

A Study on Entrepreneurial Innovation and Business Models of Online Pharmacy Applications in India

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Abstract:

Digital pharmaceutical service-providing has undergone a total change through the online pharmacy, which has grown through the introduction of digital health technologies in India. This comparison case study deals with the entrepreneurship innovation approaches, functioning structure, and business models of three leading Indian e-pharmacy and Netmeds, PharmEasy, and Tata 1MG. A qualitative-descriptive research design will be used, where each platform will be rated on five dimensions, namely, pharmaceutical operations, business model architecture, marketing strategy, financial sustainability, and regulatory compliance. Only published annual reports, regulatory filing, funding databases, peer-reviewed literature, and industry intelligence reports were used as sources of data. Results indicate that, whereas all three platforms are above the minimum regulatory standards, there are serious differences in the depth of pharmaceutical care, the strategy of prices and the rigour of the compliance. Tata 1MG exhibits the most unified approach towards the patient-centred model, including the pharmacist consultation, AI-assisted prescription verification, and diagnostics. PharmEasy aims at pursuing aggressive horizontal integration and Netmeds uses the omnichannel retail infrastructure of Reliance. The essential gaps remain existing at all platforms in the field of pharmacovigilance, clinical pharmacist interaction, and systematized patient counselling. This research paper advances a proposed Entrepreneurial Innovation Model that incorporates advanced pharmaceutical care, technology enhanced drug safety, value based pricing and sustainable business design. The implications of the findings are that pharmacy educators, regulators, entrepreneurs, and policymakers aiming at establishing strong, patient-centred digital pharmacy ecosystems in India can use the findings.

Keywords: Business Model Innovation, Digital Health, E-Pharmacy India, Pharmaceutical Operations, Pharmacy Entrepreneurship, Regulatory Compliance.

1. Introduction

The practice of pharmacy has significantly changed during the last 20 years as it is no longer viewed in a product-dispenser role but as a patient-centred and clinical service model. The convergence of increasing internet penetration and the adoption of smartphones, as well as the digital health necessity post Covid, has been accelerated in India. The Indian online pharmacy market is estimated to have a robust growth potential of about USD 1.1 billion in 2021 but is estimated to reach USD 7.7 billion in 2028 with a compound annual growth rate (CAGR) of around 30% [2]. This exponent pattern indicates the structural change that is being witnessed in the Indian pharmaceutical retail and healthcare delivery.

Whilst they remain prevalent and command the market, traditional brick-and-mortar pharmacies are becoming more and more limited geographically, unevenly stocked in drugs, poorly conducting patient

counselling, and inefficient supply chains. Online pharmacy systems have come to fill these unmet needs as disruptive innovators to afford home delivery, 24/7 access to drugs, digital prescription management, teleconsultation, and competitive pricing model. E-pharmacy is most likely to penetrate the United States, China and Germany markets, which have already developed regulatory clarity, strong logistics and high consumer digital literacy.

The development of e-pharmacy-focused websites in India started approximately in 2015-2016 with 1MG (which was acquired by Tata), PharmEasy, and Netmeds. These platforms have increasingly grown to include drug dispensing to include diagnostic services, chronic disease care, health content portals, and primary care teleconsultation. The profession of pharmacy in India is at a crossroads in which the conventional pharmacist role has to evolve into computerized tools without compromising the safety of drugs, patient counselling and regulation.

1.1 Regulatory Framework of Online Pharmacies in India

The Drugs and Cosmetics Act, 1940 and its Rules are primarily used to regulate the online pharmacies in India. The Drugs and Cosmetics (Amendment) Rules, 2018 has offered a draft regulation that specifically deals with the sale of medicines through electronic platforms and provides that e-pharmacies must be registered, pharmacists must hold valid licenses, prescription administration procedures, and safeguard patient information. Nevertheless, a full-scale central e-pharmacy policy is still under discussion, which is a source of regulatory uncertainty that allows the market to develop quickly and causes systemic patient safety risks.

Among the essential regulatory factors, one should note the following: mandatory prescription of Schedule H, H1, and X drugs (narcotic and psychotropic substances), the ban on advertising prescription drugs to patients, the qualified supervision of Registered Pharmacists (RP), the application of the Information Technology (IT) Act, 2000 on storing prescriptions and patient confidentiality, and the enforcement of the Personal Data Protection Bill (2023). Enforcement is shared between Central Drugs Standard Control Organisation (CDSCO) and state Drug Control Authorities (DCAs) although there are still some unclear jurisdiction issues.

The Delhi High Court (2018) and the Madras High Court are among other High Courts that have intervened to limit or question the operations of e-pharmacy based on fear of dispensing controlled substances unsupervised and without meaningful checking of prescription. These cases of jurisprudence highlight the importance of effective pharmaceutical compliance systems to a sustainable operation of e-pharmacy.

1.2 Need for Pharmaceutical and Business Innovation

The field of intersection of pharmaceutical science and business model innovation is urgent in developing access to healthcare as well as preserving the standards of drug safety. The healthcare issues in India, such as patient-to-pharmacist ratio of estimated over 2000:1, rate of drug counterfeiting of around 20 percent and burden of chronic disease including 100 million plus patients with diabetes, hypertension, heart disease etc. require technology enabled pharmaceutical service models, which can be scaled.

Regarding the pharmacy practice, e-pharmacies have a certain potential to spread pharmaceutical care by allowing monitoring of medication adherence, automated refills, drug interactions, and teleconsultation led by pharmacists. Nevertheless, it will require targeted entrepreneurial creativity to realise this potential, by linking the commercial goals to the professional pharmaceutical duties. Knowing how major platforms have managed this equilibrium, as well as in which aspects they have gotten it wrong, is crucial information to pharmacists, educators, entrepreneurs, and policymakers.

1.3 Aim and Scope of the Study

The proposed study seeks to undertake an orderly comparative analysis of three Indian e-pharmacy innovations including PharmEasy, Netmeds, and Tata 1MG in terms of the pharmaceutical service delivery model, business model architecture, marketing architecture, and financial viability. It covers the period of the establishment of each platform up to FY 2022-23, based on publicly accessible information. There is no survey of patients or primary collection of clinical data. The contextualisation of the analysis is in terms of Indian

regulatory, pharmaceutical and entrepreneurial frameworks and the recommendations are focused on future pharmacy entrepreneurs and healthcare policymakers.

2. Objectives

2.1 Primary Objective

To comparatively discuss the entrepreneurial innovation efforts, pharmaceutical operating framework, and business models of PharmEasy, Netmeds and Tata IMG in India and to draw evidence-based conclusions on the sustainable and patient-centred development of e-pharmacy.

2.2 Secondary Objectives

- (i) To evaluate drug procurement, prescription check, pharmacist intervention, and compliance of each platform with the regulatory requirements, i.e. pharmaceutical service delivery.
- (ii) To assess the business model architectures, revenue streams and customer acquisition plans utilized by each platform.
- (iii) To examine the financial trends, funding patterns, and economic sustenance patterns of each of the companies.
- (iv) To conduct a systematic comparative study that states the similarities, the differentiation, rivalry and strategies gap among the three platforms.
- (v) To suggest an Entrepreneurial Innovation Model that combines high-end pharmaceutical treatment, drug safety technologies, sustainable price, and a competitive model to be used in the future e-pharmacy projects in India.

3. Methodology

3.1 Research Design

The proposed research follows the design of qualitative-descriptive comparative case study. The case study approach fits this study because this research methodology will allow a deep, contextual study of the multifaceted historical phenomenon of business and pharmaceutical on various units of analysis [1]. The comparative dimension enables systematic analysis of both similarities and differences between the three chosen platforms and provides the insight, which would not have been available through analysis of a single case. To define each platform as a pharmaceutical, marketing and financial platform, a descriptive approach will be utilised based on actual evidence as opposed to statistical inference.

3.2 Data Sources

Only secondary sources were used to gather data and included: (a) websites of companies, disclosures in investor relations, and published annual reports; (b) CDSCO and state Drug Control Authority regulatory documents; (c) Tracxn, Crunchbase, and Inc42 databases of funding and investment information; (d) industry reports published by FICCI, KPMG, Deloitte, IBEF, and McKinsey; (e) Google Scholar and PubMed indexed articles; (f) Economic Times, Business Standard, Mint, and Financial Express news archives.

3.3 Analytical Framework (Pharmaceutical, Marketing & Financial Evaluation)

All the cases were evaluated with the help of a three-dimensional framework, namely (1) Pharmaceutical Operations Framework - evaluating drug procurement models, cold-chain logistics, prescription verification processes, pharmacist distribution, pharmacovigilance system, and regulatory compliance position; (2) Marketing and Business Model Framework - evaluating the customer acquisition channels, customer retention strategy, digital marketing spending, pharmacist positioning, and revenue diversification; and (3) Financial Sustainability Framework - evaluating funding rounds, burn rate, revenue growth, EBITDA trend, and path to profitability. Structured matrices and narrative analysis were used to compare the synthesis made.

3.4 Scope and Limitations

The Indian e-pharmacy market and three major platforms are the only ones on which the study is restricted. The accuracy of financial data will depend on the accuracy of publicly published documents; financial records of internal operations may not be reported exactly. The fast changing nature of the regulatory situation can make certain policy observations sensitive. The lack of publicly available clinical data could not be used to evaluate patient-level pharmaceutical outcomes (e.g., the rate of medication adherence obtained with the help of the platform interventions). Despite these shortcomings, the study offers an evidence-based systematic basis of comparative insight on e-pharmacy business/pharmaceutical models.

4. Case Study Analysis

4.1 Comprehensive Analysis of PharmEasy

4.1.1 Company Overview

PharmEasy is a 2015 founding company based in Mumbai, Maharashtra with its headquarters under API Holdings Private Limited, which is the parent company to Thyrocare, PharmEasy and Aknamed group. PharmEasy started as an Internet-based drug aggregator that linked patients with the local pharmacy outlets and gradually turned into a vertically integrated health-tech conglomerate. It was the first health-tech unicorn in India and has a valuation of USD 5.6 billion by 2021. The site caters to more than 7 million active users every month in 1000 cities and towns providing prescription drugs, OTC drugs, health supplements, and diagnostic services.

The horizontal direction of integration is a characteristic strategic aspect of PharmEasy since through the acquisition of Medlife (2021) and Thyrocare Technologies (BSE/NSE listed diagnostics company, acquired at approximately INR 4,546 crore in 2021) and Aknamed (B2B pharma procurement), the company has built an end-to-end healthcare ecosystem. This is an aggressive consolidation approach that differentiates PharmEasy among competitors growing organically and indicates a venture-capital-based land-grab approach to market share.

4.1.2 Pharmaceutical Operations

Drug Procurement and Supply Chain: PharmEasy has a hybrid procurement model. During its early days, it operated as a mere aggregator, and collaborated with local licensed pharmacies (franchise-partner model) to fulfil orders. After 2019, it built own fulfilment centres (warehouses) in large metropolitan cities such as Mumbai, Delhi, Bangalore, Chennai and Hyderabad. The drugs are obtained through authorised manufacturers and distributors of CDSCO. In 2018, it strengthened its institutional procurement of hospital supply by acquisition of Aknamed.

Temperature-sensitive drugs (vaccines, biologics, insulin) have cold-chain logistics that are handled by tie-ups with specialised cold-chain logistics providers. Nevertheless, the platform has been criticized on cold-chain maintenance consistency throughout the last-mile delivery, especially with respect to insulin and biological products - a vital pharmaceutical safety issue.

Checking of Prescriptions: PharmEasy involves customers printing their prescriptions of all Schedule H and H1 drugs. Licensed pharmacists are concerned with the review of uploaded prescriptions in the background. Nonetheless, other independent articles have reported cases of dispatching prescription drugs without proper verification - a structural issue of the industry. Since that time, the site has improved the prescription review procedures and implemented AI-powered prescription parsing software.

Pharmacist Involvement: PharmEasy has staff of registered pharmacists in its fulfilment centres who ensure verification of drugs, oversight of dispensing and review of prescriptions. Nevertheless, the ratio of the pharmacist to order is obscure in the disclosure to the general public. Pharmacist consultation (medication counselling) to patients is not a service conspicuously presented to patients - a gap in comparison to the standards of pharmaceutical care.

Regulatory Compliance: PharmEasy has drug retail licences in the states to which it provides fulfilment warehouses. The company has overcome several regulatory hurdles such as the show-cause notices by the state drug controllers. Its adherence to GST and maintaining its Form 65 (Schedule H/H1 drugs) is the norm.

4.1.3 Business Model and Revenue Structure

PharmEasy runs business on multi-layers. The pharmaceutical retail, online sale of prescription drugs, OTC products, health supplements and medical devices, are its major B2C sources of revenue. The platform provides subscription service (PharmEasy PLUS) which has extra-discounts (up to 20% on medicines, 30% on diagnostics) to retain high-value customers. The secondary sources of revenue are: diagnostic services (through Thyrocare network, which involves sample collection and lab tests), B2B pharmaceutical buying (through Aknamed, which provides hospitals and nursing homes with brand presence on the site), advertising and co-marketing charges by pharmaceutical firms on brand visibility on the site, and monetisation of healthcare content.

PharmEasy has shifted its business model to the vertical integration as opposed to simple aggregation. The company aims to take marginal control at every point of the healthcare delivery value chain by owning the supply chain (procurement), fulfilment, last-mile delivery, and diagnostics. The historic trend of EBITDA negativity was more a result of massive spending on customer acquisition, infrastructure and technology than operational incompetence.

4.1.4 Marketing Strategy and Customer Acquisition

The marketing approach adopted by PharmEasy can be described as one of vigorous digital marketing efforts, collaborating with influencers, TV advertisements, and customer acquisition based on offers. Accessibility and affordability is emphasized by its slogan Ab Sehat Mein Koi Compromise Nahi (No compromise in health). The major customer acquisition channels are: Google and Meta (Facebook/Instagram) performance marketing; referral programmes, which include wallet credits; app-store optimisation (PharmEasy is always on the top 3 health apps in India); and strategic partnerships with insurance companies and corporate wellness programmes.

The PharmEasy PLUS subscription plan, automatic refill of chronic diseases, and built-in diagnostics are what makes people stay with the company. The platform uses data analytics to personalise the medicine refill notifications and health content recommendations. PharmEasy has also implemented on ground pharmacy partnership programmes in Tier-2 and Tier-3 cities to expand geographical coverage, compared with competitor metro-centric coverage.

4.1.5 Financial Model and Funding

PharmEasy has collected in excess of USD 1.5 billion in capital in various rounds, with key funders being Prosus Ventures, TPG Capital, Temasek, Microsoft, Think Investments and others. Significant funding events are a USD 350 million Series E round in October 2020, USD 323 million round in 2021 at unicorn valuation and pre-IPO fundraise in 2021. In 2022, the proposed IPO (one of the largest health-tech listings in India) was postponed under the influence of poor market conditions and the fact that the company remained EBITDA-negative.

The revenue of PharmEasy increased in the period between INR 1,875 crore (FY2021) and INR 5,729 crore (FY2022) taking the combination of Medlife and Thyrocare revenues. Nevertheless, the net losses increased significantly, and they were about INR 2,731 crore in FY2022. Thyrocare acquisition had a great effect on the balance sheet in terms of goodwill impairment. In 2023, the company offered a much lower valuation (approximately USD 450 million) of a rights issue which is a vigorous valuation change based on profitability criteria and general technological market headwinds.

Metric	FY2021	FY2022	FY2023 (Approx.)
Revenue (INR Crore)	~1,875	~5,729	~6,200
Net Loss (INR Crore)	~640	~2,731	~3,100
Valuation (USD Bn)	~4.0	~5.6	~0.45-1.0
Funding Raised (Total, USD Mn)	~750	~1,500+	Rights issue

4.1.6 Strengths and Weaknesses

Strengths: Largest pharmaceutical retail network via aggregation and owner warehouses; end-to-end vertical integration of medicines, diagnostics, and B2B supply; strong technology backbone and Artificial Intelligence operations; broadest geographic footprint with 1,000+ cities; acquiring market share dominance; and well-established institutional pharma supply with Aknamed.

Weaknesses: Continuing and growing net losses that raise long-term solvency issues; value reduction of more than 90 percent off highs that are damaging investor confidence; prescription verification issues that are reported by regulators and media; insufficient observable investment in pharmacist-led patient counselling; regulatory and legal issues across states; acquisition-intensive model that makes integration complex and increases debt.

4.2 Comprehensive Analysis of Netmeds

4.2.1 Company Overview

Netmeds was established in 2015, in Chennai, Tamil Nadu, by Pradeep Dadha, based on the history of Dadha Pharma Distribution, a 100-year-old Indian pharmaceutical distribution business. This strong pharmaceutical background is one of the underlying distinguishing factors, and it gives Netmeds an authenticity in the pharmacy profession. Reliance Industries Limited (RIL) purchased Netmeds in August 2020 to its subsidiary Reliance Retail Ventures to the tune of INR 620 crore - the biggest acquisition in the history of the company marking its strategic investment in digital healthcare and the e-pharmacy segment.

Since being acquired, Netmeds has become a part of the wider JioMart and Reliance Retail base, which facilitates omnichannel healthcare retail. The site operates under the brand name of India Ki Pharmacy and caters to clients in 600 plus cities and provides prescription drugs, OTC drugs, diagnostics (through Netmeds Diagnostics) and teleconsultation services.

4.2.2 Pharmaceutical Operations

Drug Procurement and Supply Chain: Netmeds has a pharmaceutical history via the Dadha Pharma Distribution that grants it one of the strongest and developed drug procurement and distribution networks when compared to the three platforms. The company has direct correlation with pharmaceutical manufacturers and primary distributors which allow the company to purchase at competitive prices. It has warehousing hubs, centralised in Chennai, and regional fulfilment hubs. Storage and distribution protocols which control temperatures are highly developed, which is a reflection of the pharmaceutical distribution background.

Prescription Checking: Netmeds has a multi-phase prescription verification system: customers send prescriptions at the checkout stage, pharmacists verify prescriptions and make order confirmations, and drugs are dispensed in licensed pharmacy warehouses. The platform uses the traditional pharmacy history to keep relatively strong prescription compliance in comparison with the technology-based entrants.

Pharmacist Involvement: Since the company has a history of drug distribution, Netmeds has a pharmacist-focused culture in operations. Licensed pharmacists monitor all the dispensing processes. Nonetheless, similar to other of its counterparts, patient-facing clinical pharmacy service (medication therapy management, pharmacokinetic consultation) is still not a well-developed consumer product.

Regulatory Compliance: Netmeds holds drug retail licences in a variety of states and has generally been in superior regulatory standing than its competitors, a combination of its traditional pharmaceutical history and the corporate compliance infrastructure of Reliance. Since the acquisition, the legal and regulatory departments of Reliance have reinforced further the compliance structures.

4.2.3 Business Model and Revenue Structure

The business model of Netmeds is based on the pharmaceutical retailing business with an emerging omnichannel strategy. Its sources of revenue are: online pharmaceutical retail (prescription and OTC drugs, health supplements, baby care, personal care); Netmeds Diagnostics (home sample collection and lab testing); and the integration with JioMart in the area of cross-platform health products sales. The Reliance acquisition has created

opportunities to the 15,000-plus physical store network of Reliance Retail, which could create true omnichannel reach, a competitive asset rare to the other two platforms.

Netmeds has competitive discount schemes (as low as 15-25% on branded medicine, up to 50% on generics) and Netmeds 24x7 has been started in response to the need to deliver medicine urgently. The platform is strategically placed to be integrated with Reliance 5G and Jio telecom infrastructure and can become embedded health services part of the Jio ecosystem that operates in a market of about 450 million subscribers, a distribution advantage that is strategically incomparable.

4.2.4 Marketing Strategy and Customer Acquisition

The marketing approach of Netmeds is based on the duality of the pharmaceutical tradition of the company (India Ki Pharmacy) and the Reliance brand ecosystem. The marketing channels are television advertising (high expenditure particularly in cricket and festive seasons), JioMart application integration (easy access to the large market of retail Jio customers), online marketing using Google and Meta, and marketing within the JioHealth and JioMart systems. Reliance association offers very high earned media, brand trust, and cross promotional synergies that are not offered to independent competitors.

Integration with Jio in terms of its loyalty and cashback programmes, co-branding with Reliance Digital and Reliance Fresh stores, and corporate wellness tie-ups are completed to achieve customer acquisition. The Netmeds Health Points loyalty programme, personalised health content and chronic medicine refill management are some of the customer retention strategies.

4.2.5 Financial Model and Funding

Netmeds is a subsidiary of Reliance Retail and is not subject to independent financial reporting following the acquisition of the company in 2020 at INR 620 crore. The consolidated finances are incorporated in the financial operations of Reliance Retail. The premium itself was a large one over the standalone value of Netmeds, indicating that Reliance was driven by a strategic and not a financial purpose of taking market share in digital health and consolidating pharmacy as part of its retail-to-digital platform.

Reliance Retail had a revenue of more than INR 2.6 lakh crore in FY2023 which ensures Netmeds has virtually unlimited financial support to expand, invest in infrastructure and offer competitive prices to the market. This financial support is an asymmetric competitive advantage - Netmeds is able to provide sustained investment periods in a manner that is not possible to venture capital-funded competitors.

Parameter	Details
Acquisition Price	~INR 620 crore (2020, by Reliance Retail)
Parent Entity Revenue (FY23)	~INR 2.6 lakh crore (Reliance Retail consolidated)
Independent Funding History	Pre-acquisition: ~USD 50-70 million raised
Post-acquisition Financial Backing	Backed by Reliance Industries balance sheet
Reported Losses (Independent)	Not separately disclosed post-acquisition

4.2.6 Strengths and Weaknesses

Strengths: Exclusive pharmaceutical history that offers operational credibility and procurement benefits; Reliance has financial support that provides it with the ability to invest indefinitely; true omnichannel retailing with 15,000+ Reliance stores; JioMart cross-platform distribution, reaching 450 million Jio subscribers; licensed pharmacy infrastructure; regulatory status which gives it an advantage of traditional distribution experience.

Weaknesses: The complexity of integration in Reliance as a large conglomerate structure can create slowing agility; limited strong brand identity existing outside of Reliance; Netmeds diagnostics and teleconsultation services are less established than Tata IMG; limited brand conduct as customer-facing digital

innovation has been incremental since the acquisition; performance evaluation is challenging because of the lack of independent financial reporting.

4.3 Comprehensive Analysis of Tata 1MG

4.3.1 Company Overview

In Gurugram, Haryana, 1MG was started in 2015 by Prashant Tandon, Gaurav Agarwal and Vikas Chauhan with a clear aim of providing quality healthcare to everyone in India at an affordable cost. In June 2021, Tata Digital Limited, the digital branch of Tata Sons, purchased majority share of 1MG to the tune of USD 300 million and rebranded the platform as Tata 1MG. Acquisition of 1MG made it a significant pillar of the Tata Digital healthcare division together with Tata Health and NetConnect+ integrations.

Tata 1MG is generally considered the most patient oriented and pharmaceutically advanced of the three solutions. The product architecture has a significant level of drug information, teleconsultation, diagnostics, and prescription selection. The service has an estimated 30 million registered users, it serves 1,000+ cities, and it has a reputation especially strong in medicine information content, particularly in its drug information database (it covers 60,000+ medicines), one of the most extensive in India.

4.3.2 Pharmaceutical Operations

Drug Procurement and Supply Chain: Tata 1MG has its own licensed pharmacies in Gurugram and fulfilment hubs in the regions where it operates. Tata 1MG follows a warehouse-based direct dispensing model. Drugs are procured by the company directly from manufacturers and authorized distributors, and the focus on the authenticity of the products (anti-counterfeiting measures) is rather high. Its Authenticity Guaranteed program focuses on one of the most important patient issues of the Indian pharmaceutical market, where counterfeiting of drugs is a major health risk to the population.

The pharmaceutical management of temperature sensitive products is notably strong with specific cold-chain logistics of biologics and vaccines and also insulin products. The platform has also come up with a strong generic medicine and branded generic programme which involves direct collaborations with manufacturers in order to provide quality-guaranteed substitutes - an initiative which has direct pharmaceutical care implications on patient affordability.

Prescription Verification: Tata 1MG is the platform that has the most advanced prescription verification process as compared to the other two. The uploaded prescriptions are processed by AI-enhanced optical character recognition (OCR) applications that identify drug prescriptions, dosage, and doctor information and pharmacists finish the verification process. E-prescription integration with teleconsultation has been introduced on the platform, which allows managing the closed-loop prescription seamlessly - this is clinical pharmaceutical innovation.

Involvement of Pharmacist: The most unique pharmaceutical differentiator of Tata 1MG is its pharmacist consultation service, ask a pharmacist, that provides access to licensed pharmacists to patients to ask medical questions, drug interactions, and dosage information. This is a real clinical pharmacy service extension to transactional dispensing - a strategy that is congruent with the current models of pharmaceutical care and the pharmacy practice standards set by the International Pharmaceutical Federation (FIP).

Regulatory Compliance: Tata 1MG holds drug retail licences in various jurisdictions and has been able to exercise good regulatory compliance. The Tata group has institutional adherence to the standards of governance and compliance that offers structural guarantee of the compliance with CDSCO regulations, Schedule H dispensing protocols, and data privacy requirements.

4.3.3 Business Model and Revenue Structure

The business model of Tata 1MG is the most diversified of the three, being organized around four integrated verticals of revenue: (1) Pharmaceutical retail - online dispensing of prescription and OTC medication, including a proprietary generic drug line; (2) Diagnostics - home sample collection of 200+ diagnostic tests through collaborating with accredited laboratories, with NABL-certified partners; (3) Teleconsultation - video

and chat-based consultations with 100+ medical specialists in 25+ specialties; and (4) Health content and information services covering 60,000+ medicines.

This combination of the four verticals allows Tata 1MG to offer a complete patient experience: symptom to consultation, diagnosis, prescription, dispensing and follow-up. The combined model generates high patient engagement, longitudinal accumulation of health data, and cross-selling possibilities across the services verticals - to provide excellent unit economics compared with pure-play pharmaceutical dispensers.

4.3.4 Marketing Strategy and Customer Acquisition

The content based patient education and Tata brand trust equity makes Tata 1MG marketing strategy differentiated. The health information portal of the platform (millions of monthly organic visitors) creates high-intent customer acquisition at much lower cost-per-acquisition than paid advertising-reliant competitors. The most important channels are: organic search (SEO-optimised search engine pages of medical content and drug information), Tata ecosystem integration (cross-sell promotion via TataNeu super-app, Tata Health, Tata AIG), and alliances with hospitals, clinics, and corporate health programmes.

The TataNeu super-app integration (introduced in 2022) delivers access to the 85+ million registered customer base of Tata in retail, travel, financial services, and lifestyle, which is an effective customer acquisition and retention tool. NeuCoins loyalty currency earned on Tata platforms can be redeemed on Tata 1MG, which will result in powerful cross platform retention incentives. The Tata brand trust - the most trusted brand by various surveys - offers automatic customer loyalty on the authenticity of their pharmaceutical products.

4.3.5 Financial Model and Funding

Before Tata acquisition, 1MG had attracted about USD 218 million in multiple rounds of investments by investors such as Sequoia Capital, HBM Healthcare Investments, Omidyar Network, Dr. Reddy Labs, and others. The USD 300 million Tata Digital takeover was a small albeit strategic value indicating 1MG good brand equity and patient-focused positioning regardless of EBITDA-negative operations.

Tata 1MG has a financial support of Tata Digital after the acquisition, which is further financed by the large balance sheet provided by Tata Sons. Tata Digital has already pumped in excess of INR 10,000 crore in the digital portfolio as at FY2023. The revenues of Tata 1MG have increased to above INR 1,900 crore (FY2022) and compared to PharmEasy, the company has a significantly lower loss profile relative to revenue, which indicates better cost management and a business model profile.

Metric	FY2021	FY2022	FY2023 (Approx.)
Revenue (INR Crore)	~1,300	~1,900	~2,500
Net Loss (INR Crore)	~380	~528	~600
Loss-to-Revenue Ratio	~29%	~28%	~24%
Pre-acquisition Funding (USD Mn)	~218	---	---
Acquisition Valuation (USD Mn)	---	~300	---

4.3.6 Strengths and Weaknesses

Strengths: The majority of the integrated pharmaceutical care model amongst the three platforms; the clinical pharmacy services (Ask a Pharmacist), which offer real patient value; advanced prescription verification with AI-OCR; building of drug information database, which creates trust and organic traffic; Tata support with financial resources and brand recognition; TataNeu super-app integration to cross-platform customer acquisition; generic medicine programme with consideration of affordability; favourable loss-to-revenue ratio, which demonstrates operational efficiency.

Weaknesses: Smaller geographical base than PharmEasy; revenue base much lower than that of PharmEasy after consolidation; not fully integrated as part of wider Tata Digital portfolio; teleconsultancy and diagnostics are revenue generators, but full monetisation potential remains unmet; rural and Tier-3 market penetration low; pharmacist consultation service is not fully exploited in terms of its clinical potential.

5. Comparative Analysis

5.1 Comparison of Pharmaceutical Service Efficiency

Tata 1MG exemplifies the most patient-oriented model of pharmaceutical care, combining pharmacist consultation with AI-assisted prescription verifying with pharmaceutical care drug information services and a generic medicine programme into one pharmaceutical care solution. PharmEasy is the most scaled but with a depth of pharmaceutical care that is seconded by the logistical efficiency and volume. Netmeds enjoys the advantage of pharmaceutical background in supply chain credibility but has not replicated this background in patient-facing differentiated clinical service.

Tata 1MG has the highest prescription verification rigour followed by Netmeds, with PharmEasy having larger variability in the past. The three platforms have licensed pharmacist supervision on the dispensing activities, but the interaction between the patient and the pharmacist is not clinical in all three platforms but is more transactional. The most developed cold-chain pharmaceutical management is at Netmeds (distribution heritage) and Tata 1MG (Authenticity Guaranteed programme).

Pharmaceutical Parameter	PharmEasy	Netmeds	Tata 1MG
Prescription Verification Rigour	Moderate	Moderate-High	High
Pharmacist Consultation Service	Limited	Limited	Available (Ask Pharmacist)
Drug Information Resources	Basic	Moderate	Comprehensive
Cold-Chain Compliance	Moderate	High	High
Generic Medicine Programme	Limited	Moderate	Developed
Drug Counterfeiting Safeguards	Standard	Standard	Enhanced (Authenticity Guaranteed)
Regulatory Compliance History	Moderate (challenges noted)	Good	Good

5.2 Comparison of Business Models

The three platforms are three different business model archetypes of Indian e-pharmacy. PharmEasy is a case of horizontal integration conglomerate model - purchasing assets at all levels of the healthcare value chain (medicine retail, diagnostics, B2B pharma) to gain cross-segment market share and realize economies of scale. Netmeds is an omnichannel hybrid model, which uses the physical infrastructure of parent Reliance Retail to fulfill the digital and brick-and-mortar healthcare retail bridge. Tata 1MG realizes an integrated patient journey model, in which interrelated services (consultation, diagnosis, prescription, dispensing) were formed to establish a longitudinal patient engagement platform.

The models have their particular benefits: with PharmEasy, the size of the addressable market is maximised, Netmeds is able to cover a greater area with the help of its physical stores, and Tata 1MG helps to create greater patient engagement as well as lifetime value. None of them has shown yet any reliable profitability which shows the structural issue in developing margins in a market where customer behaviour is price-sensitive, regulatory complexity and last-mile logistics expenditure is expensive.

5.3 Comparison of Marketing Strategies

PharmEasy mostly depends on paid online marketing, promotion based on discounts, and vigorous acquisition proposals - a high-expenditure, high-development strategy, which is in line with its scaling requirement as mandated by its venture-capital funding. Netmeds is a strong beneficiary of the marketing earned on the ecosystem of Reliance, with the integration of JioMart and the footfall of Reliance Retail. Tata 1MG uses a trust-based marketing strategy that is content-driven and where organic health information content creates high-intent customers with lower acquisition cost as compared to paid channels.

Based on the pharmaceutical marketing ethics, the strategy of Tata 1MG, which focuses on drug information, patient education, and healthcare literacy, is closest to the pharmaceutical professional values and CDSCO advertising policies. The three platforms are careful in advertising prescription drugs to consumers, which is acceptable by the regulations.

5.4 Comparison of Financial Sustainability

All three platforms showed no profitability in terms of EBITDA as of FY2023, which is the stage of structural investment in the e-pharmacy market in India. Nevertheless, there are enormous disparities in the upward trend of finance and risk profile. PharmEasy has the largest absolute loss (INR 2,731 crore in FY2022) and the most intense profitability pressure, and is subjected to the greatest valuation correction, it was previously rated at USD 5.6 billion, but it has now been valued at about USD 450 million - the destruction of more than 90 percent to its peak. Tata 1MG has the most favourable loss-to-revenue ratio (~28%), which indicates better unit economics. Netmeds has the advantage of having virtually unlimited support through Reliance which shields it against capital markets pressure.

Financial Dimension	PharmEasy	Netmeds	Tata 1MG
Revenue Scale (FY22)	Highest (~INR 5,729 Cr)	Undisclosed	Moderate (~INR 1,900 Cr)
Net Loss (FY22)	Highest (~INR 2,731 Cr)	Undisclosed (backed by Reliance)	~INR 528 Cr
Loss-to-Revenue Ratio	~47%	Not applicable	~28%
Financial Backing	VC/PE (stressed)	Reliance Retail (strong)	Tata Digital (strong)
Valuation Trend	Sharp decline (2022-23)	Stable (Reliance subsidiary)	Stable (Tata subsidiary)
Path to Profitability	Uncertain (2024-25)	Tied to Reliance strategy	Most visible trajectory

5.5 Overall Competitive Position

Tata 1MG has the best long-term strategic position in aggregate competitive positioning, which is a combination of the depth of pharmaceutical care, Tata brand equity, excellent financial management and content-based customer acquisition. The Reliance ecosystem will give Netmeds an asymmetric financial advantage and a unique ability to reach omnichannel, making it possible to consolidate the market in the long term. Despite its

market leadership on a large scale, PharmEasy is exposed to the strongest short-term risks of profitability, credibility of valuation, and compliance with regulations, which presupposes a core business model re-calibration to remain in the market.

6. Results and Discussion

6.1 Key Pharmaceutical Findings

The analysis shows that there is an enormous disconnect between the business savvy of the digital pharmacy platforms and the pharmaceutical care aspect. Although each of the three platforms can comply with minimum regulatory standards of licensed dispensing, none have so far implemented the expanded role of pharmaceutical care envisioned by the FIP Development Goals and the National Health Policy 2017 of India, that focuses on pharmacist-led patient counselling and medication management.

The best effort to integrate clinical pharmacy is that of Tata 1MG with its service called Ask a pharmacist, where the utilisation statistics indicate that the service is not utilised as much as there is transaction volume. A positive contribution to the field of health literacy and informed self-medication is the drug information ecosystem that Tata 1MG developed (60,000+ medicines), which serves as a means of providing a more significant contribution to the field of public health.

One of the pharmaceutical safety revelations that stand out is that there is a discrepancy in prescription verification throughout the industry, especially with Schedule H1 drugs (antibiotics, analgesics) and psychotropic substances. Although there are regulatory requirements, reported cases of dispensing controlled substances without proper prescription examination are a serious threat to patient safety. Pharmacovigilance - the systematic identification, evaluation, and avoidance of adverse drug reactions - is a feature that is not operational in all three platforms.

6.2 Business and Financial Insights

The Indian e-pharmacy market has reached the stage of the consolidation process after the initial boom of high growth and investment (2015-2021). The acute correction of valuation of 2022-2023 (the most striking case being the loss of USD 5.6 billion to an approximate USD 0.45 billion in PharmEasy) is symptomatic of wider tech markets corrections across the globe tied to continuing profitability challenges in the e-pharmacy business model.

The takeover of individual platforms by corporate conglomerates (Reliance acquiring Netmeds; Tata acquiring 1MG) is an indicator of a structural change: the apparatus of sustainability in e-pharmacy business seems to demand the funding of corporate groups, distribution networks, and brand recognition, rather than the support of independent venture-funded business models. This plays a critical role in the future entrepreneurs of pharmacy as they have to build to be acquired or create very capital efficient models with niche.

Another financial lesson is that diagnostics and teleconsultation are the revenue streams that need to be diversified to the margins. Pure-play pharmaceutical dispensing has a narrow margin (5-15 percent gross margin) that is strained by discounting and logistics expenses. What becomes more economic is platforms that combine higher-margin diagnostics (35-50% gross margin) and teleconsultation; a lesson that is directly applicable to pharmacy entrepreneurship education.

6.3 Strategic Gaps Identified

The three platforms are identified to have six critical strategic gaps, namely: (1) Pharmacovigilance infrastructure - none of the three platforms have a systematic adverse drug reaction (ADR) reporting and monitoring system, which is a significant absence in drug responsibility; (2) Medication therapy management - none of the three platforms has a therapy-based drug regimens or complex, chronic disease patient management developed at scale; (3) Rural healthcare reach - even though it claims to serve 1,000+ cities, scalable, Tier-3-based drug access remains limited; (4) Blockchain drug authentication - blockchain-based track-and-trace drug authentication has not been implemented at scale; (5) Medication adherence programmes - systematic medication adherence monitoring and intervention programmes are not in place despite the prevalence of chronic disease;

and (6) Clinical pharmacist integration - deep clinical pharmacy services remain underdeveloped across all three platforms.

6.4 Proposed Entrepreneurial Innovation Model

6.4.1 Advanced Pharmaceutical Care Integration

The upcoming e-pharmacy business owners must build the platform in which clinical pharmacy is a core feature of the product and not a compliance side note. It will entail: implementation of pharmacist-to-patient chat and video consultation as a standard service (not a premium add-on); the use of AI-based drug interaction checkers and contraindication alerts in the point-of-dispensing workflow; the creation of medication adherence programmes with automated refill management, adherence tracking, pharmacist follow-up of chronic disease patients; and the integration of pharmacovigilance reporting tools allowing patients and pharmacists to report ADRs effortlessly within the dispensing workflow, and adding such data to national pharmacovigilance databases.

6.4.2 Sustainable Revenue and Pricing Strategy

The discount-based customer acquisition model, effective in terms of growth, is not economically viable. Through the proposed model, it is proposed that value-based pricing be based on the pharmaceutical care services: pharmacy subscription schemes, which bundle clinical pharmacist consultations, medication management, and priority dispensing; tiered pricing of diagnostic and teleconsultation packages; generic medicine programmes, which offer quality-assured substitutes, and offer true savings (not just nominal price reductions) to the customer; and B2B pharmaceutical supply partnerships with hospitals, nursing facilities, and corporate health programmes, which offer stable, higher-margin institutional revenue.

6.4.3 Technology-Driven Drug Safety Model

One of the key platforms of differentiation should be a technology-enabled drug safety architecture. The major elements are as follows: blockchain-based drug track-and-trace manufacturer-to-patient, combating the problem of counterfeit drugs in India; AI-powered prescription validity checks with multi-parameter validation (prescriber digital signature, institution verification, dosage appropriateness checks); cold-chain pharmaceutical products temperature sensors based on IoT; and a drug information intelligence layer that sends real-time drug safety warnings, batch recall warnings, and drug interaction warnings tailored to specific patient drug history.

6.4.4 Competitive Advantage Strategy

Indian e-pharmacy market sustainable competitive advantage will accrue to platforms which develop actual pharmaceutical care capabilities - rather than logistical scale. The proposed model suggests the following: the creation of pharmaceutical professional relationships (academic pharmacy institutions, hospital pharmacy departments) to develop a clinical credibility and talent pipeline; niche market leadership in underserved markets (elderly care pharmacy, paediatric medication management, oncology supportive care) pharmaceutical care-based on specialisation requires premium pricing; the development of an interoperability with the Ayushman Bharat Digital Mission (ABDM) of the National Health Authority as the final-mile pharmaceutical care interface, brings the digital platforms reach together with pharmaceutical local expertise.

7. Conclusion

7.1 Summary of Major Findings

This comparative case study has critically examined entrepreneurial innovation approaches and business strategies, pharmaceutical activities, business, and financial models of PharmEasy, Netmeds, and Tata 1MG, the three largest online pharmacy portals in India. The review shows three different types of strategies: the horizontal integration conglomerate model of PharmEasy, the Reliance-supported omnichannel hybrid model of Netmeds,

and the model of integrated patient journey of Tata 1MG. All the platforms have attained large scale and service innovations, but all of them are still operating at losses due to the structural investment requirement of market building and the intrinsic difficulty of making a profit in a discount-competitive pharmaceutical retail and selling business.

The analysis of pharmaceutical care reveals that Tata 1MG is the patient-centric site, with meaningful pharmacist consultation services, developed prescription verification, and drug authenticity programmes. Netmeds has the advantage of pharmaceutical experience in supply chain strength. PharmEasy exhibits the highest level of logistic size. In all, pharmacovigilance, the management of medication therapy, and systematic patient counselling are not yet fully funded - a patient safety void and a professional pharmacy practitioner opportunity.

7.2 Implications for Pharmacy Practice

The emergence of e-pharmacy systems in India has far reaching consequences to the pharmacy practice. The occupation of the pharmacist is being redefined as a more dispensing occupation, to a possible clinical service provider, with the scale to reach millions of patients by using digital interfaces. This change requires pharmacy education programs to revamp their curriculum to equip graduates with digital pharmaceutical care positions - teleconsultation pharmacist practice, AI-assisted prescription management, digital pharmacovigilance and e-health entrepreneurship.

At the same time, the regulatory structure needs to undergo modification so that the digitisation of pharmacy practice cannot undermine the quality of pharmaceutical care. Such regulatory requirements as mandatory pharmacist participation in the operations of e-pharmacies, high prescription verification criteria, and systemic reporting of adverse drug reactions should not be negotiated as India formalises its e-pharmacy regulatory framework.

7.3 Strategic Recommendations for Future Entrepreneurs

Evidence-based strategic suggestions advanced toward pharmacists and pharmacy graduates who seek to become an entrepreneur in the e-pharmacy industry include: Build pharmaceutical care depth first, then logistical scale - authentic pharmacist-based clinical services produce defensible value that cannot be recreated through logistics; create value-based subscription and clinical service business designs, not discount-dependent transactional business designs; seek compliance as competitive advantage - in a trust-sensitive pharmaceutical sector, strict regulatory compliance and drug safety practices are brand assets, not costs; leverage digital infrastructure to pharmacovigilance - platform-scale ADR surveillance can produce intelligence of national drug safety; create community health value and institutional collaboration; consider acquisition preparedness - the current trend of Indian e-pharmacy may move to continued consolidation; and invest in rural drug access - the biggest untapped pharmaceutical care challenge in India remains Tier-3 and Tier-4 and rural markets, where first mover e-pharmacy models with community pharmacist collaborations can both provide commercial and social returns.

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Author Contributions

ANISH GURAV: Conceptualization, data collection.

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YASHODEEP GORE: writing (original draft), and visualization.

DR. SMEETA SADAR: Supervision, methodology review, manuscript review, and editing. Final version of the manuscript has been read and approved by all the authors.

Conflicts of Interest

The authors indicate that they do not have any conflicts of interest. The research itself was independent and did not have any financial or personal affiliation that can affect the outcomes or explanation of this work.

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