

# The Business Models of Frugal Enterprises for Sustainable Development in a Constrained Environment

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**Abstract**—Constraints and institutional voids in emerging markets pose significant challenges to serving low-income customers. Indeed, the complex constraints often discourage traditional companies from pursuing such endeavors, but a new breed of enterprises characterized by their frugal approach is emerging from this constrained environment. Nevertheless, we know little about how these frugal enterprises transform constraints into opportunities through innovative business models that include collaboration with local and international partners, as well as how they can contribute to sustainable development. Drawing on institutional theory perspective and the resource-based view, this article explores how frugal enterprises create business models for serving overlooked customers in emerging markets and overcoming the various constraints and institutional voids. Based on six cases of frugal enterprise and 22 interviews, this qualitative study contributes to the literature in the following three ways. *First*, it reveals how frugal enterprises transform constraints and institutional voids into viable business models for serving traditionally underserved customers. *Second*, it sheds light on how these enterprises engage with local and international partners to overcome the constraints in emerging markets. *Finally*, it demonstrates that frugal enterprises contribute to sustainable development in a profitable manner. The findings offer valuable insights to guide managers and policymakers in attaining sustainability and profitability in the emerging markets.

**Index Terms**—Business model, emerging markets, frugal enterprises, frugal innovation, sustainable development.

## I. INTRODUCTION

ENTREPRENEURSHIP has remarkable potential for achieving sustainable development [1], [2] but traditional firms are profit-oriented with little interest in sustainable development [3]. Nevertheless, there is a compelling need for both multinational enterprises (MNEs) and small- and medium-sized

enterprises to strike a balance between profitability and their contributions to sustainability [4]. With their novel business models, frugal enterprises have emerged as key players contributing to sustainable development in resource-constrained environments [5]. Frugal innovation considered a valuable source of sustainable entrepreneurship [6], [7]. Frugal enterprises are ventures that develop affordable products and services for low-income customers who are typically not deemed worthy of attention by conventional companies [8]. Over recent decades, sustainable development has arisen as a means for addressing the issues of poverty, environmental damage, and social inequality. It essentially means that societies should satisfy their current needs without sacrificing the ability of future generations to satisfy their needs [9], and it encompasses three main aspects: economic, social, and environmental [10]. Enterprises play a pivotal role in achieving sustainable development goals (SDGs), and frugal enterprises are increasingly seen as crucial players in promoting sustainable development [11] by targeting low-income consumers in developing countries and turning local challenges into market opportunities [12], [13], [14]. However, frugal innovation does have its drawbacks, including limited societal impact, frequent reliance on short-term solutions, hindrance to social development, and the exploitation of children and women as low-paid workers in low-paying, unsanitary environments [15].

Institutional voids in developing markets are common, and accessing resources can be daunting [16], yet there are large numbers of low-income customers in these markets who cannot afford conventional products, so novel business models are needed to serve these customers [17]. The success of a venture is closely associated with the design and implementation of its business model [18], but our knowledge about the adoption of sustainable business models is limited. New ventures can be particularly effective at creating sustainable business models by developing new activities and building partnerships to link these activities in novel ways [19]. Business models for sustainable development are closely associated with emerging markets, where resource and institutional constraints are ubiquitous [12], so it is unsurprising that we have witnessed a surge in new business models in such countries [20]. Unfortunately, the business model concepts discussed in the extant literature primarily originate from practices in developed countries, where resource and institutional conditions are much more favorable compared to those in developing countries [21]. This points to the need to research

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the resource and institutional aspects in a specific social context, particularly in emerging markets [22], [23], [24]. Emerging markets represent a promising research setting due to a surge in new enterprises in recent years despite the constraints [25], [26], [27]. Developing countries are much more vulnerable than developed countries when it comes to accessing basic needs like education, healthcare, and drinking water, yet studies of business models in constrained environments, especially in developing countries, are scarce [28], particularly from the perspective of producers [29]. Thus, we urgently need further research to understand how the business models of frugal enterprises are connected with sustainable development and how such enterprises contribute to the SDGs through their business models [30].

This article therefore attempts to answer the following question: How do frugal enterprises develop business models within the constrained context of a developing country, and thus, contribute to sustainable development? Based on the institutional theory, the resource-based view, and the business model literature, we explored the business models of six nascent enterprises in Pakistan through data from 22 interviews, mainly with these enterprises' founders, and a large volume of secondary data. Drawing from an institutional theory perspective, we have developed arguments that demonstrate how this theory influences the development of frugal innovation, taking on either a constraining or facilitating role, thereby reflecting its central position in the context of entrepreneurship. Furthermore, we examined the resource-based view from a strategic management standpoint to understand how resources and capabilities are manifested in resource-constrained environments to realize frugal innovation and entrepreneurial aspirations, particularly in the underprivileged populations in developing countries. This work thus contributes to the literature in three ways. First, it demonstrates how frugal enterprises turn resources and institutional constraints into business opportunities for serving underserved customers. Second, it reveals how such enterprises develop and leverage local and international partnerships as a means for overcoming the constraints by facilitating knowledge and technology exchange. Finally, it makes specific theoretical contributions related to the frugal innovation and business model literature, the contextualization of business models in developing countries, and the emerging literature that explores the link between business models and sustainable development. It provides evidence to show that frugal enterprises contribute to sustainable development while simultaneously capturing value for themselves by the virtue of their business models. In terms of practical applications, our study holds considerable relevance for business strategies and policy directions, particularly with regard to integrating sustainable development practices. Specifically, this study inspires managers to develop profitable strategies to serve underserved customers through new business models that create value and foster partnerships to mobilize critical resources.

## II. LITERATURE REVIEW

In this section, we review prior studies related to institutional theory and institutional voids. We also discuss the literature on

resource constraints, business models, and frugal innovation. Supplements A and B in the Supplementary Material depict the overall synthesis of the relevant literature.

### A. Institutional Theory and Institutional Voids

Institutional constraints influence human interactions and serve as the “rules of the game” for doing business, and institutions must act efficiently within regulative, normative, and cognitive contexts for markets to function properly [31]. The institutional theory has been applied to understand how the institutional context guides the development of frugal innovation [32], [33]. For example, scholars have explored the significance of weak innovation infrastructures in both constraining and enabling frugal innovation [34], [35]. Weak innovation infrastructures encompass various constraints, such as inadequate protection for intellectual property and insufficient support mechanisms, which can impede frugal innovation [35], [36]. Nonetheless, these weak institutional environments can also provide fertile grounds for opportunities, allowing frugal innovators to explore novel business prospects and develop innovative business models [37], [38].

When the aforementioned institutions are absent or function poorly, institutional voids occur. Institutional constraints can be both formal and informal [12]. Formal constraints include a lack of rules, little or no legal support, a lack of specialized intermediaries, the absence of agencies for quality certification, and inadequate regulatory bodies [39]. Informal constraints, meanwhile, relate to social norms, cultures, and codes of conduct [16]. The role of institutions may include limited government support, which again may hinder entrepreneurs from accessing resources through formal and informal channels [40]. Some researchers have focused on the absence or underdevelopment of strong formal institutions [41] for supporting business activities, while others have emphasized the interconnectedness between formal and informal institutions, such that informal institutions tend to fill the gap left by formal institutions [42]. The impact of institutions on entrepreneurial activities is evident in emerging markets [43]. Indeed, institutional constraints pose a serious barrier to entrepreneurial activities in themselves, and they inextricably result in a lack of various resources that enterprises need to flourish [44]. Supportive institutions, in contrast, are viewed as stimulators and providers of resource support [45].

Nevertheless, the lack of strong formal institutions and poor provision of adequate social goods can lead to greater social entrepreneurial activity by transforming these limitations into business opportunities [16], [40]. The notion of constraints also closely relates to sustainable development, which is severely limited by institutional constraints and a lack of resources [46]. On recognizing the constraints, some enterprises in developing countries have responded to the challenges with great sensitivity to local needs, and they have emerged as critical players in community development, which has been failed by inadequate institutions and insufficient resources [47]. Such enterprises devise creative solutions to complex socioeconomic and environmental problems in a resource-constrained environment [48].

## B. Resource Constraints

Resources are crucial for any new venture trying to develop products or services [49]. From the strategic management perspective, the resource-based view (RBV) elucidates the mechanisms through which a firm gains a competitive advantage by obtaining distinctive and superior resources, and subsequently, translating these resources into capabilities that deliver better value for customers and bolster the firm's value appropriation [50]. The resource-based perspective has been applied to frugal entrepreneurs to understand how they mobilize human, financial, and social resources and capabilities in a resource-constrained environment to realize their innovational and entrepreneurial aspirations [12]. Frugal entrepreneurs employ diverse strategies in developing markets, such as fostering partnerships with local actors to cocreate products or collaborating with nontraditional stakeholders to overcome local constraints [51], [52].

A lack of resources prevents many people from engaging in entrepreneurship [53]. In developing countries in particular, entrepreneurs often encounter several constraints, such as a lack of raw materials and advanced machinery, underdeveloped information technologies, and a shortage of local technological expertise [54]. Nevertheless, some entrepreneurs transform these resource limitations into opportunities [55], such as through partnerships [56]. Moreover, the constraints in developing countries lead some firms to offer affordable products thanks to their low production costs.

The RBV is mainly grounded in well-established markets that are characterized by intense competition [56], and it has been less commonly applied from the perspective of frugal innovation [12]. A key limitation of the RBV is that we know little about how to configure resources to best realize their potential for creating value in various other contexts [57], such as in developing markets. Consequently, its managerial relevance is somewhat limited when we consider the process of configuring resources to create value in those countries, which are characterized by resource scarcities that significantly impact resource-management practices [58].

## C. Business Models and Frugal Innovation

Business modeling has emerged as an important topic in management scholarship, with it gaining significant momentum in recent years [59]. A business model's significance can be understood through the central role it plays in explaining a firm's competitiveness and overall performance [60], [61], and numerous evidence between certain business model and a firm's performance [62], [63]. The term "business model" has no single universal definition [64], but the underlying concept mainly comprises three main components: value proposition, value creation, and value capture [65]. For this study, we applied the Teece model, which combines the business model, strategy, and innovation [65]. Despite the challenges in defining a business model, various factors are recognized as being key elements depending on the objective nature of the business [14]. These can include internal factors, such as infrastructure and a process for creating efficiencies, and external factors, such as customers and processes for value creation, which must be in place for a firm to

meet its objectives [66]. A number of business model elements have been identified for developing and running a business, as presented in Supplement B in the Supplementary Material: value proposition, key activities, key resources, customer segment, partners/stakeholders, cost structure, revenue flows, and distribution channels [65], [67], [68], [69]. As enterprises need to become more agile and ambidextrous [70]; studies on digital business models [71] in relation to innovation have emerged recently.

Frugal innovation is a "resource-scarce solution designed and implemented despite resource constraints, whereby the outcome is significantly cheaper than competitive offerings (if available) and is good enough to meet the basic needs of customers who would otherwise remain un(der)served" [72, p. 133]. Recent studies of frugal innovation have embraced a wide range of topics from various disciplines, such as strategy, inclusive development, sustainability, and industrial application [73]. Scholars have also studied frugal innovation from the perspectives of sustainability [74], supply chains [75], [76], frugal innovation capability measurement [77], sustainable development [74], [78], sustainable entrepreneurship [30], service industry [79], as well as reverse innovation and Jugaad [80].

Business model is a key element for the success of any innovation [71]. Several studies have also explored frugal business models, including in the context of sustainable innovation [81], small enterprises [72], MNEs [5], the medical device and laboratory equipment industry [82], and the role of information technology [83]. Nevertheless, scarce attention has been given to examining business models in the context of frugal enterprises and their role in promoting sustainable development, indicating that an alternative framework for frugal business models in developing countries is needed.

## D. Nexus Between Constraints, Business Models, and Sustainable Development

Constraints, business models, and sustainable development are closely related in contexts with institutional voids. Indeed, frugal enterprises use fewer materials and resources and engage with various stakeholders to create promising pathways for sustainable development [11]. Scholars have advocated that the local context should be more deeply integrated into firms' business models for achieving sustainable development [84], [85], [86]. This is particularly important in developing countries, where the local context is unique in terms of its resource and institutional constraints, such that private enterprises play an important role in promoting sustainable development [87]. Indeed, the idiosyncratic local context influences firms' business models for sustainable development by creating value and having a socioeconomic impact on the community by overcoming the pervasive social, economic, and environmental pressures [74].

There is a strand of research dealing with the nexus between business models and sustainable development, with the emphasis usually being on investigating how the development and implementation of new business models can create and capture value in the transition to sustainability [88]. For example, firms with sustainable business models gain a competitive



advantage by offering superior customer value in their core products [60], [89]. They also contribute to sustainable development for other social and environmental stakeholders [60] by integrating sustainability elements into their mechanisms for value proposition, value creation, and value capture [90]. Moreover, innovative business models can enable firms to serve underserved customers, and this presents a new pathway to sustainable development [14] by turning local challenges into new market opportunities [91]. Firms utilize sustainable business models to not only establish a financially viable business but also deliver economic and social value, thereby contributing to SDGs. The business models pursued by frugal enterprises can particularly contribute to sustainable development by providing communities with the ability to purchase products that meet their needs while reducing the consumption of natural resources and creating inclusive economic growth by involving local communities and stakeholders in the value chain [13], [92]. Despite a growing consensus among scholars about the need for businesses to effectively incorporate the local context into their quest for sustainable development [85], [93] little is known about the ways in which local contexts are relevant to a firm's role in sustainable development [30].

### III. METHODS

#### A. Research Setting and Case Selection

As the sixth-most populous country in the world, Pakistan faces a myriad of development challenges in terms of economic, environmental, governance, and social aspects. The country also faces the alarming and growing threat of climate change, which manifests most prominently in the form of natural disasters, water scarcity, food insecurity, and rising air pollution [94]. Nevertheless, it has witnessed an unprecedented rise in entrepreneurial activities in recent years, but how these new entrepreneurial activities align with sustainable development remains to be understood. Addressing challenges of sustainable development requires working around many institutional limitations that are typical to a resource-constrained environment like Pakistan. This study, therefore, attempts to examine how some local nascent enterprises have utilized innovative yet frugal business models to create profitable and sustainable businesses. Formulating frugal business models allow such new enterprises to turn constraints into opportunities and serve indigenous problems of the country.

We adopted a qualitative research approach with a multiple case study based on the works of Eisenhardt [95] and Yin [96]. The case study method is generally acknowledged for its usefulness in gathering insights into underexplored phenomena [96]. A purposive sampling method was used to select multiple cases, thus ensuring a diverse range of sectors were represented [97]. Fig. 1 illustrates the process for data collection and analysis. Compared to mainstream enterprises, frugal enterprises typically face more severe institutional constraints, so they are rich exemplars for how firms develop business models to undertake entrepreneurship. Table I gives an overview of the cases, and a common denominator among them is that they targeted similar types of customers, mostly the poorer segments of the country, and had been founded in the last five years. In addition, all

the selected cases offered innovative solutions designed around proprietary technologies to address some fundamental need of their customers, such as by providing affordable housing, clean drinking water, primary healthcare, and a mode of transportation.

Two authors initially conducted comprehensive desk research on local cases, with the focus being on those predominantly catering to underserved customers. We identified 13 such enterprises based on advice from some entrepreneurship mentors and managers of incubation centers in the country. We then selected six startups by applying the following selection criteria: They should have novel ideas in the region that are recognized by experts, serve underserved customers, solve some pressing problem, and hold significant socio-environmental value in their business models.

#### B. Data Collection

We collected data mainly through unstructured interviews, field observations and notes, and extensive secondary documents. Initially, we organized meetings with three industry experts and the directors of three leading incubation centers in Pakistan, leading us to identify 13 potential cases of frugal innovation. We also performed extensive desk research into these firms to collect secondary data, such as from the firms' websites, media articles, reports, and video clips. This secondary data then enabled us to shortlist six frugal enterprises for our study from the 13 suggested start-ups. Using the key informant approach, we interviewed the "single most knowledgeable and valid information sources," namely the founders and senior managers. We, therefore, conducted 22 in-depth interviews, of which seven were conducted face-to-face and 15 were held over Zoom due to COVID-19 pandemic restrictions. Two researchers together conducted the interviews in two separate rounds. In the first round, the founders of only two frugal enterprises were interviewed, and this was followed by a preliminary analysis of their transcripts and a joint reflection by the two authors. Referring to the literature, the authors identified some tentative themes from the data that were relevant to the research question(s) before proceeding to the next round of interviews. In the second round, 16 more interviews were conducted with the founders, customers, and employees of the remaining four enterprises. Soon after each interview, the two authors who conducted it reflected upon and discussed the interview notes and the nature of the data. All the interviews were conducted in Urdu, the national language of Pakistan, although the interviewees sometimes used English words and phrases. We recorded and transcribed each interview and eventually translated the transcriptions into English. Next, two researchers independently and mutually reviewed all the transcripts. Three on-site visits were made by one of the coauthors together with a research associate, and these included visits to the factories of Jolta and Byonyks, as well as the head office of the latter. Senior company managers also gave guided tours, during which the research associate took pictures and made field notes. Data from the interviews were triangulated [98] by cross-checking with publicly available information, such as numerous blogs, newspaper articles, and

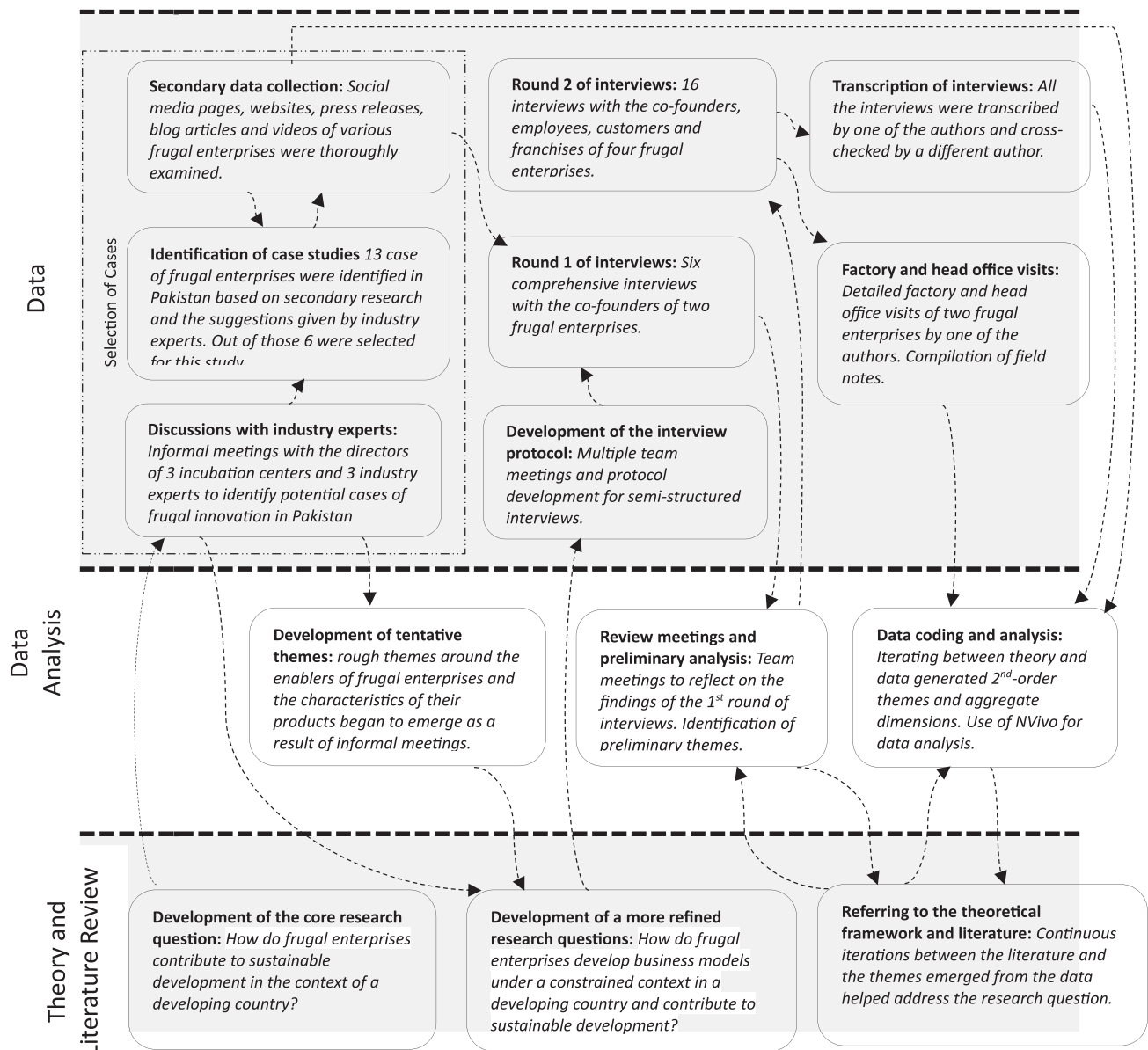


Fig. 1. Research method diagram.

press releases published on reputable forums about our selected cases. Furthermore, we collected secondary data for each case from websites, LinkedIn, and Facebook. We also thoroughly watched and transcribed more than 300 min of videos featuring TV interviews with the founders, product descriptions, and customer reviews. Table II outlines the primary and secondary data.

### C. Data Analysis

For data analysis, we used the prominent NVivo software to code, organize, and analyze our qualitative data. This enabled us to code and categorize our interview data into different themes and concepts that were related to our research question, thus helping to identify patterns, relationships, and trends within the

data and enabling a deeper understanding of frugal business models and their connection with sustainable development. We started coding with an inductive approach to identify the crucial notions and ideas that were expressed in the interviews. All the interview transcripts were analyzed independently by two of the authors in an iterative manner, with them oscillating between data, emerging themes, and patterns [90]. Using NVivo, we navigated easily across various transcripts to access relevant information for coding. For the coding, we used in vivo coding, which involved using the exact words or phrases from the transcripts as codes, when possible, and descriptive codes from the transcripts when in vivo codes were not available. A total of 25 first-order codes were formed. For instance, the expressions, such as “so we made an intermesh technology. It’s like we optimize the man to machine ratio ... it reduces the cost and

TABLE I  
SUMMARY OF THE CASES

Case ( year founded)	Products	Product under development	Start-up motivations	Key elements of business models	Sustainability features
Pak Vitae (2017)	<ul style="list-style-type: none"> <li>• Detachable water filters</li> <li>• Point-of-use water purifier</li> </ul>	<ul style="list-style-type: none"> <li>• Water dispenser bottle with pre-installed filter</li> <li>• Athlete water bottle with preinstalled filter</li> </ul>	<ul style="list-style-type: none"> <li>• Personal experience of diarrhea</li> </ul>	<ul style="list-style-type: none"> <li>• In order to facilitate business and fundraising, the parent company is established in Singapore.</li> <li>• 100% in-house technology development.</li> <li>• Only 14 employees, make it a very lean organization.</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent filter lifespan with no maintenance costs.</li> <li>• Substantially less unit manufacturing cost.</li> <li>• Low fixed cost</li> </ul>
Modulus Tech (2016)	<ul style="list-style-type: none"> <li>• Prefabricated sustainable and affordable housing, namely B2B office structures and community houses</li> </ul>	<ul style="list-style-type: none"> <li>• Eco tourist pods</li> <li>• Backyard housing</li> </ul>	<ul style="list-style-type: none"> <li>• The Syrian crisis and the displaced people who became homeless as a result</li> </ul>	<ul style="list-style-type: none"> <li>• Partnering with non-financial institutions to provide mortgages to low-income clients</li> <li>• 100% in-house technology development</li> </ul>	<ul style="list-style-type: none"> <li>• Construction costs are one-third that of comparable items.</li> <li>• More energy-efficient houses</li> <li>• Utilization of structural materials is lower than for equivalent imported materials.</li> <li>• Low shipping and packing costs as a result of the flat-pack method</li> <li>• Low fixed cost.</li> </ul>
Jolta Electric (2021)	<ul style="list-style-type: none"> <li>• Electric motorbikes</li> </ul>	<ul style="list-style-type: none"> <li>• Jolta Electric Care</li> </ul>	<ul style="list-style-type: none"> <li>• Personal environmental consciousness</li> <li>• Tesla success</li> </ul>	<ul style="list-style-type: none"> <li>• Utilizing existing networks of suppliers and dealers strategically in Pakistan's motorcycle industry</li> <li>• 100% in-house designing of the kit</li> </ul>	<ul style="list-style-type: none"> <li>• Costs ½ of the price of imported Chinese equivalents</li> <li>• Significantly better mileage (80Kms in PKR20), which translates to less expensive operation.</li> <li>• An environmentally sustainable and noiseless substitute for standard motorcycles</li> <li>• Low manufacturing cost</li> </ul>
EzShifa (2018)	<ul style="list-style-type: none"> <li>• Technology-enabled kiosk for medical consultation (Apna Doctor)</li> </ul>	<ul style="list-style-type: none"> <li>• Kiosks with integrated power bank, ultrasound, and ECG machines</li> </ul>	<ul style="list-style-type: none"> <li>• Personal awareness of Pakistan's remote areas' inadequate primary healthcare services</li> </ul>	<ul style="list-style-type: none"> <li>• Partnerships with doctors in the USA and UK.</li> <li>• Use of a franchising model for product distribution.</li> <li>• 100% in-house development of software.</li> </ul>	<ul style="list-style-type: none"> <li>• Costs one-fourth 1/4th of what a doctor in a private hospital would charge.</li> <li>• The kiosk is simple to put up, simple to use, and requires little training to utilize.</li> <li>• Use of local raw material.</li> </ul>
Daisy (2016)	<ul style="list-style-type: none"> <li>• Eco-friendly sanitary napkins</li> </ul>	<ul style="list-style-type: none"> <li>• A range of sanitary napkins</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of female hygiene and the menstrual taboo in Pakistan</li> <li>• Personal environmental consciousness</li> </ul>	<ul style="list-style-type: none"> <li>• Product design partnership with similar Indian start-ups</li> <li>• Partnership with local NGOs for product distribution and conducting menstrual hygiene camps in rural areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Use of local raw materials.</li> <li>• Low mechanization results in very low manufacturing costs.</li> <li>• No profit is taken from the sale of goods to NGOs.</li> <li>• Low fixed cost due to outsourced manufacturing.</li> <li>• Using cotton instead of plastic without the need for bleaching</li> <li>• Carcinogen-free and environmentally friendly</li> </ul>
Byonyks (2017)	<ul style="list-style-type: none"> <li>• Bloodless home-based dialysis machine</li> </ul>	<ul style="list-style-type: none"> <li>• Complimentary mobile application</li> <li>• Different models of dialysis machine</li> </ul>	<ul style="list-style-type: none"> <li>• Western businesses' refusal to sell their portable dialysis machines in Pakistan's low-income market</li> </ul>	<ul style="list-style-type: none"> <li>• Equity sharing model for international technical experts.</li> <li>• Using experienced nephrologists and other medical professionals as product ambassadors.</li> </ul>	<ul style="list-style-type: none"> <li>• Costs about 1/10th of the price of imported equivalents.</li> <li>• Considerable reliance on favors from individuals and voluntary groups in the US and UK.</li> <li>• 100% internal mechanical and electronic component design.</li> <li>• Very lean physical infrastructure.</li> </ul>

optimizes the speed of production” and “we enjoy 3 to 4 times higher rates of influx than any competitor in the market” were collated to become a first-order code of “Improving product functionality.” Subsequently, we performed axial coding [99] to identify the relationship between different first-order constructs to consolidate them into second-order theoretical categories to progress the analysis to a higher level of abstraction. For example, the first-order codes like “improving product functionality,” “developing new product architecture,” “building proprietary technologies,” and “focusing on experimentation and

R&D” were merged to form the second-order category of “new technology development.” Resultantly, a total of 11 second-order categories were formed. Next, referring to the core concepts of literature on frugal innovation and business model, we aligned our second-order categories to formulate even a higher level aggregated dimension around three core elements of business model, namely, value creation, value capture, and value proposition. At the same time, two additional aggregated dimensions evolved purely from our data about the constraints faced by the frugal enterprises and the sustainability elements of

TABLE II  
SUMMARY OF CASE INTERVIEWS AND SECONDARY DATA

Cases	Interviews			Secondary data (#)			
	Interviewees designation	No. of interviews	Duration (minute)	Social media pages	Press release/ Blogs	New articles	Videos
Byonyks	Founder and CEO	2	120	6	49	2	10
	CTO	1	35				
	Head of HR	1	45				
	Chief medical officer	1	30				
	International expert	1	20				
Modulus Tech	CEO	2	140	3	17	2	4
	COO	1	120				
Jolta Electric	Founder and CEO	3	120	2	12	1	10
	CTO	1	45				
EzShifa	Cofounder and CEO	1	90	4	14	1	7
	Cofounder and CTO	1	80				
	Franchisee	1	40				
Daisy	Founder	2	130	2	4	1	-
	Head of marketing	1	90				
PakVitae	Cofounder and CEO	2	150	3	13	5	8
	Cofounder and CFO	1	130				
Total		22	1345	20	109	12	39

their products and services (i.e., outcomes). Finally, we concentrated on conceptualizing the connection between these aggregate dimensions, as well as understanding how they interacted to form a logical framework for sustainable business models in a resource-constrained context.

#### IV. RESULTS

Our findings revealed how unconventional businesses are conceived as entrepreneurs try to circumvent resource constraints through a sustainable business model. Based on our data analysis, Fig. 2 illustrates how frugal enterprises in a resource-constrained environment capture value while contributing to sustainable development. Entrepreneurs consider some key constraints as a starting point for their ventures, and they turn these constraints into opportunities by developing innovative business models for offering creative and affordable solutions to serve low-income customers. Their value propositions entail a set of benefits that lead to raising the initial funding and value creation through new technology development, knowledge acquisition, and cost optimization techniques that are enhanced in various ways. Thus, through their business models, frugal enterprises achieve two key outcomes: value capture for themselves and their partners, and sustainable outcomes for the external stakeholders. Both local and international partners seem to play a pivotal role throughout the functioning of these business models,

especially at the initial stage of the entrepreneurial journey. In the following subsections, we expound on these various components of frugal business models along with the constraints and partnerships.

##### A. Constraints for Frugal Enterprises

The entrepreneurs encountered a range of institutional, infrastructural, and resource constraints at various stages, with these being highly prevalent during technology development and fabrication. These constraints include a lack of raw materials and advanced machinery, limited access to institutional funding, and insufficient local technological expertise. Furthermore, frugal enterprises face cultural taboos and complicated regulatory systems. For example, in the case of PakVitae, which makes detachable point-of-use water filters, a lack of local experts related to their technologies, the unavailability of raw materials, and the absence of appropriate testing facilities were the main constraints. As the cofounder and COO of PakVitae expressed the following:

*“The major challenge was finance. Second, no expertise in Pakistan, as no one knew about the hollow fiber membrane technology in Pakistan. So we had to go to other countries like China, Korea, and Singapore. Third, in Pakistan, there aren’t good laborites to test, no facility in Pakistan to check if a virus can pass through the membrane.”*

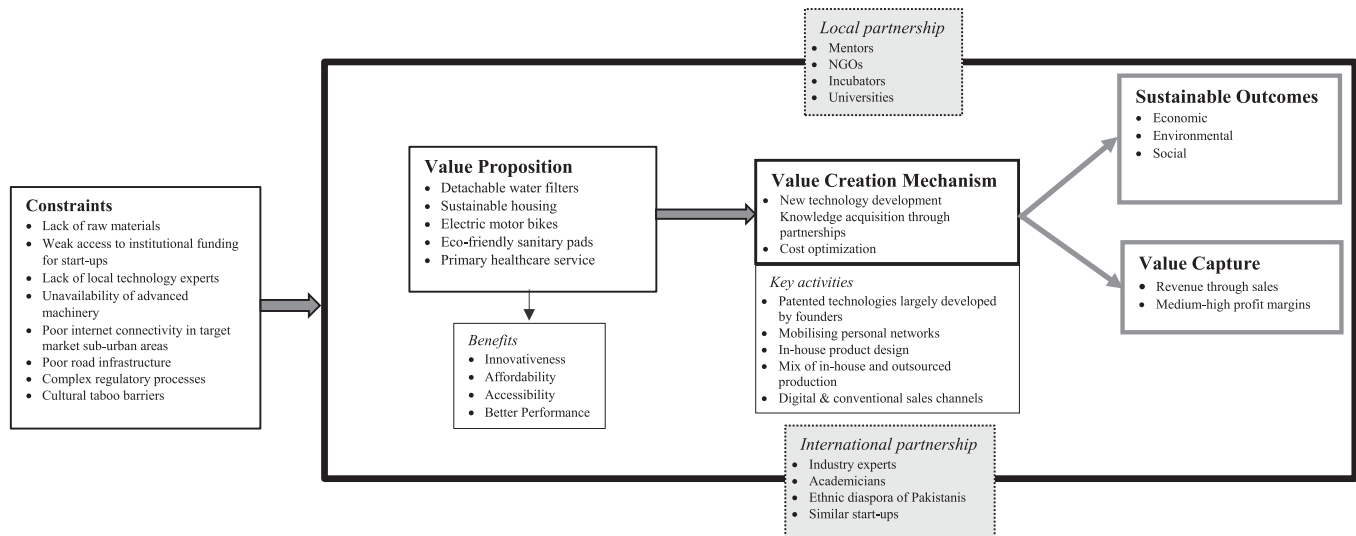


Fig. 2. Framework for a Business Model in a Constrained Environment with Dual Outcomes.

For Jolta, meanwhile, importing raw materials for its patented electric kits and motors was imperative due to the lack of comparable material grades in the local market. Furthermore, the lack of institutional support in the form of good quality vocational training institutes in Pakistan was deemed paramount for the firms engaged in extensive in-house manufacturing, such as Jolta Electric and Byonyks, because without appropriate vocational training, it is hard to recruit skilled technicians. A lack of institutional funding is also a key constraint for frugal enterprises, especially as investors are more concerned about hardware-based, as opposed to platform-based, ventures that are riskier and less scalable. The founders of almost all the frugal enterprises echoed the challenges of fundraising as being an inherent limitation for their hardware-based products. Indeed, frugal enterprises are less likely to raise funds due to their focus on low-income customers, and most have so far managed to sustain themselves through internally generated revenues and external grants. Nevertheless, their potential to scale up remains restricted due to the lack of external funding. The frugal enterprises also experienced numerous infrastructural constraints. Poor or nonexistent Internet connectivity is one critical constraint that enterprises face, especially when trying to serve low-income customers in rural and suburban areas. For example, the founder of EzShifa expressed that Internet connectivity presents a key challenge for the effective operations of its Apna Doctor kiosks in the remote areas of Sindh and Northern Pakistan. He also shared what they were doing to overcome this problem, as follows:

*“When the Internet is weak, we don’t do video consultations and just get by with audio sessions, so we manage. Audio sessions can also happen on slower 3G connections. We have partnerships with PTCL (the largest Internet provider in Pakistan); so we make the links.”*

Likewise, a lack of proper road infrastructure is also a major challenge, especially for frugal enterprises trying to serve customers located in remote areas. Modulus Tech, for example, finds it extremely problematic to build houses for communities

in the far-flung areas of Sindh and the mountainous areas of Northern Pakistan due to the poor road infrastructure in these regions. Overregulated and bureaucratic processes for attaining approvals and licenses are another key institutional constraint for frugal enterprises. Such regulatory factors create significant barriers for entrepreneurs trying to innovate and contribute to sustainable development. For example, it took Byonyks almost two years to get their dialysis machine approved by the local drug regulatory authority. Similarly, the cofounder of PakVitae said the following about his experience of interacting with various government organizations:

*“In Pakistan, the number of government organizations should be far less; they try to control more than what they can manage [...] I realized that as a start-up one should just stay away from them as long as possible.”*

As informal constraints, cultural taboos are also prevalent for some products. In conservative societies like Pakistan, women are often shy about discussing topics like sanitary pads and menstruation in public. The founder of Daisy mentioned the following challenge related to her sanitary pads:

*“For women in rural areas, there was so much taboo around these menstrual products that it was almost inconceivable to hang their sanitary cloth in outdoor to be dried in the sun, where it might get visible to the male members of the family.”*

Enterprises tend to view these barriers to market entry as creating potential gaps within the market because many needs remain unmet. Hence, they develop business models that are embedded in the local constraints, thus enabling them to build innovative solutions and address some of the social and economic challenges. Consequently, they help people escape the cycle of marginalization and instead direct their energies toward useful endeavors.



### B. Four Main Features of Value Proposition

We found affordability, accessibility, innovativeness, and superior performance to be the four main features of the value proposition offered by the frugal enterprises. Most customers in a resource-constraint environment typically have low incomes, making it an ideal environment for launching affordable products. A key value proposition is, therefore, to serve such customers with affordable solutions. For example, PakVita, which makes water purifiers, distinguished itself through the longer lifespan of its water filters that require no maintenance due to their antimicrobial material, essentially increasing the value and affordability of the product for the customer. Jolta Electric, meanwhile, has produced e-bikes that make mobility easy and inexpensive for low-income customers. The founder of Jolta Electric explained the following:

*“The purpose of the e-bike is to make commute hassle-free, affordable, and convenient for people from middle to low-income families who otherwise struggle a lot on the buses and vans.”*

Compared to the biggest competing product in the local market, the Honda CD70 motorcycle, Jolta’s offering is not only more environmentally friendly but also cheaper (US\$400 versus US\$375) for customers. Moreover, when compared to imported Chinese equivalents, Jolta’s bike is around half the price. In addition, given its cheap mileage cost (i.e., 80 km for 20 PKR), it costs significantly less to run than conventional gasoline bikes in Pakistan. Likewise, the portable dialysis machine manufactured by Byonyks costs about a tenth (US\$300 versus US\$3000) of the imported equivalents due to its lean cost structure and the use of manual labor and local raw materials.

All the case firms target underserved customers residing in either rural or suburban localities, thereby improving these customers standard of living. For instance, most of EzShifa’s telemedicine kiosks are located in rural and other underdeveloped areas. Of the 30 operational kiosks, 21 are installed at either rural or small urban sites, including the extremely remote and deprived areas of inner Sindh and Gilgit Baltistan. Thanks to online consultations with local and international doctors and access to the medical devices that are attached to the kiosk, people in these underdeveloped places now have easy access to primary health care.

Modulus Tech, meanwhile, is aiming to offer dignified living to those in the lower socioeconomic strata of society. It created flat-pack housing technology that is not only affordable but also easy to assemble, mostly for projects to meet the housing needs of disadvantaged people. Most of their revenue (60%) is attributed to the 70 units they have constructed in the marginalized localities of Sindh and Baluchistan, as well as the 17 units being constructed in the poorer localities of Karachi. Through a partnership with a nonbanking financial institution, it ensures the provision of low-cost housing loans for their low-income customers, who would otherwise be excluded by conventional banks. As the cofounder of Modulus Tech explained the following:

*“We buy the land and build houses on our own; once it is done we sell the property to the partner mortgage company who then sells it*

*to customers on a mortgage [....] Customers can decide their own terms with the mortgage company.”*

Two other value propositions emerged very strongly from our cases, namely innovativeness and the resulting improvement in product performance. All six of the studied frugal enterprises offer products that are not just improved versions of existing solutions but rather hold a significant novel element in their architecture. These novelties lie in various patented technologies that were fundamentally developed by the cofounders themselves through experimentation and consultation with relevant experts. With the exception of Daisy, all the cases had already acquired local and international patents for their technologies. The replacement of the conventional hemodialysis machine by Byonyks, for example, with a completely new peritoneal dialysis machine offers a value proposition to patients who would not be able to bear the lifelong cost and inconvenience of repeated hospital visits for dialysis. By revamping the whole product architecture, the peritoneal dialysis machine offers a simpler, portable and more efficient alternative to patients with kidney failure. The Chief Medical Officer of Byonyks, who is himself a very senior nephrologist and has treated numerous dialysis patients, commented the following:

*“Peritoneal dialysis is a brand new concept in Pakistan ... The uniqueness of this product is that it is nonexistent in Pakistan .... It is a bloodless device as there is no presence of needles like in hemodialysis.”*

In the case of Daisy, the unique design of its sanitary pads enable it to not only produce softer and more protective padding but also replace imported plastic materials with locally produced and more environmentally friendly cotton ones. The telemedicine kiosk of EzShifa, which is built on a digital platform based on SaaS (Software as a Service), presents great value for people living in extremely remote areas by allowing them access to primary health care consultations with remote doctors, thereby removing the need to visit the closest city for basic checkups. Moreover, the AI-backed system enables doctors to track the patient’s history and diagnose the patient’s data.

*“The set-up of our kiosk is very simple and required minimal training ... it costs about one-fourth of the fee charged by a doctor in a private hospital, and public hospitals are too crowded” (cofounder of EzShifa).*

### C. Value Creation

Frugal enterprises tend to optimize their costs in all areas of the value-creation process, focusing on developing simple but novel technologies that meet specific customer needs. This approach to innovation allowed the enterprises to meet their cost targets while offering unique products and services to customers with limited resources. Building partnerships is a critical part of their value-creation activities, because this results in both innovation and cost reduction.

1) *Technology Development and Cost Optimization:* In all cases, the development of frugal value propositions became mainly possible by developing simple yet novel product architectures. The technology-development process for these frugal

enterprises is a rather meticulous and consequential element of value creation, one involving extensive research and development (R&D) and experimentation. While PakVitae, Modulus Tech, Jolta, and Daisy developed their own proprietary technologies, EzShifa and Byonyks found remarkable new applications for existing technologies and developed novel product architectures. Nonetheless, the focus of all these technological developments was to make products simpler and more affordable. In most of the cases, cost optimization was inherent to the very technologies and product designs that were developed by these frugal enterprises, as explained by a cofounder of Modulus Tech as follows:

*“Our intermesh technology optimizes the man-to-machine ratio which ultimately reduces the cost and optimizes the speed of production. .... It is the same technology that makes it possible for us to flat-pack our structures and transport more of them in less space.”*

Likewise, the antimicrobial hollow fiber membrane used in PakVitae’s water filters not only improves the filtration capacity and quality, but also improves its lifespan while significantly reducing the unit manufacturing cost. Similarly, Jolta invented its own electronic kit, but rather than innovating the design of its e-bikes, it merely replicated the standard designs of existing gasoline bikes. In addition, Jolta integrated existing vendors and dealers into its network to minimize its manufacturing and distribution costs. Indeed, the evidence indicates that the enterprises used outsourcing as an effective activity for value creation by minimizing their manufacturing and distribution costs. Daisy, for example, teamed up with a local NGO to distribute their sanitary pads and establish menstrual hygiene camps in remote rural areas that would otherwise be hard to access. Modulus Tech, meanwhile, started with 100% in-house manufacturing but eventually completely outsourced the manufacturing of its prefabricated structures, as expressed by its cofounder as follows:

*“We made a factory initially because our products weren’t that many but as we have grown, we have outsourced. We do quality check and deliver the product to the site. But on the site, our own team does the assembly of the house.”*

**2) Knowledge Acquisition Through Local and International Partnerships:** Partnerships included both local and international collaborations with academics, industry experts, incubation centers, mentors, and similar enterprises, as well as the diaspora of Pakistanis in developed countries. These partnerships helped the entire process of value creation, including developing technology and acquiring knowledge for effective production, marketing and supply chain management. Moreover, partnerships have been quite instrumental in the enterprises’ efforts to navigate around certain institutional and resource constraints. For example, two cofounders of EzShifa extensively mobilized their ties with Pakistani doctors based in the USA and U.K., so they could provide consultations to patients in underserved localities in Pakistan through EzShifa’s telemedicine kiosk.

Frugal enterprises tend to rely heavily on the knowledge and expertise of industrial experts and academics based in developed countries. For Byonyks and PakVitae, the development of the

very technology behind their products would have been impossible without such partnerships. As mentioned by a cofounder of PakVitae, *“To be honest, we are a product of networking!”* Given the acute shortage of knowledge on the functioning and manufacturing of hollow fiber membranes in Pakistan, they partnered with a seasoned membrane scientist from the National University of Singapore (NUS) who was extremely excited by the idea of a low-cost detachable water filter. This scientist not only helped PakVitae develop its initial conceptualizations for the product but also arranged for a small R&D facility at the NUS to experiment with it. Similarly, designing a bloodless portable dialysis machine for Byonyks came about due to the immense intellectual contribution of academics and industrial experts from the U.K. and USA. The transfer of domain knowledge also took place through partnerships with similar businesses in other countries. The founder of Daisy, for example, reflected on a similar experience as follows:

*“I reached out to a few companies in India who were doing something similar. I reached out to them for advice and to look into how they were managing things, what materials they were using, etc. They helped me design the product.”*

Along with international partners, local partners helped the frugal enterprises with refining their business models, distributing their products, and securing funding. For instance, Modulus Tech and PakVitae leveraged the networks of incubation centers and universities to obtain initial funding. As a cofounder of Modulus Tech fondly recalled:

*“The role of NEST I/O (a leading incubation center of Pakistan) was extremely valuable. We were engineering students, we didn’t come from a business background and didn’t know about little business essential things for running a company that was taught to us by NEST I/O. In university, we only had knowledge of technology but NEST I/O helped us with business knowledge, legal affairs, investment raising and other business things.”*

Similarly, Daisy collaborated with local NGOs to not only distribute sanitary pads in rural areas but also educate the women living in those areas about menstrual hygiene through hygiene camps. The cofounder of Daisy explained the following:

*“We have worked with many NGOs in Baluchistan and Punjab ... We just provide them some sanitary napkins, which they use to conduct hygiene camps in different rural areas on our behalf, where they supply hygiene products and organize talks on menstrual hygiene. Sometimes I also join them for these hygiene camps and directly interact with rural women ... these NGOs act as a go-between for us.”*

We observed how the founders of the frugal enterprises were committed to networking and actively seeking out new connections to compensate for the lack of institutional support available to them. These partnerships and collaborations served as alternative social structures for supporting these enterprises in creating and delivering their value propositions.

#### D. Capturing Value

The approaches for capturing value were rather straightforward for these frugal enterprises. Along with the conventional way of capturing value through direct sales, some enterprises

also used innovative revenue models, including franchising, mortgage financing, and low-cost approaches with high profit margins. The enterprises were also effective on the cost side of the revenue model, because they produced their products at a low cost, which in turn enabled them to sell at higher margins. For example, they minimized their R&D and manufacturing costs. They also have a cost advantage due to their proximity to the market they serve, meaning lower logistics costs. Other than EzShifa and Modulus Tech, the enterprises adhered to the traditional sales model. EzShifa adopted a franchising and revenue sharing model, and its founder shared its value-capturing strategy as follows:

*“We have a franchising model, we sell them a kiosk for US\$1300 and we do the marketing as well, it is a whole package, we also install 50 appointments with it.... We provide a revenue sharing model. We ask the person to make the entrance fee, but we take 40% of it.”*

Although high-tech enterprises need to buy some components from abroad, their relative proximity to China helps reduce import costs. All the enterprises benefit enormously from the local cost advantages, because local engineers, technicians, salespeople, and other workers carry out the production activities. Modulus Tech adopted a different approach for capturing value, however, by introducing the mortgage financing system to make its housing affordable for the lower stratum of society. The cofounder of Modulus Tech said the following:

*“We do a mortgage system. We are working with private mortgage system companies, we provide mortgage and arrange it for them (clients) to offer affordable housing.”*

### E. Sustainable Outcomes

Frugal enterprises integrate sustainable practices and principles into various aspects of their business models, from their operations and supply chains to their products and technologies. Unlike conventional businesses, their business models aim to create long-term economic, social, and environmental value for their customers and the wider community while also successfully capturing value for themselves. In terms of the economic outcomes, frugal enterprises boost the local economy, create local jobs, and increase economic activity in the market of low-income customers. They also train local people in new technologies and skills, so they contribute to skills development, which is another key economic contribution. The enterprises also stimulate employment and microentrepreneurial activities at the local level, something that is crucial to minimizing the pay gap between local employment and employment in the cities. For example, EzShifa provides self-employment opportunities for people living in deprived areas by allowing them to operate their telemedicine kiosks on a franchising model, such that the franchisee gets formal training from the experts of EzShifa and keeps 70% of the fee charged to the patient. One franchisee of EzShifa whom we interviewed said the following about his experience of operating a kiosk in Tharparkar, a small desert area of Sindh:

*“One of my friends told me about EzShifa. I met the CEO in Karachi and really liked it due to its latest technology so I thought why not introduce it in desert areas of Tharparkar [...] it feels really nice and*

*we got the device because the CEO is very cooperative. His approach is nice—to give benefits to the people. The income is not very good at the moment but we will get the reward in the future as more people will start using it.”*

From a social perspective, the business models of frugal enterprises promote inclusive growth and societal empowerment by creating social value. For example, Daisy aims to dismantle the social taboos around menstrual hygiene by organizing hygiene camps in remote areas to promote open conversation and learning about the subject. The enterprises developed innovative solutions to serve areas where conventional products are either too expensive or unavailable. Thus, the enterprises meet the fundamental needs of marginalized people by providing access to clean drinking water, affordable housing, sustainable transportation, and life-saving medical devices, so they help break the cycle of marginalization and encourage activities that are more productive for the targeted customers. The outcomes of frugal business models also contribute to female empowerment. For instance, Modulus Tech requires that their low-cost houses be owned by a female family member. A founder of Modulus Tech emphasized its contribution to sustainable development as follows:

*“At the conception stage, we wanted something that would account for all the environmental factors, we wanted to keep the cost low too [...] We were also looking at sustainability; we were specifically looking at the total carbon footprint and continuously changing our design and materials to make the final product more sustainable.”*

Frugal enterprises also offer more sustainable alternatives to conventional products by relying on ecofriendly technologies and sustainable raw materials. For example, Daisy differentiates itself from other contemporary products by using environmentally friendly materials to make its sanitary products. It omits the bleaching process and the resulting carcinogens from its sanitary pad production, and it replaces plastics with cotton as the main raw material for its pads, making them reusable in the process. Likewise, Jolta Electric substituted gasoline bikes with electric ones at a similar price, while PakVita's detachable water filter can potentially avoid using up to 1000 plastic water bottles (1.5 L each) over its lifetime, so it contributes significantly to a sustainable environment. Modulus Tech, meanwhile, produces energy-efficient and carbon-neutral housing. Thus, the enterprises naturally contribute to sustainable development. For instance, the cofounder of Daisy explained certain details of the manufacturing process as follows:

*“Another problem with current products is that they use bleach during manufacturing. They have to bleach the material quite vigorously [...] But then bleaching has some carcinogenic by-products which are quite harmful not just for women's health but also for the environment. But we don't bleach because we use a different material for our pads.”*

## V. DISCUSSIONS

### A. Discussion

In line with earlier research, our findings highlight that firms in developing countries tend to face several constraints [54], [100]. By examining the business models of six frugal enterprises,



we demonstrated how frugal enterprises navigate around the local constraints of a developing country and turn them into business opportunities [55]. Our study identified three main value-creating activities used by frugal enterprises. *First*, the main driver of frugal business models relates to how they develop novel technologies. In all six cases, we observed that substantially new product architectures, compared to the existing products, are created in a process that is essentially led by the founders. *Second*, a critical factor that manifests in all the cases is the incorporation of cost-optimization activities. The frugal enterprises adapted their overall business model design to optimize costs in all aspects of the value chain, such as manufacturing, sourcing, and collaborating, in order to achieve a frugal value proposition that connects with customers in resource-constrained contexts. This aligns with previous research that has asserted that cost optimization is a primary factor driving a firm's business model in low-income countries [82]. *Third*, to overcome the lack of local domain knowledge and expertise, the firms needed to develop local and international connections and establish business collaborations [56]. Local partnerships were also found to be crucial for identifying and accessing funding opportunities, something that is generally otherwise a major institutional constraint for businesses that target low-income segments, while international partnerships are instrumental for technology development.

More specifically, the findings reveal the coexistence of two types of attributes related to business modeling: one related to the value creation, delivery, and acquisition mechanism [65] through a systematic set of operational activities and business processes [101] and the other related to institutional attributes that allow frugal enterprises to mitigate institutional and resource constraints [102] through extensive partnership at the local and international levels. This agrees with a previous study that emphasized that the emerging market uniquely predicts relevant organizational outcomes, such as value creation, through the coexistence of transactional and institutional attributes [103]. Our study furthers the theory by drawing attention to the mechanisms that help frugal enterprises to deal with resource constraints and institutional voids in developing countries and realize sustainable development.

Frugal enterprises adopt business models that promote sustainable development by enabling communities to purchase products that meet their needs, reducing the consumption of natural resources, empowering marginalized populations, and fostering inclusive economic growth for local communities and stakeholders who are traditionally ignored by mainstream businesses. Although scholars agree about the importance of incorporating the local context when pursuing sustainable development [30], [46], [93], there is limited understanding about how local contexts influence the role of frugal enterprises in achieving sustainable development. In response, we investigated how the creation and implementation of new business models can generate and capture value while delivering sustainable outcomes, with there being a particular emphasis on the role of frugal enterprises. Our findings, therefore, suggest that firms driven by frugal business models can potentially navigate their way around the local constraints of developing countries as

they work toward creating social, economic, and environmental outcomes that contribute to sustainable development.

### B. Contributions to the Theory

The recent emphasis on sustainability has rekindled interest in the concept of business model today, with a particular focus on business model and innovation in emerging markets [74]. The frugal innovation literature has grown exponentially in the past 15 years. However, it still struggles to answer the questions around the use of frugality regarding business models and its contribution to sustainable development. This study, therefore, offers three main contributions to literature.

*First*, it contributes to an under-researched area of frugal innovation [12], especially with regards to how resources can be configured to create value in emerging markets. The empirical evidence shows that frugal enterprises develop certain key elements of a business model—such as technology adoption, cost minimization, and knowledge acquisition—through partnerships to overcome the institutional voids and resource constraints in an emerging market, thus creating value for customers who would otherwise have been unserved. As a result, our study attempts to link the concepts of business model with institutional theory and the resource-based view in the context of emerging markets. This study also presents evidence about how to configure resources to realize their potential for creating value in different types of contexts. Frugal entrepreneurs overcome barriers and develop business models that are embedded in the local constraints to develop innovative solutions, and we have revealed how institutional and resource-constrained contexts shape the development of frugal business models by requiring that enterprises build partnerships at the local and international levels for building knowledge capacity for innovation by sharing knowledge and developing technology [104].

*Second*, this study contributes to the contextualization of business models within the context of enterprises in emerging markets [103], [105], thus adding to the limited context-specific development of theory. This study helps to understand the comparative perspectives on role of local contexts for frugal innovation between emerging markets and developed countries [37]. Previous research on business models in emerging markets has mainly focused on social entrepreneurship [17], Western companies' business models for serving emerging markets [82], and eco-innovation for resource-constrained firms in emerging markets [44]. Moreover, the existing literature on business model is mostly rooted in the context of developed countries, where critical business processes, operational activities, value creation, value delivery, and value capture differ significantly to those in developing countries. There is limited literature on business models that reflects other institutional contexts and market conditions that are often epitomized by resource constraints and institutional voids [105]. In addition, most current research on frugal innovation is product-oriented, but our research extends the discussion to a broader level of the business model. It demonstrates the applicability of the theories of constraints in the new business model development process to overcome limitations and institutional voids.



*Third*, this study contributes to the emerging stream of literature dealing with the relationship between business models and sustainable development [106]. As such, we extend the literature to cover local frugal enterprises that serve low-income customers in an emerging market with affordable products through business models that embrace sustainable development as their core element. This research, therefore, sheds light on a little-known way in which businesses can play an important role in achieving sustainable development [85], [107], [108], and it responds to a call for greater research into the role that frugal innovation plays in supporting inclusive growth and economic development [32]. Overall, our findings add to the growing scholarly consensus about the need for private sector organizations to effectively incorporate the local context into their quest for sustainable development [85], [109] and become involved in the implementation process to achieve SDGs [110].

### C. Implications for Practice and Policy

In emerging markets where resource constraints and institutional voids are prevalent, such limitations generally hinder the development of new business models and innovations. However, our study reveals that these limitations can indeed encourage the development of new business models that manage to bring successful innovations to market while also contributing to sustainable development. Managers of large organizations and potential entrepreneurs can therefore draw some inspiration from this study and develop strategies to serve underserved customers profitably by developing new ways to create value and build partnerships, so they can mobilize the critical resources needed to overcome the institutional voids. The findings of this study are also relevant to companies in developed countries, because the potential market in emerging markets is enormous, whereas the markets in advanced economies are highly competitive. Moreover, companies in developed countries possess technologies and expertise but lack knowledge about the local context of developing countries, so there is great potential for synergy and knowledge/technology exchange in the value network. Thus, multinational firms could identify new opportunities for serving customers in emerging markets by building partnerships with local entrepreneurs to help them overcome the limitations they face while also pursuing their own internationalization strategies. Most companies in developed countries emphasize product and service innovation, but innovative business models are important for serving underserved customers. Indeed, our study demonstrates how managers and entrepreneurs can build institutional capital and mobilize resources to gain a competitive advantage at the local level. Our study highlights that value propositions for relatively affluent customers in developed countries, such as they are, are simply not suitable for low-income customers, so they need to be adjusted if they are to serve low-income customers profitably.

Many managers at multinational firms are struggling with the pressure to integrate the sustainable development agenda into their businesses. This study reveals ways in which managers can deal with this challenge, specifically when operating in emerging markets. This study also has implications at the

policymaking level by emphasizing the importance of collaborative partnerships among various local and international stakeholders and private–public sector engagement to facilitate sustainable development. While this study had a limited geographical focus on a South Asian country, its findings can be extended to other developing regions, such as Africa, Latin America, and other emerging economies that share similar resource constraints and institutional voids. Frugal business models for offering affordable but functional products and services are highly relevant to such regions.

### D. Limitations and Future Research Directions

Nevertheless, this study also has several limitations. Its generalizability is somewhat limited because we selected cases based on set criteria. Selecting cases with a different set of criteria could therefore provide further insights. The study was conducted for the context of Pakistan, but other countries may have different issues that would be useful to consider in a similar line of inquiry. Furthermore, our study focused on early-stage enterprises, so studying more mature enterprises could provide additional insights within the same context. In addition, this study is qualitative in nature, so future quantitative studies could test the arguments of this study by looking for causal relations between different constructs. Future research could also focus on the dynamic elements of business models with longitudinal data. For example, how business models evolve over time in cases like ours would be an interesting research avenue. Such longitudinal studies will help to understand the changes in a business model in response to particular circumstances and illustrate the temporal and contextual dimensions of how frugal enterprises not only build but also sustain and scale their business models in a resource-constrained environment. Since we only focused on early-stage enterprises in this study, some critical research questions remain to be explored by future studies: Do frugal enterprises continue to deliver sustainable outcomes as they mature and grow their businesses in a profitable manner? What elements of a business model become more instrumental in terms of achieving frugality and sustainable development while working with constrained resources? Furthermore, the role of technology in the context of frugal enterprises in general and its relevance to achieving sustainable outcomes is a particularly underexplored subject. In this study, we brought the factor of new technology development to the fore as a significant element of business models for serving low-income customers. The intricacies of this phenomenon, however, have yet to be thoroughly investigated, so future studies could look more deeply into the enablers and challenges of building proprietary technologies for frugal enterprises. In addition, even though this study exclusively focuses on a developing country, the context of developed countries could be studied in relation to the phenomenon of frugal business models, because many low-income customers in developed countries are desperately seeking affordable products with flexible payment terms. This would help us achieve a balanced understanding of low-income customers in both developed and emerging markets. Establishing partnerships between advanced economies and emerging markets is crucial to building business

models for serving low-income customers in developing countries [111], so future research could explore the mechanisms by which various parties establish mutually beneficial partnerships. We also need studies of how international companies could integrate low-cost business models for serving low-income customers worldwide. Nevertheless, the provision of frugal products and services does not directly address the structural causes of poverty [112] or the root causes of environmental degradation, because the path to sustainable development is complex and multifaceted in nature, so it requires further research at all levels.

## VI. CONCLUSION

This article examined how frugal enterprises developed innovative business models to serve underserved customers in emerging markets despite the various resource constraints and institutional voids. In doing so, it showed how frugal enterprises hold great promise for achieving sustainable development through novel business models. While traditional firms were predominantly profit-oriented, frugal enterprises managed to achieve sustainable outcomes while generating financial returns. We had, therefore, drawn some attention to the contextual elements that link sustainable outcomes with financial sustainability. This study shed some light on the way in which frugal enterprises transformed various resource constraints and institutional voids into business opportunities. It also showed how frugal enterprises often collaborate with local and international partners to overcome the constraints of the emerging market. This study, therefore, provided guidance for practitioners and policymakers in their efforts to synergize sustainability and profitability in emerging markets with various institutional voids and resource constraints.

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