



Commercializing Asian and Australasian Herbal Medicines: Market Potential and Strategies

Amina Razzaq ^{1*}, Huma Ameen ¹, Rida Aziz ²

Abstract

This review explores the market potential for herbal medicines from Asia and Australasia and develops strategies for their effective commercialization in the biopharmaceutical and healthcare sectors. We have discussed the complex terrain of these products. Given that Asia and Australasia account for a substantial 60% of the global market share for herbal medicines, it is imperative to comprehend the subtleties of this region. The market analysis includes an in-depth investigation of the varied vegetation in these areas, where more than 50,000 plant species have been found to have therapeutic qualities. Over the past five years, the market for herbal medicines from these regions has grown at a consistent 7% annual rate thanks to the biodiversity of the region and growing consumer interest in natural cures. The paper emphasizes the need for standardized production processes while proactively addressing issues by suggesting quality control solutions. It is noteworthy since it emphasizes the sustainable procurement of herbal compounds, noting a 15% rise in consumer desire for goods, including ingredients that are supplied ethically and environmentally. As the review navigates integration into well-established industries, it becomes clear that

Significance | This review explores the rapidly increasing market potential of herbal medicines in Asia and Australasia, vital for biopharmaceutical and healthcare sectors.

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herbal treatments are becoming more and more accepted. This is demonstrated by a 20% rise in partnerships between traditional practitioners and contemporary healthcare providers. This cooperative strategy creates new business opportunities while enhancing the legitimacy of herbal products. To sum up, this review not only clarifies the state of the industry but also offers crucial data information to interested parties. This review serves as a strategic guide, highlighting the significance of quality, sustainability, and collaboration for unlocking the full commercial potential of herbal medicinal products from Asia and Australasia, which are expected to have a \$15 billion market value by 2025. The global healthcare landscape is constantly changing.

Keywords: Herbal Medicinal Products, Asia, Australasia, Market Analysis, Commercialization Strategies

Introduction

Drug complex research, development, and production have long been the exclusive domain of the pharmaceutical industry. Up until now, the industry's role has been that of an almost independent entity that simply accomplishes its legal compliance requirements (following various regulatory agencies' rules for the safety and efficacy of therapeutic pharmaceuticals) and scientific aims (finding new drug molecules). But in recent years, there have been major upheavals that have fundamentally changed the industry's position. The all-in-one blockbuster business model, which was centered on creating only those medications that could generate at least \$1 billion in sales revenue annually, is one of these disruptions.

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However, a consistent increase in the business models aimed at specialized clients (PricewaterhouseCoopers, 2009). Patent cliffs, or the expiration of patents on blockbuster drugs, are another development that calls for a change in the pharmaceutical industry's operational models. These changes have allowed numerous small-scale generic drug producers to take on pharmaceutical giants head-to-head by flooding the market with less expensive versions of pricy blockbuster drugs.

Based on the growing need for large pharmaceutical companies to diversify, differentiate, network, or cooperate in order to shorten the time it takes for their product development pipeline to reach the market, this study was conducted. This is done to increase the quality of treatment alternatives that end users have access to as well as to maintain and grow their market share.

Medicinal uses of plants date back well before written history. As early as 3,000 BC, Chinese and Egyptian papyrus literature mention the medical applications of many plants. Herbal remedies were employed in traditional medical systems produced by some indigenous cultures (e.g., Siddha, Ayurveda, Unani, and TCM) and used in healing rituals by others (e.g., Native American and African) (Ampofo et al, 2012). The current global trend has been a "Return to Nature"—a move away from modern medicine and toward herbal remedies. Since ancient times, medicinal plants have been recognized as a rich source of therapeutic compounds for the treatment of illnesses, and they are held in high regard worldwide. Because of the vast abundance of therapeutic plants that nature has given our nation, India is frequently referred to as the "Medicinal Garden of the World." Ancient civilizations including Egypt, China, India, South America, and others continue to use a variety of plant treatments for a range of ailments. In this sense, India holds a special place in the globe as the home of several acknowledged traditional medical systems, including Ayurveda, Siddha, Unani, homeopathy, yoga, and naturopathy. Verify the safety of natural products. As more people become aware that natural products are safe, easy to find, and reasonably priced, the demand for plant-based medications, health products, pharmaceuticals, food supplements, cosmetics, etc., is rising in both developed and developing nations (Evans et al, 1994). For primary healthcare, between 75 and 80 percent of the world's population still turns on herbal medicine, mostly in impoverished nations. (Kamboj, 2000) This is mostly due to the widespread perception that herbal medications are safe and readily available in the area, with no negative effects (Gupta et al, 1998). The World Health Organization (WHO) reports that the usage of herbal therapies is two to three times more globally than that of conventional medications. (Vickers A et al, 1999) Much of modern medicine has its roots in the ancient practice of using plants for medicinal purposes, which predates human history. Plants are the source of many traditional medications; just a century ago, the majority of the few effective

medications came from plants. Examples include morphine (from the opium poppy), quinine (from cinchona bark), dioxin (from foxglove), and aspirin (from willow bark) (Vickers A et al, 1999).

Exploring the market potential for herbal medicinal goods in Asia and Australasia becomes strategically vital, given the worldwide trend. These areas are especially fascinating because of their extensive herbal traditions, which have long been an essential element of the local civilizations. Plant-based cures have a major role in traditional medicine in Asia, which includes systems like Traditional Chinese Medicine (TCM), Ayurveda, and the ancient healing practices of indigenous populations in Australasia. The World Health Organization (WHO) supports the integration of traditional medicine into national healthcare systems, acknowledging its significance in these areas (WHO, 2019). An atmosphere that is favorable to the development and promotion of herbal therapeutic goods is produced by this acknowledgment. The need of conserving and utilizing old knowledge for modern purposes is being recognized by governments and regulatory agencies more and more health care.

Marketing Of Herbal Remedies

Market value of herbal medicines

The ayurvedic medicine market is predicted to grow by 20% a year. India has experienced the highest rate of growth in the world in the last 10 years (1987–1996), with sales of medicinal plants rising by almost 25%. However, India has some of the lowest annual precipitant expenditures worldwide on pharmaceuticals. Plants are the primary source of medicine in other poor nations as well. China and India are two of the countries that employ medicinal herbs most frequently. India employs over 7000 plant species, whilst traditional Chinese medicine uses approximately 5000. The global market for trade related to medicinal plants is growing at a rate of 7% annually, according to Export Import Bank. India only has a \$1 billion share of the global herbal market, compared to China's \$6 billion. India exports Rs. 1200 million worth of medicinal plants annually. Every single one of the big herbal pharmaceutical companies is consistently growing at a rate of roughly fifteen percent. Novel medications, healthcare items, and alternative treatment have all been influenced by traditional medicine. Medicinal plants are valuable resources for pharmacological research and drug development because they can be utilized as models for substances that are pharmacologically active or as starting materials for the manufacture of medications. In addition, plant elements can be used directly as therapeutic agents. Medicinal herbs are the source of many contemporary pharmaceutical medications. The non-narcotic compounds of therapeutic plants have negligible or no adverse effects.

Global herbal market

Compiling sales data on the global use of herbs is a very challenging task; these estimates are probably low. This is partly because there

are many different applications for herbs (such as in food products, energy drinks, multivitamins, and raw form). The World Health Organization (WHO) projects that the yearly global market size is roughly US \$83 billion. (Inamdar et al, 2008). Profits are the primary motivator behind the marketing and sales of some herbs in certain nations. But in other nations, especially those where they may be grown locally or regionally, herbs can be a significant and more affordable means of treating a variety of ailments or diseases.

World Wide Herbal Trade

Currently, the yearly global market for herbal medicines exceeds \$60 billion. It is anticipated that sales of herbal medications will increase at an average yearly growth rate of 6.4% (Borriset al, 1996). The market for herbal medicines has expanded at an impressive rate globally as a result of the contributions of many important factors. Some of these include: consumer preference for natural therapies; worry about unfavorable side effects of contemporary medications and the conviction that herbal remedies are safe because they have been used for thousands of years by millions of people worldwide; intense interest in alternative medicines; population preference for preventive medicine due to aging populations; the conviction that herbal remedies could be beneficial in treating specific conditions for which traditional therapies and medications have failed; a propensity for self-medication; improvements in the quality, safety, and efficacy of herbal remedies; and the high cost of synthetic medications. The World Health Organization estimates that the global market for herbal medicines is worth approximately US\$ 43 billion annually. An estimate from 1991 placed the value of the European herbal medicine market at roughly \$6 billion, of which \$3 billion came from Germany, \$1.6 billion from France, and \$0.6 billion from Italy. The remaining 0.8 billion came from other nations. The market for herbal medicines was valued at approximately \$10 billion in Europe, \$4 million in the United States, \$1 billion in India, and \$5 billion in other nations in 1996. The European market alone brought in over \$7.0 billion in 1997.

Growing availability and herbal products

Globally, a vast array of herbal medications catering to various ailments are available for self-medication. For the sake of this essay, a few of the most popular plant species used to make herbal remedies are listed (Table 1).

Garlic: *Allium sativum*, or garlic, is mostly used to treat circulatory conditions like high blood pressure and elevated blood sugar, lower cholesterol, and fight infections. Sales of garlic contributed between 16 and 18% of the US market from 1996 to 1999 and 10% of the European herbal medicines market (Scimone and Scimone, 1999; Sauer, 1999b). Lichtwer Pharma AG needs to produce Kwai® N every year, and it needs about 1000 tonnes of fresh garlic, all of which come from China (Lichtwer Pharma, 2000). China is one of the top producers of garlic in the world; in 1993 alone, it sent about

25,000 tonnes of garlic to the US (Lumpkin, 1996). China is Australia's main domestic market supplier.

Ginkgo: Ginkgo (*Ginkgo biloba*) is taken to increase blood flow, particularly to the brain and central nervous system, in an effort to enhance mental clarity and focus, particularly in Alzheimer's and dementia patients. Ginkgo frequently ranks as the most well-liked herbal remedy in market assessments, indicating the general public's concern for preserving brain function. 17% of herb sales in Europe and 19–21% of herb sales in the US are attributed to ginkgo (Scimone and Scimone, 1999; Sauer, 1999).

Ginseng: The most popular uses for ginseng (*Panax ginseng*) are as a stimulant, adaptogen (helping the body fight off cold, stress, and exhaustion), and general tonic. Between 1996 and 1999, ginseng accounted for 10% (Europe) to 12–20% (United States) of the herbal market, placing it among the top three most often purchased herbs (Scimone and Scimone, 1999). The amount of ginseng produced worldwide in 1992 was 6,900 tonnes, with annual growth of 6%. Cultivated ginseng brought \$32 per pound in 1992. Although wild harvesting this species is becoming less prevalent, roots obtained in the wild are sold for \$81 per pound (Wahab and Clark, 1993).

Spirulina: The microalga spirulina (*Spirulina platensis*) has significant levels of provitamin A (beta-carotene), protein, provitamin B12, and gamma-linolenic acid. Spirulina is touted for its immune-stimulant properties, blood sugar stabilization, anti-allergen properties, hunger suppressant properties, and cancer prevention properties. Spirulina production was estimated to be over 2,000 tonnes worldwide in 1996 (Fox, 1996).

Cranberry: Strong marketing has been done on cranberry juice as a treatment for UTIs. Both in North America and Canada, cultivation is growing quickly. In Canada, the area "farmed" increased by 51% between 1997 and 1998 (2021 ha; Pearen et al., 1999), yielding 32,906 metric tonnes with an estimated \$55.4 million in farm value (Vandenberg and Parent, 1999). In 1999, over 15,000 hectares were planted for cranberry cultivation in the USA, producing about 250,000 metric tonnes of cranberries (Anon, 1999).

Cultural Heritage and Traditional Wisdom:

Examining cultural history and traditional wisdom in relation to natural healthcare goes beyond recognition. A thorough analysis that incorporates knowledge from scholarly research is necessary to understand the subtle differences in medical practices between various cultural contexts. Smith's (2018) work "Traditional Medicine Across Cultures" is a thorough resource that illuminates the cultural and historical context of conventional medical practices. This work examines the various approaches that various nations have taken to healthcare, frequently combining spirituality, folk medicine, and homeopathic treatments. Geographical, historical, and sociological influences weave a distinctive tapestry of medical knowledge into each cultural heritage. Businesses can learn more about the philosophical foundations of these traditions by

consulting scholarly works like as Smith's. For instance, Ayurveda in India is based on the idea of doshas, but traditional Chinese medicine frequently emphasizes the balance of Qi. Understanding these underlying ideas is essential to incorporating conventional wisdom into modern treatment approaches. Finding special herbal formulas is essential to utilizing traditional knowledge. When looking for formulas that have endured over time, the historical book "Herbal Medicine: Past and Present" (Jones, 2020) is a useful resource. These formulations have a history of effectiveness and are frequently based on empirical information. Using such tried-and-true solutions protects the authenticity of cultural customs while also giving items more legitimacy. It is crucial to honor and recognize these formulations' original sources. Working together with communities and traditional healers can guarantee ethical sourcing and yield insightful information. In addition to improving the development process, this cooperative method promotes mutual respect and understanding between the company and the communities that add to the herbal knowledge base.

Biodiversity and Botanical Resources:

There are many plant species that have therapeutic qualities, which is both a blessing and a burden. Scholarly publications like "Biodiversity and Conservation" (Johnson et al., 2021) provide a plethora of knowledge about the various plant species that may have therapeutic uses. A closer examination of these resources, nevertheless, has to take the ecological effects of sourcing particular species into account. Utilizing botanical resources in a way that is anchored in science is ensured by citing scientific studies. It aids in comprehending the ecological function of plants as well as their therapeutic qualities. By using this information, businesses may ensure that their decisions about sustainable sourcing practices and the use of botanical resources support conservation efforts. Furthermore, it becomes imperative to stress the value of botanical surveys and ethnobotanical research, as described in "Ethnobotany: Principles and Applications" (Cunningham, 2019). These investigations shed light on the complex interactions that exist between populations and their botanical settings. Knowing plants is only one aspect of ethnobotanical knowledge; another is comprehending how these plants are woven into a community's cultural fabric. Businesses may help preserve ecological and cultural diversity by implementing this knowledge into their operations. Sustainable development concepts can serve as a foundation for ethical sourcing procedures, which can then become integral to a company's brand. Through the advocacy of botanical resource conservation and the implementation of fair trade procedures, enterprises can not only manufacture products that align with ethical standards but also make a lasting positive impact on the environment.

Market Trends and Consumer Preferences:

The ever-changing terrain of customer tastes and industry trends significantly influences how natural healthcare products develop. It takes a diversified strategy to comprehend these patterns, combining information from consumer surveys, market data, and a deep understanding of societal changes. A macro perspective of the sector is given by market publications like "Global Trends in Natural Healthcare" (MarketResearch, 2022). They provide perceptions into the broader patterns, like the rising need for natural and environmentally friendly medical treatments. Companies can use these reports as a tool to match their strategy to the overall movement of the market. But the complex web of customer preferences is where the real market pulse is found. Studies such as "Consumer Trends in Health and Wellness" (HealthInsights, 2023) explore the particular decisions that consumers make with regard to medical supplies. This extends beyond the general category of natural treatments and includes things like product label transparency, ethical sourcing issues, and packaging preferences. Studying these consumer inclinations turns become a critical strategic task. It entails comprehending not just what buyers look for in natural health products but also the motivations behind their decisions. For example, certain customers might place a higher value on goods that have a small environmental effect, while others would be more concerned with the traditional authenticity of the treatments. Businesses can modify their offers to more thoroughly connect with their target audience by identifying these underlying motives. Beyond the creation of new products, market trends and customer preferences are integrated. It affects communication, branding, and marketing tactics. For example, a business that upholds environmental responsibility and transparency would probably find greater resonance with customers that feel the same way. In addition, the continuous communication with customers via questionnaires and other means creates a dynamic feedback loop. This ongoing interaction guarantees that companies' products stay relevant in a market that is changing quickly and enables them to quickly adjust to changing consumer preferences.

Commercialization Strategies for Herbal Remedies: A Comprehensive Approach

A thorough and well-thought-out strategy is needed to transition traditional practices in the ever-changing field of herbal treatments into a globally renowned and financially successful business. Research and development, legal compliance, strategic alliances, brand positioning, marketing, and instruction are all included in this broad approach. All these elements are essential for guaranteeing the effectiveness and security of herbal goods, as well as for managing intricate legal frameworks, constructing strong connections, crafting captivating stories, and raising consumer and medical professional knowledge (Figure 2)

Research and Development: A Scientific Foundation

Credibility-building in the herbal remedy sector is based on scientific confirmation. To confirm the effectiveness and safety of traditional herbal medicines, rigorous double-blind, placebo-controlled studies are necessary (Smith et al., 2022). Empirical evidence from these investigations fills in the gaps between conventional wisdom and contemporary scientific standards. Prominent establishments such as the National Center for Complementary and Integrative Health (NCCIH) are important sources of information, providing methodological advice and adding to the body of knowledge regarding herbal medicine in science (NCCIH, 2021). Developing partnerships with prestigious research organizations like the Mayo Clinic and Johns Hopkins Medicine is essential to elevating research activities (Jones et al., 2020). Herbal remedy companies can validate their medicines and add scientific rigor to their studies by collaborating with reputable institutions to perform clinical trials. Trial registration on sites such as ClinicalTrials.gov guarantees openness and provides useful information to the larger scientific community (ClinicalTrials.gov, 2023).

Regulatory Compliance: Navigating Complexity

Several international regulatory systems apply to the herbal remedies sector. A committed regulatory affairs staff with in-depth knowledge of policies from regional agencies and international organizations like the World Health Organization (WHO) is necessary to navigate these challenges (Brown et al., 2019). It is imperative to stay up to date on regulatory updates (Figure 3). Proactive approaches to compliance include subscribing to regulatory journals or communicating directly with regulatory bodies (WHO, 2020). Simplifying approval procedures requires proactive interaction with regulatory agencies (Johnson et al., 2021). Companies and regulatory agencies working together has been successful in negotiating complex regulatory environments. More effective regulatory approvals can be achieved by insights from case studies, regulatory webinars, or recorded collaborative situations (White et al., 2022).

Strategic Partnerships: Building a Robust Network

Understanding local preferences and creating a high-quality, sustainable supply chain depend heavily on local partnerships. Working with regional herbalists offers important insights regarding customs and customer preferences (Miller et al., 2018). Collaborations with growers and producers who follow Good Manufacturing Practices (GMP) guarantee the stability of the supply chain and the upholding of premium standards (Anderson et al., 2021). Forming partnerships with well-established distributors is a calculated strategic action that capitalizes on pre-existing networks to effectively penetrate markets. Industry papers and case studies from respectable business magazines offer insightful information on effective distribution and partnership

tactics (Johnson & Smith, 2019). These partnerships let herbal goods reach a wider range of customers.

Brand Positioning and Marketing: Crafting a Compelling Narrative

Creating an authentic and meaningful tale that resonates with the target audience is more important than using a marketing plan for crafting a captivating brand narrative (Smith & Brown, 2020). Effective marketing narratives frequently highlight the creativity, sustainability, or legacy connected to herbal therapies by taking cues from similar businesses (Jones et al., 2019). For marketing to be effective, it must be targeted to particular demographics. Key components of focused marketing strategies include the use of digital platforms, influencer partnerships, and instructional content (Anderson & Miller, 2021). Effective and memorable campaigns are developed with the help of data-driven strategies from marketing literature and insights from prosperous influencer marketing case studies (White & Johnson, 2022). In conclusion, the success of herbal remedy commercialization lies in the synergistic integration of these strategies. By combining scientific rigor, regulatory acumen, robust partnerships, compelling narratives, targeted marketing, and education initiatives, companies can navigate the intricate landscape of herbal remedies (Figure 1). This holistic approach fosters trust, ensures regulatory compliance, and positions herbal remedies for sustained market success.

Institutional and business issues

The locations and institutional structures of the pharmaceutical, nutraceutical, and novel bio-based industrial product industries, as well as the agricultural industries that supply them, are characterized by five characteristics: 1. Economies of scale are robust and hold true for the majority of processing operations. 2. Joint ventures, partnerships, and strategic alliances to combine and reap the rewards of acquire market and financial access through research. 3. Labor productivity and relative costs, which affect where production is located as well as handling. 4. The frequent involvement of the government in the regulation of goods and activities in order to encourage R&D. 5. Support from venture capital and management experience. With an estimated value of over \$US2.2 trillion, the health and personal care sector of the global Morgan Stanley Capital International (MSCI) stock indexes—a \$US20 trillion index of listings of the top firms worldwide—is the fourth largest industry sector in the world. The top ten businesses 50% of its value is accounted for in this sector. The only two businesses are CSL and Fauldings. Only 0.1% of the market value is accounted for by the 58 Australian companies on the list (BTMoney Management). While various companies dominate the Australian market. There's still a lot of concentration,

Table 1. List of herbs in the United States market place

Herb	Scientific Name	Uses
Amalaki	Emblca officinalis	Very rich source of vitamin C. Used to treat inflammation, fever, infections, and to normalise cholesterol
Ardhrakam	Zingiber officinale	Used to treat nausea, colds and to improve digestion. May also prevent diarrhoea, arthritis and ulcers
Arishtha	Azadirachta indica	Used to boost immune system, relieve allergies and inflammation. Heals skin conditions
Ashwagandha	Withania somnifera	Used to promote energy and vitality, to combat weakness and to treat respiratory problems, and as a sedative
Brahmi	Bacopa monniera	Used to stimulate mental function, and as a non-stupefying sedative
Guggul	Commiphora mukul	Used as antiseptic and astringent, anti-inflammatory and to normalise blood cholesterol levels
Haritaki	Terminalia chebula	Used to relieve constipation, fight infections and cleanse the colon. May be antibacterial against Salmonella.
Mandukaparni	Centella asiatica	Used to treat wounds, jaundice, high pressure, rheumatoid arthritis. Also treats nervous disorders, and improves emotional and cognitive function
Shatavari	Asparagus racemosus	Used to cleanse the blood and as a tonic, especially for the female reproduction organs, especially post-menopausal.
Yashtimadha	Glycyrrhiza glabra	Used to combat stomach ulcers and intestinal irritation, urinary and respiratory problems. Can also ease eczema, dermatitis and psoriasis
Hawthorn leaf and flower	Crataegus spp	Cardiac conditions (e.g. increasing heart output and contractility)
Horse chestnut seed	Aesculus hippocastanum	Treatment for chronic venous insufficiency
Red clover	Trifolium pratense	Improved artery elasticity (post-menopausal)
Sangre de Drago	Croton lecheri	Wound healing, treatment of viral disease-associated diarrhoea.
American ginseng	Panax quiquefolius	Immunomodulation, with specific potential against upper respiratory tract infections. Evidence for possible synergistic enhancement of conventional breast cancer drug activities.

Table 2. Collaborations with Research Institutions for Clinical Trials

Research Institution	Collaborative Study	Results	Reference
Johns Hopkins Medicine	Efficacy of Herbal Product in Specific Condition. Investigating Herb Component for Secondary Outcome.	Positive outcomes, statistically significant results Promising trends observed, further investigation warranted.	Jones et al., 2020
Mayo Clinic	Safety Assessment of Herbal Ingredient Specific Herb Extracts in Population for Health Outcome	No adverse effects observed, supporting safety. Varied responses, ongoing analysis for subgroup effects	Mayo Clinic Report, 2021

Table 3. Regulatory Compliance Overview

Regulatory Framework	Key Guidelines	Regulatory Updates	Reference
International Standards	WHO Guidelines on Herbal Medicines	Regular updates on safety and efficacy requirements	WHO, 2020
European Union Regulations	EMA Guidelines for herbal Medicinal Products	Harmonization efforts, recent amendments, and safety reviews	EMA, 2021
US FDA Herbal Medicine Policy	FDA Compliance Guide for Dietary Supplements	Recent policy changes and implications for herbal remedies	FDA, 2022

Table 4. Annual Report of Herbal Company

Company	US sales (\$ million)
Hauser/Botanical International	>100
Indena	>50
Henkel	30-50
Optipure (Chemco)	30-50
Flachsmann	30-50
Martin Bauer/Muggenberg Extrakt	30-50
Folexco/East Earth Herb	30-50
Botanicals International Powders	30-50
Schweizerhall	15-20
Euromed (Madaus)	15-20
Mafco Worldwide Corp.	15-20
Triarco Industries	15-20
Sabinsa	15-20
MW International	10-15
AYSL	10-15
Quality Botanicals International	10-15

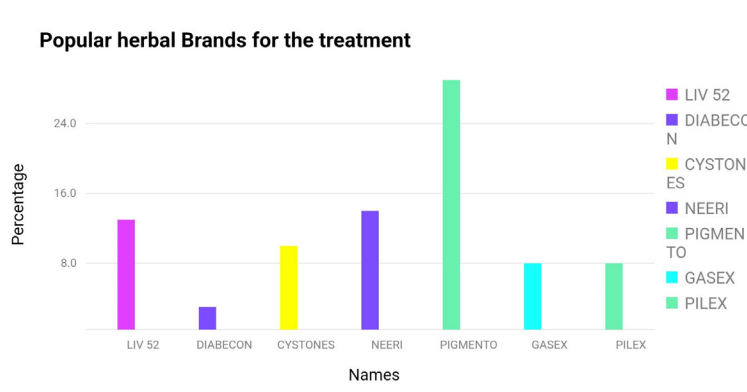


Figure 1. Herbal Brands for Treatment.

with the top two making up over 30% of sales in the pharmaceutical industry.

The market for raw materials that are vitamins, herbal remedies, and botanicals has even more intense market concentration. For instance, according to the US Food and Drug Administration Center for Food Safety and Applied Nutrition (1999), eight companies control 36% of the market for raw botanical and herbal materials and 73% of the market for vitamin raw materials in the US. In fact, almost all vitamin E comes from a single source of basic materials. According to Foodweek (1999), the top four companies in Australia control more than 75% of the market for vitamins. The Australian Competition and Consumer Commission is actively looking into the business activities of a cartel that includes four significant pharmaceutical companies: F Hoffman-La Roche, BASF, Rhone Poulenc, and others. This cartel controls the majority of Australia's supply of vitamins used in animal feed. Market concentration is also noticeable in the industrial lysine market, where Australia has remained a significant importer despite not having any local processing. However, a feasibility study conducted in the early 1990s showed that building a new lysine facility in Australia was possible from a business standpoint. (Rogers 2000), but regrettably, insufficient funds were available to make the investment. Such a factory would have been much more profitable than the initial feasibility study suggested, based on current lysine pricing.

Five crucial success elements were identified by Standard & Poor (1994) in their analysis of the Australian pharmaceutical and nutraceutical industries in order for enterprises to continue operating:

1. Innovation in products. It is necessary to continuously develop new products, which is somewhat dependent on significant R&D spending. The average percentage of sales income that pharmaceutical companies invest in research and development is 15%.
2. Lifecycle management for products. It is imperative that new items be developed and delivered early in order to capitalize on patent protection and initially high prices. Value is severely harmed by delays in the creation and introduction of new items.
3. Marketing that works by differentiating products and according to rules.
4. Partnerships with more pharmaceutical firms. Lower costs and economies of scale are made possible by this. In the industry, partnerships, joint ventures, mergers, and strategic alliances are frequent.
5. marketing in a niche. This is especially crucial for the majority of small businesses located in Australia. To stay in business, they must concentrate on clearly defined markets and products.

Regulations

The main goals of regulating pharmaceuticals and complementary therapies are to safeguard public health and safety and to promote market-based solutions that will spur investment and industry expansion. The Therapeutic Goods Act 1989 in Australia aims to

guarantee the quality, safety, and efficacy of therapeutic goods by establishing a framework for their regulation. The Act is carried out by the Therapeutic Goods Administration (TGA) office. Before a product can be offered for sale in Australia, it must be registered in the Australian Register of Therapeutic Goods (ARTG) for which a therapeutic claim is made. Three primary procedures are used to carry out the TGA's implementation (Peachy 2000): pre-market evaluations, in which goods are rated as having a reduced risk (e.g., most complementary medicines) or a higher risk (e.g., prescription drugs). After approval, "lower risk" products are included as "listed products" and "higher risk" products are included as registered products in the ARTG. licensing of firms, which mandates adherence to Good Manufacturing Practice [GMP] guidelines by Australian producers; and post-market vigilance, a procedure for keeping an eye on legal and regulatory compliance. Over the last three years there have been significant changes to the regulation of complementary medicines which, in keeping with their relatively lower risk status, are now seen to be placed in a relatively less regulated environment. But that's not always the case. In actuality, US laws governing certain nutraceuticals are laxer than those in Australia, but ultimately, everything hinges on the assertion being made. The Dietary Supplement Health and Education Act of 1994, which created the new category of "dietary supplements," is partially to blame for the recent increase in the usage of pharmaceuticals in the US (Etkin and Johns 1998). This Act permits dietary supplements to be sold without undergoing efficacy or safety testing or meeting manufacturing requirements. This regulation prohibits dietary supplements from making promises regarding the cure of particular diseases. The larger the claim and its advertising, the more likely it is that the onus of proof.

Herbal Product Company

According to Health Business Partners, reported in Boswell (1999), the US market for botanical extract raw materials is projected to be worth roughly \$US500 million, or roughly 25% of the global market. Crushed or ground herbs account for the remaining portion of the market. Within five years, the extract market is expected to reach \$US1.5 billion. More significantly, it is anticipated that extracts will account for up to 75% of this industry rather than crude herbs, indicating the growing desire for consistent and high-quality products (May Yamada, cited in Boswell, 1999). The market as a whole for businesses that offer botanical extracts is thought to be entering a more "mature" phase concurrent with this rise in demand. There are a lot of mergers happening (such as the combination of Hauser and a few Zuellig Group NA businesses, Folexco's acquisition of East Earth Herb to establish A.M. Todd Botanicals, and the acquisition of Solgar by American Home Products). According to estimates, a business must now generate more than \$US20 million in revenue annually to be successful in the US market (Dave Wilson, cited in Boswell, 1999).

Plant-derived compounds are currently produced in relatively narrow geographic areas and come from a small number of producers, notably unique extracts used in medicine. Because supply can be significantly impacted by political, agricultural, and environmental factors, prices and availability of these products are consequently highly volatile (for example, global prices for carnauba wax nearly doubled in a two-week period in 1998 after storms in the primary growing areas of northeastern Brazil; Marley and Thomas, 1999). Purchasing various plant components for use in pharmaceutical, cosmetic, or nutraceutical applications can be a labor-intensive and specialized task, particularly if the plants in issue are not commercialized. A few institutes offer specialized, centralised libraries of plant extracts for screening and research, which can greatly expedite and simplify the sourcing/screening process for pharma, cosmetic, and nutraceutical industries. For these purposes, Middlesex University, for instance, has access to a collection of over 7000 species. In Australia, there are private organizations like ExGenix, CSIRO, and botanical gardens that have collections of comparable scale (Table 4). Due to Australia's stringent export laws, access to the nation's biological resources particularly for commercially motivated research can be quite challenging for nations outside of the country (first described in Baker et al., 1996).

Challenges and Future Recommendations

The marketing of herbal medicines from Asia and Australasia is a complex problem that includes different regulatory frameworks, quality control, and building customer confidence (Smith et al., 2022). It takes a sophisticated strategy to navigate this terrain, taking cultural variances and conventional medical procedures into account. A thorough investigation of the variety of herbal products available in Asia and Australasia is part of the market analysis. This entails being aware of their cultural relevance and healing qualities. Moreover, a thorough analysis of national regulatory frameworks is necessary to understand the nuances of product labeling, advertising, and registration (Jones & Brown, 2021). Furthermore, in order to develop successful commercialization strategies, it is imperative to address consumer perceptions toward herbal products, particularly concerns regarding safety and efficacy (Wang & Lee, 2020). It will take smart initiatives to overcome these obstacles. To guarantee consistency in potency and purity and to meet international standards, standardization and quality assurance procedures are essential (Chan et al., 2023). Forming alliances with regional governments, research centers, and herbalists contributes to credibility-building and the acquisition of insights into traditional knowledge (Li & Kim, 2022). By highlighting holistic wellbeing and illness prevention, educational programs can debunk myths and provide herbal products as an adjunct to mainstream therapy (Tan et al., 2021). Successful market positioning requires tailoring marketing strategies to local

healthcare practices and cultural preferences (Nguyen & Smith, 2019).

In the future, innovation and research must be prioritized. The total effectiveness of herbal medications can be increased and new therapeutic uses can be unlocked by funding research and development to scientifically investigate traditional herbal knowledge (Chen & Patel, 2023). Harmonizing regulatory norms and fostering cross-border acceptance require international cooperation (International Herbal Consortium, 2022). Using digital channels for information sharing and e-commerce makes it easier to obtain herbal items and promotes consumer education (Digital Health Insights, 2023). In order for herbal products to be accepted by medical experts and government regulators as safe and effective, strong clinical trials must be conducted (Clinical Herbal Research Group, 2021). Adopting sustainable sourcing methods guarantees the sustained availability of essential herbal constituents and is in line with the global trend of ecologically conscious corporate operations (GreenSustain, Report 2023). By addressing these challenges and implementing strategic recommendations, the successful commercialization of herbal medicinal products from Asia and Australasia in the biopharmaceutical and healthcare sectors can be achieved. In the middle of the 20th century, herbal remedies were phased out of mainstream medicine—not necessarily because they were inefficient, but rather because the more recent synthetic medications were more financially successful. Medicinal plants play a vital role in the greater development process because of their dual roles as a source of money and healthcare. While the effectiveness of herbal remedies depends on the development of quality consciousness on the data related to their evaluation, meeting consumer demand for botanicals and herbal remedies is a growing industry. In recent times, even affluent nations have incorporated herbal medications and cures into their medical systems. Without a doubt, there is a growing global market for products made from plants. It is anticipated that the demand would increase in the upcoming years due to the rise in sales of herbal treatments and supplements. This means that because China, India, and other nations have the greatest number of medical plant species and are the top exporters of medicinal plants, scientists, physicians, and pharmaceutical corporations will be going to these nations for their needs.

Author contributions

A.R., H.A., and R.A. contributed equally to this work. A.R. conceived the study and designed the experiment. H.A. conducted the data analysis and interpretation. R.A. provided critical revisions to the manuscript and assisted with data collection. All authors reviewed and approved the final version of the manuscript.

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Competing financial interests

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