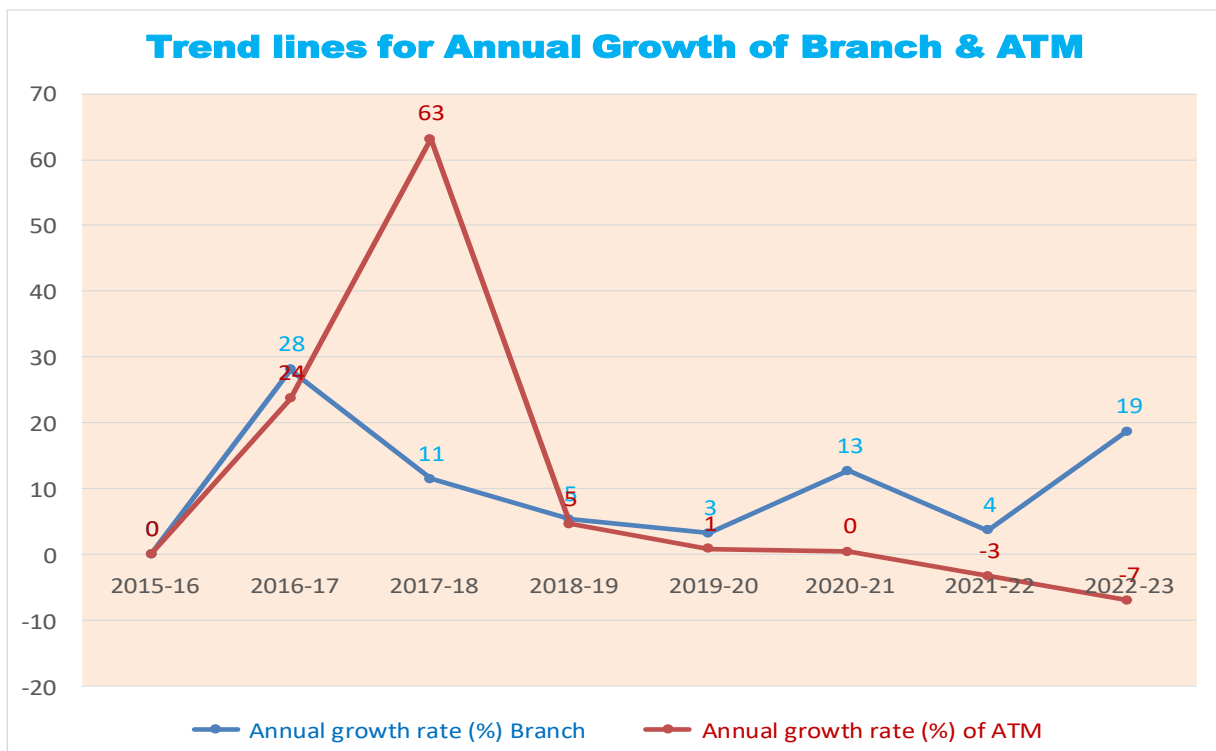
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Table: 1 Physical Management Performance of Bandhan Bank for the period 2015-16 to 2022-23 (as ended on March 31 in each year)

| | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 |
|--------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| No of States and UT | 29 | 33 | 34 | 34 | 34 | 34 | 34 | 34 |
| No.of Bank Branch | 656 | 840 | 936 | 986 | 1018 | 1,147 | 1,189 | 1,411 |
| No. of ATM | 228 | 282 | 460 | 481 | 485 | 487 | 471 | 438 |
| Annual growth rate (%) Branch | | 28 | 11 | 5 | 3 | 13 | 4 | 19 |
| Annual growth rate (%) of ATM | | 24 | 63 | 5 | 1 | 0 | -3 | -7 |
| Average growth rate (%) Branch | 12 | | | | | | | |
| Average growth rate (%) of ATM | 12 | | | | | | | |

Source: Various Annual Report of Bandhan Bank

Graph 1



Source: Various Annual Report of Bandhan Bank

Graph 2

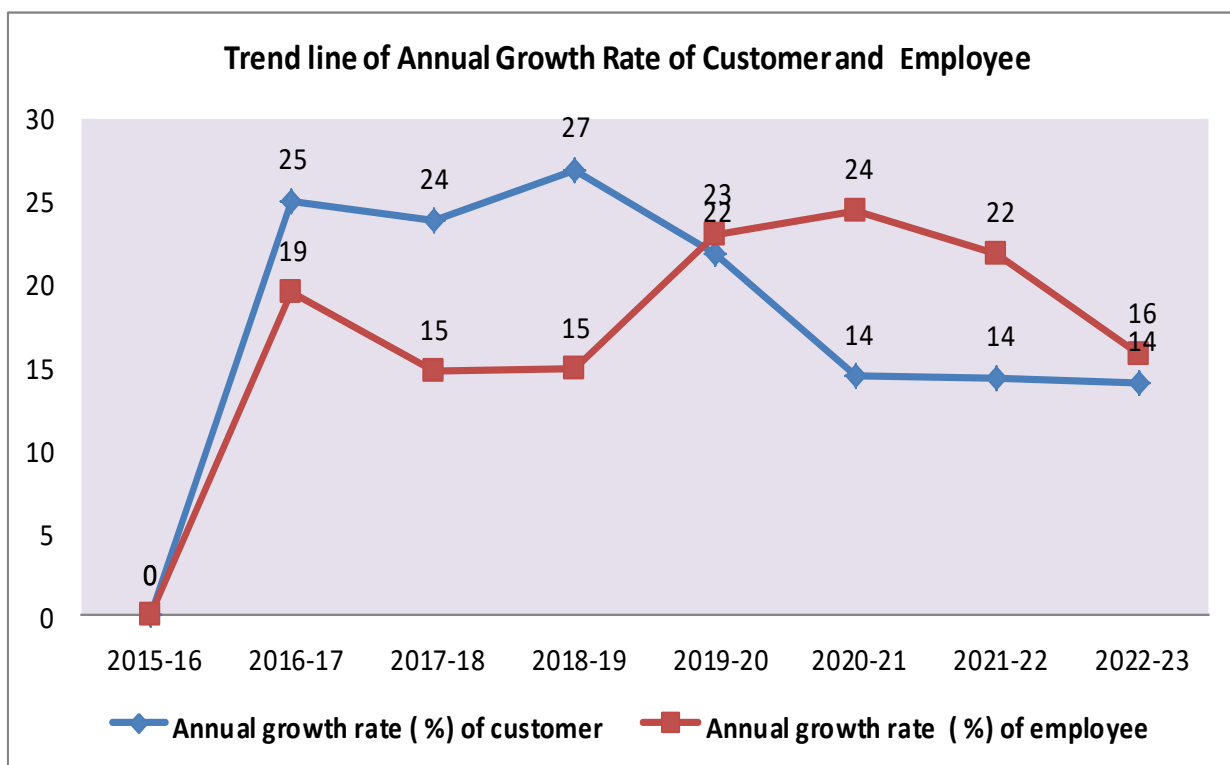


Table: 2 Employment Management Performance of Bandhan Bank for the period 2015-16 to 2022-23 (as ended on March 31 in each year)

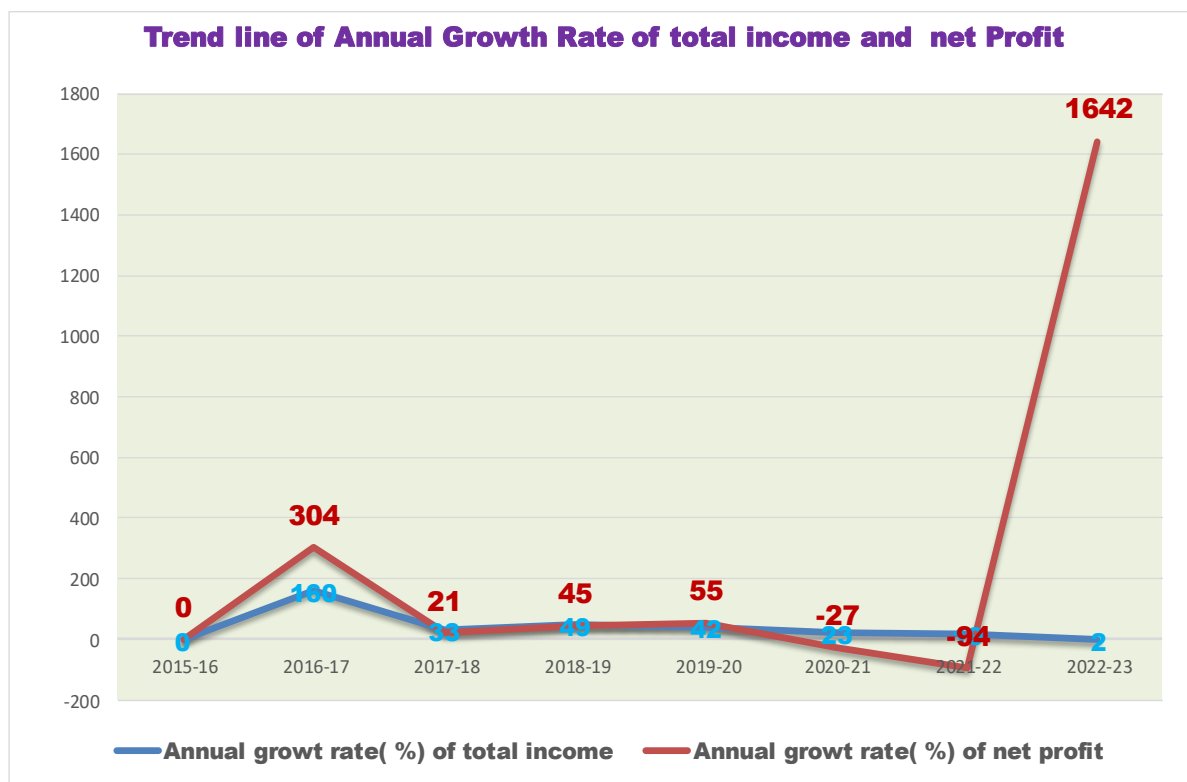
| | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 |
|-------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| No. of Customer (Crore) | 0.84 | 1.05 | 1.3 | 1.65 | 2.01 | 2.30 | 2.63 | 3 |
| No. of Employees | 20548 | 24548 | 28159 | 32342 | 39750 | 49,445 | 60,211 | 69,702 |
| Annual growth rate (%) of customer | | 25 | 24 | 27 | 22 | 14 | 14 | 14 |
| Annual growth rate (%) of employee | | 19 | 15 | 15 | 23 | 24 | 22 | 16 |
| Average growth rate (%) of customer | 20 | | | | | | | |
| Average growth rate (%) of employee | 19 | | | | | | | |

Table: 3 Financial Performance of Bandhan Bank for the period 2015-16 to 2022-23 (as ended on March 31 in each year)

| | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 |
|--|---------|---------|---------|---------|---------|---------|---------|----------|
| Deposit (Crore) | 12089 | 23229 | 33869 | 43,232 | 57,082 | 77972 | 96331 | 108069 |
| Advances (Crore) | 15593 | 23543 | 32339 | 44,776 | 71,846 | 87,043 | 99,338 | 1,09,122 |
| Total Income (crore) | 1083 | 2815 | 3738 | 5,558 | 7,873 | 9,672 | 11,537 | 11,728 |
| Profit after tax(Crore) | 275 | 1112 | 1346 | 1952 | 3024 | 2,205 | 126 | 2,195 |
| Annual growt rate (%) of deosit amount | | 92 | 46 | 28 | 32 | 37 | 24 | 12 |
| Annual growt rate (%) of net profit | | 304 | 21 | 45 | 55 | -27 | -94 | 1642 |
| Average growt rate (%) of deosit amount | 39% | | | | | | | |
| Average growt rate (%) of net profit | 278% | | | | | | | |

Source: Various Annual Report of Bandhan Bank

Graph 3



Climate refugees: A concrete understanding of one of the most pressing twenty-first century challenges

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Structured Abstract:

Purpose: The purpose of the paper is to find out the various nuances of the term “climate refugee” under the domain of environmental ethics and the problems arising.

Methodology: Qualitative method has been chosen for this study. Numerous research articles were evaluated to arrive at a concrete understanding of the term “climate refugee.”

Findings: The term “climate refugee” lacks a universally accepted definition. Climate-induced displacement results because of environmental, social, economic, and political factors. The legal status and protection of climate refugees remain contentious due to the lack of universal consensus in the term’s definition.

Value: The paper will raise a conversation about the ethical aspect of climate refugees so that it becomes a part of mainstream dialogue thereby leading to potential solutions.

Keywords: Climate, Refugee, Displacement, Poverty, Inequality.

Paper type: Definition Paper.

Introduction

Climate change is a global crisis currently impacting billions of people. Starting from sea-level rise to global warming, the effects of it are visible all around us. Human beings over the years have altered the climate beyond repair and this has led to this being one of the most pressing issues of this century. Climate is a multifaceted aspect to reckon with. Without it no civilization would have been possible.

The earth is no stranger to climate swings. The planet has seen many ice ages. In fact, we passed through one such ice age just 10000 years back (Ahmed, 2017). Coincidentally it is the same time that human beings have started settling in large numbers. We started developments in agriculture which led to our static existence instead of moving around as hunters-gatherers.

Things were fine for a considerable number of years when around 300 years back everything changed forever (Ahmed, 2017). The growth of industrial revolution and the benefits brought about by fossil fuels changed the world as we know it. The modern civilizations with all its facets are possible today because of these two developments. Definitely life is much better now if we take into consideration the metrics like life expectancy at birth, overall health of people, literacy rate and other myriad range of developmental factors.

But all of these developments came at a price. The price is climate change. Every child going through formal educational systems these days are familiar with the terms like global warming, greenhouse effect, ozone layer depletion and so on. This points out towards a systematic rot in the overall way we perceive the climate. Unfortunately the effects of climate change are not restricted to textbooks. We can see visible impacts of it everywhere.

Displacement of people due to the effects of climate change like higher number of floods, stronger storms, hurricanes etc has led to a specific category of people known as climate refugees.

In 2022 alone more than 32 million were seen to be forcibly displaced due to climate change (Karaman, 2023). If the figures are taken from 2008 then the total will exceed 350 million. Such a cumulative toll on human beings is beyond comprehension and this is something to be reckoned with due sincerity.

The United Nation anticipates that by 2050, if no concrete steps are taken against climate change then the potential number of people displaced by climate change will exceed 1.2 billion (Karaman, 2023). That is more than 10 percent of the global population of that time. Naturally it is evident that this is a grave crime that is being committed against humanity.

The technical term with which these climate change migrants are addressed is known as climate refugees. However, there are many complications in using this term. Garnering a concrete understanding with the relevant causes and implications of it is pertinent. This article will try to figure out the various nuances associated with the term “Climate refugee” and try to define it.

Literature review

“Climate refugee” is that term encompassing an increasingly relevant concept to the debate about climate change, yet, to the best of our knowledge, without a generally accepted

definition. This nuance is vital to keep in view at the beginning since it underlines not only the scholarly discourse but also the practical implications within lives touched by climate change-related displacement. Scholars, like Lee and Bautista (2021), have argued that this lack of definition instead creates multiple interpretative constructions of the phenomenon across disciplinary lines.

Divergent Definitions

The rationale behind the divergent definitions is the divergent views on what one deems to be a “climate refugee.” Some scholars have defined it as a narrow version, which should be reserved only and only for those persons compelled to leave their homes due to environmental factors such as natural disasters, sea-level rise, or prolonged droughts. Within this constrained view of climate displacement, scholars focus more on direct causation. On the other hand, this approach has a major draw-back: it oversimplifies a complex reality. Practical cases of displacement seldom manifest as the result of one factor that is independent of others.

According to Ahuja (2016), for instance, a Sub-Saharan African farmer feels that the land is becoming less fertile due to changes in the incidences of rainfall associated with climate change. Although a decline in agricultural productivity is basically the primary reason for migrating for the farmer, socio-economic factors like poverty, lack of access to education, and inadequate infrastructure decisively influence the decision to leave. These interrelated factors suggest that the concept of climate refugees cannot be labeled strictly due to their diversified nature of living experience.

Other scholars like Atapattu (2020) argue for a more liberal interpretation of the term, such that in fact it includes those displaced by a mix of socio-economic challenges and environmental factors. In this view, displacement is related to a package of vulnerability and change in the environment, not only environmental but also regional like the African sub-Saharan regions, where social and economic dynamics feature. In such a situation, displacement cuts across several aspects of life, such as governance and resource distribution, among others, and past inequalities.

Implications of Definition Ambiguity

Climate refugees lack clear definition, which gives way to some very grave consequences in terms of legal recognition, protection, and policy response. On one hand, the absence of a

definition which could be uniformly adopted by all avoids the legal framework that provides protection to displaced people. As of now, international refugee law focuses more on cases of persecution due to political, ethnic, and religious grounds, leaving many displaced people for climate-related factors stranded in limbo with their respective legal jurisdictions (Berchin et al., 2017). This model excludes the concept of climate refugees and leaves them without rights or protection under this system of law.

Further, definitional vagueness from this makes policy-making at national and international levels complicated. In the absence of a clearly identifiable population to assist governments and organizations find it problematic to come up with meaningful interventions. This problem is graver in developing countries where resources are already stretched too far, and policymakers might short-change long-term planning measures meant to offset climate displacement in favor of more urgent humanitarian demands.

Causes of Climate Displacement

Multiple interlinked factors must be analyzed to determine the causes for climate-induced displacement. Climate displacement arises from the complex interaction among environmental, social, economic, and political factors. Temperature rise, increased levels of precipitation, and sea level changes reduce agricultural productivity, water supply, and habitability are some of the other factors. Environmental changes may present extreme circumstances that drive people and populations to move.

Environmental Factors

Environmental factors are becoming more and more prominent in displacement across the world. For instance, an elevated sea level is imposing a threat on homes and livelihood in many coastline areas, compelling residents to shift their homes to inland areas. Then, regions of drips for extended periods will see a sharp decline in crop yield, which is a definite precursor to food insecurity and economic instability. The Intergovernmental Panel on Climate Change has warned that these trends are expected to worsen and displace millions in the years ahead (Dreher & Voyer, 2015).

Natural disasters, now more and more climate-change-influenced, also increasingly drive people out of their homes. That the event at hand might be a hurricane flood, or wildfire makes that immediate destruction more likely. The affected individual is also likely to face

monumental challenges rebuilding his life as there simply are not social networks to draw on after disaster has passed.

Socio-Economic Vulnerabilities

However, environmental factors alone are not enough to explain the nuances of climate-displaced people. There are socio-economic vulnerabilities such as poverty, inequality, and limited adaptive capacity that enhance vulnerability in situations of environmental change, and these impacts fall more forcefully on certain groups in the community. Low-resourced individuals are most likely to not withstand shocks from climate and most likely to migrate as a survival mechanism.

For example, in the majority of Africa, the conjunction of poverty and environmental degradation results in a vulnerability culture; rural subsistence farmers get entangled in protracted crises as climatic change demoralizes their livelihoods. In such a situation, one tends to realize a part of rural-urban migration where people run to cities in search of better opportunities to meet needs but get confronted by new elements of urban poverty, unemployment, and housing inadequacy (Faber & Schlegel, 2017).

According to Farbotko and Lazrus (2012), General historical and structural inequalities present in societies significantly determine the vulnerability of the individuals. Climate change impacts fall predominantly on marginalized groups, which are basically women, indigenous populations, and ethnic minorities, as they do not have access to many resources and decision-making capabilities or adaptive capacities. So, climate displacement cannot be analyzed purely in an environmental context; it has to be understood comprehensively in socio-economic and political contexts of displacement.

This further complicates the issue of climate-induced displacement as developed economies fail to meet their counterparts in other regions. Both transnational and intranational inequality becomes a governing force behind climate displacement. The resources and infrastructures to minimize or counteract climate impacts and populations affected are predominantly held in the hands of the world's rich nations, hence other poorer nations find it hard to respond to immediate effects of environmental change.

The inequality can take many forms (Merone and Tait, 2018). For instance, it expresses differences in preparedness during disasters or availability of technology, not to mention investments made on climate resilience. In the case of hurricanes, the developed country end

is better equipped with systems of emergency response as well as infrastructures that help protect people living in such a country. In contrast, the developing country will sometimes lack resources toward effective realization of disaster management, and its citizens will be more susceptible to displacement.

In this regard, the connection between climate change and inequality promotes vicious cycles of disadvantage in which vulnerable groups are increasingly more exposed to and vulnerable to risks in their adaptation to changing conditions. Such dynamics focus more on embedding equity into discussions around climate-induced displacement and the associated policy response as an important measure in protecting the most vulnerable peoples.

Conceptualizations and Gaps in Understanding Climate-Induced Displacement

Despite the growing attention to climate-induced displacement, there is much still unknown about drivers of it, impacts it triggers, and dynamics of what drives its occurrence. There is a clear need to examine areas of intersection between environmental, social, and economic factors in migration decision-making processes and outcomes. “A more nuanced understanding of these dynamics will facilitate crafting effective interventions to meet the needs of displaced populations,” suggests Behrman and Kent (2023).

There are also few empirical studies in evaluating measures for adaptation and mitigation to minimize displacement and safeguard affected populations. Along with several initiatives in building community resilience, the question still remains: will these measures, on their own, avoid the displacement of people? If based on selected successful examples, such policies and measures can effectively focus on priority needs and produce more effective results.

The Requirement for Thorough Definitions

So, what is called for to disentangle the intricacies involved is therefore a definition that accounts for both environmental and socio-economic driving forces? It would be instrumental in making policies and legal frameworks all the more holistic so that all needs of the displaced populations are taken into account. It would even encourage interdisciplinary research on the complex nature of factors leading to climate displacement, it thus would offer a greater depth of understanding of the phenomena.

Methodology

Research Design: This qualitative study is set on a mixed-methods approach about the use of document analysis and participatory observation to understand and define climate change. The broad scope of this investigation can capture the extensive understandings and conceptualizations of climate change through the workings of already existing texts and community interactions relevant to the topic, without necessarily using direct interviews. This would allow for the possibility of framing how climate change might be approached across different contexts, generating further insight into the complexities around the question of definition.

Document Analysis: The primary mode of data collection entailed an in-depth study of documents. The type of documents to be chosen is highly heterogeneous and encompasses:

- **Scientific Literature:** Scientifically-based articles from peer-reviewed journals, reports by Intergovernmental Panel on Climate Change, and climate assessments, which present scientific definitions and data.
- **Policy Documents:** Policies of national and local governments, climate action plans, and international agreements, such as the Paris Agreement, which present official definitions and strategies about climate change.
- **Media articles:** News reports, opinion pieces, and editorials that appear in newspapers, magazines, periodicals, and other media outlets as a record of public debate and collective thinking on climate change.
- **Community materials:** pamphlets, community meeting notes, and output from non-governmental organizations that convey local perceptions and responses to climate change.

These documents are sourced systematically from academic databases, government websites, media archives, and community organizations. Analysis has been done on identifying the themes, usage of language, and framing techniques in terms of defining climate change.

Data Analysis

The data analysis procedure followed the following stages:

1. **Familiarization:** The researcher read through all the documents that were collected to know the scope and depth of the information obtained in relation to the definitions of climate change.
2. **Coding:** A thematic coding framework was developed to group data in themes and concepts continually repeated in the text. It encompasses open coding, which discovers emergent themes, and axial coding, through an examination of relationships between themes. Key categories included scientific definitions, socio-economic implications, policy frameworks, and public perceptions.

3. Theme Development: The coded data were developed into more general themes that will reflect the different understandings of climate change. These include definitions that were contrasted between scientific and lay perspectives, as well as regional variations that varied according to local experiences.

4. Relevant Literature Review: Thematic finding was deduced in relation to the existing literature on the definition of climate change and discourse. The research was to not only express the definitions but also the values and assumptions that were reflected in different documents.

Participatory Observation

Apart from the document analysis, the activity also involved participatory observation by attending community forums and public events about climate change discussions, such as town hall meetings, community workshops, and rallies for climate action. This will enable one to see how, in the communal discourse, climate change is defined and therefore be able to capture the language held by all kinds of stakeholders and interactions among the members of the community.

Field notes were collected to note the observations, which would capture the group dynamics, catchphrases, and emotional tones in the discussions. These contextual inputs through field notes enriched the information gathered while analyzing the document.

Ethical Consideration

Ethics were an integral part of the study. All documents analyzed were public, and hence no confidential information was made public. In community settings, the researcher was allowed to attend and observe events with permission from the organizers and take notes while being candid about their purpose for this research.

Discussion

Impacts on Host Communities: The influx of climate refugees poses a complex set of challenges for host communities, changing their social and economic topography significantly. With unrelenting rises in climate-induced displacement worldwide, there is a need to understand what happens to these affected communities so that proper responses can be fashioned and social cohesion enhanced.

Strain on Scarce Resources: Among the immediate effects of climate refugees on host communities, the strain on resources already scarce tops the list (Methmann & Oels, 2015). Besides the shortage of primary services, including health and education, many receiving sites are already resource-scarce, with limited clean water, arable land, and other

essential resources. Climate refugee influx would exacerbate these shortages, thus offering more competition for these fundamental resources. For instance, on land where water is scarce, the inflow of migrants might increase competition for the utilization of the same amount of water-the emotional tension within communities increases while their social relationships continue to deteriorate.

This can ignite conflicts between the host population and the refugees. For example, in sub-Saharan Africa, which has been affected by global warming in the form of increased drought levels and reduced agricultural output, the displacement people seeking farmable land may ignite communal conflicts among local farmers. Such clashes not only compromise food security but may also cause social estrangement, as settled communities feel their livelihoods and existence are being compromised.

Over-Extended Infrastructure: In many host communities, their infrastructure may be completely unprepared to sudden swings in population. Public services may get stretched beyond their limit, keeping the standards low and exclusionary for the native population as well as the migrants. For example, schools can become overcrowded, with negative consequences for the educational outcomes of children from both groups (Stanley et al., 2021). The healthcare facilities may not have the capacity to accommodate the great population, especially in areas with high rates of incidence of communicable diseases or existing health issues.

Climate refugees' inflow tends to stress the already existing conflicts over housing in urban settings. Most cities already face low numbers of housing stock and increasing rentals; more demand usually leads to informal settlers or slum-dwellers, where living conditions are usually very poor. This further affects the health and wellbeing of the refugees but also calls out local governments due to the inadequacies in infrastructure, which may be adding on to the burden and diverting much-needed resources to other relevant sectors.

Economic Competition: Livelihood competition is another big issue that the host communities face. Climate refugees usually arrive with very meager belongings, and with fewer job opportunities at their disposal, they will tend to compete with the locals in getting low-wage employment. This situation might lead to people thinking that these refugees are taking away employment opportunities from the host population, which in turn attracts more resentment and social division among the host populations. In many

instances, economic insecurity of the natives fuels anti-immigrant sentiments, complicating integration efforts (Ahmed, 2017).

There is another dimension in the economic contributions of refugees. In fact, as competition for jobs might be intense on the earlier side, refugees might bring skills, labor, and entrepreneurial spirit to the benefit of the host community. Some years back, refugees revived some local economies through new businesses and contribution to labor force in some areas. Thus, there should be recognition and support for these contributions toward positive relations between refugees and host populations.

Cultural Tensions and Identity Conflicts: The settlement of climatic refugees can also cause cultural conflicts and identity crises. The settlers' language, customs, and social behavior may be from another culture, and these can likely cause complexities for these people to get integrated and live peacefully because they will misunderstand the new environment. The local communities may become prone to forgetting their cultural identity, while the refugees struggle to understand the new cultural climate. This situation contributes to social fragmentation, which creates divisions between “natives” and “immigrants,” and blow up existing grievances and discordance.

Integration and assimilation efforts between refugees and other people in the country may, on a large scale, improve these tensions. Community interactions, cultural exchange, as well as mutual support, help foster understanding and solidarity among both groups of people. Such efforts not only make the refugees feel at home but also strengthen communities, where diversity is strength rather than weakness.

Legal and Policy Frameworks: Climate refugees are an issue that is contentious with legal status and protection within international law. The national and local response continues to be complicated. Existing frameworks--such as the 1951 Refugee Convention--largely protect individuals fleeing persecution on grounds of politics, ethnicity, or religion and do not explicitly refer to displacements brought about by climate change (Ahmed, 2017). This sparks worries in the host country regarding its level of obligation towards climate refugees.

Important steps toward acknowledging and protecting climate refugees include new legal instruments such as the Global Compact on Refugees and the Global Compact for Safe, Orderly, and Regular Migration. These compacts will foster international cooperation and

provide frameworks for protecting populations that are now fleeing due to climatic reasons. Where these international agreements translate into national and regional policies remains a challenge. The legal frameworks and resources for most countries are deficient to support climate refugees, thus producing inconsistent and ineffective responses.

National policies may also not be suitable for the special needs of climate refugees, especially concerning integration and access to services. It is critically important that local authorities are well-equipped with tools and resources to address newcomers in a positive manner and to help to dissipate any adverse effects that may derive from those influxes on host communities.

Adaptation and Resilience: Addressing the root causes of climate-induced displacement requires integrated, multi-faceted strategies that combine adaptation with resilience building. Investments in climate-resilient infrastructure, sustainable land management practices, and social protection mechanisms all build on the resilience of communities to withstand environmental shocks and reduce migration. For example, improving water management and investment in renewable energy sources can, for instance, alleviate some of the pressures that migrate people in the first place.

Supporting rights and agency among affected populations, especially women, children, and indigenous communities, is fundamental to developing inclusive and equitable adaptation strategies. Enabling the above-mentioned groups not only makes them more resilient but also allows their particular inputs into the policy and planning processes (Lister, 2014). For example, women have essential responsibilities in managing household resources and agriculture, which would make them highly indispensable in decision-making processes that result in more effective climate adaptation strategies.

Research Gaps and Future Directions: Despite a real surge in the concern that climate change in fact creates or has caused environmental-induced displacement, important gaps remain in understanding its drivers, impacts, and dynamics. More exploration into the intersectionality of environmental, social, and economic factors will shape how migration decisions are made and by what mechanisms they take place; thus, it becomes essential to understand how communities differentially experience and interact with climate change so that interventions can be effectively and targeted differently.

There is a scarcity of empirical research studies that assess the effectiveness of various adaptation and mitigation measures in stopping the displacement process and facilitating assistance for affected persons. In this regard, there is a need to focus research on best practices and relevant case studies that document effective integration strategies and resilience-building measures.

Future research must engage much more meaningfully with the voices and experiences of climate refugees in co-designing more solidly grounded policy responses to their needs, aspirations, and rights. Better involving refugees in their own research and decision-making might make interventions more relevant and impactful and generally lead to a more inclusive approach to dealing with climate-induced displacement.

Conclusion

The literature on climate refugees reflects a growing recognition of the complex challenges posed by climate-induced displacement and the need for multidisciplinary approaches to address them. By examining the causes, impacts, and responses to climate-related migration, scholars, policymakers, and practitioners can work towards developing more effective strategies for mitigating displacement, protecting vulnerable populations, and promoting sustainable development in a changing climate.

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Proposition of Strategies for Business Models that Work in Sports League Business in India and Other Countries

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Structured Abstract:

Purpose: The research aims to provide a detailed overview of sports league business in India and other countries and is also an attempt to reach the strategies for a cumulative sports league business model.

Design / Methodology / Approach: The sporting awakening in Asia is not just about China. Neighbouring India, the world's most populous country since April 2023, also offers a lot of business potential for the sports industry - and this is not limited to the all-powerful cricket. Diversity is growing, also thanks to new sports stars. In the run-up to the "India Sporting Goods Fair" trade show on March 19 and 20, 2024 in New Delhi, ISPO.com provides an analysis of the Indian sports market, with all the opportunities and risks.

Findings: Young Indians in particular are so keen on exercise and the outdoors that experts are certain: Sport will be the next big industry in India. Gaurav Vazirani, national director of the New York media agency GroupM, therefore sees excellent opportunities for the future: "The Indian sports industry is ready for further growth and development [1].

Research Implications: Compared to the West and China, the Indian sports market is characterized by many country-specific characteristics. Brands and companies that want to be successful here need to understand them and integrate them into their strategy. The Indian startup ecosystem has seen notable successes across multiple industries, and the sports sector is no exception. Over the past few years, several innovative startups from India have broken with traditional approaches and revolutionised the way sport is approached, consumed and experienced [2].

Keywords: Sporting Awakening, Business Potential, Sports Industry, Indian Sports Market, Innovative Startups, Sports League Business Model.

Introduction

The global sports market, comprising of infrastructure, events, training and manufacturing and retail of sports goods is estimated at INR 37.8–44.2 lakh crore (USD 600–700 billion), accounting for approximately 1 per cent of the global GDP [3]. Besides exercising a significant impact on the global economy due to its close association with other sectors, including education, real estate and tourism, the sector also contributes to improvements in

general health and wellbeing of a country. The Indian sports sector is experiencing a sea of changes with all-round developments initiated by the government, the private sector as well as non-profit organisations. The government is introducing game-changing schemes such as 'Khelo India' to address issues regarding infrastructure, talent scouting and training facilitation. Private sector and non-profit entities are also increasingly contributing to the sector by organising leagues and tournaments, funding talented sportspersons and getting involved in grassroots development. A thriving sports sector usually has significant socio-economic impact, as it is instrumental in improving the physical health and mental agility of a nation's human resources, and in promoting unity and national pride. In fact, sport as an industry contributes to about one to five per cent to the GDPs of various countries. The commercial success of Indian Premier League (IPL) in cricket has led to a surge of similar commercial formats in other sports such as badminton, football and hockey. International and domestic examples have shown that investment in sports has high potential tangible return on investment (RoI), albeit a long gestation period for commercial returns in case of league franchises, and has significant intangible RoI as well. The intangible RoI stems from increased brand awareness, brand building among target customers and increased brand loyalty through community engagement by utilising the mass medium of sports. ***This means that there is a requirement of more understanding of sports as a business unit and a very common or simple business model which could fit in for the investors.*** Indian sports are experiencing rapid commercialization. Leagues like the IPL and PKL have led to substantial revenue generation through broadcasting rights, ticket sales, and merchandise, making them lucrative platforms for brand investment. Example: The IPL's broadcasting rights deal with Star India for over \$2 billion underscores the financial potential of sports leagues in India. A firm needs to have the ability to convert its resources and assets into competencies that create value (internal and external). Customers will not scramble to a firm's doors simply because the firm has modern resources and assets such as plants, geniuses, and patents. The firm has to use the plants, the geniuses, and the knowledge embodied in the patents to offer customers something they value. Patients do not buy patents or skilled scientists from pharmaceutical companies; they buy medicines that have been developed by skilled scientists using knowledge embodied in patents [4]. Assets must be converted into something that customers want. A firm's ability or capacity to turn its resources into customer value and profits is usually called a competence or competencies. Competences usually involve the use or integration of an organization's capabilities and resources / assets. Logic's ability to quickly

turn its “cores” into products that customers want is a competence, which can be either core or non-core competencies. Intel’s ability to develop microprocessors that exploit its copyrighted microcode and that are compatible with its installed base of microprocessors is a core differentiating competence. So is Coca-Cola’s ability to turn its secret formula and brand into a product that many customers perceive as being preferable to its rivals’ products [5]. Business modeling provides a framework for organizing competencies by accountability level. By employing such a framework, executives can begin to envision how current business activities might function as an interlocking set of modules [4]. Baden-Fuller and Mangematin (2013) [6] argue that the essential characteristics of the business model, which they define as “a meta concept to exemplify firm strategy” [6] are customer, customer engagement, monetization and value chain and linking mechanisms. The rising interest in understanding and evaluating business models can to some extent be traced to the fact that new value configurations outcompete existing ways of doing business. There exist cases where some businesses are more profitable than others in the same industry, even though they apply the same strategy. This illustrates that a business model is different from a competitive strategy and a value chain [7]. *The research aims to provide a detailed overview of sports league business in India and other countries and is also an attempt to reach the strategies for a cumulative sports league business model.*

Sports as Business – Literature Review

Definition: A sport refers to a human activity involving physical exertion and skill. Sports may involve elements of competition or social participation, where rules and patterns of behavior governing the activity exist formally through organizations. The sports market consists of sales of sports services and related goods by entities (organizations, sole traders and partnerships) that offer spectator sports and participatory sports. Spectator sports include teams or clubs and independent athletes that present sporting events before a paying audience. Team owners of participants that enter competitive events or other spectator sport events, and sports trainers who provide specialized services to support participants in sports events or competitions are part of this industry. The establishments that operate race tracks are also included in this industry. The sports market includes revenues generated by entities that provide live sporting events before a paying audience or entities that operate golf courses and country clubs, skiing facilities, marinas, fitness and recreational sports centers and bowling centers. Many people think that the sports industry solely comprises athletes, the

training staff, and the team's general manager. However, that is not the case. There are many cogs in the form of businesses and organizations, which are essential to ensure that the sports industry runs smoothly. Often, retired athletes or even sports enthusiasts eventually tend to branch out, opening a business in this industry.

Market Size: According to a study on the global sports market, sales projections showed that this industry is set to reach a net worth of approximately \$250 billion [8] soon. The global sports market reached a value of nearly \$484,910.9 million in 2023, having grown at a compound annual growth rate (CAGR) of 3.6% since 2018. The market is expected to grow from \$484,910.9 million in 2023 to \$651,007.0 million in 2028 at a rate of 6.1%. The market is then expected to grow at a CAGR of 5.8% from 2028 and reach \$862,585.5 million in 2033. The top opportunities in the sports market segmented by type will arise in the participatory sports segment, which will gain \$92,006.9 million of global annual sales by 2028. The top opportunities in the sports market by revenue source will arise in the media rights segment, which will gain \$55,932.3 million of global annual sales by 2028. The top opportunities in the sports market by ownership will arise in the standalone segment, which will gain \$100,327.5 million of global annual sales by 2028. The sports market size will gain the most in China at \$39,701.1 million [9].

Overview: Dilwyn Porter [10] has surveyed two centuries of sports entrepreneurship history, using examples from the United States, Britain, and Europe. He argues that sports have always had a connection with business but that this has changed over time, and now, at the elite level, there is a greater tendency to define themselves primarily as businesses. In particular, he notes that in British team sports, coincident with the decline of amateur hegemony, profit has become much more of a driving force than the traditional focus on utility-maximization. He also suggests that comparisons with other branches of the entertainment industry would help place developments in sport into perspective. The late John Lowerson [11] presented a British study of late Victorian and Edwardian sports entrepreneurs that looked at those involved in both the spectator product and the player product. He outlined the economic history of firms such as Hardy's [13] (high-class angling equipment), Jacques (lawn bowls and croquet equipment), and Slazengers' (tennis balls) as well as looking at company formation among golf and tennis clubs. Additionally, Wray Vamplew [12] has presented a typology of the development of work-based teams and facilities across a range of sports, which significantly often offered a degree of equality for

women. Andrew Ross [14], in a sweeping yet solid survey of the American literature on sports business history in Steve Riess's *Companion to American Sport History*, presents American sports entrepreneurs as yet another case of American exceptionalism. He argues that American sports entrepreneurs, unlike those elsewhere, are more market-driven and more profit-focused. *Few have considered 'the multiple business opportunities for the entrepreneur outside of the sports realm that are made available through the entrepreneur's connection to sport.* [15] Administrators in Australia sought to popularize their sport by creating a network of clubs and promoting competition amongst them as well as bringing overseas stars to Australia, neither of which fell within the classic British view of amateur sport under whose policies they were supposed to be operating. Instead, they replicated the practices adopted by entrepreneurs pushing professional sport. John Chi-Kit Wong has shown that elite-level amateur ice hockey in Canada was operating on a business-like model before any actual professional hockey governing bodies appeared on the scene [16]. *Universities worldwide are dedicated to teaching, learning, and research on sports enterprise.*

Jang et al. [17] was to identify consumer groups through consumer segmentation in the exponentially growing esports industry. The study focused on "game experiences" in the context of esports gameplay consumption. They developed a matrix of esports gameplay based on high/low esports gameplay, viewing esports, and hardware enthusiasm leading to four esports gameplay consumer groups: all-around gamer, conventional player, observer, and recreational gamer. The proposed esports consumers' clustering is an example of research that will contribute to mapping and defining one of the world's fastest growing sport business sectors.

Foster et al. [18] have responded to the growing demand for data analytics talent in (elite) sport organizations. As hiring analytics talent is critical, applicants can command high levels of compensation, in part because they are attractive to companies in many other industries. One of the implications of this broader adoption of analytics across elite sports clubs, will be a greater emphasis on continued innovation across many areas such as player squad assembly, pre-game and within-game strategy, and health and fitness. A further implication is that executive talent from outside of professional sport is increasingly more relevant and valuable to the sport industry. In the near future, the demand (and hence competition) for off-the-field talent in sport business will increasingly intersect with other industries, opening

opportunities for cross-pollination and innovation beyond the boundaries of the sport industry.

Jackson and Dawson [19] reflect on the meaning, value and significance of sport. They introduce the challenges facing the global business of sport and describe the privileged position of sport in society, as “sporting exceptionalism.” They then use the example of women's professional sport to illustrate three key steps for an alternative future, while also signaling risks associated with following a hegemonic male model of consumer capitalist sport. They conclude that the more dominant or hegemonic any existing social system is (including sport), the more difficult it is to consider alternative futures. However, there lies tremendous potential value in applying the concept of alternative futures to envisioning a direction for the sport industry. It allows necessary contemplation about new structures, policies, and programmes that will positively transform global sport business.

Chmait and Westerbeek [20] look at how artificial intelligence has transformed the way in which sport is consumed and analyzed. In this perspective paper, the authors present a high-level, non-technical, overview of the machine learning paradigm that motivates its potential for enhancing sports (performance and business) analytics. Founded on a summary of relevant research literature in areas where artificial intelligence and machine learning have been applied to the sport industry, they present some hypothetical scenarios of how artificial intelligence and machine learning could shape the future of sports. They conclude their work with ominous questions. Will artificial intelligence 1 day be shaping the spending behavior of sports fans by exploiting their fan infused emotional vulnerabilities? Or if indeed, artificial intelligence will sacrifice the health of some athletes in favor of the bigger team winning the championship?

Jenkin et al. [21] focus their attention on the rapidly growing, but largely ignored market segment of older adults as sport participants. They investigated how managers in Australian National and State Sporting Organizations perceive sport for older adults. Contextualized in the perspective of organizational change, a framework for marketing to the aging consumer was used to interpret the results. They found that older adults are not a high priority group for most sporting organizations, despite recognition of the benefits of engaging older adults. A lack of age-appropriate programmes was perceived to be a major barrier of engaging older adults. Across all sporting organizations there was broad agreement that increasing participation numbers and engaging the older fan base was important, but most sporting

organizations are not (yet) ready to build “age friendly” sporting environments. The study provided insights into why this untapped market is not a priority target, and offers policy makers directions to better engage with this population group.

Business Models Significance: In layman’s terms, a business model is the sum of the parts comprising an organization's products or services. Establishing these models requires a combination of developing new offerings, finding untapped markets, and disrupting the organization by discovering different ways to market. Looking at the most innovative sports business models brings to light how the rise of digital platforms and technologies transformed the fundamental behaviors, wants, and needs of people. Compared to past generations, humans consume content and communicate in a completely different way. The change is encapsulated best by Nike CEO Mike Parker’s quote [27] saying, “We used to sell you a pair of shoes and some advertising, now it's about building a relationship." Across the whole of the value chain, the future of sport business will be as much determined by advancements in artificial intelligence, machine learning and sophisticated (fan and performance) data analytics *as it will be through application and sourcing of new business models*, tapping new markets, creating alternative revenue streams, management approaches such as alternative futures scenarios, and developing strategic partnerships beyond the sport industry [22]. A *few sport management studies refer explicitly to business models* as devices that firms use to mediate technology development and economic value creation [23] or blueprints that map relationships among firms’ customers, allies, and suppliers to enable product, information, and money flows [24], [25]. Aversa et al. [26], for instance, in the context of professional sport, conclude that Formula 1 race teams build on two complementary business models: one focused on selling technology, the other on selling well-trained human resources to competitors.

Sports Business Models in India & other Countries

The main modes of private investment and private sector association with sports include:

- ✚ **Non-Profit:** These include CSR initiatives and investments in the sector by leading corporate houses, and non-profit foundations. These foundations are chiefly involved in providing opportunities to children from the under-privileged sections to take up sports, supporting promising sportspersons in accessing worldclass training facilities and developing sporting infrastructure.

✚ **For Profit:** This pertains to the commercial interests in the sports sector, and covers the entire spectrum of sports goods manufacturing, retailing, establishing sports academies, providing sports curriculum services to schools and colleges, owning leagues and franchises, player management agencies, media houses, infrastructure development companies and other companies that seek marketing avenues for their brands through sponsorship association with sports tournaments and players.

In India, non-profit association with sport is more common. For-profit investment in sport in India mainly includes sponsorships and owning leagues and franchises. The commercial success of Indian Premier League (IPL) in cricket has led to a surge of similar commercial formats in other sports such as badminton, football and hockey. Reasonable success of the Indian Badminton League (IBL) and the Hockey India League (HIL) — sports that don't enjoy the same popularity as cricket, has shown that leagues are a good medium for generating interest and driving sports culture besides the potential RoI. These leagues may therefore not only benefit their respective sport monetarily, but also boost their uptake in the country.

Sports Ecosystem of India

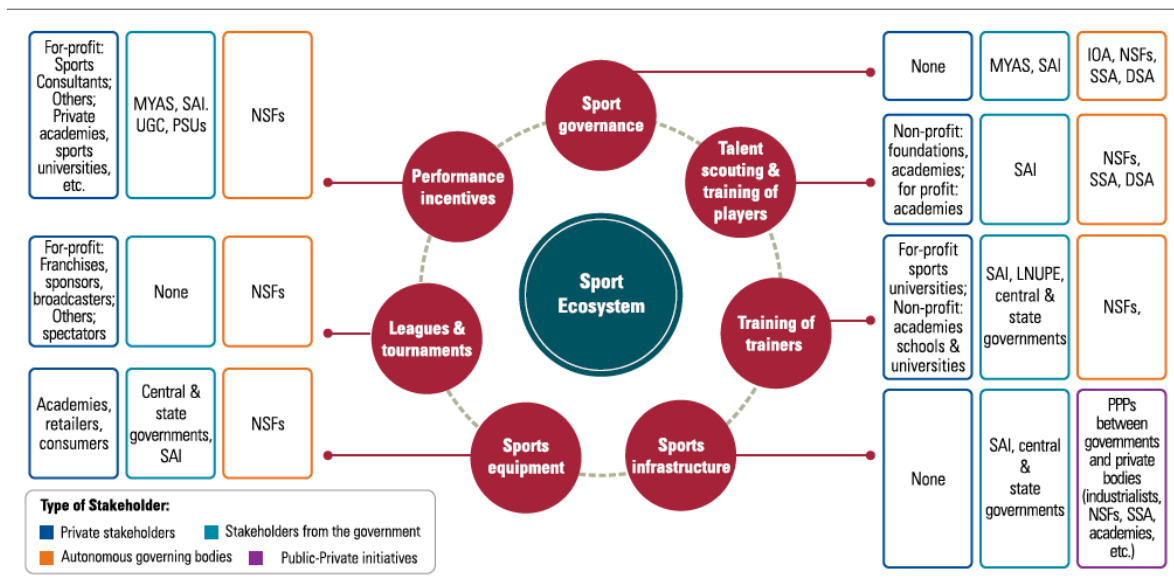
Sports ecosystem comprises different dimensions or segments that go into establishing and developing a sport and various stakeholders in each segment. The evolution of a sports ecosystem may be evaluated by the extent of interaction and awareness among stakeholders, within and across various segments. The levels of transparency and professionalism of the system, coupled with growing awareness of all stakeholders, decide the extent of the sports ecosystem's evolution. Identifying key stakeholders and addressing their issues and challenges is likely to go a long way towards strengthening the sports ecosystem in India. While the sports ecosystem is largely driven by the Government and Government-run bodies currently, the role of private sector stakeholders is on a rise and can be crucial to get the desired momentum:

✚ **Sports Governance:** The role of private sector in sports governance is limited. However, there are instances of private sector deals with sports federations for overhauling/ improving the respective sport. Such deals provide the usually cash starved National Sports Federations (NSFs) a financial breather to go about implementing plans for their respective sport's improvement.

- ✚ **Talent Scouting and Training Players and Trainers:** There is a reasonable presence of private academies being run on a self sustainable basis by former players of various sports. These academies try becoming sustainable by saving on capital expenditure through levers such as leasing playgrounds from schools and government institutions, rather than owning space. There is also a significant presence of leading corporate houses through their CSR initiatives, and non-profit foundations in the talent scouting and training players segment. Sports coaches and trainers are primarily trained in Government-run institutes. There are some private universities as well that offer courses in sports, physical education and other sports-related sciences, albeit on a limited scale. Private sector contribution in this segment is also seen by way of certain academies that provide active consultation to the Government in addressing the skill gap in sports coaching in India, and through private academies and sporting leagues that appoint a foreign coach who in turn shares expertise with Indian coaches.
- ✚ **Infrastructure:** Private sector contribution to sports infrastructure is minimal and is limited to PPPs for sports infrastructure development and operation. Some non-profit efforts towards stadia development have also been witnessed, but they are limited in number.
- ✚ **Sports Equipment Industry:** Key stakeholders in this industry are equipment manufacturers, retailers, consumers, and private sports academies. While India is a major exporter and manufacturing hub of certain sports goods, importing equipment for some non-popular sports significantly increases their cost.
- ✚ **Leagues and Tournaments:** Key stakeholders involved in this segment are broadcasters, franchises, National Sports Federations (NSFs), sponsors and spectators. The role of broadcasters and league owners in designing a spectator-friendly format becomes crucial to the commercial success of leagues, for instance the IPL, HIL, etc.
- ✚ **Performance Incentives:** Central and state Governments provide a majority of performance incentives to sportspersons in the form of government and PSU jobs, pension funds, educational scholarships and cash endowments. The role of private players is currently limited, but it is emerging gradually with the advent of non-profit foundations providing athlete sponsorships, and sports consulting firms that help athletes with post-retirement planning. Though private players are involved in various capacities in the sports ecosystem, the business of sports in India continues to be at a

nascent stage. Investing in leagues has become an important for-profit mode of entering the sports sector. However, profitability in the league format has also been a concern especially for non-cricketing sports leagues that elicit little interest from broadcasters due to inadequate spectator base — considering the fact that media rights is one of the biggest sources of league revenue.

Figure 1: Stakeholders in Indian Sports (Source: kpmg)



Leagues and Tournaments

Globally, the leagues system has served as an important way for companies to enter the sports sector. A sports league creates several opportunities for private companies in domains such as league management, franchisee, broadcasting, advertising, infrastructure, player management, licensing and merchandising. US alone is home to some of the biggest leagues in the world such as the National Football League (NFL), Major League Basketball (MLB), National Basketball Association (NBA) and National Hockey League (NHL), setting an example for ways of monetizing sports. For any league, media rights, sponsorships and revenue from franchises constitute major sources of revenue.

Commercial Viability of Leagues in India

The commercial viability of any league in India is governed by certain critical success factors, such as:

- ✚ **Players:** Involvement of the top players of the world creates interest among viewers and improves the quality of the game. IPL and IBL are some successful examples. On the other hand, I-League is struggling to attract top players, resulting in poor viewership.
- ✚ **Marketing:** An effective marketing campaign is another critical factor in increasing a league's popularity. Again, involvement of various celebrities as brand ambassadors or owners in IPL contributed to increased viewer interest in the league. In fact, the collaboration of the Indian entertainment industry and cricket has aided in making the IPL a commercial success.
- ✚ **Governance Framework:** It has been witnessed that leagues that with support from the approved federation have been able to sustain. ICL failed due to lack of support from the BCCI, and WSH is facing similar troubles due to the non-recognition of the founding federation as the official national sports federation of hockey.
- ✚ **Stadium Infrastructure:** Quality of stadium infrastructure contributes to the viewing experience, which increases the level of interest in sports. This, in turn, leads to an increase in the value of media rights.
- ✚ **Fan Base:** An effective strategy to increase a franchise fan base is the engagement of respective franchisees with the local community. This helps generate greater TV viewership, increases attendance in matches and sale of merchandise.
- ✚ **Performance of National Team or Players at the International Level** increases interest in the game and, consequently, the league.
- ✚ **League Timing:** The tournament should be held at a time when:
 - No international tournament is being organised simultaneously that can divert a significant section of the viewers
 - Maximum players are available
 - The weather is suitable for holding matches.

The length of games and timing of matches are also some other important factors, as gathered from the IPL experience.

Case Study 1: The Launch of the Japanese J-League [30]

Japanese football was in disarray until the late 1980s and in need of reform: the quality of play was low and low attendance figures confirmed people's disinterest in the sport. A series of re-organisational actions resulted in the launch of the Japanese J-League. The founders (the Japanese Football Association) in 1991 had three significant primary goals in mind:

- ✚ Improve the quality of the game;
- ✚ Develop a sporting culture;
- ✚ Earn international recognition.

The J-League was incorporated as an autonomous, non-profit organisation, unlike the English Premier League, in 1992, as a limited company. However, it is different from European football in the sense that its management is centralised, which implies that the J-League — not the clubs — makes decisions concerning sponsorships and licenses for the league. The goal was to create equal financing opportunities for every club (it was doubtful whether each club would be able to survive on its own from the beginning, because of low interest in football). The fact that all teams are highly competitive further enhanced the league's popularity. Currently, there are 36 corporate sponsors of the league and, by extension, of the clubs. This number includes large multinational companies. They usually compete with each other to acquire the status of teams' preferred supplier for different services. There are, however, no public funds used in professional football. The biggest challenge the founders faced was the lack of an established base of football in Japan. Sumo and baseball were far superior; only a few children took up football as their sport. Naturally, the limited number of players lowered football standards in the country. However, to turn this around, J-League clubs were required to go beyond being football teams and serve as community centres. Modelled after the German professional clubs, Japanese teams are comprehensive sport clubs that provide entertainment to people of all age groups. They are also tasked with promoting sports in their region and with encouraging people to participate in local sporting initiatives. To further increase public support, the teams tried to connect with their respective local communities. First of all, every participating club was renamed after its home city. Since the base city of a team cannot be changed, the naming process helped in creating a mutual commitment between a club and the locals. Every club is required to operate teams at various levels, such as under 18, under 15 and under 12. This motivates — and creates opportunities

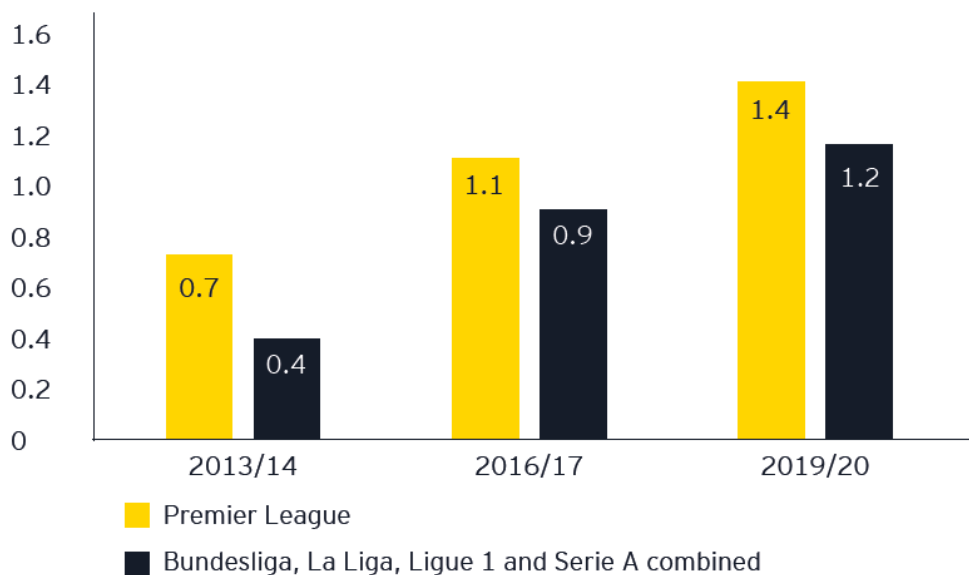
— for children to play football. Several other initiatives were taken to make the sport more spectator friendly and exciting for the Japanese consumers. The first official season (1993) started with 10 clubs (later it was expanded to 18 teams). The league adopted a two-stage season system where the winners of each stage played a final play-off at the end of the season to determine the champion. Moreover, matches could not end in a tie after 90 minutes. In case of levelled scores after the time limit, a 30-minute extra time game commenced, followed by a penalty shoot-out (if required). The system reverted to ‘classic’ rules in 1999 with a one-stage league format and the possibility of ties. There are plans to revive the two-stage format in 2015. To improve the quality of the game and increase attendance, the J-League invited foreign football stars to the teams. Among others, Gary Lineker, Dunga, Jorginho, Patrick M’Boma and Dragan Stojkovic arrived in the early years for wages reportedly as high as JPY300 million (USD 3 million) a year. Numerous foreign coaches were also employed, such as Arsene Wenger (the current manager of the EPL team Arsenal). The J-League’s embracing of the European best practices and systems helped it quickly improve the quality of the games. However, their reliance on big names was shortlived once domestic players started establishing themselves. Today, the earlier trend seems to have reversed with Japanese footballers playing for major European teams (Shinji Kagawa for Manchester United and Yuto Nagatomo at Inter Milan are a few examples). Building fan bases and creating a culture of football were also important. The J-League aimed at reaching out to people with diverse backgrounds and interests. Hooliganism was kept at bay to ensure people can enjoy the games with their families. Singing and chanting during the games was encouraged to create a good atmosphere. The league contracted a leading global creative agency to rebrand the teams and enhance their appeal among fans. Mascots and logos became an integral part of teams’ identity, further reinforcing the bond between fans and clubs. Bright and eye-catching kits with high recall value were also introduced. Like major American sports, significant focus was given on developing a variety of merchandise. The launch of the J-League proved to be a commercial and sporting success. Well-planned commercial and merchandising activities, which leveraged communal and regional pride, resulted in the creation of a strong fan base. Interest in the sport rose steadily with average attendance reaching as high as 18,000 per game. Football gradually became one of the most popular sports in Japan, since the J-League provides the country with a domestic alternative to the English Premier League, which usually overshadows domestic football. Moreover, it also helps Japanese players in showcasing their talent and rising to the top without being forced to

play for other countries' clubs. Thanks to the J-League, participation in football boomed in the country and currently about 5 million people are estimated to play professionally or at the amateur level.

Case Study 2: UK Premier League Broadcast Exports reflect its Significant International Appeal

The Premier League's broadcast exports comprise almost half of the UK's TV exports. In 2019/20, the League's broadcast exports were £1.4 billion, almost on par with the £1.5 billion achieved in exports of other UK television productions (including the BBC, ITV, Channel 4, Channel 5, Sky and the independent sector) in 2019/20 [31]. The Premier League's overseas broadcast rights have consistently exceeded the combined total of the other four major European leagues. Broadcast export value is supported by the Premier League's investment in Premier League Productions (PLP), which distributes and creates content for international rights holders.

Figure 2: Overseas Rights of Major Sports Leagues, £ Billions (Source: Premier League Analysis Estimates)



Results & Findings

Business Strategies Behind the Most Profitable Sports Leagues:-

A) Building a Global Brand

In today's interconnected world, reaching beyond national borders is crucial. The National Football League (NFL), considered one of the most profitable sports leagues globally, with an estimated worth of \$86 billion as of 2023, is a prime example. Their international expansion strategies include:

- ✚ **Establishing offices in key markets:** The NFL has offices in London, Mexico City, and China, focusing on marketing, partnerships, and fan engagement.
- ✚ **Playing regular-season games internationally:** The "NFL London Games" series, which started in 2007, attracts millions of viewers globally, showcasing the league's brand and generating significant revenue.
- ✚ **Content creation and broadcasting:** The NFL has partnered with international broadcasters and streaming services, like DAZN and Amazon Prime Video, ensuring global accessibility to their content.

Roger Goodell, NFL Commissioner, stated in 2023, "We are committed to growing the NFL internationally and making it a sport that is truly global."

This commitment to internationalization allows the NFL to tap into new markets, expand its fanbase, and ultimately, increase profitability.

B) Cultivating a Loyal Fanbase

Engaging fans is paramount for any sport. Leagues achieve this through various means, including:

- ✚ **Enhancing the Game-Day Experience:** From introducing interactive elements like in-stadium games and giveaways to creating a comfortable and family-friendly environment, leagues make attending games an enjoyable experience for all.
- ✚ **Building a Strong Online Presence:** Social media platforms and dedicated apps allow for constant fan engagement, providing behind-the-scenes content, player interaction opportunities, and personalized experiences.
- ✚ **Developing Community Initiatives:** Leagues often participate in charity drives, youth programs, and community events, fostering a sense of connection and loyalty with the local community.

The Indian Premier League (IPL), the world's most valuable cricket league with a brand valuation of \$8.4 billion in 2023, excels at fan engagement. Its success can be attributed to:

- ✚ **Focusing on High-Octane Entertainment:** The IPL's shorter format, fast-paced action, and focus on entertainment make it a captivating experience for fans, attracting a wider audience.
- ✚ **Investing in Digital Reach:** The IPL has a strong online presence, with millions of followers on social media and a dedicated app offering real-time updates, highlights, and exclusive content.
- ✚ **Leveraging Regional Identities:** By associating each team with specific Indian cities, the IPL fosters a sense of local pride and connection among fans.

These strategies not only create a dedicated fanbase but also translate into increased ticket sales, merchandise purchases, and viewership, leading to higher revenue streams.

C) Sponsorship and Advertising

Sponsorships are a significant source of income for sports leagues. Leagues like:

- ✚ **The National Basketball Association (NBA):** With a partnership revenue of \$1.5 billion in 2022, the NBA which is one of the most profitable sports leagues has secured lucrative deals with major corporations like Nike and Microsoft.
- ✚ **The English Premier League (EPL):** Its lucrative kit sponsorship deals, with shirt sponsorship alone generating over \$700 million annually, highlight the league's financial strength.

Leagues attract sponsors by:

- ✚ **Offering Valuable Brand Exposure:** Sponsorships provide companies with access to a large, engaged audience, enhancing their brand visibility and recognition.
- ✚ **Providing Activation Opportunities:** Leagues offer sponsors various opportunities to activate their partnerships, such as in-stadium branding, product sampling, and media integrations.
- ✚ **Tailoring Packages:** Leagues offer sponsorship packages catering to different needs and budgets, ensuring inclusivity and attracting a wider range of partners.

Adam Silver, NBA Commissioner, stated in 2022: "Our sponsorships are integral to our league's growth and success, allowing us to invest in our players, teams, and the game itself."

By strategically leveraging sponsorships, leagues not only generate substantial revenue but also build strong relationships with key partners, fostering long-term stability and growth opportunities.

D) Innovation and Technology

Technological advancements play a crucial role in sports leagues' success. Leagues are adopting innovative solutions such as:

- ✚ **Utilizing Advanced Analytics:** Data analysis helps sports leagues understand fan preferences, optimize game schedules, and improve player performance, leading to better decision-making and increased efficiency. For instance, leagues can analyze fan attendance patterns to determine optimal start times for games, or they might use performance data to identify areas for player development, draft decisions, and even reduce potential injuries. This type of data-driven approach allows leagues to make informed decisions that impact both the fan experience and the success of their teams, ultimately improving the league's overall health and long-term profitability.
- ✚ **Enhanced Broadcasting Experiences:** Technologies like virtual reality and augmented reality offer new ways to engage fans, providing immersive experiences and driving viewership.
- ✚ **Evolving Digital Platforms:** Leagues are constantly innovating their digital platforms, offering streaming services, interactive features, and personalized content, catering to the evolving needs of fans.

By embracing technology, leagues can:

- ✚ **Increase Fan Engagement:** Technological advancements create new and exciting ways for fans to interact with the sport, leading to a more engaged and loyal fanbase.
- ✚ **Generate New Revenue Streams:** New technologies can open doors to new revenue opportunities, such as selling exclusive digital content or offering pay-per-view events.

- ✚ **Improve Operational Efficiency:** Technology helps streamline operations, manage resources effectively, and make data-driven decisions, leading to cost savings and increased profitability.

E) Broadcasting Rights

Broadcasting rights are another major source of revenue for sports leagues. Leagues:

- ✚ **Negotiate Lucrative Deals:** Leagues negotiate exclusive broadcast rights with various broadcasters, ensuring they receive the highest possible compensation for their content.
- ✚ **Explore Different Models:** Leagues are exploring different broadcasting models, such as over-the-top (OTT) streaming services and pay-per-view options, catering to diverse audience preferences.
- ✚ **Invest in Content Production:** High-quality content production is crucial for attracting viewers and securing lucrative broadcasting deals.

With its centralized broadcasting rights model, the **German Bundesliga** is an example of successful rights management. This model ensures that all clubs receive a share of the revenue generated from broadcasting rights, promoting financial stability and competitiveness within the league.

Donata Hopfen, the previous CEO of the DFL (German Football League), stated in 2023: "Our centralized broadcasting rights model has been instrumental in ensuring the financial stability of the Bundesliga and contributing to its growth and success on a global scale."

Through effective management of broadcasting rights, leagues can generate significant revenue, ensure financial stability for their members, and reach a wider audience, further amplifying their global reach and profitability.

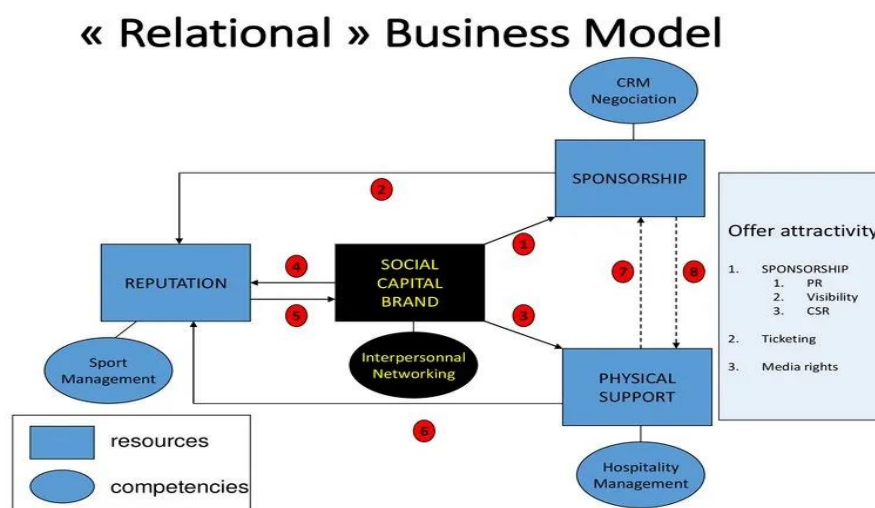
The success of a sports league is not solely determined by on-field competition but also by its strategic approach to business operations. By implementing the strategies outlined above, leagues can build a strong global brand, cultivate a loyal fanbase, leverage partnerships, embrace technology, and navigate the complexities of broadcasting rights, ultimately achieving long-term financial sustainability and paving the way for continued growth and success in the ever-evolving world of sports.

Conclusion

Therefore, the research analysis observed in the business models that currently exist in the sports business industry;

The Relational Model: This model relies on personal networks to attract funding partners for their club or event. Partners can be communities or private companies. This strategic base configures sports organizations that do not have significant TV rights, so the resource of a company or community proportionally replaces what represents the TV right for a major sports event.

Figure 3: Relational Business Model

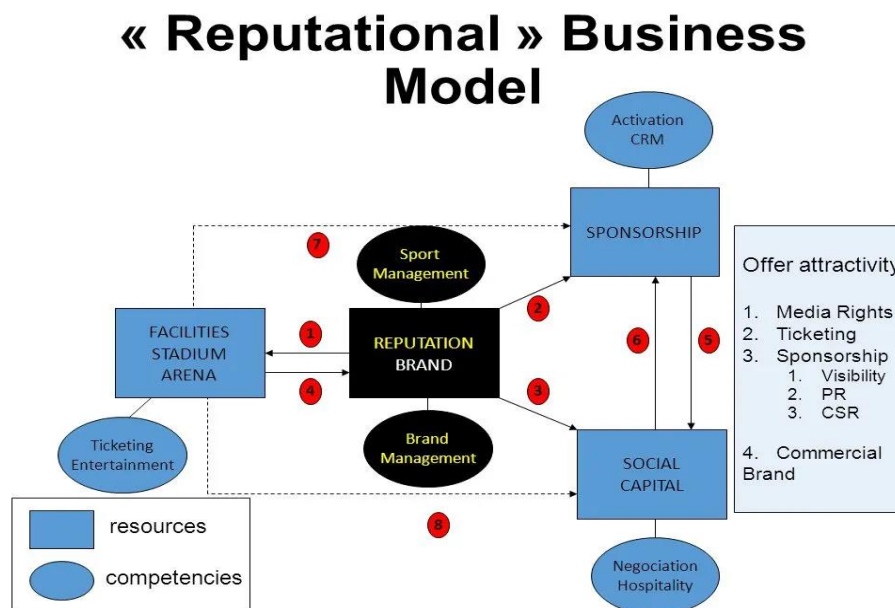


Relational asset makes the brand capital more attractive ->main partnership contracts->economically attracts the athletes and the sports management part ->this sum of money finances the costs of facilities and hospitality in sports venues -> new relations by reputation effect ->new partnerships in the context of the evolution of physical supports associated with the events.

The Reputation Model: The model of big sports events and clubs or leagues financed mainly by TV rights. The configuration is centred on the reputation capital which attracts media partnerships thanks to the sporting exceptionality. Non-media partnerships aim to develop their own brand through media exposure.

This is the model for major events such as the Olympic Games, the Football World Cup, Roland Garros, etc. They attract attention both through their sporting rank but also through media promotion.

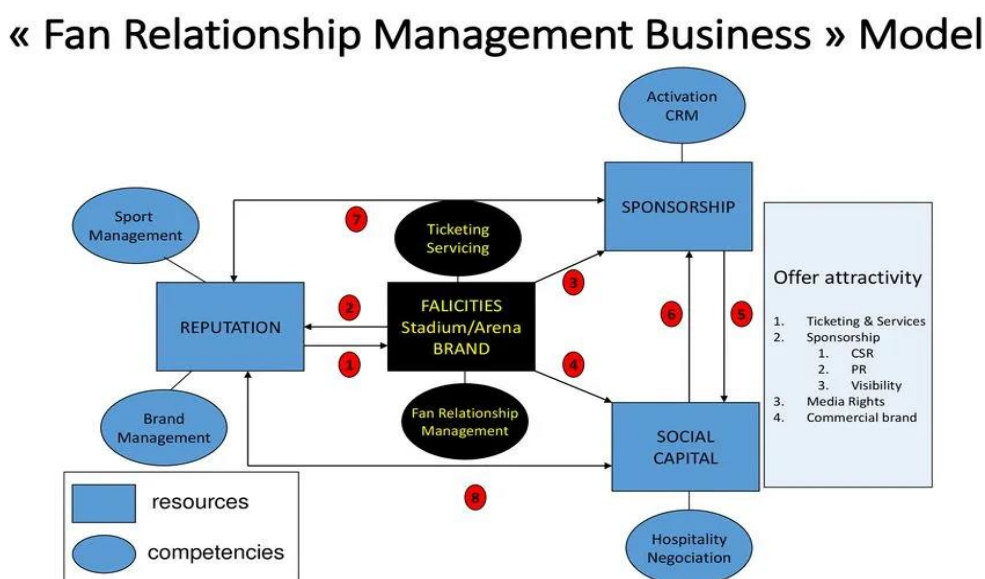
Figure 4: Reputational Business Model



The Fan Relationship Management Model: This is the business model that places their physical support at the base of their economy. In the case where the club or event owns and operates its sports arena, the latter is the source of revenue directly (sale of tickets or services and derivative products within the stadium).

The sports organisation establishes a dynamic relationship with its fans and businesses through its physical support. Then media and non-media partners are activated by the media and relational potential. These feed the reputation of the club or event.

Figure 5: Fan Relationship Management Business Model



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Harnessing Information Technology in Academic Libraries: an in depth analysis of existing tools

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Structured Abstract:

Purpose: The paper aims to inform librarians and library administrators about the importance of integrating information technology into academic library services. It serves as a guide for understanding the various applications of IT in libraries and the challenges that librarians may encounter during the implementation process. The purpose of the paper is to advocate for the effective integration of information technology in academic libraries, recognizing its potential to enhance library services, streamline operations, and support the academic mission of institutions.

Design / Methodology / Approach: It's basically a theoretical paper where I conduct a comprehensive literature review to identify relevant theoretical perspectives, debates, and empirical research findings related to IT integration in academic libraries.

I use academic databases, journals, books, and conference proceedings to gather literature and synthesize key themes, theories, and conceptual models from the literature review to inform the theoretical analysis. I built a structured approach to conducting theoretical research on the integration of information technology in academic libraries, offering transparency and clarity regarding the methods used to explore theoretical insights and frameworks. Explain the relevance of chosen theories and I try to define what types of opportunities and obstacles faced by librarians.

Findings: Academic libraries have evolved into vibrant hubs of digital resources, facilitated by IT, which enables efficient management, retrieval, and dissemination of information. However, librarians encounter several hurdles in harnessing IT effectively. These challenges include addressing the technological skills gap among library staff, managing information overload, navigating budget constraints, ensuring compliance with copyright laws, intellectual property rights, safeguarding patron privacy and data security. The importance of continuous professional development for librarians to enhance their technological proficiency and highlights the need for collaborative efforts among library professionals, administrators, and stakeholders to overcome these challenges and maximize the benefits of IT in academic libraries. It is strongly believed that libraries of the 21st century are experiencing changes in different areas of their services delivery. The dynamic landscape of information technology (IT) utilization in academic libraries and the accompanying challenges faced by librarians in adapting to technological advancements in this IT era.

Originality / Value: Effective application of information technology in library transmits users' satisfaction. The present scenario demands the updated technology for the faster and approachable library services. Gradually, new technologies are developed; consequently there is the need to develop our skills and capacity to provide enhanced library services. Library resources must be used at a large amount. The successfulness of a library and the library professional always depends on the quality of the service. The emergence of ICT is the new paradigm to extend the level of library operation and services. So, it is inevitable for the library professionals to be updated with the technology for the own existence.

Paper Type: Theoretical Research Paper.

Keywords: Information and Communication technologies (ICT), Academic libraries, Internet, Librarians Challenges, Information Retrieval, Electronic Resource Management.

Introduction

The term "library" means a collection of educational materials organized for use. This word is derived from the Latin word "Liber" which means a book. This is a good reason to believe that the root concept of library is deeply embedded in our ways of thinking about the world and coping with its problems. It is gainsaying change is constant, as propounded by a famous Philosopher Heraclitus when he tried to find out what the universe is made up of and reducible to. This change has led to several re-modulations of processes of service delivery in various institutions which the library is among. Nonetheless, libraries regardless of the type and size in a bid to cater for its clientele's information needs engages in the acquisition, organization, dissemination, preservation and conservation of information and information resources both in print and non-print forms. Information and Communication Technologies (ICT) facilitate the process of identification, collection, storing, processing and disseminating of information. The library and information science professionals are utilizing ICTs to keep pace with the problem of information explosion. The benefit of instant access to digital information is the most distinguishing attribute of the information age. But at last it is to say today's highly sophisticated information technology facilitates the storage of huge amounts of data or information in a very compact space. Information technologies promised fast retrieval of stored information and revolutionize our concept of the functions of a traditional library and a modern information centre and have dramatically changed the mode of library operations and services. In libraries, information technology has assisted library professionals to provide value added quality information service and give more remote access to the internationally available information resources.

However, the situation is changing, and the library professionals should be ready for everything to cope with the new ICT used in libraries. Computer has brought in a new impact to the library and information usage. In this circumstance the ancient librarians is inconsequential as libraries are switching over to use of ICTs, electronic resources and offering of digital services and other emergent technologies at an accelerated pace.

Objective of the Study

- ✚ **Examine IT Applications:** Investigate the diverse applications of IT in academic libraries, including but not limited to digital cataloguing, electronic resource management, online reference services, digital preservation, and data analytics. Explore how IT enhances library operations, services, and user experiences.
- ✚ **Identify Challenges Faced by Librarians:** Identify the challenges encountered by librarians in adopting, implementing, and managing IT systems and services in academic libraries. These challenges may include budget constraints, technological infrastructure limitations, staff training needs, and resistance to change.
- ✚ **Assess Impact on Library Services and Users:** Assess the impact of IT implementation on library services, resources, and user satisfaction. Explore how IT enhances access to information, facilitates remote services, supports research and teaching activities, and promotes information literacy among library users.
- ✚ **Explore Best Practices and Strategies:** Identify best practices, strategies, and innovative approaches adopted by academic libraries to overcome IT-related challenges and maximize the benefits of IT integration. Examine successful case studies and examples of IT implementation in academic libraries.
- ✚ **Recommendations for Improvement:** Provide recommendations and practical guidelines for librarians, library administrators, and policymakers to address IT challenges effectively and optimize IT utilization in academic libraries. These recommendations may include investing in staff training, enhancing technological infrastructure, fostering collaboration with IT departments, and prioritizing user-centred design principles.

By achieving these objectives, the study aims to contribute to a better understanding of the role of IT in academic libraries, empower librarians to navigate IT challenges, and enhance the overall effectiveness and efficiency of library services in the digital age.

Applications of Information Technology in Academic Libraries in the Epoch of ICT

1. **Digital Libraries:** Creation and maintenance of digital collections, including e-books, e-journals, and multimedia resources. Facilitate remote access to library resources through online catalogues and digital repositories. Application of ICT (Information and Communication Technology) for digital libraries revolutionizes the way information is accessed, stored, and managed. Here are some key notes on this are:
 - a. **Digitalization of Resources:** ICT enables the conversion of traditional library resources such as books, journals, manuscripts, and multimedia materials into digital formats. This process facilitates easier access and preservation of valuable cultural and academic resources.
 - b. **Online Cataloguing and Indexing:** ICT allows for the creation of comprehensive online catalogues and indexes, making it easier for users to search and locate specific resources within the digital library. Advanced search functionalities, including keyword search, filters, and sorting options, enhance the user experience.
 - c. **Remote Access:** Digital libraries supported by ICT provide remote access to resources, enabling users to access information from anywhere with an internet connection. This feature enhances accessibility for users who may not have physical access to a traditional library.
 - d. **24/7 Availability:** Unlike traditional libraries with fixed operating hours, digital libraries powered by ICT are available 24/7, allowing users to access resources at their convenience. This flexibility caters to diverse user needs and time zones.
 - e. **Resource Preservation:** ICT aids in the preservation of rare and fragile materials by digitizing and storing them in secure digital repositories. Digital preservation techniques, such as metadata standards, encryption, and backup systems, ensure the long-term integrity and accessibility of digital resources.
 - f. **Collaborative Platforms:** ICT facilitates collaboration among researchers, scholars, and library professionals through online platforms and social networking tools. Users can share resources, collaborate on projects, and participate in discussions, enhancing scholarly communication and knowledge dissemination.
 - g. **Multimedia Integration:** Digital libraries leverage ICT to incorporate multimedia elements such as audio, video, and interactive simulations into resource collections.

This multimedia integration enhances the richness and interactivity of the learning experience for users.

- h. Personalization and Customization:** ICT enables digital libraries to offer personalized services tailored to individual user preferences and interests. Features such as saved searches, personalized recommendations, and customizable user profiles enhance user engagement and satisfaction.
- i. Metadata Standards:** ICT plays a crucial role in the development and implementation of metadata standards such as Dublin Core, MARC (Machine-Readable Cataloging), and MODS (Metadata Object Description Schema). These standards facilitate efficient resource discovery, interoperability, and metadata exchange among digital libraries.
- j. Digital Rights Management (DRM):** ICT enables digital libraries to implement DRM mechanisms to protect intellectual property rights and control access to copyrighted materials. DRM technologies, such as encryption, access controls, and watermarks, safeguard digital resources from unauthorized use and distribution.
- k. Usage Analytics:** ICT allows digital libraries to collect and analyze usage data to gain insights into user behaviour, preferences, and trends. Usage analytics help librarians and administrators make informed decisions regarding resource acquisition, collection development, and service improvement.

In summary, the application of ICT for digital libraries enhances access, preservation, collaboration, and customization of resources, transforming the way information is disseminated and utilized in the digital age.

2. Library Management Systems: Implementation of Integrated Library Systems (ILS) for efficient cataloguing, circulation, and inventory management. Automation of routine tasks, such as acquisitions, serials control, and patron management it make a crucial role. Library Management Systems (LMS) are comprehensive software solutions designed to automate and streamline various library operations. Here are some key notes on Library Management Systems:

- a. Cataloguing and Classification:** LMS enables librarians to catalogue and classify library materials using standardized systems such as MARC (Machine-Readable

Cataloguing) and Dewey decimal classification. Cataloguing features include metadata creation, subject indexing, and authority control.

- b. Acquisitions and Collection Development:** LMS facilitates the acquisition, selection, and management of library materials. Librarians can create purchase orders, track budgets, manage subscriptions, and evaluate collection usage to support informed collection development decisions.
- c. Circulation Management:** LMS automates circulation processes such as check-in, check-out, renewals, and holds/reservations. It maintains borrower records, manages loan periods and fines, and generates circulation reports to monitor usage patterns and inventory status.
- d. Catalogue Search and Discovery:** LMS provides patrons with user-friendly search interfaces to discover library resources. Features include keyword search, advanced search filters, relevance ranking, and faceted navigation to facilitate efficient resource discovery.
- e. Interlibrary Loan (ILL):** LMS facilitates interlibrary loan services by automating request processing, resource sharing, and document delivery between libraries. Integration with consortia networks and resource sharing platforms enhances access to materials beyond the library's collection.
- f. Electronic Resource Management (ERM):** LMS supports the management of electronic resources such as e-books, e-journals, databases, and multimedia content. It provides tools for license management, access control, usage statistics, and troubleshooting of electronic resources.
- g. Digital Asset Management (DAM):** Some LMS platforms include features for managing digital assets such as digitized collections, institutional repositories, and multimedia resources. DAM functionalities may include metadata management, preservation, access controls, and digital rights management.

In summary, Library Management Systems play a crucial role in automating library operations, enhancing user services, and facilitating efficient management of library resources in both physical and digital environments.

- 3. Reporting and Analytics:** LMS generates customizable reports and analytics to assess library performance, usage trends, and resource utilization. Librarians can analyze

circulation statistics, collection usage data, and patron demographics to inform decision-making and improve services. The application of Information and Communication Technology (ICT) in reporting and analytics within libraries has significantly transformed how librarians manage resources, understand user behaviour, and make informed decisions. Here are key applications of ICT in reporting and analytics within libraries:

- a. Data Collection and Aggregation:** ICT tools facilitate the collection and aggregation of data from various library systems and sources, including circulation records, catalogue searches, user interactions with digital resources, and website traffic.
- b. Data Cleaning and Transformation:** ICT assists in cleaning and transforming raw data into a usable format by identifying and correcting errors, handling missing values, and converting data into standardized formats suitable for analysis.
- c. Descriptive Analytics:** Libraries use ICT to perform descriptive analytics, which involves summarizing and visualizing data to provide insights into historical trends, usage patterns, and resource preferences. Visualization tools such as charts, graphs, and heat maps help librarians understand data more intuitively.
- d. Diagnostic Analytics:** ICT enables diagnostic analytics, allowing librarians to delve deeper into data to uncover underlying causes and correlations. By analyzing factors influencing resource usage, circulation patterns, and user demographics, libraries can identify areas for improvement and optimize services accordingly.
- e. Predictive Analytics:** With ICT, libraries can leverage predictive analytics to forecast future trends and outcomes based on historical data. Predictive models can help anticipate demand for specific resources, identify potential issues with library services, and optimize resource allocation and collection development strategies.
- f. Usage Analytics:** ICT tools provide libraries with insights into user behavior and preferences through usage analytics. By tracking how patrons interact with library resources, librarians can tailor services to meet user needs, improve resource discoverability, and enhance user satisfaction.
- g. Collection Management:** ICT supports collection management efforts by providing data-driven insights into the performance and relevance of library collections. Librarians can use analytics to assess the usage and impact of individual resources,

make informed decisions about acquisitions and reselections, and optimize collection development strategies.

- h. Decision Support Systems:** Libraries employ ICT-based decision support systems to assist librarians in making strategic decisions. These systems use analytics to generate recommendations and predictions, helping librarians prioritize initiatives, allocate resources effectively, and achieve organizational goals.
- i. Performance Monitoring and Evaluation:** ICT enables libraries to monitor and evaluate their performance using key performance indicators (KPIs) and metrics. By tracking metrics such as circulation statistics, patron engagement, and resource usage, libraries can assess their effectiveness, measure progress toward goals, and identify areas for improvement.
- j. Data Privacy and Security:** Libraries prioritize data privacy and security when employing ICT for reporting and analytics. Measures such as data encryption, access controls, and compliance with privacy regulations (e.g., GDPR, HIPAA) help safeguard patron information and ensure data confidentiality.

In summary, the application of ICT in reporting and analytics empowers libraries to harness the power of data to enhance services, optimize resources, and meet the evolving needs of patrons effectively.

- 4. Integrated Library Services Platform (ILS):** Modern LMS platforms may offer integrated modules for additional library services such as event management, room reservations, course reserves, and patron communication (e.g., email notifications, alerts).The application of Information and Communication Technology (ICT) on Integrated Library Services Platforms (ILS) revolutionizes library operations and user experiences in several ways:

- a. Digital Catalogue Management:** ICT allows libraries to create and manage digital catalogues, making it easier for users to search, browse, and access library resources remotely.
- b. Automation of Library Processes:** ICT automates various library processes such as cataloguing, circulation, acquisitions, and inventory management, improving efficiency and reducing manual workload for library staff.

- c. Remote Access to Library Resources:** Through ICT, patrons can remotely access library resources, search catalogues, place holds, renew materials, and access digital content from any internet-connected device, enhancing accessibility and convenience.
- d. Electronic Resource Management (ERM):** ICT facilitates the management of electronic resources such as e-books, e-journals, databases, and multimedia content within the ILS, including license tracking, access control, and usage monitoring.
- e. Interlibrary Loan (ILL) Services:** ICT streamlines interlibrary loan services by automating request processing, resource sharing, and document delivery between libraries, expanding access to materials beyond the library's collection.
- f. Analytics and Reporting:** ICT provides tools for data analytics and reporting within the ILS, allowing libraries to analyze usage trends, assess collection performance, and make data-driven decisions to optimize library services.
- g. User Authentication and Security:** ICT ensures secure access to library resources through user authentication mechanisms, including login credentials, IP authentication, and integration with identity management systems, safeguarding patron privacy and data security.
- h. Integration with External Systems:** ICT enables seamless integration of the ILS with external systems such as learning management systems (LMS), discovery layers, authentication services, and bibliographic databases, enhancing interoperability and providing a unified user experience.
- i. Mobile Applications:** ICT supports the development of mobile applications for the ILS, allowing patrons to access library services, search catalogs, check account status, and receive notifications on their smart phones and tablets, enhancing accessibility and engagement.
- j. User Engagement and Communication:** ICT facilitates user engagement and communication through features such as email notifications, alerts, event calendars, and interactive online forums within the ILS, fostering community interaction and collaboration among library users.

In summary, the application of ICT on Integrated Library Services Platforms transforms library services by improving efficiency, accessibility, and user experience, while also enabling libraries to adapt to the changing needs of their patrons in the digital age.

5. **Accessibility and Customization:** LMS platforms prioritize accessibility standards to ensure inclusive access for users with disabilities. They offer customizable interfaces, user profiles, and preferences to accommodate diverse user needs and preferences.
6. **Integration and Interoperability:** LMS platforms support integration with external systems and services such as institutional repositories, learning management systems (LMS), discovery layers, authentication systems, and bibliographic databases to enhance interoperability and seamless access to resources.
7. **Information Retrieval:** Development of user-friendly search interfaces powered by Information Retrieval (IR) technologies. Integration of federated search tools to access multiple databases and repositories simultaneously.
8. **Electronic Resource Management:** License negotiation and management for electronic resources, including databases and journals. Usage statistics analysis to optimize resource allocation and subscription decisions during information uses in library and information centre by the users.
9. **Open Access Initiatives:** Support for Open Access publishing models and institutional repositories to increase the visibility and accessibility of scholarly outputs. Advocacy for Open Educational Resources (OER) to reduce textbook costs and promote equitable access to educational materials use. Application of Information and Communication Technology (ICT) in Open Access Initiatives revolutionizes scholarly communication and access to knowledge. Some example how ICT ready to build different open access repositories for academicians and fellows:
 - a. **Online Repositories:** ICT enables the creation and management of online repositories for scholarly works, providing a platform for researchers to deposit and access academic publications freely.
 - b. **Open Access Journals:** ICT facilitates the publication and dissemination of scholarly journals in open access formats, eliminating subscription barriers and providing unrestricted access to research articles.
 - c. **Institutional Repositories:** Academic institutions utilize ICT to establish institutional repositories, showcasing their faculty's research output and promoting open access to scholarly publications produced within the institution.

- d. Open Access Platforms:** ICT platforms such as arXiv, PubMed Central, and DOAJ (Directory of Open Access Journals) serve as centralized repositories for open access scholarly content, facilitating global access to research across disciplines.
- e. Digital Publishing Tools:** ICT provides digital publishing tools and platforms that enable researchers to create, publish, and disseminate their work in open access formats, bypassing traditional publishing barriers.
- f. Open Access Policies:** ICT supports the implementation and enforcement of open access policies by academic institutions, funding agencies, and governments, ensuring that publicly funded research is made freely accessible to the public.
- g. Open Access Advocacy and Awareness:** ICT tools and communication channels are used to advocate for open access principles and raise awareness about the benefits of open access publishing among researchers, policymakers, and the public.
- h. Open Access Metrics and Analytics:** ICT enables the tracking and analysis of usage metrics for open access publications, providing insights into the reach, impact, and visibility of research outputs in the open access ecosystem.
- i. Collaborative Research Platforms:** ICT platforms such as ResearchGate, Academia.edu, and Mendeley facilitate collaboration and knowledge sharing among researchers, promoting open access to scholarly content and fostering interdisciplinary collaboration.
- j. Licensing and Copyright Management:** ICT tools such as Creative Commons licenses are used to manage copyright and licensing for open access publications, allowing authors to retain copyright while granting users permission to access, reuse, and redistribute their work.

In summary, the application of ICT in open access initiatives plays a pivotal role in democratizing access to scholarly knowledge, promoting collaboration, and advancing research dissemination in the digital age. By leveraging ICT tools and platforms, open access initiatives empower researchers, institutions, and the public to freely access, share, and contribute to the global knowledge commons.

Impact of ICT on Academic Library Users

It is established fact that information and communication technology (ICT) has brought the revolution in the field of library and information science, as we have already mentioned that

all library house-keeping activities like acquisition, procurement, processing, organization and dissemination of information services are based on computer, communication, reprographic and digital technologies, which has facilitated the following ICT based library services being provided to the users more effectively, those are:

ICT-based Information Services in Academic Library

| ICT-Based Information Services | Services |
|---|---|
| 1. Reference Service | 2. Bibliographic Service |
| 3. Referral Service (FAQ database) | 4. New Arrivals alert service |
| 5. Online reservation service | 6. Online Public Access Catalogue- OPAC |
| 7. Current Awareness Service (CAS) | 8. Document Delivery Service (DDS) |
| 9. Selective Dissemination of information (SDI) | 10. Barcode / RFID Based Service |
| 11. E-Employment Alert Service | 12. E-Book Service |
| 13. E-Journals & Magazine Service | 14. E-Databases Service |
| 15. E-Newspapers Service | 16. E-Project/Report/Thesis Service |
| 17. User Orientation Program | 18. In-House Personal Training |
| 19. Resources sharing and other services. | 20. Online tutorials on how to use the information resources/services |
| 21. Automatic (electronic) mailing alert system | 22. Access to open access information sources through in house developed subject gateways/Web portals |

Such facilities, being extended to the academicians, researchers and library users to find their required information without any barriers, are possible only because of information and communication technology (ICT) use in library and information centres or libraries.

Some ICT-Based Tools for Sharing of Knowledge

ICT Platform revolutionized the sharing of knowledge by providing efficient and accessible platforms for collaboration, communication, and dissemination. ICT-based tools have democratized the sharing of knowledge by providing accessible and user-friendly platforms for collaboration, communication, and dissemination. From online collaboration platforms to open access repositories, these tools empower individuals and organizations to share their expertise, insights, and discoveries with a global audience, driving innovation and advancing collective knowledge across disciplines. At a glance here some ICT-based tools for sharing knowledge among the information seekers in digital era given below:

| Serial Number | ICT-based tools |
|---------------|--|
| 1 | E-mail |
| 2 | Phone calls/Teleconferencing |
| 3 | Intranet |
| 4 | Video conferencing |
| 5 | Data Mining/Resource Discovery Tools |
| 6 | Institutional Repositories/Digital libraries |
| 7 | Wikis |
| 8 | RSS |
| 9 | Blogs |
| 10 | Social Networking sites |
| 11 | Book marking |

Problems of Application ICT in Academic Libraries

- a. Fear of adverse impact on employment. It is generally believed that computer can do a lot of task of library operations thereby relieving staff of their positions, resulting to lose of jobs.
- b. Apprehensions that the new technology could be too expensive. There is expectations that the technology both hardware and software could be expensive and unaffordable.
- c. Lack of qualified personnel to handle the task.
- d. Lack of support from management as a result of budget constraints i.e., lack of fund.
- e. Problem of retrospective conversion of data from manual to a digital system.
- f. Lack of maintenance culture among the patrons. Maintenance cultures is absence in our country one thing is to install something and another thing is to maintain them as most people believe that government property is no body's property.

Some Barriers Related to the use of ICT in Academic Libraries

| Serial Number | Challenges in ICT Application |
|---------------|---|
| 1 | Lack of trained Staff in ICT |
| 2 | Low level of ICT skills among library users |
| 3 | Unawareness of potential benefits of ICT |
| 4 | Lack of fund for ICT |
| 5 | Inadequate ICT infrastructure |
| 6 | Resistance of library staff to use ICT |
| 7 | Lack of updated ICT policy or strategy |

Challenges of Librarianship

In the age of Information and Communication Technology (ICT) application, librarianship faces several challenges as it adapts to the digital landscape. Here are some of the key challenges:

- ✚ **Digital Literacy:** Librarians must possess and continuously update their digital literacy skills to effectively navigate and utilize ICT tools and resources. They also need to educate library users on how to access and evaluate digital information.
- ✚ **Information Overload:** The abundance of information available online can overwhelm both librarians and users. Librarians must curate and organize digital resources effectively to help users find relevant information amid the vast sea of data.
- ✚ **Technological Infrastructure:** Libraries need robust technological infrastructure to support the implementation and maintenance of ICT applications. Challenges such as outdated hardware, limited bandwidth, and software compatibility issues can hinder the effective use of technology.
- ✚ **Data Management and Privacy:** Managing and protecting digital data, including patron information and digital collections, presents significant challenges. Librarians must adhere to privacy regulations, implement robust security measures, and develop data management policies to safeguard sensitive information.
- ✚ **Digital Divide:** Disparities in access to technology and digital resources create a digital divide, with some users having limited or no access to ICT. Librarians must address this divide by providing equitable access to technology and digital services, particularly for underserved communities.
- ✚ **Copyright and Intellectual Property:** Navigating copyright laws and intellectual property rights in the digital age can be complex. Librarians must ensure compliance with copyright regulations while balancing the need for access to digital resources and the protection of intellectual property rights.
- ✚ **User Engagement and Support:** Engaging users and providing support for ICT applications can be challenging. Librarians must offer training and assistance to help users navigate digital resources effectively and address their information needs.
- ✚ **Continuous Learning and Adaptation:** The rapid pace of technological change requires librarians to engage in continuous learning and adaptation. They must stay

updated on emerging technologies, trends, and best practices to effectively leverage ICT in their professional practice.

- ✚ **Budget Constraints:** Limited funding may pose challenges for libraries seeking to invest in ICT infrastructure, resources, and staff training. Librarians must advocate for adequate funding to support the implementation and maintenance of ICT applications.
- ✚ **Integration of ICT with Traditional Services:** Integrating ICT applications with traditional library services can be challenging. Librarians must strike a balance between digital and physical resources and ensure that ICT enhances rather than replaces traditional library services.

In summary, librarianship in the age of ICT application requires librarians to navigate various challenges, including digital literacy, technological infrastructure, data management, and user engagement. By addressing these challenges effectively, librarians can harness the opportunities presented by ICT to provide innovative and impactful library services in the digital age.

Management and Interpersonal Skill will make Librarians to be

- a. More effective managers of net worked resources and services.
- b. Possess expert knowledge of the content of information resources, including the ability to critically evaluate and filter them;
- c. Provide excellent instruction and support for library and information services users;
- d. Use appropriate information technology to acquire, organize and disseminate information and
- e. Analyze the professional domain and where it is heading.

Conclusion

Information Technology has transformed academic libraries into dynamic hubs of information access, collaboration, and innovation. While offering numerous benefits, IT also presents significant challenges for librarians in terms of technological adaptation, information management, and resource allocation. Addressing these challenges requires a collaborative effort from library professionals, administrators, and stakeholders to ensure that academic libraries continue to evolve and thrive in the digital era. In essence, the study underscores the importance of IT integration in academic libraries and the need for librarians to address challenges proactively while embracing emerging opportunities. By doing so, academic

libraries can continue to evolve and thrive in the digital age, fulfilling their mission of supporting learning, research, and scholarship within academic communities.

Recommendations

The above identified challenges could be solved through the following strategies:

- a. Government should intensify efforts to provide the infrastructural facilities for information Communication technology (ICT). Attention should be geared by the authorities for proper funding of libraries.
- b. Organizing a public awareness forum such as library orientation, conferences, symposia, workshops to create awareness and educate librarians and users on the social networking services and applications.
- c. Pro-active training and re-training opportunities to acquire 21st century skills to adapt to the changing ICT environment should be made available for librarians.
- d. Embracing current change in order to remain relevant and adapt to the new ICT driven environment.
- e. Priority should be given to storage of multi-volume materials in machine readable format
- f. Federal Government should address the problems of power more pragmatically.
- g. All imported ICT equipment should be tax-free or subsidized.
- h. Networks and resources sharing should be undertaken by academic libraries.
- i. Staff and students of the various institutions should be re-orientated on maintenance culture of ICT equipments.
- j. Imbibing a maintenance culture so as to manage the few available ICT facilities effectively.

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