CHAPTER 1
INTRODUCTION

1.1 Background to the research

The healthcare system in India is in a stage of nascent growth. The rising healthcare costs and diminishing quality of healthcare services and care have hindered the nation’s progress over the years. A nation’s progress depends on favourable healthcare outcomes for its citizens. For both developed and developing economies, social and economic progress are highly dependent on healthcare outcomes [1,2]. There are multiple factors that determine the positive performance of the health and wellness indicators of social progress [2,3]. The global, non-profit, accredited organizations for human welfare (OECD, 2006) critically evaluate quality parameters linked to health and non-health related dimensions [4]. While the non-health-related dimension is responsiveness and can be linked with communication, the principle health-related measure is mortality from disease [5,6].

As treatment of communicable diseases is a global concern, treatments sometimes require innovative drug product formulation, but non-communicable diseases are usually treated with generic drugs for reasons of cost-effectiveness [4]. Reduced mortality rates indicate that a disease is under control. However, for India, deaths from non-communicable diseases (NCD) are alarmingly high (>50%) [4,6]. This is probably attributable to a relatively low level of responsiveness towards the adoption of better medicines. These mortalities, and a life expectancy of seventy years [6], limit
the country’s social progress as well. In recent years, India has experienced some economic growth but the rate of social progress has not been promising [1-3,6]. Some doubt that sustainable economic growth over a long term is possible unless healthcare performance indicators improve [4]. From such doubts, it follows that the healthcare system of India cries out for improvement, especially in the wake of adoption and use of effective and cost-efficient pharmaceutical products for controlling mortality from NCDs [6].

Despite a large volume of research focused on providing quality medical treatment, the challenges of achieving favourable health outcomes remain largely unmet, especially for developing nations [1,2,5-8]. With the diffusion of medical technology, healthcare services and product adoption (or consumption) have evolved over time [8,9]. The acceptance procedure by which doctors commence the prescription process for new drugs is known as drug adoption. Acceptance by doctors depends upon their perceptions of the quality of the drug formulation and its purported effectiveness in clinical trials for treating specific diseases. A new drug is known as a pioneer drug or innovator drug. Such drugs, because they are first-entrants into the public market, are very costly for consumers because of the enormous investment in research and development incurred during the drug’s discovery, development, testing for efficacy and safety, and initial marketing [10]. Consumers may access new drugs either over the counter (OTC) or by a doctor’s prescription. Those drugs that are available only with written instructions from a doctor for treating patients are known as ethical drugs. Firms that, after patent expiry, introduce ethical generic drugs into the market that reproduce
the same safety and efficacy properties as the pioneer drug are producing what are called comparator drugs or, more commonly, late-entrant drugs. Drug-manufacturers and-marketers develop competitive strategies to communicate with stakeholders who consist primarily of patients and their prescribing physicians. Other major stakeholders involved in the adoption communication process are the government, the regulators, and the health insurance companies.

In making adoption decisions, prescribing physicians and institutional prescribers communicate extensively among themselves regarding new drug performance and side effects. Concerning technology adoption in general, the research literature has stressed the important role of information exchange. Proponents of the technology adoption model, Davis [11] and Rogers [12] identified the critical factor in the adoption process as being communication about the new product and the use of communication to influence adoption decisions by consumers. Early research on new drug adoption dealt most often with the communication strategies of drug-producers and marketers as the primary actors in the process of new drug adoption [13-15]. However, the concepts that underlie adoption decisions for ethical drugs are actually quite complex and are not easily defined or studied. This is especially true in the differentiation between the adoptions of innovation products (first-entrant drugs) and those of imitation products (late-entrant drugs).

Two theoretical structures are widely recognized as milestone achievements in the field of innovation diffusion. These are the models developed by E. Rogers [12] and F.M. Bass [16]. Rogers identified different steps through which an innovation decision
process develops (knowledge, persuasion, decision, adoption, and confirmation) and different adopter categories as ideal types (innovators—venturesome, early adopters—respectable, early majority—deliberate, late majority—skeptical, and laggards—traditional). Bass proposed an analytical model for the timing of the initial purchase of new products; the author assumed that the population consists of ‘innovators’, who typically adopt early, independently of the others, and ‘imitators’, who are influenced in their choice by the media and by the number of previous buyers.

In this context, extant literatures have suggested that product innovations can be imitated [17-19] and, thereby, can reduce the differentiation advantage of first-entrants [20-21]. While defining imitation adoption, Lieberman and Asaba identified two key mechanisms leading to imitation: firms may follow other competitors that are perceived as having superior information (i.e., information-based imitation), or firms may imitate rivals to maintain competitive parity (i.e., rivalry-based imitation) [22]. Firms can exploit the innovator’s efforts in developing the products and markets for them and then overtake these products with their improved products [23]. A strategy of imitation strategy can be a wiser choice for firms that want to gain a competitive advantage. However, adoption by imitation presents a risk for the firms that invest resources in the production of a new substitute drug formulation technology that, in the end, may exhibit lower performance efficacy and or market preference than those already in use. The success of late-entrants becomes uncertain as responses towards adoption of imitations become unpredictable.
Product offerings that are new for a particular form but that already exist in the marketplace undergo *imitation* adoption. Late-entrant drugs fall into this category. Notwithstanding the importance of knowledge on product innovation in the Indian market, most studies have been based on North American (mostly U.S.) data, which leaves the generalizability of their findings to other economies as an open question [22-23]. For example, Cho, Kim, and Rhee [24] suggested that, due to the unique cultural characteristics of Asian countries, the pioneer and follower phenomenon in Asia may not be systematically explained by theories largely derived from Western experience. To fill this research gap, factors underlying adoption of late-entrant drugs in India, an emerging market of Asia, require study.

Rogers’ model on the diffusion of innovations [12] suggests that communication plays a crucial role, as participants create and share information with one another to reach mutual understandings that drive the process of adoption. Following Rogers [12], Fruchter and Bulte [25] extended knowledge about innovation adoption by observing that the diffusion of new products through the marketplace is often affected both by marketing communication efforts and social interaction among the adopters. Since imitation adoption depends heavily upon the second process, it is readily apparent that communication and the channels through which it flows comprise a critical focus for the study of such adoption. Adoption-related communication can be directly delivered from the firm to stakeholders (*direct channel communication*) or indirectly exchanged among peer-doctors at healthcare institutions (*indirect channel communications*) [10]. The communication process that persuades doctors to prescribe new late-entrants is
known as *information coding*. More precisely, information coding refers to the quality and quantity of medical information reaching through diverse communication channels among the pharmaceutical adoption stakeholders [10]. According to Bloomvist, a major factor affecting drug adoption is the challenge of *information asymmetry* [26]. He explained that information asymmetry occurs when market dynamics (such as varying preferences for firms and/or their drug product consumption, changing drug prices due to regulatory policy or manufacturing improvements, mergers among domestic firms, and acquisition sprees of global pharmaceutical firms aiming at monopoly instead of experiencing an oligopolistic marketplace) influences the quality and extent of information coded in medical communication via direct and indirect channels [10]. The information conveyed, therefore, reveals variances, and these variances eventually influence the outcome of drug adoptions.

To take a seemingly unarguable example from a world in which a clever YouTube video can command an audience of millions, researchers suggest that social influence through word of mouth exchange (WOM) or, by implication, online social interaction among communities of patients and consumers is destined to influence drug adoption in a major way [10-13]. This study’s position is that adoption variances attributable to social communication among physicians and patients, WOM included, will be especially influential in the adoption of late-entrant drugs in contrast to first-entrant drugs because the latter enters the market without any public usage experience or dialogue. In other words, for the first-entrant drug, there is nothing new—no social experience—to talk about. To the extent that the variances alluded to by Bloomvist
lead to limitations on access by healthcare systems, doctors, and patients to late-entrant drugs (or ethical drugs in general) [26], it is incumbent on the healthcare professions, including the drug-prescribers, to understand such inefficiencies and, if possible, eradicate them by re-engineered and vastly improved medical information coding techniques.

Notwithstanding (a) the sustainability needs of pharmaceutical firms to achieve successes with quality-driven, generic, ethical drugs and (b) the obvious importance of these drugs to the social welfare [7,27], there is a paucity of research on how the medical information should be coded through direct and indirect channels to maximize the efficiency of the process through which late-entrant drugs win acceptance or suffer rejection. This dissertation studies how direct communication from marketing sources (through the traditional medical supply chain) and indirect communications (through the influence of social networking) influence the adoption of late-entrant generic prescription drugs (‘LEGPD’, for purposes of the study) in India (henceforth, ‘locally’). Despite the intent of firm managers to optimize their decision when they plan late-entrant launches, this is the first study in the Indian context of the implications of doctor-patient relationships for the coding of the information that is pertinent to such launches.

The literature that has been reviewed for this study falls into three major thematic categories dealing with the adoption of late-entrant ethical drugs, namely, (a) the mechanics of such drug adoption in the local market, (b) the identification of factors that are related to such drug adoption, and (c) the typology of information
communication that has an influence upon the adoption of prescription late-entrant drugs.

1.1.1 Prescription-based drug adoption

The improvement in India (and all developing countries) of drug adoption metrics must be an important element of social planning and development [27-31]. The reason, simply stated, is that the more broadly quality prescription drugs are adopted, the better control will healthcare services have over mortality from diseases such as hypertension [28,32] and cancer [33], among others [29-31,34]. It comes as no surprise, therefore, that despite the enormous amount of research to improve healthcare technology and the inventory of new drug formulations [9,13-14], there is also research that focuses on systems of delivery [35-36]. Recently, the Indian government has promoted [37] increases in the supply of medical resources, such as prescription drugs based on indigenous medicines that can be manufactured at affordable costs and at the requisite levels of safety [38-39]. However, the funding (or healthcare packages) from the Indian government to control the sharp rise of mortality due to NCDs has not been promising [40-41]. With sloppy performance in healthcare sector, social progress might not be sustainable and the lack of social progress in this areas has become a crucial subject of investigation [2,3]. For example, prescription decision-making by doctors about which ethical late-entrant to prescribe from a series of drug manufacturers becomes a complex phenomenon as a drug’s medical goal as a remedy (such as reducing hypertension) can be achieved through many routes, targeted by diverse formulations of generic drugs. Furthermore, the lack of time and high patient load with
medical staff to patients in a ratio of 1:1800[42] indicates, to say the least, an imbalance in the demand and supply dynamics of healthcare resources. Late-entrant prescription drugs cannot be guaranteed a profitable market penetration because of the availability of substitute products (in an oligopolistic market).

Consequently, LEGPD might not attain the desired level of adoption and consumers will suffer from treatment inefficiencies [43]. In summary, both the producer and consumers in the healthcare value chain [44] are affected as doctors’ prescriptions decision for new late-entrants across private hospitals are not standardized. At this stage, communication of quality medical information among the stakeholders of healthcare value can be instrumental in improving drug adoption metrics. As firms better strategize their market-oriented communication and as more informative becomes available through social communication among medical practitioners, higher measures of entry success for quality new drugs can be assumed [10]. However, performance of drug adoption metrics will differ in private and public sector hospitals.

In India, the healthcare value chain gets compromised because public sector hospitals provide cheaper, but less efficacious, products for their patients, products that may fail to produce a desired outcome or might induce some side effect because of the absence of adequate ‘pharmaco-vigilance’ by a small-to-mid-grade drug producer. Regulatory policy-makers whose intent has been to provide affordable medicines for poor persons in public hospitals [44] have recognized that their efforts have been limited by the lack of primary resources, such as sophisticated diagnostic kits and instruments, access to skilled medical taskforces, and the availability of beds for ailing
population. Moreover, in India, there is no public health insurance assistance from the Government of India, which has led to high out-of-pocket expenses for which there is no offset [41]. Although private hospitals provide better medical consultation and treatments, these services lie beyond the financial reach of most individuals [4,6]. Thus, no matter the initiative to improve healthcare delivery, evidence of overall effectiveness and sustainability remains marginal at best.

This study’s inquiry into the diffusion of medical information concerning late-entrant drugs is intended to assist in achieving higher rates of adoption for LEGPD and, thereby, to reduce the variability of prescribers’ decision-making as to the appropriate drug regimen for specific persons presenting specific medical conditions [45]. This dissertation has embraced global drug adoptions using healthcare adoption models, practiced in developed nations (such as US and Europe)[14,26,46-49], and endeavored to standardize local drug adoption in India[50-52], comparing and contrasting the findings with other emergent markets such as Brazil [53] and Thailand [54-55], so that other members of SAARC countries (such as Pakistan, Sri Lanka, Bangladesh, etc.) can also develop or implement a strategy-making process to determine late-entrant drug adoptions.

1.1.2 Global perspective of drug adoption

The prescription drug industry deals in a ‘unique commodity’ market where physicians are the buyers and, in this respect, differs from other technology driven markets [55-56]. The physician, as prescriber of wide range of generic drug alternatives, serves essentially as the consumer’s agent[45,56-57]. Drug producers and peer-doctors
influence the prescriber through direct communication channels [58-60]. Indirect communication through medical journals, advertisement, and a multitude of other channels [61-62] also influence prescription-making, especially for new ethical drugs. Since pioneer brands are better remembered than generic drugs for their proven efficacy, generic drugs struggle to achieve market penetration [15,62-63]. In developed countries, patients consume a prescription drug only after a decision negotiation (or shared decision) with their doctors, and this practice favours the choice of new brands [64-65].

The literature does not provide a statistical process for predicting adoption decisions by physicians for LEGPD (although the pharmaceutical companies no doubt strive to develop such instrumentation). Due to the uniqueness of the product adoption process, dependent as it is on the responses of each stakeholder in the prescription drug industry, medical decision-making regarding patient use of drugs for medical purposes is in a state of constant flux. Consumers benefit from a sustained and structured flow of medical information, such as when pharmacists dispense drugs according to a doctor’s prescription and, in the process, educate patients in disease management [66-67]. Prescription decisions involving patients has been referred as ‘shared-decision-making’ and has been evidenced in developed market [68-70]. This dissertation, in one of the emerging markets, India, has evaluated if there is any shift from doctor-centric prescribing to shared-prescribing with the patient’s opinion taken into consideration [71-72]. Health maintenance organizations (HMOs) in the US play a decisive role for
adopting late-entrant drugs as structured procedures are in place, which is not the case in emerging markets or in India [10,13,15,46,50-52,73].

Despite the fact that HMOs in the US evaluate risk: benefit ratios for prescribed drug and the quality of patients’ lives during medical interventions [46,73], sources of variation in adoption decisions by physicians and the HMOs themselves remain either unidentified or unresolved [71-72]. Given such a situation, variations in decisions not only affect patient well-being, jeopardizing healthcare efficacy, but also influence the investment decisions of generic firms (occasionally in dramatic ways should notice of a failure of the healthcare system go viral) [10-47]. Even new marketing strategies, such as direct-to-customer advertising (DTC) does not guarantee marketing success for LEGPDs [14,47,74]. Despite having the world’s second largest GDP per capita [10], the USA, ranks eleventh in terms of Health and Wellness, ranking lower than countries like Peru, Ecuador and Albania, which have a much lower GDP per capita than developed nations [3]. Improving health and wellness factor, an indicator of social progress [3], for economically stable nations like USA, Great Britain. In order to safeguard healthcare outcomes, HMOs [45,65], are responsible for accepting drugs into the formulary (i.e., medical compendium) for medical practice (i.e., physicians). The healthcare organizational factors (such as organizational size, hierarchy among decision-makers, or relationship with drug-marketers) also play a key role in decision-making aspect for LEGPD [46,73]. Physicians, lacking leadership, management, and communication skills, are unable to safeguard consumer’s interest or producer’s sustainability for their new product launches by virtue of the non-standard format of the information communicated
among stakeholders. As Goffee and Jones refer to authentic leadership as ‘chameleons adaption to nature’ [76], physicians, too, need to display such contextual adaption skill while communicating with consumers, producers, and insurance providers [45,73].

There are diverse mechanisms of drug action in the treatment of a disease, leading to a wide range of medicinal chemical formulations for treating non-communicable diseases. Further, there are many companies manufacturing generic drugs, competing against the pioneer drug after the expiry of patents [8]. The diverse range of options, leading information overload, makes a prescription decision especially complex as adopting newly branded generics gets uncertain [57]. Due to such underlying uncertainty, variability in perceived medical information for treating hypertension has been reported by Greveng et al. [48]. The informational asymmetry (i.e., variation in quality and quantity of medical information communicated) in prescription decisions becomes more acute in an emerging market where the government does not assure medical assistance or insure medical support for its citizens.

Moreover, in an emerging market (such as India or Brazil), drug adoption decisions are not strictly controlled by a healthcare institution [46,73] as they are in developed markets. India, in which both domestic and international drug-marketers launch the same LEGPD (featuring oligopolistic demand and supply characteristics)[48,72-73], demonstrates uncertainty in regard to the effective communication coding of medical information that is required for successful market penetration.
1.1.3 Drug adoption uncertainty in India

Dadhich and Upadhyaya, recently reported that the emerging markets are expected to reach a size of US$400 billion by 2020, with India evolving as a key market [37]. In Indian medical community, growing evidence suggests that the healthcare value chain [1,7], centered on competing branded medicines, is exposed unpredictably to complex interactions between various stakeholders, such as government bodies, healthcare providers, and manufacturing firms [41,44,65,75]. Branded pioneer drugs which are prescribed in private healthcare institutions are generally regarded as more effective and safer [31-38], having fewer side effects, compared to their cheaper, non-branded (non-proprietary) counterparts, which are usually prescribed in public hospitals [71-72,53]. The latter face barriers to adoption, as their side effects and efficacy are not well established from a medical point of view and they are not well accepted by patients, mentally or physically [15]. These late-entrant drugs are cheaper than pioneer drugs and should be well accepted by practitioners as they are the same drug presumably tested in the same way as the corresponding pioneer. The schematic diagram in Figure 1.1 presented the diverse types of drug adoption markets for NCD epidemiology management [75]. The different type of drug markets adoptions [such as, over the counter (OTC), prescription-based innovator or first-entrant, prescription-based generic or late-entrant] are diagrammatically presented in Figure 1.1.
The current study focuses on how the flow of information among stakeholders for adoption of LEGPD occurs and on what the relationships are among the communication drivers that influence such adoption decisions. It can be argued that the control of mortality from NCDs signifies social progress due to enriching health and wellness livability factors. Since pharmaceutical business largely depends on the success of their prescription drugs, the current study focuses on LEGPD adoption defining such as a proxy for the welfare of society. Reported studies suggest that lack of shared decision-making approaches among doctors and patients in emerging markets [67-70] may lead to poor LEGPD acceptance accompanied by a rise in mortality rates [75].
mortality due to hypertension is alarmingly high in India and cardiovascular disease management is highly sought.

The cardiovascular drug market is a notable area of pharmaceutical business, as a large number of patients suffer from a chronic disease like hypertension [27]. Many manufacturers, producing generic antihypertensive (i.e., hypertension treating) prescription drugs are exposed to buyer’s risk due to frequent brand switches [77-78]. Each drug prescribed for any therapeutic segment with coexistent (i.e., alternative) LEGPD presents a unique set of characteristics that are hard to determine a priori. Again, the information asymmetry [26] in coded messages among the stakeholders causes drug adoption uncertainty [49] and compels firms to revive a responsive communication model to understand why only a few branded generic drugs succeed while the vast majority fails to achieve market penetration.

There is an overwhelming need for change in the Indian healthcare delivery system, with pharmaceutical manufacturers, acting as a nerve centre. Declining revenues and thinning operating margins are driving pharmaceutical companies to further concentrate their focus on quality costs and volume as the prescription drug industry in India has changed considerably in last two decades. Earlier, competitors were fewer and opportunity was immense for NCD managements. The generics became available for cardiovascular usage late 1980s and early 1990s. Despite being cheaper, they did not gain the trust of the Indian consumers. Medical practitioners were also sceptical regarding the safety and efficacy of generics [53]. Hence, these drugs were not well understood, or accepted [49]. This condition prompted some multinational
companies, who have provided India with an established market in pioneering branded
drugs, to explore opportunities in the generic business, assuming that generics would
also perform well.

In last decade, several MNCs based in India brought a generic range of
medicines, particularly in the cardiovascular and antidepressant fields, into India [79]
creating competition with indigenous producers cheaper drug options. The result was an
uphill battle for the MNCs, who failed to achieve sustainable sales in the
cardiovascular, depression, or cancer treating (therapeutic) segments [50] of the market.
Before long, many small companies in India were thriving with low price alternatives,
gaining an edge over the MNCs, and pushing out their products out of the market
altogether [43,48,73], as the expenses outweighed the low returns in the highly
fragmented and oligopolistic market [79-80]. As supply rose with more participating
local firms, demands for first-entrant drug from global manufacturer shrunk
considerably. Hence, accepting the business dynamics marked with imbalances of
demand and supplies, MNC companies continued to sell their generic offerings.

This dissertation argues that had shared decision-making has been practised
effectively in the first instance of generic entry into the Indian marketplace, companies
would have saved a great deal of money and effective entry would have been
sustainable. More precisely, in the case of a simple disease, such as hypertension,
paternalistic decision-making by the medical practitioners in a fragmented
pharmaceutical market expose some certainty for firms towards LEGPD market
penetration [82]. For the purpose of studying doctor’s preferences across generic
medications for the therapy of hypertension management, this dissertation evaluates five classes of antihypertensive drugs: CCB (Calcium Channel Blocker), ACE (Acetylcholine Esterase inhibitors), ARB (Angiotensin Receptor Blocker), BB (Beta-Blockers), DIU (Diuretics) [48]. Despite having comparable efficacy and safety with first-entrants, the barriers to drug adoption for LEGPD increase with increasing disease complexity or with uncertainty about treatment success. With the increasing complexity of diseases—cancer—accurate prediction by the firms for their late-entrants being prescribed by medical practitioners become highly uncertain and unpredictable [82]. Hence, this dissertation undertakes an opinion-related inquiry into anti-cancer LEGPD (exemplified with Imatinib drug), employing qualitative strategies and following an action research model[32-33].

Investigating from the perspective of a diverse range of disease management capabilities such as treating hypertension and cancer diseases efficiently with LEGPD that are highly competitive with innovator counterparts[32-33] requires a thorough understanding of the types of communication media that influence such drug adoption. These media can be either verbal in form, such as the fall-out of a meeting with the medical representatives or by attending company presentations (on product detailing), or non-verbal, for example, references to a drug communiqué or compendium, or draw downs upon one’s own experience and knowledge [71-72]. Investigations regarding such media forms need to study both forms simultaneously to determine how they are related and whether there is pending intent of doctors, exposed to such cascading verbal
and non-verbal communications, to adopt or reject the new late-entrant prescription drugs.

1.2 Premise for research problem statement

The problem statement for this dissertation is rooted in the theories of social progress and human development. Pioneering work of Amartya Sen and Michael Porter on human development has revealed that until social progress is being achieved by a nation, its economic advancement is hardly achievable [1-3]. The social progress index (SPI) is a better measure for a nation’s improving social advancement than the per capita GDP (an economic growth indicator). Use of the SPI measure indicates that moderate-to-low income countries can still achieve better social progress and sustained economic growth than resourceful, economically strong countries. For instance, resource-rich Gulf countries underperformer in terms of SPI due to easy economic gains that economic development makes possible. Such development, however, leaves behind the conditions requiring social growth and environmental repair [3]. This indicates that SPI is a convincing parameter to measure the economic growth of a nation. Again, health and wellness are important indicators for the SPI. In India, since the extent of non-communicable disease has reached an alarming stage, SPI performance is seen to be in the decline [75]. Despite rising GDP for BRICS nations such as India and China, performance in social progress is unsatisfactory due to uncontrolled mortality and morbidity.

Higher per-capita GDP implies better health outcomes compared with countries with lower per-capita GDP, such as China and India, where rising healthcare costs are
probably due to mismanagement and inefficiencies in their healthcare systems [40-41]. With sub-standard medicine in rural areas, and over-priced ethical late-entrants in private hospitals in urban areas, aiming at high profit margins [43,75] has weakened the healthcare performance of these neighbouring countries. Further, the lack of companion policy to reform drug delivery systems exposes patients to uncertain and relatively high healthcare costs and compromises their basic needs. In summary, to mitigate the non-uniform and unstable conditions that embroil a prescription decision [53,79], effective and efficient cooperation, collaboration, and coordinated action through information and knowledge sharing has become essential. The lack of sufficient healthcare spending (or insurance supports) has spent in healthcare (or insurance supports) by governments [40-41] has led to a poor score in SPI measures for both India (ranked one hundred two) and China (ranked ninety) [3] as depicted in Figure in 1.2. From this figure, the dissertation argues that higher per capita GDP does not necessarily imply higher a SPI, as, for example, India’s economic progress exceeds Sri Lanka and Bangladesh, but has a lower SPI than either. Figure 1.2 shows economic progress (measured by per capita GDP) of both developed nations and developing nations including member of BRICS and SAARC countries. However, the SPI measures depict that social progress has not advanced in accordance with economic progress. Notably, the poor performance of India in regard to SPI (ranked 102) must account in part for the poor economic progress of the nation [2-3].
Figure 1.2. GDP progression rate on SPI score scale (Sources: World Bank Data are compiled for the Development Indicator from 1970 with SPI then plotted for the same period.)
The problem of poor social advancement can be attributed to its [1-2] health and wellness outcomes. Countries that rank higher in SPI have established sound information technology usage in healthcare system and it is apparent that India’s failure to improve healthcare outcomes has cost the nation dearly in terms of social progress. With the diffusion of information technology in India, a modernized treatment system could be evolved to address low adoption of quality drug. Variations in adoption decisions across private hospitals are evident and are the greatest barrier to improvement of treatment efficiencies. Of special concern, however, are variations in prescription decisions for the treatment of diseases such as hypertension, as studied by Pavani [51] and Sreedharan et al. [52]. Treating this problem with new generic formulations or developing fixed-dose combinations may not solve the issue as other non-drug-related factors seem responsible [71-72] for prescription variation.

In India, hospital groups functionally involved in prescription decision management (e.g., public safety, human services, and communication infrastructure) have not been upgraded to tap medical information, knowledge flow, and relevant communication so as to benefit from a rational prescription system across all healthcare institutions like that of HMOs in US [46-73]. In other words, there is often no consensus amongst physician that can help to arrive at an optimal prescription solution or to collect the information required to prescribe new late-entrants [66-67]. Decision-makers, i.e., the prescriber-clout may sometimes be required to operate in contexts that do not fall within their immediate areas of experience; however, they must nonetheless make a decision regarding adoption or switching to alternative brands. Such
circumstances can negatively influence new pharmaceutical launches and this remains currently an unresolved problem [53, 65-68]. The lower the rate of adoption of quality antihypertensive drugs, the higher will be the risk of not being able to control hypertension [65]. As a result, healthcare outcomes weaken and social progress is nil. A quality prescription drug is the demand of patients but multiple competing environmental challenges affects prescription intentions even for simple diseases like hypertension. Diverse classes of drugs leading to multiple approaches to target the disease further compound the problem. Based on the research inquiry to unfold the researchable problem, the propositions as derived are summarized succinctly.

Social progress is directly related to the quality of healthcare outcomes [2-3]. In developed countries, effective pharmaceutical products effectively distributed lead to strong and constantly improving healthcare outcomes. In India, as in many developing countries, this model breaks down because of gross inefficiencies in the timely delivery of the best drug available for a particular patient with a particular malady. The principal source of inefficiency lies in a failure of the information system that, in developed countries, is used to create (a) a comprehensively informed base of medical practitioners at all levels and (b) a base of consumers with promoted and self-driven access to pharmaceutical information. This problem is especially acute regarding LEGPD adoption and use.

The general problem to which this dissertation applies itself is the precise characterization of how the pharmaceutical information system fails, especially for
LEGPD, and how the damaging effects of these failures can be slowed and eventually reversed.

1.3 Research question, study objective and propositions

Following Phelps, [49], this study endeavours to understand how quality drug adoption occurs in India against the global adoption, and in doing so, answers why certain drugs retain their popularity while most expert opinion decries their use. The adoption of generic, quality drugs has become a highly structured process in developed markets because of HMOs [46,73]. Conversely, in India, researchers have observed that the tendency toward lower drug adoptions has limited firms’ success in commercializing their generic drug products. India has shown alarming healthcare performance (measured in terms of mortality from NCDs). High death rates in India due to NCDs, as evidenced by Bloom et al. [75], may stem from poor adoption of quality drugs. Even though high level of drug adoption is essential for healthcare competitiveness, the same is not observed for hypertension management in the indigenous market. Due to local regulatory interventions such as pricing, compromising quality for cost [43], the local drug adoption situation is disappointing in comparison with the streamlined, global drug adoption process. Unless a much improved level of drug adoption is achieved, India cannot expect to see the benefit of improved healthcare services and treatment efficacy or to enjoy that benefit in the form of an advance in social progress.

In order to understand the arrays of research problem figured out, the study asks four researchable questions:
**Research Questions #1.** Given that the level of pharmaceutical adoption for prescription purposes in India is low in comparison with the adoption rate for developed countries, what specifically and precisely are the sources of medical information that influence domestic adoption decision and how do these relate to one another based on disease complexity?

**Research Question #2.** How the practice of informed decision-making, dependant on disease complexity, is related to clinical symptoms that can lead to higher adoption of late-entrant drugs?

**Researches Question #3.** What are the diverse sources of medical information that doctors consider in clinical setting to adopt new late-entrant prescription?

**Research Questions #4.** What are the communication drivers that support or impede new prescription drug adoption?

Again this dissertation argues that the research objectives, comprising of four successive steps (beginning with (i) to identify problem, (ii) developing solution, (iii) designing and implementing solution and ending with (iv) assessing its impact are to be undertaken in order to answer the above research questions.

Answering the Research Question 1 necessitates drawing on the conceptual and empirical literature dealing with (a) the drug adoption process (essentially a strategy-making process), (b) communication transactions among the stakeholders of medical community, and (c) context factors that influence the processes and the strategies that result from them. In order to answer this question, the dissertation uses general literature on healthcare adoption and builds a communication framework (as shown in
V-shape form in Figure 1.3) tailored for pharmaceutical firms, drawing from the literature on strategic planning by firm-managers/researchers. Having designed this solution; both literature review and brainstorming approaches were implemented so that the identifiable, theoretically-driven constructs get verified in the current context by employing qualitative techniques. This model, which this study calls a Healthcare Communication Framework (as shown by a V shaped Figure 1.3), further develops propositions to facilitate the operationalisation of each objective. These propositions derived from the communication framework are then empirically tested in cross-sectional study within the boundary of healthcare institution of India.

![Figure 1.3 Proposed model for healthcare communication framework](image)

As discussed in the previous sections and represented in Figure 1.3, a nation’s economic progress is only sustainable with its steady social progress.
Based on the identified literature gaps [1-7,75], the health and wellness factor is one of the key indicators of social progress, and anchoring the non-medical approach with communication coding (at the base of V-shaped model) is one of the primary elements of the health and wellness component. The study, conceiving a model that is linked to each constructs (Figure 1.3), employs an action based research (or response) model. This study proposes better adoption of quality drugs, more efficient will be the treatment experience of patients.

With better medical treatments, positive healthcare outcome will be registered that can enable the nation to succeed with social progress as depicted in Figure 1.3. To develop an instrument for measuring the drug adoption, this study explores the competing factors at the patient and prescriber level so that the envisaged strategy can be formulated at the producer-level. At the patient-level, reported studies have shown that prescription decisions were influenced by patient characteristics such as disease, age, bodyweight and lifestyle habit (i.e., smoking, alcoholism) [27,77]. For instance, according to Gerving et. al [48], patient-related factors in ARB drug prescription affected the drug adoption outcome. With the objective of understanding the influence of patient-related factors in prescription decisions in India, in Figure 1.3, the sub-question that emerges from the above overarching research question is:

Based on Research Question #2, a response model for including patient-related factor in the adoption process has been incorporated in the research framework. Next, the study measures the prescription intention of doctors for LEGPD [89] as drug selection for treating hypertension in India has been highly variable, as noted from
Pavani et al. [51] and Sreedharan et al.[52]. The data mining approach using classification technique to reveal the patient-based disease monitoring is applicable in private hospital setting or not has been the other objective of the study. Therefore, the second proposition to improve healthcare performance in India is that the firms employing a strong information communication system for their new late-entrant drug launches, experience higher drug adoption [50]. As shown in Figure 1.3, the third question that arises in the given context to influence the process is:

The Research Question requires the understanding that drug adoption is a dynamic process. Earlier, Dadhich and Upadhyaya explored drug manufacturing opportunity in India because of the availability of cheaper, skilled labour forces as compared to other developed markets [37]. However, the direct and indirect sources of medical information through communication channels influencing prescription decision in India has not been strategized by firms. The communication flow among the stakeholders in the medical community needs to be optimized. The communication factor has been included into the research design phase, in an attempt to clarify the variations in the drug adoption decision. This dissertation explores the key relationship between these constructs (as discussed in Section 1.2) and proposes a framework that provides an integrative approach to predict the drug adoption process. The fourth question that emerges contextually, as depicted in Figure 1.3, is:

The Research Question can be solved if all other research question converges to the theme of communication impacting LEGPD adoptions. Based on the research premise
and developing a framework for the study, research outline has been framed to describe the strategy and plan of work.

1.4 Research outline

Chapters of this thesis have been organized based on Easterby-Smith et al. and Phillips and Pugh’s [90-91] unified structure. Perry suggests a five-chapter structure for research studies in marketing and related fields using common methodologies such as structural equation modelling [92]. An additional chapter on data and measures has also been added using a mechanism of quantitative–qualitative and quantitative–sequential design. Based on the research proposition, usually the body of knowledge in a dissertation can be broadly classified into six sections as shown in Figure 1.4.

![Figure 1.4 Model of thesis chapters adopted](image-url)
To meet the intended research objectives, the study utilized the design of quantitative methods proposed by Creswell [93] and the ‘Four-Phase Process of Measure Development and Validation’ proposed by Xia and Lee [94]. These two approaches are summarized in Table 1. Phase zero is the background work in which the literature gap is identified, research objectives are fixed and methodology is designed based on operational definitions and measurement referred. A brief insight into the contribution to the body of knowledge, the research limitations and scope with future research directions is presented at the outset as a summary.

Part 1 study involves a detailed literature review on identifying the dimensions of drug adoption and linking elements to each construct. Studying the methodological approach and anchoring to conceptual model of behavioural intention to adopt has been the essence of this chapter. Contributions of researchers are summarized and knowledge domain of drug adoption has been enriched. To address the research question, this section traces a hypothetical framework, complementing with field interviews and focus groups’ strategies so that the items generated converge to specific dimensions.

In Part 2, the proposed model has been integrated with the final items of measurements, anchored to sharper hypothesis. A causal relationship among the dimensions and fitting data using structural equation modelling is the essence of this section.

Part 3 involves survey data collection involving both quantitative and qualitative techniques to develop a knowledge map for measuring prescribing intentions and predicting drug adoption.

Part 4 involves data analysis, measurement and establishing reliability and validity of a scale that can be applied to measure the variations in drug adoption decisions or switching intentions among the same or different classes of prescription drugs for treating simple disease like hypertension. All these five parts are summarized in Table 1.1.
### Table 1.1 Research outline on drug adoption

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<tr>
<th>Part 0</th>
<th>Research Context</th>
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<tbody>
<tr>
<td></td>
<td>Research Background, Problem Statement and Research Objectives, Research Significance, Methodology and Research Site, Research Outline and Research Scope, Limitations and Conclusions</td>
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<th>Conceptual Development and Initial Item Generation</th>
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<th>Data Analysis and Measurement Validation</th>
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<td>Part 4</td>
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The qualitative and quantitative research issues relating to these questions are further discussed in Chapter Three.

Following Hu’s approach [9] towards medical innovation adoption, this research study has directly addressed the scope of new generic drug adoption for efficient healthcare management of patients, based on communication-diffusion in the healthcare value chain. To deal with the complexity and uncertainty in predicting doctor’s prescription intent, the study took a hybrid research approach for instrument development and testing the theoretically driven constructs. Following Platt’s model of methodological triangulation [95], an exploratory phase was used to provide a detailed understanding of the underlying challenges in adopting drugs for treating NCDs and to generate specific research questions or models for the subsequent explanatory phase. This dissertation was intended to respond to earlier inadequacies and misapplications in relation to conceptualizing adoption of LEGPD.

The following chapters reflect a holistic approach towards drug adoption, appraising the patient’s wellness factor (with the anti-hypertensive and anticancer drug) that may not have as yet been monitored by policy-makers and regulatory authorities. Further, understanding the global perspective of healthcare service delivery and the nations that are ranked higher than India in the SPI and then implementing best practices of top SPI performers can be useful to improving healthcare conditions in India and make the nation a favourite global destination for medical tourism.