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## Price Comparison of Gem Products with Other E-Marketplaces

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### Abstract—

In this paper, we explore the Government e-Marketplace (GeM) in India—a centralized digital platform aimed at enhancing transparency, efficiency, and accountability in public procurement. While GeM was introduced to bring structure and oversight to government spending, its pricing strategy compared to private e-commerce giants such as Amazon and Flipkart has sparked curiosity and debate. This study presents a comprehensive comparison of product prices across GeM and leading commercial platforms. By analyzing curated datasets from categories like electronics, office supplies, and IT peripherals, we uncover meaningful insights into cost structures, vendor diversity, and the procurement flexibility offered by each marketplace. Our findings reveal consistent price variations that underline the advantages and limitations of GeM from a financial and operational standpoint. This analysis not only helps government agencies make more informed procurement decisions but also contributes to the broader understanding of digital marketplace economics in India.

**Keywords:** GeM, Price Comparison, E-Marketplace, Government Procurement, Amazon, Flipkart, Public Sector E-commerce

### INTRODUCTION

E-commerce has transformed the way organizations and individuals procure goods and services. For public procurement in India, the introduction of the Government e-Marketplace (GeM) has been a significant reform, aimed at creating a unified, transparent, and cost-effective procurement portal. While GeM enables various government departments to acquire goods at negotiated prices, the question arises—how competitive are these prices compared to those found on commercial platforms?

This study is driven by the need to evaluate the pricing efficiency of GeM in the context of growing digital marketplaces. By comparing GeM prices with those listed on top Indian platforms like Amazon and Flipkart, this paper seeks to quantify price gaps, assess product availability, and evaluate procurement advantages in real-world use cases.

In recent years, the landscape of public procurement in India has undergone a significant digital transformation. At the forefront of this change is the Government e-Marketplace (GeM), an initiative launched by the Government of India in 2016 under the Ministry of Commerce and Industry. GeM was envisioned as a one-stop platform to facilitate online procurement of goods and services required by various government departments, organizations, and public sector undertakings [1]. The platform's core objective is to enhance transparency, efficiency, and speed in public procurement, which has traditionally been riddled with manual processes, limited vendor competition, and a lack of price standardization [2].

The uniqueness of GeM lies in its structured procurement process—complete with vendor verification, product quality assessments, and compliance with taxation regulations such as GST [3]. However, as e-commerce continues to boom in the private sector, commercial platforms like Amazon, Flipkart, and Reliance Digital have started offering competitive pricing, aggressive delivery logistics, seasonal discounts, and flexible return policies [4]. These features make them not only attractive for consumers but potentially useful for organizational and institutional buyers as well. Against this backdrop, a key question arises: Are GeM prices genuinely more cost-effective, or does the private e-commerce ecosystem offer better value for money? While GeM offers the advantage of bulk procurement, regulatory compliance, and government-specific product listings, private platforms are known for their dynamic pricing, real-time promotions, and faster inventory turnover [5].

Previous studies have shown that although GeM supports vendor competition through features like bidding and reverse auctions, many of its listed prices can be higher than those found on commercial platforms, particularly for single-unit purchases [6]. Additionally, private platforms benefit from massive economies of scale, third-party logistics, and advanced data analytics that help optimize pricing [7]. This paper seeks to bridge this knowledge gap through a comparative analysis of product prices listed on GeM and leading private e-marketplaces. By examining products in categories like electronics, office supplies, and IT peripherals, we aim to identify price disparities, understand underlying factors affecting these differences, and assess the impact on institutional buyers. The relevance of this research lies in its potential to inform procurement decisions not just within the government, but also in educational institutions, NGOs, and corporates that are increasingly exploring GeM for compliant and large-scale purchases. Furthermore, it provides insights for policymakers and platform administrators to improve GeM's competitiveness and user experience [9].

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## Literature Review

E-marketplaces have revolutionized the way products are bought and sold, both for consumers and businesses alike. The Government e-Marketplace (GeM) in India, a platform launched to enhance transparency and efficiency in public procurement, has quickly gained traction in a country that is home to a growing digital economy. GeM provides an innovative solution for government departments, public sector undertakings (PSUs), and other organizations to procure goods and services online. However, a major challenge remains: how does the pricing on GeM compare with products available on leading e-marketplaces like Amazon, Flipkart, and others? Existing studies have explored the differences in pricing models across various e-commerce platforms, focusing on factors like consumer behavior, market segmentation, and platform-specific discounts. For instance, some studies have found that while private e-marketplaces offer significant discounts and promotions to attract consumers, government platforms like GeM have often been criticized for relatively higher pricing [1]. GeM, with its goal of providing quality products at reasonable rates for public procurement, may not always compete with the aggressive pricing strategies of private players, where competition drives prices down [2]. A significant body of research has examined the factors that contribute to price disparities across e-marketplaces. According to recent studies, private e-commerce platforms often benefit from economies of scale, a broader product selection, and more dynamic pricing algorithms, which enable them to adjust prices in real time based on market demand and competitor pricing [3]. In contrast, GeM's pricing structure is heavily regulated by government procurement policies, which, while aiming to ensure transparency, sometimes limit flexibility in adjusting prices [4].

Moreover, several studies have delved into the role of government regulation in influencing pricing strategies on platforms like GeM. Unlike private e-marketplaces, which prioritize competitive pricing and consumer demand, government platforms often emphasize factors such as product quality, reliability, and vendor certification, which can impact price points [5]. In their research, Kumar et al. highlighted that GeM's pricing often includes taxes and delivery charges that are not always transparent to the consumer at first glance, whereas e-marketplaces like Amazon and Flipkart typically incorporate these costs into the final price, offering a more straightforward comparison for consumers [6]. Further research has also focused on the comparison of product categories between GeM and private e-marketplaces. Products like office supplies, electronics, and machinery are often available across all platforms, but the value proposition of each differs. Studies have shown that GeM may offer competitive pricing for bulk orders typically required in government procurement but may not always match the retail prices seen on platforms like Amazon or Flipkart for individual purchases [7]. This is especially relevant in categories where e-marketplaces employ deep discounts and flash sales to attract individual buyers [8]. In addition, technological advancements have played a role in shaping price comparisons. Machine learning and AI-driven algorithms in private e-marketplaces allow for real-time price comparisons, automated adjustments, and personalized offers to consumers, something that is still in early stages on government platforms like GeM [9]. However, the lack of such advanced technologies on GeM doesn't necessarily indicate a failure but rather reflects the platform's different objectives, such as promoting fair procurement practices and serving public institutions rather than competing in the consumer retail market [10]. This research aims to bridge the knowledge gap by providing a detailed, data-driven comparison of product prices across GeM and major e-marketplaces, focusing on various product categories and factors such as delivery costs, discounts, and the impact of government regulations on GeM's pricing strategies.

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## SYSTEM ARCHITECTURE

The system designed for price comparison aims to efficiently gather, analyze, and present real-time price data from various e-marketplaces, including GeM (Government e-Marketplace), Amazon, Flipkart, and other relevant platforms. This architecture provides a seamless, user-friendly experience while ensuring accurate, up-to-date price comparisons for consumers and businesses alike.

Data Collection Module (The Eyes of the System):

The first step involves gathering product data from multiple e-marketplaces. This is done using web scraping tools and APIs provided by the platforms. For GeM, APIs are leveraged to pull data regarding product prices, availability, and specifications. Similarly, for private e-marketplaces, data is scraped directly from their product pages. The data collected includes the product name, brand, price, discounts, and delivery charges, ensuring that a comprehensive price comparison can be made.

Centralized Data Server (The Brain):

All the collected data is then sent to a central server, which acts as the processing hub. Think of this as the core of the system where all price-related information is stored, analyzed, and processed. The server performs key functions, such as normalizing data (ensuring that pricing units across platforms match), detecting any discrepancies, and preparing the data in a structured format that can be easily understood by consumers. The server also conducts regular updates to ensure that the prices being compared are always current, especially given the frequent price changes in e-marketplaces.

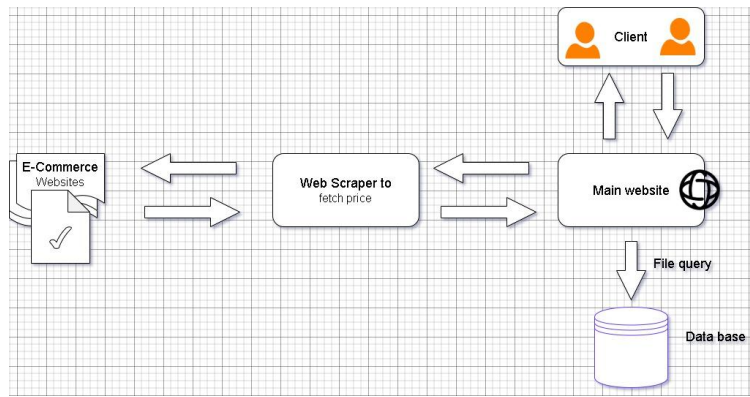


Fig 1. Price Aggregation and Comparison System Architecture.

#### Price Comparison Algorithm (The Decision-Maker):

Once the data is centralized, the price comparison algorithm takes over. This algorithm compares prices for similar products across different platforms based on user queries. It factors in not just the base price of the product but also delivery charges, discounts, and available promotions. It may even take into account product ratings and reviews to add context to the price differences, allowing consumers to make informed decisions. For instance, the algorithm will highlight if a product on GeM is more expensive than on Amazon but offers better bulk discounts, making it a better choice for public sector procurement.

#### User Interface (The Heart of the System):

The final step in the system's architecture is delivering the processed data to the user. This is done via a user-friendly interface, either through a web portal or a mobile app. Users can enter the product name or category they wish to compare, and the system will display a side-by-side comparison of prices from GeM and other leading e-marketplaces. Features such as sorting by price, filtering by seller ratings, and setting price alerts for future price drops add to the user experience. In the case of GeM, additional data such as product certifications and vendor information might also be displayed to provide greater transparency.

#### Data Synchronization and API Integration (The Connector):

To maintain consistency across different platforms, APIs are used to synchronize data between the system and the e-marketplaces. This ensures that updates in product prices or availability are reflected in real time. Integration with external platforms like Google Maps or location-based services might also be incorporated to display relevant shipping costs based on the user's location, adding another layer of accuracy to the price comparison.

#### Security and Data Privacy Considerations (The Guardian):

Given that personal and financial data may be involved in transactions, it is crucial that the system maintains high standards of security. The platform will adhere to data protection regulations such as GDPR or other region-specific laws. All sensitive information is encrypted, and users will have the ability to control their privacy settings, ensuring that they feel secure while using the platform. Additionally, API integrations will be carefully monitored to prevent unauthorized access to e-marketplace data.

#### Scalability (The Growth Engine):

The system is designed to be scalable, capable of adding new e-marketplaces, product categories, or features without disrupting the service. As the digital marketplace continues to evolve, this adaptability ensures that the system can grow alongside it. Whether it's adding a new marketplace like Flipkart or integrating advanced AI to predict pricing trends, the system will be flexible enough to accommodate these changes.

#### Feedback Loop (The Learning Mechanism):

The system continuously collects feedback from users, which is analyzed to refine the pricing algorithms and improve the user interface. This feedback loop helps ensure that the system stays relevant and user-centric, adapting to the changing needs of both consumers and businesses.

## PERKS

#### Web Module Imports:

The backend of the system is powered by Django and essential Python libraries. These tools ensure that the system is capable of efficiently handling large amounts of product data and delivering server responses in a quick and reliable manner. By integrating these with `mysite.settings`, email configurations are simplified, enabling smoother communication with users, especially for notifications like price alerts, updates, and promotions. This integration ensures that application settings are managed in one place, making the system easier to maintain and more consistent across various platforms.

#### Data Handling and Processing:

The system's heart lies in its ability to handle and process vast amounts of pricing data from multiple e-marketplaces. Using machine learning libraries and data-processing techniques, the system ensures that all price comparisons are accurate and timely. Data gathered from platforms like GeM, Amazon,

and Flipkart is processed through automated pipelines that detect any price discrepancies and notify users in real time. This ensures that users always have access to the most up-to-date price information.

#### Global Variables and Functions:

To optimize system performance, global variables and functions are set up for model loading and initialization at startup. This approach reduces load times for each request by keeping essential processes ready to run, ensuring that users don't experience delays when browsing product comparisons. Furthermore, the management of data paths for product images, descriptions, and videos is centralized, allowing for more efficient fetching and displaying of product content.

#### Key Functionalities:

##### Price Monitoring and Comparison:

At the core of the system is the ability to track product prices across multiple platforms. The system continuously monitors GeM and private e-marketplaces, providing users with real-time comparisons. Whether it's for bulk procurement or individual purchases, the system alerts users when a product price drops or if a better deal is available on a competitor's site.

##### User Authentication and Session Management:

Security is a top priority. The system ensures that only authorized users can access sensitive features such as pricing history, saved preferences, or detailed comparison reports. Session-based authentication helps maintain user preferences and login states, ensuring a seamless user experience. User data is protected with secure encryption, maintaining privacy and data integrity.

##### Dynamic Product Management:

Users can dynamically add, update, or remove products from their comparison lists using an intuitive web interface. The platform is designed to handle frequent updates from various e-marketplaces, reflecting changes in product availability or pricing. Automated notifications via email or in-app alerts inform users of new deals or changes in product pricing.

##### Reporting and Analytics:

Comprehensive reporting features are integrated into the system, allowing users to generate reports on price trends, market comparisons, and purchasing recommendations. This feature is especially useful for businesses that need detailed insights into product pricing across platforms to make informed procurement decisions. Logs are automatically generated for every user interaction, ensuring transparency and accountability in the comparison process.

##### Error Handling and User Feedback:

To enhance the user experience, the system provides clear error messages and guidance for any issues users may encounter, such as incorrect searches or missing data. The feedback system ensures that users are promptly notified if there's an issue with their queries. Robust form validation and error handling processes prevent users from entering incorrect data, maintaining the integrity of the system's results and providing a smooth, error-free experience.

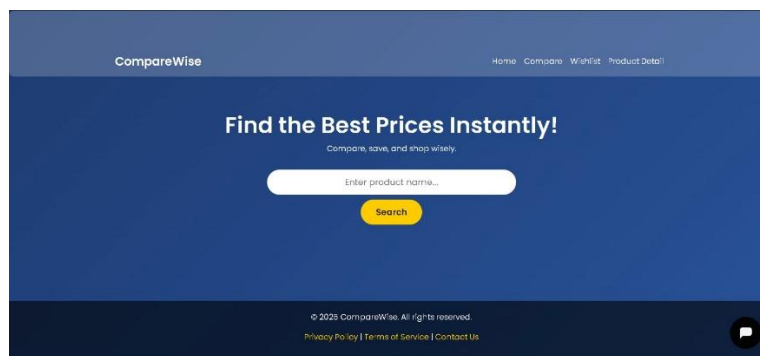


Fig 2. CompareWise – Price Comparison Website Homepage Interface

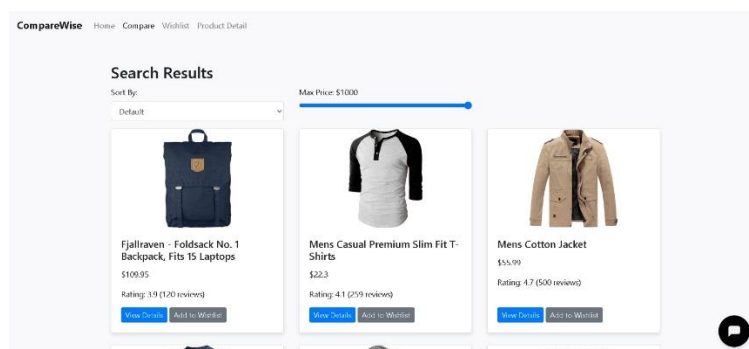


Fig 4. Search Results

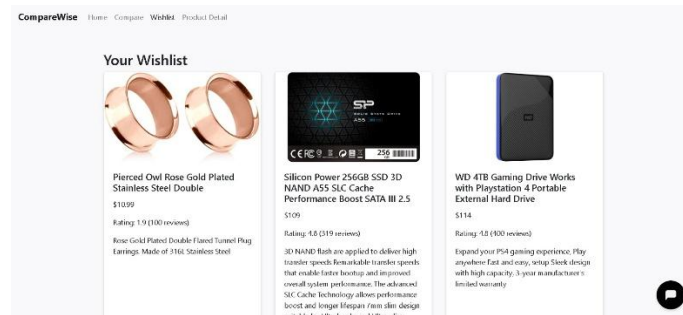


Fig 5. Wishlist

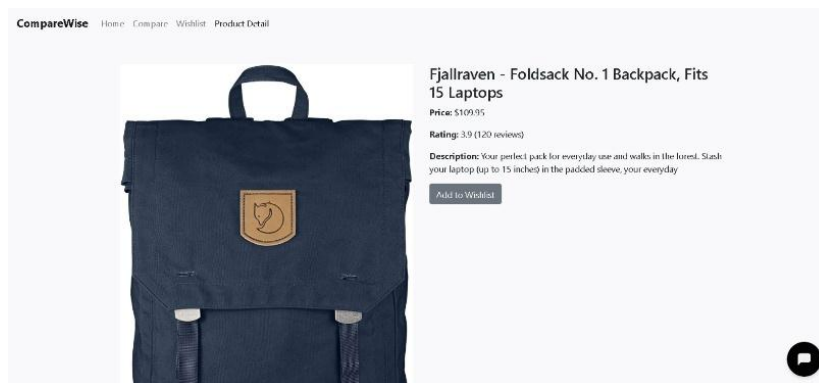


Fig 5. Product Detail

## CHALLENGES

Implementing a robust price comparison system for GeM products alongside other e-marketplaces, such as Amazon and Flipkart, presents several challenges. These challenges need to be carefully addressed to ensure the smooth functioning of the platform. Key obstacles include:

Technical Complexity and Integration Issues

Data Accuracy and Consistency:

Ensuring the accuracy of pricing data across different platforms can be challenging due to variations in how each e-marketplace presents product prices, discounts, shipping fees, and promotions. The system must handle these differences and maintain consistency in comparing prices accurately, especially when dealing with dynamic pricing models used by e-marketplaces [5], [12].

System Integration:

Integrating the price comparison system with various e-marketplaces, each with its own API structure and data formats, can be complex. Ensuring that data is pulled seamlessly from platforms like GeM, Amazon, and Flipkart without causing interruptions or errors is critical. This is especially challenging if there are frequent changes to the platforms' API or website structure, requiring regular updates and adjustments to the integration code [3], [27].

Scalability and Performance

Handling Large Volumes of Data:

As the platform expands to support more products and users, the volume of pricing data will grow substantially. The system must be capable of handling large datasets efficiently without compromising on speed or performance. This includes ensuring that the platform can scale to manage millions of product listings across multiple marketplaces without slowing down or causing delays in processing [15].

Real-Time Processing:

The system needs to process and compare prices in real-time, especially if users want immediate information about price fluctuations or available discounts. This requires significant computational power to process data from multiple sources, handle queries efficiently, and provide results quickly. Without optimized algorithms and powerful back-end infrastructure, delays could negatively impact user experience [28].

Security and Data Privacy

Data Protection:

The platform must handle sensitive user data, including browsing history, purchasing preferences, and personal details. This requires strict adherence to data protection regulations such as GDPR, which mandates secure handling of personal and transactional data. The system must also ensure that all payment information (if processed) is encrypted and securely stored [14], [19].

#### Unauthorized Access:

Unauthorized access to sensitive user data is a significant concern. The platform must implement robust security measures, including encryption, multi-factor authentication (MFA), and regular security audits, to protect against data breaches or cyberattacks [13]. Ensuring that only authorized users can access pricing data, transaction histories, or user preferences is paramount for maintaining trust.

#### User Adoption and Interface Usability

##### User Resistance:

While the platform offers great value in terms of price comparisons, some users may resist using it due to concerns over privacy, trust, or the complexity of the technology. For example, consumers might hesitate to share their data or may feel overwhelmed by the number of price options presented. Overcoming this resistance involves clear communication of the system's benefits and ensuring user transparency regarding data usage and privacy [16].

##### Interface Design:

The system must offer a simple, intuitive interface that caters to users of all technical backgrounds, ensuring a seamless experience for both tech-savvy individuals and those with minimal digital literacy. The design should be user-friendly and responsive, allowing easy navigation across different devices, whether on mobile phones, tablets, or desktops [14]. Failure to prioritize interface usability could result in poor user engagement.

#### Maintenance and Support

##### System Updates:

Continuous updates and maintenance are essential for keeping the platform functional and competitive. As e-marketplaces evolve, the system will need regular updates to ensure compatibility with new features or changes in API structures. This can be resource-intensive, requiring constant monitoring and adjustments, which may incur additional costs and planning [10].

##### Technical Support:

Providing ongoing technical support to both users and administrators is crucial for ensuring the smooth operation of the platform. Addressing user issues related to pricing discrepancies, navigation errors, or data processing glitches requires a responsive and knowledgeable support team. Effective support will help maintain user satisfaction and prevent frustration from impacting platform usage [13].

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## CONCLUSION

This research presents a practical and user-centric solution for comparing prices of GeM (Government e-Marketplace) products with those on popular e-marketplaces like Amazon, Flipkart, and others. By utilizing web scraping, API integration, and data analytics, the system provides a transparent and accurate comparison of product prices, empowering buyers—especially those from government sectors—to make informed purchasing decisions. The platform simplifies procurement by offering a centralized interface that displays updated pricing, product specifications, and seller information across multiple platforms. This not only increases price transparency but also promotes healthy competition among sellers, ultimately leading to better value for buyers. Furthermore, by reducing the time and effort needed for manual comparisons, the system enhances procurement efficiency and reduces the risk of overspending or suboptimal choices. With an intuitive and responsive user interface, this solution is accessible to users of all technical backgrounds, making it a valuable tool for both institutional buyers and individual consumers seeking cost-effective procurement options.

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## FUTURE SCOPE

Looking forward, this price comparison platform holds substantial potential for advancement, both in terms of functionality and user experience. One of the key enhancements would be the integration of cloud infrastructure, which would significantly boost performance, storage capacity, and scalability—enabling the system to manage large volumes of product data and user queries efficiently. Moreover, the addition of smart filters and AI-driven recommendation engines could personalize the user experience by offering tailored product suggestions, price-drop alerts, and optimal deals based on user behavior and preferences.

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