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Trade Evolution of Medicinal Plants' Products in Tanzania: An Explorative Study

By

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Abstract

In Tanzania, a complex rural to urban supply network for the medicinal plants' products trade has developed over time driven by environmental changes and the response of traders. The environment changes include policy, regulatory frameworks, and pandemics. These environmental changes and responses of traders shaped the current trade practices. However, the response of traders to environment dynamics and the evolution paths over time to the current status is not well documented. Therefore, this paper aimed to synchronize environment dynamics incidences for a period of time and empirically determine the respective responses of the medicinal plants' traders in Tanzania with respective evolution paths. The study applied economic evolution theory to describe the interactions of environmental changes and responses of traders and to determine the evolution stages. Primary data were collected from traders, regulators, and researchers through 10 focus group discussions and 16 in-depth interviews from five regions of Tanzania. The traders followed the market in urban areas and establish supply chains to meet market demand. While environment changes caused de-coordination, the traders responded by re-coordination to explore market opportunities. Four evolution stages of trade in medicinal plants products were identified in Tanzania: Colonial era (1882 -1961), government supremacy era (1961 - 1984), emergency of private sector era (1985- 2004), and the market and regulation integration era (started in 2005). As a result of the partial implementation of the regulatory framework, the fifth stage of trade evolution is expected. The fifth stage is when the regulatory framework and market forces will work together. The study recommends proper enforcements measures to be put in place to ensure desired results whenever there are environmental changes in traditional medicines. Because the fifth stage is expected, potential business models to be adopted can be studied to ensure firms' survival during stiff competition.

Keywords: *critical incidences, traditional medicine, business growth, legitimation of products, health systems*

1. Introduction

The medicinal plants' products (MPPs) have been used to treat various diseases from time immemorial in different cultures around the world (He *et al.* 2018; Jamshidi-Kia *et al.* 2018). MPPs are final commodities usually derived from a mixture of numerous different medicinal plants (Otieno *et al.* 2015; McMillen, 2012). The MPPs are the main business component of the traditional and alternative medicine industry in the health sector of most developing countries (Khasim *et al.* 2020). The MPPs constitute about 95% of traditional and alternative medicines systems such as African Traditional Medicines, Chinese Traditional Medicines, and Ayurveda (Gakuva *et al.* 2020; Kayombo *et al.* 2013). The World Health Organization (WHO) recognizes traditional medicines and MPPs in particular, for their distinctive application in the management of lifestyle-related chronic diseases (WHO, 2019).

Distribution and access to MPPs form a trade with a global value approximated to USD 33 billion in 2014 and increasing at 2.4% and 9.2% annually in volume and value respectively (Vasisht *et al.* 2016). In Africa, the MPPs trade has been a buoyant local trade in different parts of the continent. The value of MPPs trade ranged from USD 25 900 in Marsabit county, in Kenya, to USD 300 000 in Johannesburg, South Africa (Cuni-Sanchez *et al.* 2017; Williams *et al.* 2007). In Tanzania, at the Kariakoo Market in Dar es Salaam, the value of non-wood medicinal plants in 2017 was approximated to USD 200 000 (Posthouwer *et al.* 2018). Currently, there are about 400 medicinal plants traded in different markets in Tanzania (Veldman *et al.* 2020; Hilonga *et al.* 2018). The current MPPs trade practices in Tanzania include modern packaging of MPPs, established shops of MPPs as well as MPPs-based clinics (Mpelangwa *et al.* 2021). The current MPPs trade practices are the outcome of the MPPs traders' response to environment dynamics (Langwick, 2021; Langwick, 2010).

The current rural to urban supply networks and value chains of MPPs trade in Tanzania have gradually developed due to environmental dynamics and initiatives of MPPs traders over a period of time (Langwick, 2021; Mpelangwa *et al.* 2021; Hilonga *et al.* 2018). These environmental dynamics include changes in policy, regulatory framework, and technological advancements. Some of the policy changes include; shifting traditional medicine from Ministry of Culture to Ministry of Health in 1989, the inclusion of traditional medicines in Health Policy in 1999, and establishing the Traditional and Alternative Medicine Act of 2002 which created the Traditional and Alternative Health Practices Council (TAHPC) in 2005 (Stangeland *et al.* 2008; Kayombo *et al.* 2007). Therefore, the current practices of the MPP trade have been the outcome of changes in working environments taken by the government and the response of the MPP traders over time (Langwick, 2021).

However, the response of MPPs traders to environment dynamics and the evolution paths over time to the current status is not well documented. The literature on Tanzanian development of MPPs trade in particular and traditional medicine in general (Tab. 1), focused on the macro-level initiatives and little on micro-level initiatives. The macro-level initiatives were those taken by the government before and after independence such as changes in policy and regulatory frameworks (Langwick, 2021; Langwick, 2010; Stangeland *et al.* 2008; Kayombo *et al.* 2007). The micro-level initiatives are those taken by individual MPPs traders to respond to market demand offered by

environmental changes. As the consequence, there is scant information to stretch the evolution stages on MPPs trade in Tanzania before and after independence as described by Langwick (2010).

Therefore, this paper aims to synchronize environment dynamics incidences over a period of time and to empirically determine the respective responses of the MPPs traders in Tanzania. Specifically, this study answers two research questions: (i) what are the response of MPPs traders to environmental changes over a period of time? (ii) What are the evolution stages of MPPs trade in Tanzania to current practices? The study opted for the business evolution theory to analyze critical incidences interactions of environment changes and MPPs traders' responses, and consequently determine evolution stages over a period of time.

The relevance of the study is to provide crucial information to develop MPPs trade because it explains the response of traders to environmental changes. The development of MPPs trade contributes to realizing one of the key strategic initiatives of WHO to create conducive environments for distribution and access of quality MPPs (WHO, 2019; WHO, 2013). In addition, the information on the evolution stages reinforces the understanding of policy impacts over time. Further, the information on the evolution stages of MPPs trade in Tanzania is vital to traders because it can be used to design business models for enhancing exchanges and predicting the coming stages.

This paper is organized as follows: After this introduction, section two presents a literature review while the theoretical and conceptual framework is presented in section three. The fourth section explains the study methods while the results are presented in the fifth section. The sixth section presents a discussion while the conclusion and recommendation are presented in the seventh section.

2. Literature Review

The literature review was done to synchronize the environment dynamics at the macro level, solicit possible answers to the proposed research questions and establish evidence of the evolution of MPP trade. The literature review focused on studies done in Tanzania. The keywords used for the literature search were traditional medicine (substituted with herbal medicine, medicinal plants, and ethnobotany) with the market (trade, commercialization, industry, supply chain, value chain) followed by evolution (changes, growth, evolution, practices, regulations). The databases searched were Science Direct (Elsevier), Web of Science, ABI/INFORM Collection, and Scopus. A checkup of citations and reference lists was done to find relevant articles otherwise skipped from databases. As illustrated in Tab. 1, there were relatively few studies (12 articles) related to the evolution of the MPPs trade in Tanzania. This small number of published articles suggested a narrative literature review instead of a systematic review (Snyder, 2020).

The literature reveals that traditional medicine was the only health system before German colonialism in Tanganyika in 1882 (Alexander, 2012). Introduction of the modern medicine to different parts of Tanganyika by colonialists created pluralisms of health service systems (Vähäkangas, 2015). However, the expansion of modern medicines went in parallel with the detrimental of traditional medicines because of their complexity and mystery in the diagnosis and

Table 1: Summary of Literature Reviewed on Evolution of Trade in Products on Medicinal Plants in Tanzania

Title	Author(s)	Year	Topic	Findings
Regulation of Traditional Medicine in the WHO African Region	Kasilo <i>et al.</i> ,	2005	Regulation of traditional medicine practices and products, and highlights the challenges posed by attempts to regulate the sector.	<p>More than half of the countries in the African Region have developed national policies on traditional medicine and regulation is one of the components of such policies. Eighteen countries have developed national codes of ethics to ensure the safety, efficacy and quality of traditional medicines.</p> <p>Less than half of the countries are yet to implement these policies and therefore, only a few countries have developed regulations for traditional medicine.</p> <p>Twenty-one countries have developed legal frameworks that provide for accreditation, registration of traditional health practitioners (THPs) and the establishment of a THP Council for regulation of traditional medicine practice and products</p>
Traditional health practitioner and the scientist: bridging the gap in contemporary health research in Tanzania	Mbwambo <i>et al.</i> ,	2007	Global, regional and national perspectives of Traditional Medicine development and its inclusion to contemporary health research in Tanzania.	<p>A legal framework has been put in place through the Traditional and Alternative Medicine Policy and Act of 2000, and 2002, respectively, and several research infrastructures in traditional medicine established.</p> <p>Practitioners are increasingly organizing themselves in to associations and the ongoing collaborative research projects so far have significantly narrowed down the gaps between traditional and modern medicines</p>
Recognition and Development of Traditional Medicine in Tanzania	Stangeland <i>et al.</i> ,	2008	Tracing developments in Traditional Medicine (TM) and legislation concerning conservation and use of biodiversity in Africa, with Tanzania as a case study.	<p>TM is the most common form of health care, and that the HIV pandemic has highlighted the need to work across health sectors. New legislation has facilitated this need.</p> <p>In Tanzania TM is experiencing a renaissance in being formally recognized, integrated into mainstream health care, formal establishment of practitioners, and gaining the interests of different sectors.</p> <p>Development of TM can also provide income possibilities. It is however yet to be seen if the recent regulations can be made fully operational and implemented.</p>

From Non-Aligned Medicines to Market-Based Herbals: China's Relationship to the Shifting Politics of Traditional Medicine in Tanzania	Langwick, Stacey	2010	Elaborate the continuities and discontinuities central to the emerging field of market-based traditional medicines.	The institutionalization of traditional medicine in Tanzania reveals how strategies for socialist liberation are morphing into strategies for neo-liberalization. In the 1960s and 1970s, traditional medicine promised the raw material for the scientific development of an indigenous pharmaceutical industry. At the turn of the millennium, however, traditional medicine has re-emerged in Tanzania as a new path into the fast-growing global herbals market. Tanzania's relationship with China has been central to these dynamics.
Ethnobotanical Knowledge Transmission and Evolution: The Case of Medicinal Markets in Tanga, Tanzania	McMillen, Heather	2010	Explores the range and distribution of local ecological knowledge (LEK) of popular medicinal plants by means of a case study in the medicinal markets of Tanga, Tanzania.	The results diverge from the assumption that markets erode knowledge of medicinal plants. The worldwide trends of growing medicinal plant commerce and shifting from subsistence to market economies likely influence changes in plant knowledge, management, and use among many different contemporary local populations, not just the ones described here.
Climatic Change and Female Reproductive Health: The Case of Traditional Medicine in Tanzania.	Alexander, Nancy	2012	Climatic effect on medicinal plants use in Makonde Community, Tanzania	With legacy of traditional medicine in Tanzania following points realized: Traditional medicines are important to many socio-economic groups regardless of their economic status and geographical location. Traditional medicine services are used in rural and urban areas because they fill a void of services in demand, they are very cheap, accessible and they give recognized responses to illness. In addition, traditional medicines treat illness in its social, cultural and familiar context and seek the root cause of the disease beyond the disease itself.
Prospects and Challenges of Medicinal Plants Conservation and Traditional Medicine in Tanzania	Kayombo <i>et al.</i> ,	2013	Assessment of prospects and challenges of medicinal plants conservation and traditional medicine in Tanzania	Traditional medicine and medicinal plants were faced with challenges notably; threats due to increasing depletion of the natural resource as an impact of population increase, urbanization, modernization of agriculture and climatic change.

				<p>The other major challenges on traditional medicine and MPs were constraints and include lack of data on seriously threatened and endangered medicinal plant species, inadequate and conflicting guidelines on management and utilization of natural resources, especially medicinal plants. Traditional health practitioners, TRM and medicinal plants should be essential components in PHC in order to meet the health millennium goals by 2025.</p>
Babu wa Loliondo—Healing the Tensions between Tanzanian Worlds	Vähäkangas, Mika	2015	Analyses the reasons for instant and huge success as well as demise of Rev. Mwasapila’s healing ministry connected with use of medicinal plants.	<p>The theoretical explanations of medical pluralism practices in Tanzania. Introduction of modern medicine which leads into considering the cultural categories in the lives of Tanzanian Christians as portrayed through the reception of Churches once established by Western missions often lack the embodiment of the spiritual and thereby also represent the Western dichotomy between the body and the soul. Among a number of other African Christian healers, Babu was able to bridge the gap between the bodily and the spiritual.</p>
Vernacular Dominance in Folk Taxonomy: A Case Study of Ethnospecies in Medicinal Plant Trade in Tanzania	Otieno <i>et al.</i> ,	2015	To elucidate the relations between the most common vernacular names and the ethnicity of the individual traders among the medicinal plant markets in Dar es Salaam and Tanga regions in Tanzania	<p>In Tanzania, a thriving trade in traditional medicine exists in both rural and urban areas. The majority of Tanzanian medicinal plant material originates from the wild where the supply chains have emerged to serve the urban consumers. Existence of the markets of medicinal plants in different parts of Tanzania</p>
Quantitative market survey of non-woody plants sold at Kariakoo Market in Dar es Salaam, Tanzania	Posthouwer <i>et al.</i> ,	2018	To assess sustainability of traded herbal medicine at Kariakoo Market in Dar es Salaam, the major hub for medicinal plant trade in Tanzania by a market survey of non-powdered,	<p>The growth of the trade in MPP at Kariakoo Market in Dar es Salaam. Kariakoo Market is the main medicinal plant market in this city, with the largest number of stalls and vendors. Besides Kariakoo Market, Dar es Salaam accommodates several herbalist shops, individual stalls and ambulant sellers of herbal medicine throughout the city. Additionally, there are several shops exclusively selling dried herbal medicine</p>

Trade of Wild-Harvested Medicinal Plant Species in Local Markets of Tanzania and its Implications for Conservation	Hilonga <i>et al.</i> ,	2019	non-woody medicinal plants To assess the trade of wild-harvested medicinal plant species in local markets of Tanzania and its implications for conservation	imported from the Middle East or a combination of Tanzanian and Arab medicinal products. Identified emerging supply chains on the trade in MPP in Tanzania. Existence of urban and rural markets selling different MPP in Tanzania
Properties of (Dis)Possession: Therapeutic Plants, Intellectual Property, and Questions of Justice in Tanzania	Langwick, Stacey	2021	To traces the practices of knowing and unknowing that forged traditional medicine in Tanzania and their role in constituting the terms, objects, and institutions through which struggles for justice have been imagined.	The dynamism of traditional medicine as a modern category of knowledge and practice lay in its ability to solve (first colonial and then postcolonial) problems of knowledge and politics simultaneously. Twenty-first-century Tanzanian scientists, healers, herbal producers, policy makers, and patients grapple with these colonial legacies. Yet, traditional medicine has never fully captured the wide range of practices that strive to catalyze growth, fullness, maturation, extension, strength, and fertility. Healing remains unruly, and the friction this creates holds open the possibility of generating alternative forms of the therapeutic value of plants and rendering visible the ongoing forms of (dis)possession that shape notions of justice in late liberalism.

treatments of diseases (Mbwambo *et al.* 2007). The situation became worse by the introduction of the Witchcraft Ordinance by the British Colonialists in 1929 which failed to distinguish witchcraft from traditional medicine (Mbwambo *et al.* 2007). The Ordinance resulted in dormant traditional medicines that operated underground (Veldman *et al.* 2020; Peter *et al.* 2014).

Moreover, the literature indicates that governmental initiatives were taken after Tanganyika independence in 1961 to revive traditional medicine and in particular uses of MPPs. The initial initiative was the issue of a new Medical Practitioners and Dentists Ordinance of 1968 which recognized traditional medicine (Mbwambo *et al.* 2007). Another initiative was the establishment of the Department of Traditional Medicine in 1976 at then Muhimbili Medical School, which later was upgraded to the Institute of Traditional Medicine (ITM) in 1991 (Stangeland *et al.* 2008). The literature indicates further that the development of traditional medicines after independence was motivated by self-reliance policy which was influenced by Tanzania Chinese Friendship (Langwick, 2010). According to Langwick (2010), Stangeland *et al.* (2008), and Mbwambo *et al.* (2007), the development stages of MPPs trade in particular, and traditional medicine, in general, can be categorized to before and after Tanzania independence.

The literature attributed the expansion of trade on MPPs to HIV/AIDS pandemic discovered in Tanzania in 1984 (Stangeland *et al.* 2008; Mbwambo *et al.* 2007). The MPPs were the most relevant, available, and affordable treatments of secondary infections to HIV/AIDS patients before the ARVs introduction in 2004 (Kayombo *et al.* 2007; Mhame *et al.* 2005). About 600 000 people were estimated to be living with HIV/AIDS by 1999 (URT, 2001). All these infected people were considered potential users of MPPs because there was no significant help at hospitals for people infected with HIV/AIDS by that time. HIV/AIDS revealed the potential of MPPs and the growth of its trade. The Non-Government Organizations (NGOs) were the initial promoters of the use of MPPs to HIV/AIDS patients (Mhame *et al.* 2005). Flourished trade-in MPPs demanded regulation for public health security (Kayombo *et al.* 2007). The literature indicates the regulation framework was initiated in 2000 and reached a climax in 2005 by the establishment of TAHPC (Stangeland *et al.* 2008; Kayombo *et al.* 2007; Mbwambo *et al.* 2007).

The current practices of MPPs consumption have grown from community gift to trade commodity to both rural and urban areas with the development of complex networks of supply chains (Hilonga *et al.* 2018; McMillen, 2012). The literature indicated the trade on MPPs has shifted from personal contacts between healers and patients to different supply and value chains (Mpelangwa *et al.* 2021; Veldman *et al.* 2020) The value chain nodes were harvesters, vendors, and formulators with distribution centers like shops and herbal clinics (Hilonga *et al.* 2018; Posthouwer *et al.* 2018; Otieno *et al.* 2015). The growth in trade on MPPs went in parallel with the increased use of MPPs on non-communicable and chronic diseases such as diabetes (Mwanri *et al.* 2017; Stanifer *et al.* 2015).

Literature provides evidence of the MPP trade evolution over time, however, the information is explained in bits from articles on different topics. The indicated preliminary set of evolutionary phases: before and after independence, need to be confirmed, revised, and/or detailed empirically. The reviewed literature indicated the environment dynamics which affected the MPP trade over time as synchronized in the legitimation column in Tab. 2. The literature indicated the evolution

paths influenced by the government's initiatives and HIV/AIDS pandemic. Although the literature indicates the increased use of MPPs on non-communicable and chronic diseases, there is a gap in the time when it evolved and impacted MPPs trade.

3. Theoretical and Conceptual Framework

3.1 Theoretical Framework

Evolution theory in economics focuses on the transformation of economic activities such as production, exchange, consumptions, distribution, and accumulation over time and the consequences this transformation has for current conditions of particular economic activities (Witt, 2016). The theory explains how the business changes over time because of its response to environments dynamics based on its internal capacity (Witt, 1996; Nelson and Winter, 1982). The theory considers that no stage of business development came into existence spontaneously, but grew or developed out of the stage before it (Keizer, 2015).

The economic evolution has been theorized from biological concepts of how the living organisms survive in the changing environments at their inherent characteristics in a period (Witt, 1996). Evolutionary theory has its roots in Darwin's theory that focuses on genetic mutation and the survival of the fittest, and the Lamarckian model which focuses on evolution through the use and usefulness of a capability. The evolution theory in economics was refined by Freeman and Hannan (1989) who built an organizational ecology based on Darwin's explanation and by Nelson and Winter (1982) who focused on economic change based on the Lamarckian explanation.

This paper is based on Freeman and Hannan (1989) who explain that environmental changes affect the legitimacy of the organizations and so its access to resources which can affect the capabilities of the organizations to survive and compete. According to Freeman and Hannan (1989), legitimacy implies suppliers, customers, and other economic actors that determine acceptability to exchange resources with the organization. The legitimation enhances the survival of firms through increased products consumption and is attained when products are socially taken for granted.

The survived organizations compete themselves on market opportunities which trigger the next stage of development with the demand for new environments for survived organizations. Freeman and Hannan (1989) consider competition as the market force that shapes the behavior of firms towards efficiency operations, diversification, and survival. Continuation of such kind relationship of legitimation and competition form a basis for organizational ecology and evolution stages. For this matter, the stages are determined by the incidences which cause the environmental changes and competition between organizations.

An important part of the Freeman and Hannan (1989) framework is the interplay between legitimation and competition and how this interplay shapes the evolution of an industry. The interplay is explained through Density Dependency Model. The model explains that legitimation and competition have an inverse relationship with each other on how they influence changes in trade hence the growth or death of firms. The legitimation causes the changes while the competition controls it. The effect intensity on trade caused by the interaction of legitimation and competition depends on the growth stage and the population density of firms in a given industry.

3.2 Conceptual Framework

This study was guided by the conceptual framework in Fig. 1. The framework indicates legitimation, the market/demand, and their interaction as core constructs with the boxes showing their components.

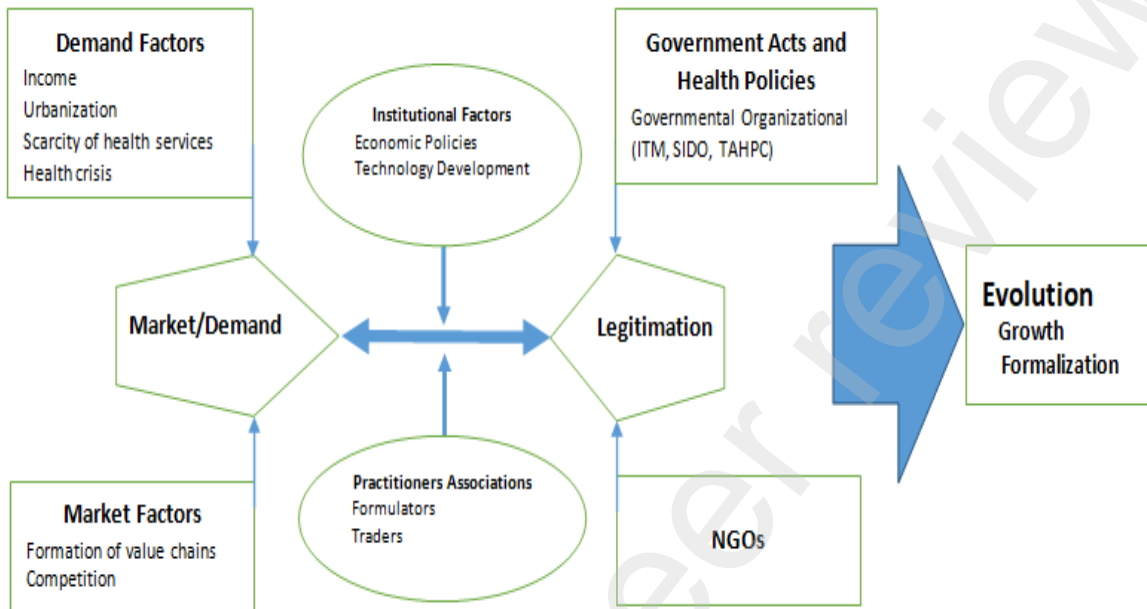


Figure 1: Conceptual framework of evolutionary development of trade in products of medicinal plants in Tanzania

In line with Freeman and Hannan (1989), the framework considers the evolution of MPPs trade was influenced by environment dynamics which aimed to legitimize MPPs consumption. In this study, a distinction is made between legitimation through promotion and legitimation through regulation. In the former case, the government encourages the development, production, and sale of MPPs. In the latter, the government increases legitimation by assuring that MPPs are tested and thus safe to use. The legitimation roles can be played by other actors such as NGOs and civil societies. The environment dynamics at the macro level are conceptualized on the legitimation side.

The micro-level initiatives of MPPs traders were conceptualized to market forces and demand-side which shaped their reaction to environmental dynamics in line with Freeman and Hannan's (1989) theory. Market/demand includes terms of the response of MPPs traders, pandemic, and technology advancement. Two sets of mediating and influential factors are included in the framework. The first includes institutional factors such as economic policy (for example structural programs) and technological development (for example mobile phones). The second includes associations for practitioners of traditional medicines. These influential factors shape the outcomes of legitimation-market/demand interaction.

Critical Incidence Technique (CIT) was sought to identify incidences that are strong enough to announce and cause a shift to a new evolutionary stage. A critical incident is defined as an activity

that is sufficiently complete in itself to permit inferences and predictions to be made about the changes (Butterfield *et al.* 2005). The incidences to cause the evolution should be persistent and significant to change legitimation and/or competition of the MPPs trade (Viergever, 2019).

4. Research Method

4.1 Study design

The study used qualitative primary data from MPPs traders and secondary data synthesized from the literature reviewed. The study was designed to identify the critical incidences which caused changes in MPPs trade from traders, regulators, and researchers in the traditional medicine sector.

4.2 Sample and procedures

The study was done in five regions of Arusha, Dar es Salaam, Manyara, Morogoro, and Njombe in Tanzania. Two regions were selected to represent rural settings (Njombe and Manyara) and the other two (Morogoro and Arusha) represented urban settings, while one region (Dar es Salaam) was taken as the market hub. In each region, two districts were selected.

The study units were traditional medicines practitioners who owned the MPPs shops and clinics, referred to as MPPs traders. Sampling procedures were based on the following arrangement: The list of the registered MPPs traders was obtained from the district coordinators of traditional medicine. The obtained list of MPPs traders was categorized based on experience in terms of worked years, location within districts, and sex with help of district coordinators and leaders of practitioners associations. Ten members for focus group discussions (FGD) were selected from the most experienced and less experienced traders, different locations of districts, and a mixture of men and women. The triangulation of the content discussed in the FGD as well as clarification of some debated issues was done through in-depth interviews with other qualified but not selected MPPs traders within the districts. The selection of the MPPs traders for in-depth interviews was purposive and solely done by authors. The researchers and regulators of traditional medicines who participated in in-depth interviews were identified by their respective organizations.

4.3 Data Collection

Primary data were collected through ten FGD, one in each selected district. In total, 99 MPPs traders participated; ten for each district, except nine for Ifakara District, Morogoro Region. Among them, female participants were 46.5% and males were 53.5%. The youngest participant was 32 years old, while the eldest was 76. The most experienced MPPs trader had practiced for 38 years while the least experienced practiced for seven years. Most (69%) of the participants had primary education, and only 26% had secondary education, while 5% had a college education.

In addition, 16 in-depth interviews were conducted; ten from selected MPPs traders one in each district, three researchers from ITM, the TAHPC chairperson, and two officers from the Directorate of Traditional Medicines in the Ministry of Health, Community Development, Gender, Elderly, and Children (MHCDGEC). The FGD and in-depth interviews were guided by prepared and reviewed guidelines. On average, FGD used 90 min while in-depth interviews were 70 min. All participants provided their consent to participate and sound record before the interviews.

4.4 Data analysis

Data were analyzed using content analysis followed by the analytical hierarchy, as described by Spencer *et al.* (2003) with the assistance of NVivo 12 computer software. The codes were critical incidences on two nodes of legitimation and market/demand. The nodes lead to emerged themes of eras of MPPs trade, as meta-events, at a given period. The eras of the MPPs trade and the period leading to the identification of evolution stages. To ensure that the emerging themes of meta-events came from the data, they were cross-checked with scribed and voice records continually.

In this study, the trade evolution stages were identified based on de-coordination, re-coordination, and new order as per identified critical incidences. The de-coordination stage corresponds to the creation of the point of disturbance which could be a potential source of change (Zharova and Chechel, 2020). The re-coordination stage retains the order at different levels which new order stage is created after changes of approaches, methods, and tools previously used.

5. Results

Based on the data analysis, four meta-events were identified at given periods which formed a foundation of evolution stages of MPPs trade in Tanzania (Tab. 2). The identified four meta-events were the colonial era, government supremacy era, private sector era, and markets and regulations integration era. These four meta-events lead to four evolution stages of the MPPs trade, as further explained below.

Colonial Era

Colonial Era starts in 1882 when Tanganyika was invaded by Germany to 1961 when Tanganyika obtained its independence from the British. This era was characterized by strict rules on MPPs trade and traditional medicine practices. The Witchcraft Ordinance, by the British colonialists, that was introduced in 1929 failed to distinguish MPPs from witchcraft, which spoiled severely the progress of the MPPs trade. The ordinances reduced the legitimacy of MPPs and treated herbalists and witchdoctor the same, as possessors of occult power. This era is considered stage one of the evolution of MPPs trade in Tanzania.

Government Supremacy Era

The government Supremacy Era covers a period from 1961 when Tanganyika gained its independence to 1984, a year before economic structural adjustment policies. The era saw the rebirth of traditional medicine and the legitimate use of MPPs. Development initiatives during this era were dominated by the government as MPPs would reduce the importation of pharmaceuticals. The government took lead by establishing different organs such as the Department of Traditional Medicines at Muhimbili Medical School in 1976 and the National Institute for Medical Research (NIMR) in 1980.

There were limited involvements of MPPs traders in this era. It was noted during the FGDs that there were only a few stalls in Dar es Salaam Markets by 1980 that sold raw medicinal plants. No one recalled the presence of MPPs shops in regions other than Dar es Salaam. In this era, the government considered to re-coordinate the MPPs trade which was de-coordinated by the colonial era. Therefore, the government era is considered to be the second evolution stage of MPPs trade.

Table 2: Critical Incidents, Meta Events, Periods and Evolution Stages of MPP Trade in Tanzania

Market/Demand	Critical Incidents Legitimation	Meta event	Periods	Evolution Stage
	1929: Introduction of witchcraft Ordinance by the British	Colonial Era Detrimental of traditional health systems	1882 – 1961	1.
1980: Trade in individual medicinal plants (not mixture/readymade) started at Kariakoo Market – Dar es Salaam	1963: Colonial Laws on Traditional Medicine relaxed 1968: Recognition of traditional medicine through new Medical Practitioners and Dentists Ordinance of 1968 1976: Establishment of Traditional Medicine Department at Muhimbili Medical School 1980: Establishment of National Institute for Medical Research (NIMR)	Government Supremacy Era Initiatives to revive traditional medicine systems for self-reliance	1961 – 1984	2.
1985: Increased demand of MPPs due to HIV/AIDS crisis as there were little services from modern medicines 1987: Started value addition activities such as milling of individual medicinal plants for urban consumers 1990: The shift of the traditional healers from rural to urban areas with most customers 1992: Established supply chains of medicinal plants to facilitate the traditional healers who shifted to urban areas 1999: Emergency of readymade (formulated) MPP. 2000: Introduction of container packaging with modern printed labels Visible frauds MPP, specifically in urban markets.	1989: Traditional Medicines moved from Ministry of Culture to Ministry of Health 1990: Incorporation of traditional medicine into National Health Policy 1991: Transformation of Department of Traditional Medicine to Institute of Traditional of Medicine 1995: Introduction of registered organizations of practitioners (Registered by Ministry of Home Affairs) 1998: Reported challenges of unregulated trade and unregistered practitioners. 2000: Traditional and Alternative Medicine Policy formulated Involvement of NGOs for promotion of MPP to PLWHA 2002: Establish a Traditional and Alternative Medicine Act	The era of Emergence of a Private Sector	1985 – 2004	3.

<p>2005: Using modern diagnosis tools by sending the patients to private health laboratories. This action increased specificity in using MPP.</p> <p>2009: Perceived increase of customers from identified non-communicable diseases to MPP</p> <p>2012: Public visibility of trade MPP because of registration from Traditional and Alternative Health Practices Council. This action was associated with an increased number of service centers and shops Advertisements in public media for already formulated MPP</p> <p>2015: Special formulators of MPP and other products such as oils, jelly, rubbing Packaging of MPP in modern packs such as tubes, sealed bottles, and containers Regulated advertisements of MPP in mainstream media</p>	<p>2005: Implementation of Traditional and Alternative Medicine Act Working in public because have been registered by the governments</p> <p>2005: Decrease use of the <i>ramli</i> (traditional way of diseases diagnosis using spirits) due to fierce government actions motivated by the killing of people with albinism</p> <p>2009: Availability of mobile phones which make easy communication and money transfer</p> <p>2010: Establishment of Traditional and Alternative Health Practices Council which facilitated the registration of both practitioners and MPP</p> <p>2013: Recognition of traditional medicine by the government attracted people other than practitioners to join the industry in investments in processing medicinal plants</p> <p>2015: Involvement of other government organs in control of MPP such as TMDA, TBS, and GCLA</p>	<p>The era of regulation and market integration</p>	<p>2005 – 4</p>
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Era of Emergence of a Private Sector

The Era of Emergence of a Private Sector started in 1985 with the World Bank inspired structural adjustments policies which focused on market and private sector driven economy. This era persisted until 2004, a year before the implementation of the Traditional Medicine Act of 2002. During this era, private sectors flourished in different sectors include traditional medicines, and in particular MPPs trade. Amid the implementation of structural adjustments policies and people taking advantage of the private sector emerged the HIV/AIDS pandemic. The increased number of people infected by the HIV/AIDS pandemic accelerated the number of consumers hence the MPP trade.

Some of the initiatives taken by MPPs traders had to shift to urban areas for the market, establish structured supply chains, pack and label MPPs. It was narrated during FGD that it was this period when MPPs-based clinics and shops emerged in urban areas. However, it was noted during FGD that fraud, by selling fake but well-packed MPPs, was at its peak towards the end of the 1990s.

The Era of Emergence of a Private Sector was the result of the de-coordination of the Government Supremacy Era by structural adjustment policies and invade of HIV/AIDS pandemics. The re-coordination by MPPs traders as the private sector took place and established supply chains, MPPs shops, and clinics to advance MPPs trade. Therefore, the Era of Emergence of a Private Sector is referred to as evolution stage three.

During in-depth interviews with researchers, it was revealed that in this era the potential of MPPs to health services was manifested. The ability shown by some MPPs to treat secondary HIV/AIDS infections and the appearance of fake practices stimulated the need to integrate traditional medicine into mainstream modern health services and to regulate it. The initiatives include shifting of the traditional medicine activities from the Ministry of Culture to the Ministry of Health, the inclusion of traditional medicine in national health policy, and the establishment of the Traditional and Alternative Medicine Act of 2002 which came into effect in 2005. The Traditional Medicine Act of 2002 aimed to regulate traditional and alternative medicines practice through established TAHPC. The functions of TAHPC include monitoring, regulating, promoting, and supporting the development of traditional medicine.

Era of Markets and Regulations Integration

The established regulatory framework through TAHPC de-coordinated the MPPs trade practiced in the Era of Emergence of a Private Sector. The re-coordination of MPPs traders to abide by regulations began in 2005 when TAHPC started to function. This era is referred to as Market and Regulation Integration which is considered the fourth stage.

MPPs traders responded by starting to produce MPPs that could abide by the regulatory framework. It was described during FGD in urban areas and market hubs, that it was this period where diseases specified MPPs started to appear in the markets. Non-communicable diseases took the lead in the consumption of MPPs. The observation confirmed numerous shops selling MPPs in form of tablets, oil, jellies, soaps, and rubbing medicines for specified diseases. It was narrated during FGD that Government Organizations such as ITM and Small Industries Development

Organizations (SIDO) enabled MPPs traders with processing and packaging skills of MPPs respectively.

It was agreed during FGD that the supply chains and trade activities in MPPs became structured and strengthened by various technology available such as mobile phones, printing services, and packaging materials, and media for publicity. The given example was the mobile phone services, such as voices and money transfer, which simplified the rural-urban trade of raw medicinal plants.

It was reported by both FGD and in-depth interviews that few MPPs traders were abiding by the requirements of TAHPC. The registration was based more on practitioners than on premises and MPPs. The mentioned barrier was high costs associated with registration of MPPs and premises because it involved other authorities such as Tanzania Medical and Drugs Authority (TMDA), Tanzania Bureau of Standards (TBS), and Government Chemistry Laboratory Authority (GCLA). The outcome was most MPPs traders were registered by TAHPC but their premises and MPPs were not registered. It was narrated during the in-depth interview with the TAHPC chairperson that there were about 21,000 registered out of more than 70,000 who were expected to be registered. The registered premises were less than 1000 while registered MPPs were 40.

6. Discussion

The MPPs trade in Tanzania has passed four evolution stages up to the current practices. The four stages have been an outcome of interactions of public policies, the response of MPPs traders, pandemics, and technological advancements. The MPPs evolved from being a free community towards traded commodities in the health sector. The four evolutions stages of MPPs trade is more explorative than the two stages of before and after independence, as explained by Langwick (2010), Stangeland *et al.* (2008), and Mbwambo *et al.* (2007).

The environment changes, in terms of public policies and regulatory framework, played the de-coordination role along the four stages in the evolution of trade in MPPs. Although the environmental changes aimed to legitimize the trade in MPPs, they had mixed results. In the second and third stages, the legitimation aimed to promote MPPs. In the fourth stage, the legitimation is based on the regulation of MPPs trade to assure their quality. However, a low level of implementation of regulation legitimation led to mixed practices as indicated in stage four where registered and unregistered MPPs traders, premises, and MPPs perform under the same platforms. This kind of practice left consumers with uncertainty about the legitimacy of MPPs in terms of quality, efficacy, and safety.

On other hand, market/demand played the re-coordination role in stages three and four in the evolution of trade in MPPs. In the second stage, the re-coordination role was played by the government to address the damage of colonialism in traditional medicine. The re-coordination role was performed well with the private sector in stages three and four when compared to the public sector in stage two. The private sector was active to use other environmental changes such as technological advancement.

The fourth evolution stage provides important policy issues towards the development of MPPs trade in particular and traditional medicine in general. Any environmental change in traditional medicine should be accompanied by strategic initiatives to direct practitioners' reactions. The century's operation nature of the traditional medicine sector could mean high inertia property towards changes. As it was observed during the in-depth interview with the TAHPC chairperson, the registered practitioners, premises, and MPPs were low taking into consideration fifteen years since TAHPC was established. There should be accompanied incentives and proper enforcements to ensure desired results of health and economic securities. Therefore, the activities of mediating factors in the interaction of legitimation and market demand (Fig. 1) should be strengthened. These include the activities of ITM, SIDO, and the association of practitioners.

As a result of partial implementation of the legitimation and infant competition between traded MPPs, the fifth stage of MPP trade evolution is expected. The fifth stage is expected to be full-fledged commercialization where legitimation and market forces will work together. The fifth stage will be characterized by stiff competition among firms where registered brands of MPPs will be competing in the market. Further, legitimation procedures like protection of the property rights of formulated MPPs as well as complete registration of the traded MPPs may fast-track the fifth stage.

7. Conclusion and Recommendations

The MPPs have been used to treat various diseases from time immemorial in different cultures around the world. Its trade has emerged to a complex rural to urban supply network in Tanzania which has developed over time driven by various environmental changes which shaped the current practices. However, the response of MPPs traders to environment dynamics and the evolution paths over time to the current status was hardly known. It was crucial to understanding evolution stages up to current practices of MPP trade because they could reinforce the understanding not only for factors that caused changes but also the assessment of policy impacts over time.

Therefore, this paper sought to use the economic evolution theory to answer two research questions about the current status of MPPs trade in Tanzania: (i) what is the response of MPP traders to environmental changes over a period of time? (ii) What are the evolution stages of MPP trade in Tanzania to current practices? The result indicated that while the environmental changes caused de-coordination, the MPPs traders in the private sector responded by re-coordination to explore market opportunities caused by pandemics while taking advantage of other technological advancements. The study identified four evolution stages of trade in MPPs in Tanzania. These stages are the colonial era (1882 -1961), the government supremacy era (1961 - 1984), the emergency of the private sector era (1985- 2004), and the market and regulation integration era (started in 2005). As a result of partial implementation of the legitimation and infant competition between traded MPPs, the fifth stage of trade evolution is expected. The fifth stage is expected to be full-fledged commercialization where legitimation and market forces will work together.

The recommendation is made to establish accompanied incentives and proper enforcements measures to ensure desired results whenever there are environmental changes in traditional

medicines for health and economic securities. The activities of mediating factors in interaction of legitimation and market demand such as ITM, SIDO, and practitioners associations should be strengthened. Further, because the fifth stage is expected, awareness creation on the importance of intellectual property rights of MPPs and branding should be prioritized. In addition, potential business models to be adopted in the fifth stage can be studied to ensure firms' survival during stiff competition.

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