

Health Entrepreneurship in Pharmacy: Exploring Success Stories from South Asian Countries

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ABSTRACT

Health entrepreneurship has emerged as a dynamic force shaping the landscape of healthcare delivery, with a particular focus on the pharmaceutical sector. This mini-review aims to investigate and present success stories of health entrepreneurship in the pharmacy field within South Asian countries and to contribute valuable insights into the distinctive characteristics of health entrepreneurship in the pharmacy domain. The databases Google Scholar, PubMed, ScienceDirect and Academia were analyzed for articles published in English from January 2000 to May 2024 that involved success stories of the pharmacy field in South Asian countries. A comprehensive review of case studies, interviews and industry reports was also analyzed. The study delves into the entrepreneurial endeavors of individuals and organizations that have demonstrated notable achievements, innovations and sustainable impact in advancing healthcare solutions. It analyzes the strategies employed by successful entrepreneurs, the challenges they face and the unique solutions they devise to navigate the complex healthcare ecosystem. Furthermore, the key findings examine the role of government policies, regulatory frameworks and socio-economic conditions in fostering or hindering health entrepreneurship within different nations of the South Asian region. This mini-review also highlights the importance of private-sector engagement and the contribution of the respective government in fostering pharmaceutical entrepreneurship. This article provides actionable recommendations for policymakers, industry stakeholders and aspiring entrepreneurs seeking to promote and sustain health entrepreneurship in South Asian countries.

Keywords: Health entrepreneurship, Pharmacy, Success story, South Asia, Entrepreneurs, Pharmaceutical sector, Pharmaceutical company.

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INTRODUCTION

In recent years, health entrepreneurship has emerged as a transformative force, reshaping the face of healthcare delivery across the globe. Pharmacy sector serves as a focal point for innovative solutions to the multiple difficulties faced by the healthcare system. This review begins a thorough examination of health entrepreneurship in pharmacy, with a particular emphasis on success stories from the diverse and vibrant nations of South Asia.

South Asian countries, marked by their unique socio-cultural and economic landscapes, have witnessed a surge in entrepreneurial initiatives aimed at revolutionizing the pharmacy field. Entrepreneurs in this region have demonstrated remarkable resilience and creativity while navigating the complex regulatory environments and introducing novel strategies to improve access,

affordability and quality of healthcare services.¹ Understanding the success stories of health entrepreneurship in the pharmacy sector is critical for defining the future of healthcare in South Asia as the demand for creative solutions grows.

The research aim is to untangle the complex fabric of entrepreneurial endeavors in the pharmacy domain across South Asian countries. We hope to shed light on the various techniques adopted by entrepreneurs and the long-term consequences of their inventions on healthcare delivery by evaluating success stories. This will provide significant insights to policymakers, industry stakeholders and aspiring entrepreneurs, thereby establishing an environment favorable to the continued expansion of health entrepreneurship in South Asia.

METHODOLOGY

An extensive literature search was conducted using academic databases PubMed, ScienceDirect, Academia and Google Scholar, utilizing keywords "health entrepreneurship", "pharmacy", "success stories" and specific South Asian country names focusing on articles published in English from January 2000 to May 2024. A comprehensive review of case studies, interviews,



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industry reports, government policies and regulatory frameworks were taken into consideration to explore the contextual factors influencing health entrepreneurship in the South Asian region. Studies not related to pharmacy, health entrepreneurship, or not set within the context of South Asian countries were excluded. Success stories were chosen based on their emphasis on entrepreneurial initiatives, innovations and notable achievements in the pharmacy sector within South Asian countries. Ethical considerations were addressed through proper citation of original works, respect for intellectual property rights and transparency. The findings were synthesized to present a coherent narrative of health entrepreneurship success stories in South Asian countries in the pharmacy field, ensuring a systematic and comprehensive approach.

RESULTS AND DISCUSSION

Health entrepreneurship is the application of entrepreneurial skills to address public health problems. An increase in public health problems has led to the need for successful health entrepreneurship. The expansion of the pharmaceutical market is driven by increasing populations, aging societies, unhealthy lifestyles, political pressure to expand healthcare services and the growing proportion of newly disposable income that will be spent on health-will all lead to more drug purchases. To meet these growing needs, governments are required to make long-term investments in their health infrastructures.

Health entrepreneurship in the pharmacy field, reflects the growth of three main areas within the pharmacy sector. They are, innovation of new medicines, manufacturing of generic medicines to address the local need and the management of supply chain. These three major interrelated categories are analyzed in different countries of South Asia in this mini-review. When considering these 3 branches in different nations, India shows prominent success in Research and Development (R&D) along with innovation of new drug entities, whereas Bangladesh and Pakistan address their local needs successfully. Manufacturing of generic medicines and successful management of supply chains are performed in all the nations of South Asia.

Developing generic drug products differs significantly from creating reference or innovator drugs, which demands for extensive scientific and technical approaches.² Most pharmaceutical industries in developing countries now prioritize generic product development due to its shorter timeline and lower costs compared to innovator companies.^{2,3} India, Bangladesh and Pakistan particularly capitalize on this concept to drive health entrepreneurship and economic growth. India leads in both generic production and innovation of new entities.^{3,4}

Success stories of Indian Pharmaceutical Industry

India is the world's largest supplier of low-cost generics, vaccines and affordable medicines and is among the largest producers

of drugs both in value and volume terms.³⁸ India ranks 14th globally in terms of value and third in terms of volume.^{37,38} The Indian pharmaceutical sector supplies over 50% of global demand for various vaccines, 40% of generic demand in the US and 25% of all medicine in the UK and exports to more than 200 nations including developed and developing countries.³⁸ India operates a significant number of United States Food and Drug Administration (USFDA) and World Health Organization (WHO) Good Manufacturing Practices (GMP)-compliant plants.³⁷

The Indian government has significantly supported the pharmaceutical sector's growth. For instance, it allocated INR 100 crore from the PM-CARES Fund to support the initiative to develop a vaccine for COVID-19.³⁷ As per the Union Budget 2022-23: INR 3,201 crore has been set aside for research.³⁸ They encourage private and public sectors as well as foreign investors to increase investments in pharmaceutical R&D. They have taken steps to reduce interest rates for export financing, to deduct additional tax for R&D expenses and to reduce the price control of pharmaceuticals.³ Small-scale industry exemptions have led to the proliferation of small formulation manufacturers and low-cost drug manufactures.³ The Department of Pharmaceuticals has prepared an Umbrella Scheme namely 'Scheme for Development of Pharma industry' for the development of pharma industry in India.³⁸ Implementation of these strategies showcase the foresight of India to become a powerful nation globally in the pharmaceutical industry. India's booming pharmaceutical industry is not only a great source of innovation and employment generation, but it has also become a global healthcare provider in need.³⁷ During the COVID-19 pandemic, India has shown exemplary work on international cooperation by sending valuable medicines to many countries.³⁷

There is abundance of success stories in the pharmacy field from India. The domestic pharmaceutical industry includes a network of 3,000 drug companies and approximately 10,500 manufacturing units.¹⁰ The Indian Pharma sector currently contributes to around 1.72% of the country's GDP.³⁸ It is estimated to touch US\$ 130 billion in value by the end of 2030.³⁸ Sun Pharma, Dr. Reddy's Laboratories, Cipla, Torrent Pharmaceuticals and Zydus Lifesciences are the top 5 pharma companies in India in 2023 by market capitalization (as of Mar 31, 2023).³⁹ Notable achievements in major pharmaceutical companies of India are summarized in Table 1.

Sun Pharmaceutical's portfolio includes products for the treatment of psychiatric, neurological, nephrological, gastroenterological, orthopedic, ophthalmologic and heart diseases and it employs 41,000 people.⁴⁰ Sun Pharma is the fourth largest specialty generic pharmaceutical company in the world with global revenues of US\$ 5.4 billion.⁴⁰ It is supported by 43 manufacturing facilities, providing high-quality, affordable medicines to more than 100 countries across the globe.⁴⁰

Significant milestones include the acquisition of Ranbaxy in 2015 and Concert Pharmaceuticals (USA) in 2023.⁴¹ Notable product launches include specialty drugs like Ilumya (tildrakizumab) for psoriasis, Winlevi (clascoterone) cream for acne vulgaris and Cequa (cyclosporine) for dry eye disease.^{41,42}

Dr. Reddy's Laboratories Ltd., has a strong focus on R&D, developing and commercializing a diverse portfolio of affordable generic and specialty pharmaceutical products. They entered international markets with exports of Methyldopa; entered the Russian market with omeprazole in 1991.⁶ They launched Reditux (rituximab), the world's first biosimilar of a monoclonal antibody in 2007 and their groundbreaking products are ibuprofen, sumatriptan, norfloxacin, finasteride, ondansetron, fluoxetine.^{6,7} The acquisition of Betapharm (Germany) in 2006 gave Dr. Reddy's a strong foothold in the European market.⁶

Cipla (Chemical, Industrial and Pharmaceutical Laboratories) has been a pioneer in providing good quality, affordable and accessible medications, especially for the HIV/AIDS epidemic in 2001.^{9,10} In 1985, Cipla became the first Indian company to receive FDA approval for its drug manufacturing facilities.¹⁰ Formulation development is focused on Respiratory, Oncology, cardiology, diabetes, urology, ophthalmology products.¹¹ The first oral iron chelator in history, Deferiprone, was introduced by Cipla in 1995.¹¹ Cipla introduced the first worldwide Fixed Dose Combination (FDC) containing Abacavir+Lamivudin+Lopinavir+Ritonavir (30+15+40+10 mg) targeting the paediatric population.⁹ The production pipeline has over 250 products, including complex formulations and over 60% of the products are developed for international markets.⁹

Zydus Life Sciences is a fully integrated, international healthcare provider along with 1300 researchers operating across 35 facilities.^{12,43} They study the concept of NCEs (New Chemical Entities), vaccines, complex generics, biosimilars and specialized technologies.¹² Globally, they are well-represented in the highly visible markets and regulated markets of the US and Europe.¹² Zydus launched the first oral alternative to injectable Erythropoietin Stimulating Agent (ESA) in March 2022.⁴³ The pipeline includes vaccines such as the Hepatitis E, Hepatitis A, MMRV and Bivalent HPV vaccine, as well as a few vaccines in the early development stage.⁴³

Torrent Pharma has launched the concept of niche marketing and are leaders in the therapeutic segments of cardiovascular, gastrointestinal, gynecology, pain, antidiabetic and dermatology.^{13,14} Its four core markets, India, Brazil, Germany and US constitute more than 85% of its total revenue and distribute products to more than 40 countries.¹³ They mainly focused on branded generics, chronic care, high field force productivity, R&D investments and strategic acquisitions.¹³

Other than the pharmaceutical industry, E-Pharmacy is a successful concept that witnessed a surge in its demand with the

recent pandemic, which enabled purchasing medicinal drugs and E-services online.⁴⁴ At present, India has about 50+ start-ups in the E-pharmacy space providing quality and affordable medicines to about 5,000,000 patients per month across the country.⁴⁴ Major key drivers for online purchase of medicines are internet penetration, digital India initiative, government support, changing lifestyle and disease progression, booming Indian economy, expansion in domestic demand and pandemic outbreak.⁴⁴ In 2015, the Indian Internet Pharmacy Association was set up by 11 initial start-up E-drug stores; as of now, around 250 online drug stores have come up within India.⁴⁴

Success stories from Bangladesh

Bangladesh has succeeded in developing a pharmaceutical industry despite being a Least Developed Country (LDC).^{45,46} The rise of the pharmaceutical industry in Bangladesh is attributed by the implementation of Drug Ordinance in 1982 and subsequent development in the technology and skilled personnel which created a market for the local firms for simple generic formulations.^{31,45} Patented medicines are manufactured in Bangladesh, which account for about 7% of the market and exports to more than 100 developing countries.⁴⁵

The domestic market is essentially a branded generics market. The size of the pharmaceutical market in Bangladesh is estimated to be USD 3.1 billion in 2019 and the country is self-reliant in formulations, meeting about 97% of the local demand.⁴⁵ Bangladesh has local firms such as Square, Beximco, Incepta, Renata, Eskayef and Oponin and as well as international companies such as Sanofi, Novo Nordisk, GlaxoSmithKline and Novartis. Bangladesh manufactures more than 450 generic drugs for 5600 registered brands covering different therapeutic classes.⁴⁵ Manufacturers produce the most sensitive drugs such as Insulin, hormones, vaccines and also technically advanced products such as lyophilized injectables, sterile ophthalmics, prefilled syringes, oral thin films and multi-layer tablets.⁴⁶ Notable achievements in major pharmaceutical companies of Bangladesh are summarized in Table 2.

Square Pharmaceuticals Ltd., is the largest Bangladeshi multinational pharmaceutical company, founded in 1958 by Samson H. Chowdhury along with his friends as a private firm and then went public in 1991.³⁰ They started to export different antibiotics and medicine across the world from 1987 and currently exports to 36 countries.³⁰ The company employs more than 28,000 people with the current yearly group turnover of 616 million USD.³⁰ It has been continuously in the 1st position among all national and multinational companies since 1985.³⁰

Beximco Pharma, founded in 1976, initiated its operations by importing products from Germany and USA, then introduced its proprietary formulation brands in 1983 becoming an emerging global generic pharma company in the region.³¹ They manufacture more than 300 products, covering almost all therapeutic

Table 1: Notable Achievements of major pharmaceutical industries in India.

Pharmaceutical Industry	Headquarters	Establish year	Founder	Notable Achievements
Sun Pharmaceutical Industries Ltd.	Mumbai, India.	1983	Dilip Shanghvi	No.1 generic pharma by 'Corporate Reputation of Pharma' survey 2021. ⁵
Dr. Reddy's Laboratories Ltd.	Hyderabad, India.	1984	Dr. Kallam Anji Reddy	First generic Ibuprofen in the US (2008) ^{6,7} It has 21 manufacturing facilities in 66 countries. ^{6,8}
Cipla Ltd.	Mumbai, India.	1935	Khwaja Abdul Hamied	Generic medications for HIV/AIDS, respiratory, cardiovascular diseases. ⁹⁻¹¹
Zydus Lifesciences	Ahmedabad, India.	1952	Ramanbhai Patel	COVID-19 vaccine named ZyCoV-D. ¹² In 2014, launched the world's first adalimumab biosimilar. ¹²
Torrent Pharmaceuticals Ltd.	Ahmedabad, India.	1959	Uttambhai Nathalal Mehta	Leading pharma company with a turnover of LKR 9620 Cr (FY 2023). ^{13,14} Pioneers in niche marketing. ¹⁴
Glenmark Pharmaceutical Ltd.	Mumbai, India.	1977	Gracias Saldanha	Focused on new drugs and biosimilars for cancer, dermatology and respiratory diseases. ¹⁵
Bharat biotech	Hyderabad, India.	1996	Krishna Ella	Develop vaccines for Chikungunya, Hepatitis B, Zika and Japanese Encephalitis; ¹⁶ COVAXIN for COVID. ¹⁷
MedPlus India	Hyderabad, India.	2006	Madhukar Gangadi	Second largest pharmacy chain in India, with 3,000+ stores. ¹⁸
Serum institute of India	Pune, India.	1966	Cyrus S. Poonawalla	World's largest vaccine producer by number of doses. ¹⁹ During the COVID-19, developed Covishield, Covovax, Sputnik V. ¹⁹

categories and export to over 50 countries including the highly regulated markets of USA, Europe, Canada and Australia.³² Beximco Pharma has been awarded the National Export (Gold) Trophy eight times, as one of the largest exporters of Bangladesh's medicines.³² Its acquisition of Sanofi Bangladesh Limited in 2021 helped it win the Global Generics and Biosimilar Awards 2022 ("Acquisition of the Year").³²

Incepta Pharmaceuticals Ltd. produce various types of dosage forms which include oral solid, liquids, dry powder vials, powder for suspension, creams, sprays, drops, prefilled syringes, liquid filled hard gelatin capsules, lyophilized injections, human vaccines with high quality at affordable price³⁴. It has its own large distribution network having 28 depots all over the country and exports to 95 countries around the world.³⁴ They planned to use reverse engineering and analogue research in order to produce the new API.³⁴

Renata Limited continues to rank in the top five pharmaceuticals in Bangladesh with a market share of 7% in 2023.³³ Moreover, new products targeting non-communicable diseases are contributing to a greater share of growth in the therapeutic areas of gastrointestinal, anti-infectives, CNS, cardiovascular,

antihistamines, non-narcotic analgesics and women's health.³³ In addition, the inclusion of 3 new modalities, namely oncology injectable, hormone injectable and inhaler facility provide more products to the consumer. Renata continues to be the market leader in animal health products with a growth of 11.4% by developing new products.³³

Eskayef manufactures and markets a wide range of therapeutic drugs, bulk pellets and animal health and nutrition products.³⁵ Over the years, it has emerged as one of the most trusted, quality-driven and scientific information-based companies in the eyes of health care professionals and patients. It is the first EU GMP Approved Oncology Facility in Bangladesh and introduced the first generic molnupiravir, remdesivir to treat COVID-19 patients.³⁵

Success stories from Pakistan

The pharmaceutical industry in Pakistan is still in its early stages, but it has managed to establish a small presence in Asia-Pacific market. Presently, the total volume of Pakistan's pharmaceutical market stands at 1.64 billion US dollars, growing annually by 11%, surpassing the global growth rate of the pharmaceutical

industry.⁴⁷ Pakistan exports pharmaceutical products to Germany, Switzerland, Ireland and the United States. Among 750 registered pharmaceutical units in Pakistan, 400 produced active finished drugs which also include those 24 units run by multinational companies.⁴⁷ Although Pakistani industries meet 80% of the local market demand, approximately 90% of the active ingredients used in medicine production are imported.⁴⁷

The barriers for the development of the pharmaceutical industry in Pakistan include, weak drug regulatory framework, competitive nature of the pharmaceutical market, low prices of pharmaceutical items, logistical issues of banking and inclusion of formulations in the negative list as a protectionist measure.⁴⁸ The current landscape in Pakistan is not conducive to research and innovation, because there are no patent protection, absence of high-tech clusters and no research synergies between firms, universities and public institutions, absence of a financing system to pay for innovation and the presence of few regulatory pathways to spur innovation.⁴⁹ Notable achievements in major pharmaceutical companies of Pakistan are summarized in Table 2.

Getz Pharma Pvt. Ltd., is the largest branded generic pharmaceutical company that is recognized as one of the fastest growing pharma firms in Pakistan.^{36,50} In 1995, the company ranked 198th out of 200 companies in Pakistan and today it is rated as the third largest pharmaceutical company in Pakistan, operating in over 23 countries and producing over 500 products with an employee base of over 5700 well-trained and qualified personnel.⁵⁰

Success stories from Sri Lanka

In Sri Lanka currently, 83.6% of pharmaceutical needs are imported and the balance 16.4% of the requirement is provided by 15 local manufacturing plants including SPMC, Astron, Morison, Celogen, Hemas, Navesta, Kelun lifesciences, Gamma Interpharm, Emergen with an estimated value of Rs 18 billion annually.^{51,52} Domestic production mainly entails the manufacture of generic drugs (~8.5bn units of medicines per year) and do not necessarily focus on R&D and innovation of original/innovative drugs.⁵² Local manufacturers are 100 percent import-dependent for APIs. Locally manufactured products are generally supplied to the public sector via SPC through open tenders and buy-back deals, as well as to the private sector through distribution networks.⁵² Notable achievements in major pharmaceutical companies of Sri Lanka are summarized in Table 3.

SPMC (State Pharmaceutical Manufacturing Cooperation) is the only public manufacturer, established in 1987 with grant aid from the Japanese Government through Japan International Cooperation Agency (JICA).²⁰ It ensures that the public have access to differentiated, superior quality medicinal drugs for economically well-matched prices.²⁰ They are the pioneers in producing oral solid dosage forms of generic products in Sri Lanka in accordance with British Pharmacopoeia (BP), United States Pharmacopoeia (USP) and SPMC's own benchmark standards.²⁰

Astron was established in 1956 by Dumex, a Danish Multinational Company, who set up the pioneer pharmaceutical manufacturing plant in Sri Lanka. It became a Sri Lankan owned company from 1993.²¹ The therapeutic groups manufactured locally comprise of vitamins and minerals, antitussives, bronchodilators, antibiotics,

Table 2: Notable Achievements of major pharmaceutical industries in Bangladesh and Pakistan

Pharmaceutical Industry	Headquarters	Establish year	Founder	Notable Achievements
Square Pharmaceuticals	Dhaka, Bangladesh	1985	Samson H Chowdhury	Exports its medicine to 36 countries. ³⁰
Beximco	Dhaka, Bangladesh	1980	Ahmed Sohail Fasihur Rahman	Manufactures its own branded generics. ³¹ Introduced the world's first generic remdesivir for COVID-19. ³²
Renata	Dhaka, Bangladesh	1993	Syed Humayun Kabir	Received the UK MHRA approval for its Potent Product Facility which manufactures hormone, steroid and cytotoxic drugs. ³³
Incepta Pharmaceuticals Ltd.	Dhaka, Bangladesh	1999	Abdul Muktedir	First Bangladeshi company to produce human vaccines. ³⁴
Eskayef Pharmaceuticals Limited	Dhaka, Bangladesh	1990	Latifur Rahman	First Generic Remdesivir and molnupiravir for COVID-19. ³⁵ First EU GMP Approved Oncology Facility in Bangladesh. ³⁵
Getz Pharma	Pakistan	1995	Khalid Mahmood	The largest branded generic pharma in Pakistan. ³⁶

Table 3: Notable Achievements of major pharmaceutical industries in Sri Lanka.

Pharmaceutical Industry	Headquarters	Establish year	Founder	Notable Achievements
State Pharmaceutical Manufacturing Cooperation (SPMC)	Ratmalana, Sri Lanka	1987	Government of Sri Lanka	Only state sector pharma manufacturer in Sri Lanka. ²⁰ Manufacture high-quality, effective drugs as oral solid dosage forms. ²⁰
Astron	Colombo, Sri Lanka	1956	Marise Deckker	Manufactures 80 Brands and exports to 10 countries. ²¹
Navesta	Colombo, Sri Lanka	2017	Sanjaya Jayaratne	Specialized in dry powder Beta Lactam injectables (antibiotics). ²²
Celogen Lanka	Pallekele, Sri Lanka	2016	L. K. Panda	Manufactures over 360 different solid dosage finished formulations. ²³
Kelun Lifesciences	Kandy, Sri Lanka	2020	Dr. Gyan Prakash Ujalayan	Sri Lanka's first and largest facility for sterile liquid injections and infusions; ²⁴ fulfills 40% of total demand for saline. ²⁵
Gamma Interpharm (Pvt. Ltd.,)	Colombo, Sri Lanka	1995	Gamini Hevemallika	Manufacture mouthwashes, creams and generic drugs. ²⁶
Emergen Lifesciences	Kelaniya, Sri Lanka	2012	Manoj Hettiarachchi	Specializes in dry powder inhalation (DPIs) preparations. ²⁷
Morison Limited	Colombo, Sri Lanka	1959	Murtaza Esufally	First WHO GMP and EU GMP compliant infrastructure and quality management systems. ²⁸
Farmchemie Manufacturers	Homagama, Sri Lanka	2002	Uditha Wanigasinghe	In 2012, started manufacturing animal health products. ²⁹

anthelmintics, antihistamines, analgesics, antipyretics, antifungal agents and corticosteroids.²¹ Locally manufactured Astron animal health products are primarily for the poultry and cattle industries.⁵³

Kelun Lifesciences, an Indian investment, with Chinese collaboration, has saved over LKR 1.5 billion through the manufacture of saline locally since 2017. It fulfills 40 percent of total demand for saline in the country by 2023.²⁵ It is the largest sterile liquid injectable pharmaceutical manufacturing facility established in Sri Lanka, offering a wide product range in Large Volume Parenteral (LVP) and Small Volume Parenteral (SVP) and striving to expand into new markets throughout the world.²⁴

Gamma Interpharm Pvt. Ltd., is a locally owned pharmaceutical company founded in 1995.²⁶ It manufactures and markets generic and branded pharmaceuticals. It possesses the largest liquid oral dosage form manufacturing facility, complies with BP standards and WHO accepted GMP standards.²⁶

Celogen Lanka was established in 2016 and is the first Joint Venture partner under the patronage and guidance of the SPMC considering international product quality standards for the domestic market.²³ It extends its products' benefits to all the hospitals and clinics across Sri Lanka. They manufacture

360 different solid dosage finished formulations to cater many therapeutic segments.²³

Several companies produce and import veterinary pharmaceuticals in Sri Lanka. Major importers include Browns Veterinary Pharmaceuticals, A. Baur and Co., Dymec and Hayleys animal health. Whereas key producers are Farmchemie, Vetpharma Biotechnology Pvt, Ltd., and Super Pharmaceuticals.

Farmchemie was founded in 2002 by Mr. Uditha Wanigasinghe, an agriculturist aimed to enhance crop yield and profitability. The establishment of 'production facility' in 2012 marked a milestone, allowing it to manufacture animal health products.²⁹ It became the first Sri Lankan-owned animal health organization to achieve ISO 9001:2015, WHO GMP and FAMI-QS certifications.²⁹ In 2016, they entered the international market by exporting feed premix to India; and now exports a range of products, including specialty feed additives, oral liquid supplements and pet supplements to markets in South Asia, East Asia, the Middle East and Africa.²⁹

Vetpharma Biotechnology Pvt. Ltd., was founded in 2010 by Dr Sujith Sudusinghe (BVSc) for importing veterinary pharmaceuticals and feed additives.⁵⁴ They started their own production in 2012 by producing mineral mixtures for dairy cattle and expanded to manufacture veterinary pharmaceuticals and nutritional supplements for pets, livestock and poultry.⁵⁴

Super Pharmaceuticals manufacture scientifically formulated veterinary pharmaceuticals at an affordable cost. It was established in 2008, with all the machinery required to produce tablets, boluses, syrups, powders and granules.⁵⁵ At present the company is ISO 9001:2015 and WHO-GMP certified company producing about 30 veterinary pharmaceuticals categorized as poultry, small animals and large animals.⁵⁵

The Sri Lankan government supports local manufacturers with key initiatives and policies including a public procurement system favoring local producers through buy-back deals and tenders, tax relief on raw material, relief of import restrictions on locally produced drugs, legal provisions for promoting generic options and Ayurveda products.⁵² The Sri Lankan pharmaceutical regulator (NMRA) implements price ceilings and the Ministry of Health (MoH) reduces controlled prices on certain essential drugs to ensure affordability.⁵²

Success stories from Nepal

There are 87 licensed pharmaceutical manufacturers in Nepal, out of which 41 manufacture modern medicine, 7 veterinary products and 37 manufacture herbal preparations⁵⁶. Nepal is neither capable of producing pharmaceutical starting material, nor innovation of new active substances; But the production of formulations from pharmaceutical starting material and repackaging of finished dosage forms are successfully done by domestic manufacturers.⁵⁶

Although Nepal's domestic medicine market is still dominated by Indian products, domestic manufacturers are increasing their market share. Some domestic companies have already started exporting medicines. Lomus Pharmaceuticals is a leading exporter and four other domestic drug-makers also have received the 'Certificate of Pharmaceutical Product' (CPP). They are: Nepal Pharmaceuticals Laboratory (NPL), Deurali-Janta Pharmaceuticals, Elder Pharmaceuticals and National Health Care Nepal.⁵⁶ Despite significant export potential, the sector has not fully matured due to insufficient government support, inadequate industrial environment and the need to import APIs.

Strengths and weaknesses of the study

This mini-review on "health entrepreneurship in pharmacy" presents valuable insights and strengths. The review covers a wide range of success stories addressing relatively underexplored area, providing a holistic view of health entrepreneurship in the pharmacy sector across diverse South Asian countries. The in-depth analysis of individual success stories helps identify common factors that contribute to entrepreneurial success, including innovation, market strategy and effective regulatory navigation. This review also exhibits several weaknesses. One significant limitation is that, limited number of success stories were analyzed which may not be representative of broader regional trends. Lack of published or reported data is another

concern, making it challenging to assess the sustainability of certain ventures. This review was limited to articles published in English, potentially causing loss of data published in other languages. There might be an overemphasis on countries with more developed healthcare sectors like India, potentially neglecting insights from smaller or less-developed countries in the region. Another notable weakness is the insufficient discussion on failures; focusing primarily on success stories overlooks the importance of learning from unsuccessful ventures.

CONCLUSION

This review investigates and presents success stories of health entrepreneurship in the pharmacy field within South Asian countries and contributes valuable insights into the distinctive characteristics of health entrepreneurship in the pharmacy domain. Among the South Asian nations, India and Bangladesh emerge as dominant players, showcasing remarkable growth fueled by its prowess in generics, vaccines and affordable medicines. The respective government's strategic support and investments in research, led both multinational companies and local entrepreneurs to invest in the pharmaceutical field and to reach the heights by breaching the hurdles. Enhancing the accessibility, affordability and quality of healthcare services significantly boosts the success of the pharmaceutical industry. Pharmaceutical companies pursue their vision through diverse strategies, including engaging in the discovery of new chemical entities, developing innovative therapeutic dosage forms, exploring engineering technologies, manufacturing generic products at reasonable prices and strategically acquiring other pharmaceutical firms to consolidate to emerge as successful industry leaders.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

R&D: Research and Development; **USFDA:** United States Food and Drugs Administration; **WHO:** World Health Organisation; **GMP:** Good Manufacturing Practices; **USA:** United States of America; **FDC:** Fixed Dose Combination; **NCEs:** New Chemical Entities; **ESA:** Erythropoietin Stimulating Agent; **LDC:** Least Developed Country; **JAICA:** Japan International Cooperation Agency; **SPMC:** State Pharmaceutical Manufacturing Cooperation; **BE:** British Pharmacopeia; **USP:** United States Pharmacopeia; **LVP:** Large Volume Parenteral; **SVP:** Small Volume Parenteral; **NMRA:** National Medicines Regulatory Authority; **MoH:** Ministry of Health; **CPP:** Certificate of Pharmaceutical Product; **NPL:** Nepal Pharmaceutical Laboratory.

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