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Prioritizing E-Commerce Marketplaces Using the Analytical Hierarchy Process -A Seller's Perspective

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Abstract:

E-Commerce, Defined As Conducting Commercial Transactions In An Electronic Setting, Is Gaining Traction Due To The Rising Use Of The Internet And Mobile Devices. The Global Proliferation Of The Internet Has Spurred The Expansion Of E-Commerce And Significantly Altered Individual Consumption Patterns, Leading To A Heightened Interest In Electronic Sales Channels. Regardless Of Their Scale, The Majority Of Companies And Retailers Are Actively Seeking Methods To Connect With Their Customers Through Electronic Platforms. In This Context, The Rapidly Growing Trend Of Electronic Commerce Prompts A Crucial Question For Businesses: "Which E-Marketplace Should We Utilize For Sales?" This Study Identifies Five Key Criteria Essential For Selecting The Appropriate E-Marketplace And Evaluates Five Alternative Online E-Marketplaces. The Research Employed The Ahp Method, A Widely Recognized Multi-Criteria Decision-Making Technique, To Establish A Framework For Selecting The Optimal E-Commerce Marketplace For Sellers.

Keywords: E-Market Places, E-Commerce, Analytical Hierarchy Process(Ahp**).**

1.Introduction

E-Commerce Represents A Sector Within The Digital Economy That Encompasses All Financial And Commercial Transactions Conducted Through Computer Networks And Associated Business Processes. In Its Early Stages, E-Commerce Depended On Non-Internet Communication Methods And Was Executed Using Separate Information Exchange Standards And Protocols. The Advent Of The Internet Has Greatly Lowered The Costs Associated With E-Commerce, Primarily Due To The Reduced Expenses Of Information Exchange. Companies Engaged In E-Commerce Can Assume The Functions That Were Traditionally Performed By Intermediary Suppliers. Furthermore, E-Commerce Has Enabled The Gathering Of Data Regarding Sales And Customers, Facilitating Comprehensive Analysis In Business And Marketing Research. Consequently, Business Processes Conducted Electronically Are Expected To Result In Cost Reductions. Nevertheless, The Widespread Adoption Of The Internet Has Contributed To The Expansion Of E-Commerce Across Various Industries. India's E-Commerce Industry Has Revolutionized The Manner In Which Business Is Conducted In India, Creating Diverse Segments Of Commerce That Include Business-To-Business (B2b), Direct-To-Consumer (D2c), Consumer-To-

Consumer (C2c), And Consumer-To-Business (C2b). Significant Segments Like D2c And B2b Have Witnessed Substantial Growth In Recent Years.

E-Commerce Refers To A Form Of Internet Utilization Primarily Aimed At Conducting Business Transactions Where Parties Interact Electronically Rather Than Face-To-Face. Such Transactions Greatly Lower Expenses, Conserve Time, Enhance Profits, And Streamline Business Operations, Engaging Manufacturers, Consumers, And Service Providers Who Utilize The Internet. There Exists A Distinct Expectation From Consumers That Businesses Should Assist Them In Their Everyday Lives And Keep Them Updated. Brands Need To Connect With Consumers In Their Current Context And Provide Tailored Services That Cater To Their Individual Requirements.

2. Objective Of The Study

The Extensive Utilization Of The Internet Has Resulted In Alterations To The Purchasing Behaviours Of Consumers. Retailers, Along With Consumers, Have Shifted Towards Online Commerce Due To The Increased Profit Margins Achievable By Selling At Reduced Prices On Internet Platforms. Transactions Involving Buying And Selling Conducted Via The Internet Are Referred To As E-Commerce [1]. E-Commerce Is Experiencing Continuous Growth On A Global Scale, With The Largest Portion Of This Expansion Attributed To Major Online Marketplaces. Numerous Sellers Today Opt To Utilize Established Online Marketplaces, As Developing And Expanding Their Own Websites Can Be Both Risky And Time-Consuming. Online Marketplaces Like Amazon And Flipkart, Which Are Experiencing Daily Growth In Volume, Serve As Crucial Platforms For Sellers Aiming To Enhance Their Business Within The E-Commerce Sector.

An E-Marketplace Is Characterized As An Inter-Organizational Information System That Offers A 'Virtual Space' For Numerous Buyers And Sellers To Engage With One Another (For Instance, Sharing Information Regarding Product Or Service Offerings, Whether They Are Generic Or Specific To An Industry, Along With Their Respective Prices) And Conduct Transactions (Such As Selling And Purchasing Products Or Services And Making Payments For Them), Frequently Backed By A Range Of Services (Including Financial, Transport, Logistics, Etc.) [2].

An E-Marketplace [3] Is Defined As A Digital Network Facilitating The Electronic Trading Of Products And/Or Services. This Concept Encompasses The Application Of Advanced Information And Communication Technology To Aid In And Finalize The Processes Of Matching Supply With Demand, Respectively. An E-Marketplace [4] Is Characterized As A Virtual Space Where Buyers And Sellers Converge To Engage In Commercial Transactions Via Mobile Agent Systems. The E-Marketplace [5] Represents Electronic Environments Where Vendors And Buyers Interact And Conduct Various Transactions, Including Buying, Selling, And Exchanging Information, Serving As An Alternative Route For E-Commerce.

E-Marketplaces Can Exist In Physical, Virtual, Or Conceptual Forms [6]. Although An E-Marketplace Fulfils The Same Roles As A Physical Marketplace, Digital Systems Offer Enhanced Efficiency By Providing More Current Information, A Wider Range Of Support Services, And Streamlined Transaction Processes.

This Study Aims To Identify The Primary Factors Influencing Seller's Choices And Satisfaction Regarding Applications Including Aspects Such As Payments, Popularity, Technology Support, Commission Rate, Policies And Conditions. These Criteria Will Be Elaborated Upon In The Methods Section

3.Literature Review

The Internet Has Evolved From A Simple Communication Tool Into A Vast And Interactive Marketplace For Products And Services. According To Source [7], India's E-Commerce Industry Is Expected To Reach A Valuation Of Us$ 325 Billion By 2030, Bolstered By 500 Million Consumers And Enhanced Internet Access, Especially In Rural Areas. By 2026, It Is Projected That Over 1.18 Billion People Will Own Smartphones, Enabling Digital Transactions. Indian E-Commerce Market Is Forecasted To Expand At A Compound Annual Growth Rate (Cagr) Of 27%, Reaching Us$ 163 Billion By 2026.

In Conjunction With The Growing Interest In The Field, Numerous Research Studies Have Been Conducted On E-Commerce, Including Definitions And Classifications Of E-Markets [8], Research And Applications Related To E-Commerce [9], Methodologies For Categorization And Selection Of E-Marketplaces [10], Frameworks For Selecting Electronic Marketplaces Through A Content Analysis Approach [11], And The Use Of Multi-Criteria Evaluation To Enhance Decision-Making Efficiency For E-Marketplace Selection In Uncertain Conditions [12]. Additionally, There Has Been Research On Prioritizing Alternative Goods Sellers Within An E-Marketplace [13], As Well As Addressing The Mode Selection Problem For Manufacturers Distributing Products Through Both Offline Channels And Online Platforms Under Cap-And-Trade Regulations [14]. Furthermore, Studies Have Focused On Determining The Appropriate E-Marketplace [15] And The Application Of Decision Support Systems For Selecting An Online Marketplace.

Ahp Is A Method For Organizing And Analysing Complex Decisions Based On Math And Psychology. Ahp Method Is Widely Used Technique In Multi-Criteria Decision Systems. Previous Literature [16] Shows That Many Researchers Have Adopted Ahp And Fuzzy-Ahp Methodology [17] In Various Fields Such As, Selecting Facility Location [18], Safety Management System [19], Project Selection [20], Health Care Management [21]

4.Methodology:

The Analytical Hierarchy Process (Ahp) Is One Of The Multi-Criteria-Decision Methods(Mcdm) And The Decision-Support Framework Developed By Saaty.Tl[22]. Its Main Aim Is To Assess The Relative Importance Of A Defined Set Of Alternatives Using A Ratio Scale, Which Is Based On The Decision-Maker's Judgment. This Methodology Highlights The Importance Of The Intuitive Assessments Made By The Decision-Maker And The Need For Consistency When Comparing Alternatives During The Decision-Making Process. Since Decision-Makers Depend On Their Expertise And Experience To Make Judgments And Ultimately Decisions, The Ahp Framework Is Well-Suited To Their Behavioural Tendencies. A Significant Benefit Of This Method Is Its Capacity To Systematically Arrange Both Measurable And Non-Measurable Factors, Providing A Structured Yet Relatively Simple Approach To Addressing Decision-Making Issues. Additionally, By Logically Breaking Down A Problem From A Broader Viewpoint To More Specific Details, One Can Create Links Between The Smaller Components And The Larger Context

Through Straightforward Paired Comparison Judgments. Saaty.Tl [23-25] Outlined The Following Steps For Implementing The Ahp.

1. Define The Problem And Determine Its Goal.

2. Structure The Hierarchy From The Top (The Objectives From A Decision-Maker's Viewpoint) Through The Intermediate Levels (Criteria On Which Sub- Sequent Levels Depend) To The Lowest Level Which Usually Contains The List Of Alternatives.

3. Construct A Set Of Pair-Wise Comparison Matrices (Size N×N) For Each Of The Lower Levels With One Matrix For Each Element In The Level Immediately Above By Using The Relative Scale Measurement Shown In Table 1. The Pair-Wise Comparisons Are Done In Terms Of Which Element Dominates The Other.

4. There Are $n(n-1)/2$ Judgments Required To Develop The Set Of Matrices In Step 3. Reciprocals Are Automatically Assigned In Each Pair-Wise Comparison.

5. Hierarchical Synthesis Is Now Used To Weight The Eigenvectors By The Weights Of The Criteria And The Sum Is Taken Over All Weighted Eigenvector Entries Corresponding To Those In The Next Lower Level Of The Hierarchy.

6. Having Made All The Pair-Wise Comparisons, The Consistency Is Determined By Using The Eigenvalue, λ_{Max}, To Calculate The Consistency Index, Ci As Follows: $Ci=(\lambda_{Max}-N)/(N-1)$, Where N Is The Matrix Size. Judgment Consistency Can Be Checked By Taking The Consistency Ratio (Cr) Defined By $CR = CI/RI$, The Appropriate Value Of Ri Is Given In Table 2. The Cr Is Acceptable, If It Does Not Exceed 0.10. If It Is More, The Judgment Matrix Is Inconsistent. To Obtain A Consistent Matrix, Judgments Should Be Reviewed And Improved.

7. Steps 3-6 Are Performed For All Levels In The Hierarchy.

Table- 1: The Saaty's Scale Of Relative Importance

Relative Importance	Definition	Description
1	Equally Importance	Two Factors Equally Influence The Objective
3	Moderate Importance	Experience And Judgement Slightly Favour One Factor Over Another
5	Strong Importance	Experience And Judgement Strongly Favour One Factor Over Another
7	Very Strong Importance	One Decision Factor Is Strongly Favoured Over Another, And Its Supremacy Is Established In Practice
9	Extreme Importance	The Evidence Favouring One Decision Factor Over Another Is

		Of The Highest Possible Orders Of Validity
2,4,6 And 8	Intermediate Values Between Adjacent Values	When Compromise Is Required

Fortunately, There Is No Need To Implement The Steps Manually. Professional Commercial Software, Expert Choice, Developed By Expert Choice, Inc. [26], Is Available In The Market Which Simplifies The Implementation Of The Ahp's Steps And Automates Many Of Its Computations.

Table 2: Average Random Consistency (Ri)

Size Of Matrix	1	2	3	4	5	6	7	8	9	10
Random Consistency(Ri)	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

In This Research, Primary Data Were Collected Through Questionnaires Distributed To Sellers. A Structured Questionnaire Was Utilized To Aid In The Data Collection Process For The Study. Particularly We Collected The Date From The Women Clothing And Ready-Made Sellers. Due To Privacy Of Sellers We Are Not Able Reveal The Names Of The Sellers. The Design Of The Questionnaires Was Meticulously Developed To Guarantee The Utmost Accuracy In The Information Gathered And To Improve The Understanding Of The Respondents. Following This, The Analytic Hierarchy Process (Ahp) Was Implemented On The Collected Data To Achieve The Goals Of The Present Research. In This Study, We Considered Five Critical Criteria For Evaluation, Which Were Considered Essential For The Assessment. The Chosen Criteria [27] Are Elaborated Upon Below.

1.Payments: Monthly Fee Which Sellers Have To Pay To Use E-Marketplace

2.Popularity:This Represents Average Number Of Customers Who Visit Each E-Marketplace In A Particular Time Period, Number Of Companies That Sell Their Products In Each E-Marketplace, Preferred By Customers And Offers A Convenient Way To Compare Prices And Products From A Single Source, Total Sales Of Each E-Marketplace Within A Year

3.Technology Support: Services Such As Product Offerings (Assigning Unique Number For Each Product), Automatic Relationships, Product Content, Pick-Up Point Delivery, Product Status Import, Orders, Cancellations, Shipments (Including Carrier Mapping), Returns (Channel And Merchant), External Fulfilment (Repricing, Fee Reductions, Product Variations (Sizes/Colors), Branding Support And Promotions Provided By E-Marketplaces.

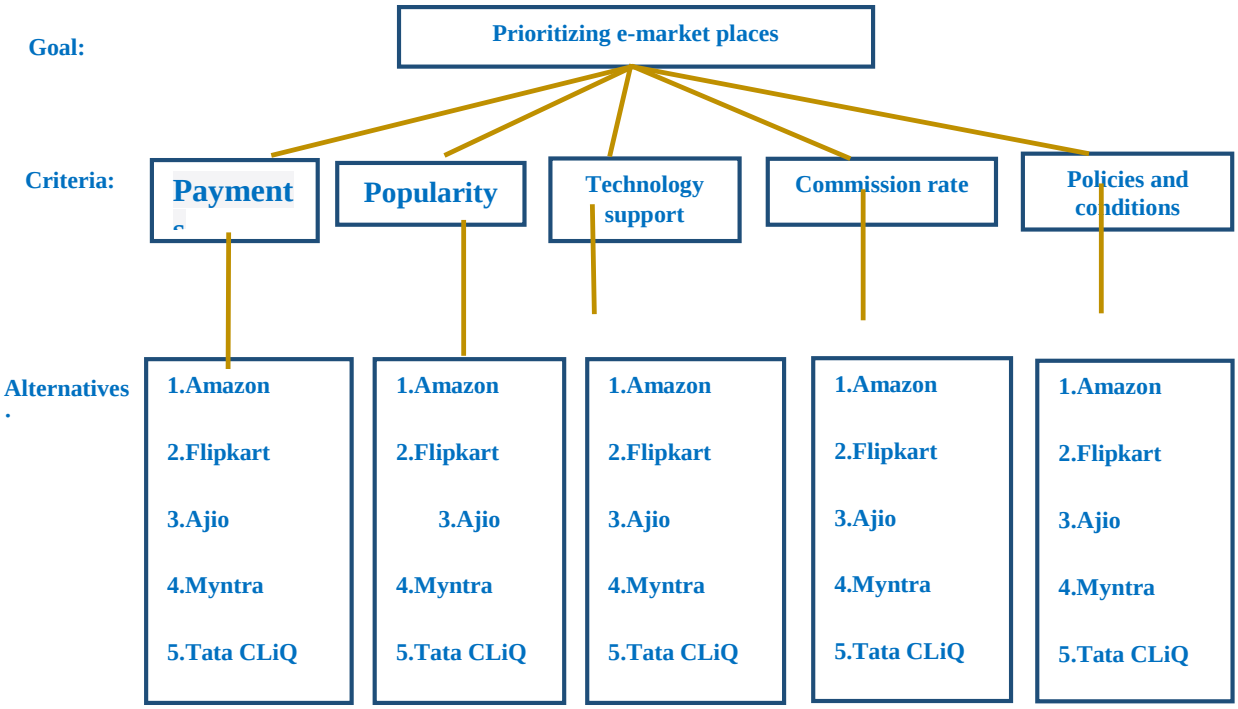
4.Commission Rate: User Is Charged A Fee For Each Transaction. This By Far The Most Popular Online Marketplace Business Model. When The Customer Pays The Supplier, The Marketplace Charges A Percentage Or A Fixed Fee For Its Services, Monthly Fee Which Sellers Have To Pay To Use E-Marketplace.

5.Policies And Conditions: Negotiation Policies, Customer's Tactics And Coalition Tools As A Value-Added Service In E-Marketplaces.

Subsequently, Five Leading E-Market Places, Amazon, Flipkart, Ajio, Myntra And Tata Cliq Are Compared Based On The Chosen Criteria By Organizing The Decision-Making Process Into A Three-Tier Hierarchy Consisting Of Goal, Criteria, And Alternatives. Overview Of This Process Is Shown In

The Following **Figure-1** And After Structuring The Goal In Hierarchy Ahp Process Is Applied To Find The Priority Ranking Of E-Market Places

Figure-1: Proposed Model



The Ahp Calculations Are Given In Table 3 To 9

Table- 3: Pair-Wise Comparison Matrix For All Criteria

	Payments	**Popularity**	**Technology Support**	**Commission Rate**	**Policies &Conditions**	**Priority Vector**
Payments	1	2	2	4	3	0.375
Popularity	1/2	1	2	3	2	0.251
Technology Support	1/2	1/2	1	2	2	0.172
Commission Rate	1/4	1/3	1/2	1	2	0.108
Policies &Conditions	1/3	1/2	1/2	1/2	1	0.094
λ_{Max} = 5.165, Cr = 0.051 < 0.1						

Table -4: Pairwise Comparison Matrix For "*Payments* "

	Amazon	Flipkart	Ajio	Myntra	Tata Cliq	Priority Vector
Amazon	1	6	1/3	3	8	0.286
Flipkart	1/6	1	1/4	1/2	4	0.079
Ajio	3	4	1	1/3	9	0.315
Myntra	1/3	2	3	1	6	0.291
Tatacliq	1/8	1/4	1/9	1/6	1	0.029
λ_{Max} = 5.385, Cr = 0.008 < 0.1						

Table -5: Pairwise Comparison For *"Popularity"*

	Amazon	Flipkart	Ajio	Myntra	Tata Cliq	Priority Vector
Amazon	1	2	4	3	1	0.326
Flipkart	1/2	1	3	2	1/2	0.190
Ajio	1/4	1/3	1	1/2	1/3	0.074
Myntra	1/3	1/2	2	1	1/2	0.122
Tatacliq	1	2	3	2	1	0.288
λ_{Max} = 5.072, Cr=0.016<0.1						

Table- 6: Pair-Wise Comparison Matrix For *"Technology Support"*

	Amazon	Flipkart	Ajio	Myntra	Tata Cliq	Priority Vector
Amazon	1	2	3	1/3	1/2	0.163
Flipkart	1/2	1	2	1/4	1/2	0.106
Ajio	1/3	1/2	1	1/4	1/2	0.070
Myntra	3	4	4	1	3	0.444
Tatacliq	2	2	3	1/3	1	0.216
λ_{Max} = 5.152, Cr = 0.034 < 0.1						

Table -7: Pair-Wise Comparison Matrix For "*Commission Rate*"

	Amazon	Flipkart	Ajio	Myntra	Tata Cliq	Priority Vector
Amazon	1	1/2	1/4	2	5	0.151
Flipkart	2	1	1/3	5	7	0.273
Ajio	4	3	1	4	6	0.449
Myntra	1/2	1/5	1/4	1	2	0.081
Tatacliq	1/5	1/7	1/6	1/2	1	0.045
λ_{Max} = 5.24, Cr = 0.053< 0.1						

Table -8: Pair-Wise Comparison Matrix For "*Policies And Conditions*"

	Amazon	Flipkart	Ajio	Myntra	Tata Cliq	Priority Vector
Amazon	1	1/3	1/2	1/6	2	0.086
Flipkart	3	1	2	1/2	4	0.249
Ajio	2	1/2	1	1/3	3	0.152
Myntra	6	2	3	1	7	0.457
Tatacliq	1/2	1/4	1/3	1/7	1	0.055
λ_{Max} = 5.037, Cr = 0.08< 0.1						

Table- 9: Final Priority Table

	Payments	Popularity	Technology Support	Commission Rate	Policies &Conditions	Final Priority Vector	Rank
	0.375	**0.251**	**0.172**	**0.108**	**0.094**		
Amazon	0.286	0.326	0.163	0.151	0.086	**0.242**	**2**
Flipkart	0.079	0.190	0.106	0.273	0.249	**0.148**	**4**
Ajio	0.315	0.074	0.070	0.449	0.152	**0.212**	**3**
Myntra	0.291	0.122	0.444	0.081	0.457	**0.268**	**1**
Tatacliq	0.029	0.288	0.216	0.045	0.055	**0.130**	**5**

5. Results

The Present Study Focuses On The Comparative Assessment Of Five E-Marketplaces Based On Various Factors, Including Payments, Popularity, Technology Support, Commission Rate And Policies And Conditions. The Findings Indicate That **Myntra(0.268)** Ranks Highest In Terms Of Overall Suitability Among All Evaluated Systems, Following **Amazon(0.242),** Emerges As The Second Most Popular One, With **Ajio(0.212)** In Third Place,**Flipkart(0.148)**In Fourth, And **Tatacliq(0.108)** In Last Position. The Results Highlight That **Myntra And Amazon** Are The Two Leading E-Market Places.

6. Conclusion

These Findings Hold Significant Implications For Practitioners. This Research Serves As A Valuable Guide For Sellers Contemplating The Transition Of Their Selling Activities To Online Platforms, Assisting Them In Assessing Various Online Marketplaces And Selecting The Most Suitable Option For Selling Their Products. By Evaluating The Criteria Based On Their Individual Priorities, Sellers Can Enhance Their Profitability By Choosing The Most Appropriate E-Marketplace Tailored To Their Needs. This Study Offers A Scientific Approach For Decision-Makers In Organizations Aiming To Shift Their Selling Operations Online. Through This Research, E-Marketplaces Can Gain Insights Into The Factors That Are Crucial For Sellers To Succeed In An Online Environment, Enabling Them To Refine Their Channel Features To Attract Potential New Sellers.

The Aim Of This Research Is To Assess And Rank Five Prominent E-Market Places, Specifically **Amazon,Flipkart,Ajio,Myntra,** And **Tatacliq,** Based On Specific Criteria. The Criteria Evaluated Include Payments, Popularity, Technology Support, Commission Rate, Policies And Conditions. The Research Engaged Participants From Hyderabad, Who Associated With The Five E-Market Places And Possess Experience With All Five E-Market Places. Subsequent Studies Could Incorporate Additional Criteria And Sub-Criteria For A More Comprehensive Evaluation. For Upcoming Research, Multi-Criteria Decision-Making (Mcdm) Techniques Such As Promethee, Fuzzy Promethee, Ahp-Anp, Vikor, Topsis, Fuzzy Ahp, And Fuzzy Topsis May Be Utilized.

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