Asia Pacific Journal of Management (2022) 39:1–26
https://doi.org/10.1007/s10490-020-09728-8

PERSPECTIVES

From *jugaad* to *jugalbandi*: Understanding the changing nature of Indian innovation

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Published online: 8 July 2020

Abstract

In this perspectives paper, I employ the term *jugalbandi* to describe the ways in which many contemporary Indian organizations engage in innovation. Through a description of three Indian organizations – ISRO, Amul and Aadhaar – I illustrate how this distinctive approach draws both on *jugaad* – and its emphasis on being frugal, flexible and inclusive – as well as systematic innovation, with its focus on building capabilities, relying on process and advancing technological frontiers. As a homegrown approach, *jugalbandi* builds on an "Indian" way of doing things while imbibing influences from other modes, and is enabling organizations build their innovation capacities even as they remain relevant to their contexts. In developing this conceptualization, I highlight the need to appreciate the contextual and institutional roots of innovation, suggest that trajectories of development within emerging economies will remain distinctive and provide both practical and policy advice on how actors should pursue innovation in these scenarios.

Keywords Indian innovation · Jugaad · Jugalbandi · Innovation & entrepreneurship in emerging economies · Homegrown innovation · Contextual innovation

In recent years, there has been considerable interest in understanding innovation and entrepreneurship, particularly as it is unfolds in countries such as India (Jain et al. 2015; Krishnan and Prashantham 2019). This is partly due to the increased recognition of the role that these processes play in economic development (Chari and Banalieva 2015; Tomizawa et al. 2020) as well as a means to decoding the impressive growth rates that countries such as China and India have posted in the past few decades (Bruton et al. 2019; Nair et al. 2015). Beyond this, however, is a growing appreciation among researchers that the manner in which business activities – including innovation and entrepreneurship – are conducted in these countries may be qualitatively different from

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their more developed economy counterparts (Ahlstrom and Ding 2014; Ahlstrom et al. 2018). This has resulted in a vibrant and growing body of work (e.g. Cappelli et al. 2010; Govindarajan and Trimble 2013; Khanna 2007; Prahalad and Mashelkar 2010; Tiwari and Herstatt 2012) that has focused on characterizing the nature of these activities, in addition to providing policy suggestions and practical advice that is grounded in the realities of these contexts.

Along these lines, academics and managers alike have alluded to a form of activity – and an associated mindset – that seems pervasive in India. The term *jugaad* – that has been part of the local lexicon for a number of decades – has been used to describe the "Indian way" of innovation (Prabhu and Jain 2015). Loosely translated, it means "workaround", "creative improvisation," or more broadly "making things happen." The word *jugaad* is etymologically related to the Sanskrit idea of "yukti," which implies not only a clever stratagem but also dexterity and discovery (Jauregui 2014). More recently, the terms has been picked up by a number of researchers (Radjou et al. 2012; Prabhu and Jain 2015) to refer to the frugal, flexible and inclusive approach to innovation that is prevalent in India. By frugal, the skill of getting more from less by making clever use of existing resources and technologies is implied. Flexible refers to being adaptive, and includes a willingness to explore different options, to view rules as pliable and to embrace situations fraught with ambiguity. And finally, inclusive alludes to the fact that these solutions are intended for communities and individuals who are typically not served by the formal sector (Kumar and Bhaduri 2014). Combining elements of resourcefulness, ingenuity, rule-bending, resilience, creative agility, pragmatism and compassion, *jugaad* represents a distinctively local form of agency invoked within these contexts (see also Varma 2005).

Jugaad and innovation in India

It is important to appreciate that *jugaad* is very much a product of the environment within which it operates. The lack of resources (severe in many cases) and the prevalence of local informal institutions have contributed to the development of a mindset – and a set of associated practices – that appears ingrained among people who have grown up in these conditions (Bijapurkar 2009a; Gopalakrishnan and Banerjee 2018). In acknowledging *jugaad*, a broad research agenda can be opened that expands our understanding of institutionalized agency, that is, how actors operate within the environments they are embedded in (Granovetter 1985; Garud and Jain 1996). Indeed, many researchers have noted the similarities (and differences) between *jugaad* and bricolage – a term that translates to "making do with what is at hand," which has gained significant traction in understanding resource-constrained entrepreneurship (Garud and Karnøe 2003; Baker and Nelson 2005). In examining *jugaad*-associated activities, we extend existing theories of innovation and entrepreneurship to understand how these activities operate in conditions characterized by high levels of uncertainty and chaos (Christensen et al. 2019). Given this, scholarly research on *jugaad* practices has grown steadily (Ananthram and Chan 2019; Shepherd et al. 2020). Studies of *jugaad*, and equivalent mindsets/practices in developing economies, enable us to develop a greater appreciation of the contextualized nature of innovation and entrepreneurship.

Even as these investigations continue, it is important to acknowledge the plasticity of the word *jugaad* in its colloquial usage and as reflected in my earlier description, given that it simultaneously refers to a product, process, mindset, and the utilization of social networks, among other connotations (Sekhsaria 2013). This polysemic nature of *jugaad* (Jauregui 2014) also implies that its multiple meanings often contradict one another. So while *jugaad* involves creatively recombining and reusing materials at hand to generate local solutions (Radjou 2017), these are often of the quick-fix variety and are typically characterized by low levels of quality. Besides, given their idiosyncratic origins, diffusing such innovations at scale is a challenging task. At another level, while *jugaad* initiatives reflect individual ingenuity and smarts, they are often emblematic of a weakly developed innovation ecosystem, one in which the various elements – that is, educational and scientific institutions, risk capital, government support, etc. – contribute minimally to the innovation process. Under such conditions, *jugaad* is often about taking a reactive rather than proactive stance to innovation – that is, it is effective in copying or repurposing existing ideas but not so useful in coming up with original products and services (Chawla 2016). Moreover, even as individuals and organizations that practice *jugaad* are celebrated for their chutzpah and resourcefulness, these same actions have been criticized by others for their shaky moral foundations given that they often involve working the system, bending the rules and blatant copying (Birtchnell 2011; Hari and Subramanian 2019). And finally, even as this term has made the leap from vernacular usage to scholarly discourse, the scope of its usage has expanded dramatically from its modest roots as a phenomena occurring primarily in the rural and informal economy (Kumar and Bhaduri 2014) to one that is broadly applied to all forms of Indian innovation and even has global aspirations.

Given these multiple interpretations, the academic and practitioner discourse on *jugaad* has predictably been polarized. To some, *jugaad* represents the quintessential Indian way of innovation, one that has and will continue to be a crucial component in powering the country's economic ascendance (Varma 2005; Saraf 2009) and that other regions in the world can learn from (Radjou et al. 2012; Govindarajan and Trimble 2013). Indeed, *jugaad* has been lifted from "something subversive to a positive attribute of national character" (Bijapurkar 2009b). For others, *jugaad* represents nothing more than a dodgy coping mechanism that encourages corruption and increases systemic risk in emerging economies (Birtchnell 2011). In this reading, the stigma and baggage associated with the term have relegated *jugaad* to being the poor cousin of innovation, one that can only provide band-aid solutions of marginal/questionable value and that is not worthy of emulation or likely to be the panacea (Prahalad and Mashelkar 2010; Kumar and Puranam 2012).

Along these lines, some scholars have explicitly contrasted *jugaad* with systematic forms of innovation, that itself derives mainly from the experience of advanced economies (such as the US and Europe), and is proffered to be what Indian organizations need to incorporate in order to enhance their innovative capacity (Krishnan 2010; Dabholkar and Krishnan 2013). Citing India's mediocre innovation record, as reflected in various global indices and scorecards (cf. Dutta et al. 2015), this work makes the case for enabling systematic innovation along two fronts. The first of these, drawing from the voluminous literature on national systems of innovation (Freeman 1987; Lundvall 1992; Nelson 1993), relates to bolstering the broader innovation ecosystem (Acs et al. 2018) of the country, that is, enhancing the technology capability of existing

firms, creating a critical mass of new technology driven firms, reforming public R&D organizations, building robust linkages between academia and industry, making more risk capital available, and creating societal conditions that enable more innovation to occur, among others (Krishnan 2010). More recently, these researchers have deployed the mushrooming literature on creativity and innovation – with its emphasis on such ideas as lean experimentation, open innovation, product champions and process/quality management – to highlight ways in which Indian companies can convert themselves into crucibles of innovation (Dabholkar and Krishnan 2013; Ahuja 2019).

While the intent of these authors is laudable, there are significant limitations to their thesis that need to be considered. For starters, engaging in systematic innovation is typically an expensive proposition, with its outputs (and attendant benefits) initially available only to those who can afford it – this being antithetical to the inclusive innovation being sought by many organizations within emerging economies such as India. Moreover, a significant body of literature has highlighted how innovation generation within high technology firms is far from a structured process, and involves high levels of bootlegging, scavenging and finagling (Kannan-Narasimhan 2014), hacking (Coleman 2012), serendipity (Garud and Karnøe 2001; Garud et al. 2011) and improvisation (Hughes et al. 2018; Miner et al. 2001). Indeed, this is a key reason for why concepts such as bricolage (Levi-Strauss 1966; Baker and Nelson 2005) and effectuation (Sarasvathy 2001) – both concepts that have a higher affinity with *jugaad* than systematic innovation – have gained significant traction in recent times.

While the recommendation for bolstering India's innovation ecosystem makes eminent sense, the plethora of recent governmental initiatives to implement this have a decidedly top-down orientation, one that has not necessarily served the country well in the past (Dhar and Saha 2014). Moreover, the call to engage in systematic innovation has itself been largely prescriptive, with a playbook provided but little consideration accorded to the ground realities in which Indian organizations operate. At a deeper level, in contrasting systematic innovation with *jugaad*, this work suggests that most past Indian innovation is of the latter variety that now needs to transition to a more disciplined, process-based method. This "throwing out the baby with the bathwater" recommendation can have the unintended effect of leaving organizations devoid of an identity and vulnerable to the forces of global competition. Besides, in taking this stance, this scholarship comes across as appearing oblivious to the several interesting cases of Indian innovation – many of which rely (in some cases, significantly) on ideas and principles associated with systematic approaches. In doing so, this work misses out on a valuable opportunity to understand the mechanisms and practices that undergird these innovations.[1]

So, if *jugaad* is an all-encompassing yet somewhat stigmatized mode, and systematic innovation largely a prescriptive fiction, what does that tell us about the state of Indian innovation? In this perspectives paper, rather than view *jugaad* and systematic innovation from an "either-or" orientation that much of the prior practitioner and academic literature has employed, I suggest that a number of Indian organizations are, in fact doing both, that is, they are synthesizing the positive elements of *jugaad* and systematic innovation to develop solutions. Combining, rather than contrasting, these

[1] Indeed, while many of the examples that Krishnan (2010) provides are of Indian firms, there has not been a deeper theoretical analysis of the kind of innovation that these organizations engage in.

disparate systems of innovation enables us to observe how these actors craft practices that generate products and services that are both rigorous and relevant. Adopting such a frame affords us with an understanding of Indian innovation that has greater descriptive validity and prescriptive plausibility. Indeed, while the value of taking such an approach has been alluded to in passing by some of the scholars working in this domain (see N. Radjou in Rao (2012), J. Prabhu in Kannan (2013), R. Krishnan in Ethiraj (2013); Prabhu and Jain 2015; Ananthram and Chan 2019), this perspective has not been explicated in any greater depth.

It is this task that I turn to next. Specifically, this paper notes how many Indian companies have moved beyond *jugaad* in crafting their innovation efforts. I illustrate this through my narratives of three organizations that exemplify this mode. Each of these employs elements of *jugaad* – in particular, the frugal, flexible and inclusive aspects that has been described in earlier work (Prabhu and Jain 2015). To this, they have added the repertoire of practices typically associated with systematic approaches to innovation – in particular, building capabilities, relying on process and advancing the technological frontier. In doing so, they have crafted a homegrown approach to innovation that is deeply sensitive to the local context and yet effectively serves as the basis for a continual stream of new ideas. This mode of innovation retains a distinctive character of its own even as it creatively melds elements of the local and the global, the traditional and the modern – and could very well serve as a viable approach for organizations within developing (and developed) economies to emulate.

From *jugaad* to *jugalbandi*

I refer to this form of innovation (that goes beyond *jugaad*) as *jugalbandi*. The term itself means "entwined twins," in a number of Indian languages, and was originally used to describe an Indian classical music performance that features the duet of two solo artists in a harmonious yet competitive interplay. Indeed, the very first *jugalbandi* was supposedly performed by Gopal Nayak and Amir Khusro in 1294, the former singing in the Carnatic tradition, from South India, and the latter in the Hindustani system, from North India (Doraiswamy 2018). Since then, usage of the term has expanded to include scenarios where artists from different countries (such as India and Pakistan) with distinct traditions of Sufi music perform together (*Hindu* 2015), or when male and female musicians with different tonal qualities collaborate and sing two individual but musically close *ragas* together (*Daily Star* 2016). Often, the musicians will play different instruments, as for example the famous duets between sitarist Ravi Shankar and sarod player Ali Akbar Khan. More recently, musicians such as Zakir Hussain and L.Subramaniam have collaborated with Western classical and jazz performers to craft *jugalbandis* involving classical Indian music and non-Indian genres.[2] In live performances, these artists either improvise together or render compositions that combine diverse elements. From its musical origins, the term has now crossed over into colloquial usage to describe the fusion of two disparate styles of performance, or duos (and dualities) that function in tandem with one another.

[2] The closest equivalent to *jugalbandi* in the Western world would be the various forms of fusion music, as exemplified by jazz fusion, a genre that combines jazz with rock, funk and rhythm & blues.

Here, I employ *jugalbandi* to denote ways in which Indian organizations combine practices and mindsets that are reflective of a local approach to innovation, as exemplified by *jugaad*, with more systematic modes, typically associated with the advanced economies. Put differently, it involves synthesizing what appear to be two different genres of organizational practice. It is important to note here that I am employing *jugalbandi* as a metaphor (Tsoukas 1991) that resonates more with its colloquial usage than its literal meaning within the world of music. Doing so enables us to provide the generative imagery to appreciate and understand an innovation method that lies between, in that it is responsive to native conditions and operates in a consistent and methodical way. This is crucial to functioning in environments characterized by high levels of uncertainty, variability and dynamism. Indeed, for many Indian organizations that face the challenge of combining the local with the global, developing such hybrid arrangements and making them work – that is, balancing these two disparate modes of innovation – is both a recognized reality and an ongoing enterprise. These entities would recoil from the assertion that they were only doing *jugaad* and yet would readily acknowledge that their innovation efforts can be upgraded. However, the academic and practitioner discourse, in its focus on *jugaad* (both in its positive and stigmatized connotations) has largely overlooked this facet of India's innovation landscape. A change in perspective and adoption of this lens, I suggest, will allow us to get beyond *jugaad* to more carefully observe, document and assess the innovation practices of these organizations. Put simply, the core proposition I investigate in this paper is that *jugalbandi* is a more appropriate metaphor for describing many instances of contemporary Indian innovation.

In order to explore this idea, this paper describes the activities of three Indian organizations – ISRO (Indian Space Research Organization), Amul and Aadhaar – to highlight their use of a *jugalbandi* approach to innovation. These exemplars were selected after a great deal of deliberation. For one, I wanted to profile a group of organizations that were different from the "usual suspects" – that is, the firms typically referenced when talking about Indian innovation (such as Infosys, Wipro and TCS in the IT sector, the Tata Group (in particular, the Nano and Swach projects), Narayana Hrudyalaya and Apollo Hospitals in the healthcare space, among others).[3] These organizations span a wide range of sectors – ISRO is focused on applications arising from its explorations of outer space, Amul operates in the milk products industry and Aadhaar is a platform initiative to provide every Indian with a digital identity. While ISRO and Amul have a storied past that go back several decades, Aadhaar is a project that is just over a decade old. Over the period of their existence, each of these organizations has crafted innovations that have had a significant impact on large swathes of the Indian populace across the income spectrum, and thus they represent strategic research sites (Bijker et al. 1987). They are all highly respected and even revered within India for the frontiers they have explored, in addition to the economic and social impact that they have had (or will have). And most importantly, from point of view of this paper, an exploration of their practices (and underlying mindset) reveals a distinctive approach to innovation that is relevant to the context in which these organizations operate. This innovation mode – which I term *jugalbandi* – creatively

[3] In fact, I began with a sample of nine firms (Aravind Eye Hospitals, Bharti Airtel, Biocon, FabIndia, PayTM and Selco were the others) but describe only three of these in this article for smoother narrative exposition.

combines improvisation and discipline, relevance and rigor, and a focus on decreasing costs without cutting corners.

The rest of the paper is organized as follows: I begin with an in-depth description of the three exemplars – ISRO, Amul and Aadhaar – as a means to highlighting elements of this distinctive, homegrown approach to innovation. I use the cases to specify, in analytical terms (Bates et al. 1998) different practices that constitute *jugalbandi*, ones that other organizations could consider emulating. Next I identify broader patterns associated with *jugalbandi* as well as compare and contrast this concept with various strands of academic discourse in the entrepreneurship, innovation and organization theory domains. I then draw some initial theoretical, practical and policy implications that emerge from this perspective. Here, I reflect on the linkages between the innovation unfolding within (and across) these organizations and broader trajectories of economic development that nations such as India are experiencing. Finally, I conclude with some ideas for future research that would further enlighten our understanding of *jugalbandi* unfolding within these economies.

Jugalbandi in practice at three Indian organizations

ISRO: A *jugalbandi* between high-tech and low-budget

The origins of the Indian space program date back to 1962, when the government, on the recommendation of Homi Bhabha and Vikram Sarabhai, two pre-eminent scientists, established the National Committee for Space Research (INCOSPAR), with Sarabhai becoming its first chairman (Baskaran 2005). Even as the program grew rapidly, INCOSPAR was reconstituted and Indian Space Research Organisation (ISRO) was established in 1969. From its very beginning, the scientists in charge were mindful that ISRO's mandate would have a distinctly 'Indian personality', with the focus of the organization being the effective utilization of space for meeting the major development challenges facing the country (Chandrashekar 2011). Along these lines, ISRO's space missions focused on three application areas – weather services, telecommunications including TV services and earth observation for resources management. As Sarabhai evocatively articulated the mission of the organization:

"There are some who question the relevance of space activities in a developing nation. To us there is no ambiguity of purpose…we are convinced that if we are to play a meaningful role nationally, and in the community of nations, we must be second to none in the application of advanced technologies to the real problems of man and society." (Dayasindhu and Chandrashekar 2005).

Constructive cobbling that creates capabilities Given its modest financial resources and limited knowhow, ISRO initially made extensive use of collaborations with international partners to build its technological capabilities. Through the 1970's, it executed several experimental missions with these partners and gained valuable experience in managing complex projects (Baskaran 2001). Soon, ISRO was embarking on more ambitious projects that further stretched its resources. In order to complete these, the organization decided to contract out everything that could be done by others. Along these lines, it created a group that facilitated coordination and technology transfer

between the various space centers and industry. Taken together, these activities highlight the effective use of collaborative arrangements (both inbound and outbound) that enabled the organization to considerably leverage its limited resources and build technological capabilities along the way.

Converting constraints to craft cutting edge technologies The stringent export controls imposed by the governments of various countries, served to spur indigenous development efforts, particularly in rocket technology. On this front, ISRO initiated a program in the mid-1970's to develop a number of technologies that would be required over the next 10 years, besides procuring items that were readily available on the international market (Baskaran 2005). This forward-looking strategy produced significant results, and by the time the MTCR (Mission Technology Control Regime) came into effect in 1987, ISRO had already developed a number of critical items that became restricted under the regime.

In certain instances, ISRO was even able to leapfrog existing approaches and develop cutting edge technologies. As an example, in the late 1970s, when ISRO was planning its future earth observation satellites, the state-of-art technology for the camera and sensor payload system used discrete photodiodes that required a complicated rotating scanning mirror made out of beryllium (Dayasindhu and Chandrashekar 2005). The scientists at ISRO instead proposed the use of charge coupled device (CCD) technology that increased spatial resolution and also reduced the complexity of the camera optics. This type of a system had never been built in India before. However, the scientists viewed CCD technology as the one for the future, less complex in the Indian context, and more amenable to indigenous development than the extant technology. It took a decade to develop the technology, but when the IRS 1C launched in 1995, on board was the new camera system that had the distinction of having, at the time, the highest spatial resolution (23 m) among all operational civilian remote sensing satellites in the world.

Fusing frugality and reliability ISRO's emphasis on frugality has garnered much attention over the years. ISRO's Mars orbiter, Mangalyaan, was reportedly put into orbit for a cost of $74 million (which was two-third's the cost of the Hollywood movie *Gravity,* and one-tenth the cost of the U.S. Maven Mars mission). Much of this was due to lower people cost in India, given that scientists and engineers are a considerable component of the overall budget. In addition, indigenous components and technologies outsourced to local companies further reduced costs. ISRO's scientists made judicious use of technologies that they had developed before. As an example, they used a rocket that had been adapted from one that had been developed indigenously and launched in 1993. Moreover, the engineers employed an unusual "slingshot" method for Mangalyaan's interplanetary journey, one in which the vehicle orbited the Earth for several weeks while building up enough velocity to break free and enter Mars orbit. This helped avoid the use of a more expensive heavy launch vehicle. Finally, it kept the size of the payload small, at 15 kg. This emphasis on frugality – and the endless tweaking, recycling and simplicity that accompanies it – has worked well for ISRO even as its track record at completing missions successfully has steadily increased.

Combining contrarian hiring practices with building a meritocratic culture Undergirding these innovations is an internal organization that is highly regarded and much sought after among technical personnel within the country. Given its need to develop and

nurture an ever-growing pool of engineering talent, ISRO put into place hiring and training processes that were somewhat contrarian (Choudhury et al. 2017). Rather than hire from the top technical institutions, their strategy has been to find the most technically proficient and motivated candidates from the second and third tier colleges, following the mantra "more than the pedigree of the institution what matters is the individual". In 2007, the Department of Space set up the IIST (Indian Institute of Space Science and Technology) to meet ISRO's demand for highly skilled people. About one quarter of ISRO's yearly 400 hires now come from this institute.

Regardless of point of recruitment, ISRO extensively trains all its new recruits. These individuals undergo a 3–4 month training program that covers diverse fields. In parallel ISRO has tried to build a collaborative and transparent culture. New employees work closely with more experienced seniors to understand the nuances and systemic aspects of the complex space technology and imbibe the unique "ISRO culture". To support individual initiative and innovation, ISRO offers modest grants for employees to pursue their own research. And while ISRO salaries are lower compared to corporate India, it has a candid performance review process in which people are promoted based on their performance. This meritocratic culture and the overall mission of the organization have combined to make ISRO a highly desirable employee destination and a place to realize increasingly sophisticated technological ambitions.

The narrative above reveals the creative and unorthodox manner in which ISRO has built its innovation capacity as reflected in its ability to engage in progressively more complex projects. This has involved developing an internal culture of meritocracy and making investments in building the ecosystem even as it has retained its focus on operating frugally and at times, somewhat opportunistically. Evolving an ongoing ensemble of *jugalbandi* practices (as chronicled above) has enabled ISRO to function seamlessly as a high-technology organization that serves wide swathes of humanity. Moreover, such activities have enabled ISRO's march into the international space market through its commercial arm Antrix, which was formed in 1992. From launching only one rocket in two to three years in the early 1990s, it is now launching close to ten rockets a year. As of 2016, ISRO was among the six largest space agencies in the world.

Amul: A *jugalbandi* of rural and urban India

The Kaira District Cooperative Milk Producer's Union Limited was founded in 1946, when dairy farmers from this region, unhappy with the Bombay Milk Scheme's decision to source milk exclusively from one large supplier (Polson Diary), went on strike and were eventually given permission by the government to form their own cooperative in Anand. Soon after, Dr. Verghese Kurien landed in this sleepy town quite by accident. He had completed his studies at Michigan State University and returned to India when the government gave him a stark choice – return the amount of his scholarship or accept a post at the Government Research Creamery in Anand. Despite his initial misgivings, Kurien dived into his assignment and eventually joined the Kaira Union in 1951 as its general manager (Kurien and Salvi 2005).

Addressing adversity by creating market opportunity Early on, the organization remained solely a collecting and supplying agency for a single product, fresh milk.

Soon, it had grown large enough to acquire machinery and other capital equipment for its operations. However, when the Bombay State Government established the Aarey Milk Colony and committed to supporting it, the Kaira Union saw its market disappear and its sales and profits fell precipitously. In response, the organization's management demonstrated creativity and enterprise in identifying an alternative, namely, the manufacturing and marketing of dairy products (Bellur et al. 1990). This was a high growth space, not only because of consumption trends but also because management was aware that entry into processed products, like cheese, baby food and powdered milk, would be viewed favorably by the government. The organization took on the moniker "Amul" (the Sanskrit word for priceless) in 1955 as a means to marketing its products that now extended to butter. Over the years, the company has steadily increased its product line to include yogurt, ghee, malted milk and chocolates.

Blending frugality/inclusivity with differential pricing and high impact branding Since its formation, Amul has been mindful that a vast majority of its consumers has limited purchasing power. In accordance with this understanding, the cooperative adopted a low price strategy to make its products affordable and guarantee value to the consumer. Even as it has entered the market for high value dairy products, Amul ensured that adequate supply of low value products was maintained. Indeed, to penetrate diverse markets, it engaged in differential pricing, charging urban consumers more than rural ones.

Part of its ability to keep its costs (and prices) low was due to its limited advertising and promotion budget (1% of revenue, compared to 10–12% by multinationals). It has been able to do this through an "umbrella brand" strategy that showcased its entire product range rather than any individual category (Bocken et al. 2016). Moreover, Amul's advertising, that featured a little girl and her take on current events, has remained topical and witty, ever since it began in 1967 (making it one of the longest running campaigns in history). This novel advertising strategy ensured that the organization got a strong "bang for the buck" even as it spent relatively little on marketing. This also contributed to the brand's powerful appeal with Amul remaining India's most well known food company.

Bridging local needs with pioneering innovation As a cooperative, Amul engaged in a number of innovations over the years that were relevant to the communities it served. In the 1950's, its engineers pioneered a commercially viable process to produce powder (and later on, baby food and cheese) from buffalo milk, a feat deemed unachievable by Western diary experts (Chandra and Tirupati 2003). Another instance of innovation involved cattle feed. Traditionally, cattle were primarily fed straw and feed concentrate in the form of cottonseed. When cottonseed prices started to rise, the cooperative sought a balanced feed manufactured from nutrients and grains available locally. This composite cattle feed, Amuldan, was provided to the farmers at cost price and resulted in a gradual increase in milk production. On another front, efforts in the area of embryo transfer technology helped create a high yield breed of cattle. Besides these initiatives, Amul's plants incorporated automation and its innovations in the areas of energy conservation and recovery also contributed to a reduction in its operational costs. Finally, the organization indigenously developed a low cost process for providing long shelf life to many of its perishable products. Equally important, given that a majority of

its member-suppliers were small farmers who were often illiterate and had no prior training in dairy farming, the cooperative invested a substantial amount of resources and effort to implementing a multipronged program of education and support that enabled its innovations to be more widely adopted by these individuals.

Incorporating inclusion in ecosystems Early on, Amul established an organizational structure – called the "Amul model" – that aimed at directly connecting village milk producers with consumers in a way that returned pricing power to farmers. Over time, this evolved into a three-tier structure that comprised village cooperative societies, district level dairy unions and state-level federations (Goldberg and Cornell 2013). At the village level – which was the primary tier – producers (typically small and landless resident farmers) brought their milk to the collection center where they were paid in cash according to the milk's weight and fat content, precisely and transparently. Here they were also able to purchase cattle feed and other husbandry-related services. Trust in the efficiency, honesty, transparency and fairness of the system brought these villagers to the collection centers. The second tier in this structure was the district level union, which collected, processed and marketed the milk, serving as the "day-to-day" business arm. They also manufactured cattle feed and provided services such as veterinary care and artificial insemination. Finally, the Gujarat GCMMF (Gujarat Cooperative Milk Marketing Federation) was formed in 1973 to serve as the apex body owned by district unions to market their products under a common brand. The GCMMF mapped out a common distribution network, planned product mixes and capacity requirements, jointly procured raw materials, provided technical and management support, arranged for financing and resolved conflicts as necessary. Each of these levels had a managing committee that held meetings and issued reports annually. The "Amul Model" has been seen as a development blueprint for local ecosystems in other emerging economies.

The experiment of empowering local milk producers later became the blueprint for the NDDB (National Dairy Development Board), established in 1965 and tasked with promoting dairy development in India as a means of socio-economic progress. Operation Flood, the signature program of the NDDB, was launched in 1970 and aimed at rapidly and vastly scaling up Indian dairy production. By 2011, India produced 121.8 million tons of milk, surpassing the US as the world's largest milk producer. Moreover, Amul's 3.2 million supplier-farmers were producing an average of 12.8 million liters of milk daily, processed at 49 dairy plants by 17 district member unions (Goldberg and Cornell 2013).

Merging rural requirements with meticulous management training Verghese Kurien, one of Amul's founding fathers, believed that most graduates of MBA granting institutions would not make competent managers at cooperatives. In 1979, the NDDB helped found IRMA (Institute of Rural Management, Anand) to provide professional training to youngsters who wanted to work at organizations such as Amul. Its signature two-year program focused on managing rural institutions, of which cooperatives were the most common. IRMA has been self-supporting, thanks to income from its endowment and fees from consultancy projects launched by its faculty members. While many of its graduates joined other companies and organizations after completing the program, a good number of individuals joined Amul, enabling it to grow its bench of competent

managers who have, over the years, risen up the ranks of the organization. Along these lines, managers at NDDB, Amul and GCMMF have highlighted the importance of recruits being both competent and passionate about helping poor farmers, emphasizing the "psychic" rewards that accrue to those working in their organization.

Amul remains an exemplar of an organization that has engaged in "relevant innovation" in that it has fused the aspirations of its supply chain community (that largely resides in rural India) and the needs of its consumers (mainly in urban India) in a ingenious, harmonious and scalable manner. In performing this *jugalbandi*, it has engaged in a slew of organizational, marketing, product and process innovations that are widely perceived as pioneering within this domain. This has enabled it to grow consistently and compete vigorously with such multinational companies as Unilever, Danone and Nestle. As of 2013, Amul was producing 46 types of dairy based foods and was India's largest food product marketing organization with sales of $2.5 billion.

Aadhaar: A *jugalbandi* of start-up within the government

The UIDAI (Unique Identification Authority of India) was set up in 2009 to address a key challenge in the country – establishing each citizen's identity. Till then, multiple documents were required to access services such as subsidized food, bank accounts or a mobile phone connection. Moreover, a large segment of the population – especially those who were poorer and uneducated – simply did not possess any documents, which implied that that they were denied services or had to bribe officials to access services that they were entitled to. Indeed, the patchwork of authentication mechanisms that had evolved since independence had created a system that systematically siphoned off a significant proportion (in some cases close to 80%) of the food and fuel aid disbursed through the public distribution system. The UIDAI was set up as an attached office to the Planning Commission that was then led by Montek Singh Ahluwalia, an Oxford-educated economist. The government turned to corporate India for leadership, and in July 2009 it invited Nandan Nilekani, CEO of Infosys (a global leader in IT services), to be the chairman of UIDAI. In taking on this assignment, Nilekani advocated that the successful implementation of this program would result in multiple benefits – it would remind citizens of their "rights, entitlements, and duties," oblige the state to improve services, boost the national economy by enabling financial inclusion, and cut government losses from corruption. As he put it, "It is the mother of all IT projects. The goal is to help bring masses of India's poor into the formal economy, where they can gain access to financial and social services" (Aiyar 2017). He further elaborated, "Scale, speed, cost-effectiveness, quality, innovation capability—these were our goals" (Aiyar 2017).

Constructing dexterity/agility within a bureaucracy In building a government unit from scratch, Nilekani's focus was on creating "an organization that has a sense of urgency, quality and lets get the job done kind of thing" (Khanna and Raina 2012). His first hire in Delhi was Ram Sewak Sharma, a veteran IAS officer, who became the UIDAI's director general. The initial proposal had been to build an organization with UID commissioners in each state and a plethora of supporting staff – that is, it envisioned 1400 officers at different levels. Instead, Nilekani, looking for a compact

superstructure that would be both nimble and efficient, suggested to Sharma that the number be trimmed to 200. Understanding that the project required high technical skills, UIDAI created a hiring model to attract talent from both the private and public sector – this included people on sabbatical from Intel, Mckinsey and GE; from organizations such as the IAS, Railways, Defence and Telecom; interns from across the world, as well as consultants and volunteers. For these people, it was the scale and objective of the project that was the draw. As a UIDAI administrator put it, "In terms of perks, privileges and pay, this place has nothing more to offer than any other government job. In many respects, it is worse off. Yet everyone is here because they want to (be)" (Khanna and Raina 2012).

Coupling minimal design and rapid implementation Within a matter of weeks, Nilekani and his small team of civil servants and technology experts had established much of the project's architecture. They had named the project Aadhaar, which meant "foundation" in many Indian languages. Besides, the team decided that adopting a start-up approach would ensure that the initiative moved rapidly and smoothly, and they took a number of decisions related to the organization and scope of the project accordingly. Concepts, design and implementation templates would be worked out in-house. Execution, as far as possible, would be outsourced to leverage competitive market dynamics. The overarching mantra was "in-house brains, outside limbs".

This design approach manifested itself in multiple ways. The first of these, as alluded to above, was to remain a small and nimble organization and to partner with others whenever required. This partnership model leveraged the existing government infrastructure at the center and at the state level. Along these lines, the UIDAI subcontracted enrollment into the program – that is, it paid state governments, or other approved partners, about a dollar per citizen enrolled. These partners, in turn, hired private enrollment companies. A second key decision that the UIDAI team took was that Aadhaar would be a unique portable identity that would only guarantee identity, not rights, benefits or entitlements. Put simply, the UIDAI would exist only to receive data and supply ID numbers, that is, there would be no ID cards. Nilekani called Aadhaar's decision not to release cards an "epiphanic moment" (Parker 2011). Finally, the UIDAI consciously limited the amount of information that it collected. The team recognized that if it had collected more data, applications would have been easier to create. However, team members believed the cost of updating and maintaining the data would be enormous and would distract them from their core purpose of proving identity. Limiting the scope of the project along these multiple dimensions enabled both rapid implementation as well as adept navigation through the numerous obstacles that a government-based initiative of this magnitude typically faced. Indeed, at the UIDAI's office in New Delhi, "make do and make way" were the operating phrases.

Pairing serendipity with state-of-the art In terms of technology, the UIDAI went for the state-of-the-art. The team decided to link the 12-digit randomly generated number – Aadhaar – to biometric data including a photograph, all 10 fingerprints, and iris scans of both eyes, and to demographic information of the enrollees. The use of iris scan recognition as an authentication technology was relatively new with the method still under patent. However, after many trials, the UIDAI team came around to the view that it would use this technology to bolster de-duplication accuracy. The UIDAI set up a

Biometrics Center of Competence to build a key group of scientists who would implement biometric-compatible systems across departments. Even so, some of the consultants warned that the technology would need enormous computing power, be difficult to work with in Indian conditions and cost a lot of money. But serendipity intervened. The concept patent expired in 2008 and the method patent was set to expire in 2011. As a consequence, prices for biometric devices dropped precipitously. This delayed action delivered the reliability and assurance that the project demanded. And as a project manager stated:

"Everyone thought biometric capture required special conditions. We proved that this could be done with minimal conditions of light, in varied temperature conditions and environments – rural, urban, slums and night shelters. We took some good decisions – that data should be stored on the computer, not online, and the process would be designed for people with very simple IT skills." (Khanna and Raina 2012).

Embracing simplicity for smooth scaling With the technology selected, the stage was now set for enrolment to begin. As mentioned above, the UIDAI partnered with state governments who signed up as registrars, and in turn, registered enrolment agencies. The protocol for registration and enrolment was drafted by the UIDAI, whose training program included everything from setting up enrollment stations to the process of enrolment and even the handling of grievances. Moreover, given that enrollment was voluntary, the UIDAI team recognized the need to generate demand for participation in this activity. On this front, the target audience was clearly not monolithic. There was urban India (about 100 m in population) for whom enrolment was akin to queuing up for yet another identity card. Then there was small-town India (about 400 m), which was brash and aspirational. Finally there was the rest of India (about 700 m) that was largely dependent on the government to survive. From this latter segment came a useful insight: the rationale for participation was not why, but why not. More generally, this learning influenced the design of the communications strategy, which focused on benefits and kept the message simple and contextual. Additionally, the idea of Aadhaar and unique identity was explicitly linked to the ongoing discourse on public expenditure and the delivery of public services.

The first Aadhaar was issued on September 2010 and enrollment trends picked up quickly. Indeed, the demand for Aadhaar took the team by surprise. Long lines formed at enrollment stations, and reports complained about the wait time, slow process to capture data and limited capacity of each center. People were worried that the stock of Aadhaar numbers would run out. The UIDAI team, in turn, used these hiccups as opportunities. They took steps to improve the process, signed up more registrars, entered into agreements to train more operators, published advertisements making it clear the application was free and introduced an appointment system to remove wait times. By January 2017, UIDAI had issued an Aadhaar to 1.17 billion residents of India, achieving an unprecedented 99% coverage in less than six years, making Aadhaar the largest online digital identity platform in the world.

Co-creating inclusion (and intrusion) via platforms The Aadhaar number was initially meant to verify identity but soon began to be used to open bank accounts as well as to authenticate students who were taking examinations. Over time it has been linked to insurance plans and retirement benefits, required to register a property, vehicle,

company or not-for-profit entity and made mandatory to receive a Government of India subsidy (such as the rural employment guarantee program) or file income tax returns. Even as the platform has gained traction in terms of the presence of consumers and service providers on it, many legitimate concerns have been raised related to its usage (Khera 2019). These include implementation issues, with large differences existing between stated policy and ground realities (on such dimensions as enrollment, linking and authentication); entrenched corruption that circumvents the Aadhaar gateway and contributes to fraud, fakes and forgeries; state of preparedness of government organizations to put Aadhaar to work; anxieties around the security of the data and possibly the most significant, the absence of clearly specified data protection and privacy laws in India, especially as they pertain to the digital age. Legislative acts by the government and rulings by the Supreme Court have begun to address these issues, even as the platform gains momentum as the most significant "soft infrastructure" element provided by the Indian government over the past quarter century (Singh 2019).

In merging the agility and acumen of a start-up with the mammoth organizational apparatus of the government, the Aadhaar project both represents a vivid example of the organizational *jugalbandi* that is behind the construction of a digital India, and the possibilities (and potential pitfalls) that such forms of collaboration entail. Even as the people and the state embrace rapidly emerging IT-based technologies in their daily lives, the need to create an underlying infrastructure that is both robust and responsive (and ideally not surveillance oriented) has become paramount. Doing so will likely require public-private partnerships that meld speed and stability, parsimony and process, and innovation with inclusion. As the Aadhaar case demonstrates, orchestrating such *jugalbandi* involves taking seemingly counterintuitive decisions and then hoping that these do not have significant (negative) unanticipated consequences.

Discussion

In providing a brief history of the innovation practices of three organizations, I have drawn attention to key elements of another distinctive "Indian" way of innovation. This approach draws upon elements of both *jugaad* and more systematic modes of innovation. From the *jugaad* side, there is an emphasis on being frugal, flexible and inclusive, that is, innovation proceeds from a resource-scarcity mindset, is highly improvisational and adaptable in its willingness to change course, and is aimed at addressing the very local needs of the many. However, there is also an effort to tap into the more systematic side of innovation – in terms of crafting capabilities to take on projects of increasing complexity, investing in processes and developing the broader ecosystem, and imagining/delivering on pioneering innovations. Melding these two modes has enabled these organizations to create a steady stream of improvements that reflect both rigor and relevance, that is, progress that is largely in tune with the contexts that they operate in. In this paper, I employ the term *jugalbandi* (which means fusion in a number of Indian languages) to characterize this form of innovative activity. I believe that this term more accurately captures the unique, homegrown face of innovation and entrepreneurship observed in many Indian firms today. These organizations have creatively combined their origins (*jugaad*) and futures (systematic) while innovating in the present. Below, I

elaborate on three specific forms of *jugalbandi* that I observed in my cases (see Table 1).

Developing capabilities frugally to create frugal competence The organizations that this paper examined were operating in conditions of limited resources and rife with adversity, and yet had to develop capabilities that would allow them to deliver consistently and reliably on their intrepid missions. As my narratives indicate, these actors displayed high levels of creativity and audacity in assembling their capabilities that in turn, enabled them to engage in continual innovation. In many instances, the constraints that these organizations faced served to spur the search for alternate solutions. Indeed, this persistence in exploration reflected an integral feature of the Indian psyche – one that emphasizes continuity rather than yearning for closure, one in which there are no full stops but always an opening for reinvention. Besides, the idiosyncratic nature of these developmental pathways enabled a fair share of these capabilities to become competencies. While the emphasis on workarounds had its downsides, it also opened up pathways to rapidly catch up with extant technologies and in some cases, leapfrog them. In addition, the skills crafted in this manner were themselves deployed by these actors to pursue efficiency in their operations and offerings, that is, in providing reliable and effective products and services at minimal cost. Put differently, these frugally assembled capabilities enabled these companies to further fortify their competence at being frugal. To summarize, these organizations have been able to orchestrate a productive *jugalbandi* between their frugal selves and ongoing capability development. Indeed, this duet is reflective of the

Table 1 *Jugalbandi* practices and themes identified from the organizations studied

Organization	Practices	Themes*
ISRO	1. Constructive cobbling that creates capabilities	*Developing capabilities frugally to create frugal competence* (1,3,5,6,11)
	2. Converting constraints to craft cutting edge technologies	
	3. Fusing frugality and reliability	
	4. Combining contrarian hiring practices with building a meritocratic culture	
Amul	5. Addressing adversity by creating market opportunity	*Investing in process while retaining flexibility* (4,8,9,10,13)
	6. Blending frugality/inclusivity with differential pricing and high impact branding	
	7. Bridging local needs with pioneering innovation	
	8. Incorporating inclusion in ecosystems	
	9. Merging rural requirements with meticulous management training	
Aadhaar	10. Constructing dexterity/agility within a bureaucracy	*Exploring the inclusive frontier* (2,7,12,14)
	11. Coupling minimal design and rapid implementation	
	12. Pairing serendipity with state-of-the art	
	13. Embracing simplicity for smooth scaling	
	14. Co-creating inclusion (and intrusion) via platforms	

* The numbers in brackets below the themes refer to practices (from Column 2) that coalesce into that theme

"resourceful" and "value-for-money" mentality pervasive among the historically small – but now rapidly growing group – of Indian entrepreneurs and innovators.

Investing in process while retaining flexibility For organizations working in India, the high levels of volatility and modestly functional ecosystem demands high levels of flexibility and improvisation on their part. And yet these firms require processes in order to function dependably, expand their response repertoire and engage in continual innovation. From my cases, I make a few salient observations of how these actors addressed these twin needs. At one level, there was a strong emphasis on relying on others through alliances and other cooperative arrangements that leveraged and developed innovation capability. On the other hand, these organizations made significant investments in developing elements of the ecosystem, particularly related to upgrading education levels and technical knowledge. These initiatives were reflective of the growing significance that these companies accorded to building robust internal systems and processes, as well as highlighted the willingness of these actors to themselves "creatively fill in the gaps" and address needs that would normally be provided through the broader innovation ecosystem (see also Christensen et al. 2019). On another front, in scenarios where process (via bureaucracy) could potentially stifle action, I observed that organizations devised ingenious interfaces that enabled agile development and scaling simultaneously. These examples are illustrative of the *jugalbandis* these actors engaged in to maintain a balance between the fluidity that improvisation affords with the stability and systematicity that a process-based orientation offers.

Exploring the inclusive frontier A third significant imperative for organizations functioning in India is to make innovation available and relevant to wide swathes of humanity. This stands in stark contrast to aspirations of being on the technological frontier, which typically has an exclusionary focus (in terms of pricing) given the costs involved in developing such products and services. In addressing this conundrum, the companies featured in my narrative reframed groundbreaking in more inclusive terms and devoted their attention to developing innovations – of the product, process, marketing, business model and organizational variety – for the masses. This required them to engage in a *jugalbandi* of another variety – one in which they harmonized their deep, empathetic insights of needs, concerns and conditions of the locals with the imagination, resolve and use of relevant technologies. For these organizations (and others in India), pioneering took on a different connotation, one that valued inclusion and leveraged local resources customized to the context, rather than operating at the technological frontier. Indeed, exploring such technological "interiors" (Ahlstrom and Garud 1996; Garud and Ahlstrom 1997) and thus developing more appropriate technologies (Schumacher 1973) for the multitudes (especially the large, underserved markets), has and will continue to be a domain where Indian innovation can make a significant and distinctive contribution. Given this, the *jugalbandi* between inclusion and innovation has now become an integral element embedded in the mindset and practices of many Indian organizations.

Above I have highlighted three specific forms of *jugalbandi* that I observed in the organizations covered in this study. I suggest that these are illustrative and likely part of a larger set of balancing acts that companies operating in India perform as part of their innovation efforts. Moreover, at the practice level, the organizations that I studied were

enacting several such syntheses simultaneously. Indeed, this paper highlights how operating in *jugalbandi* mode – that is, merging the local with the global – is a pervasive reality for many Indian organizations, and potentially others across the globe. In invoking this imagery (see also Morgan 1986; Tsoukas 1991) and chronicling its presence, the intent here is to introduce a novel perspective that more accurately describes the innovation journeys of many Indian organizations. This hybrid mode of organizing stands in contrast to the "either-or" stance that most prior scholars of Indian innovation have taken in their discourse around *jugaad* and systematic innovation. Moreover, given its integrative roots, this term invokes a richer description than that captured by such expressions as frugal innovation/engineering, reverse innovation and Gandhian/inclusive innovation. *Jugalbandi*, when done well, harnesses the positive creativity inherent in *jugaad* and accrues the benefits of being systematic, even as it avoids being shackled by routine or incessant gaming of the system.

Operating in a *jugalbandi* mode has become more of an imperative for Indian organizations, given the stage of the country's economic development (in particular, since liberalization that began at the start of the 1990s) and its growing interaction with the global economy. Such an approach builds on the historic tendencies inherent in the "Indian way" of doing things while gradually imbibing influences from other approaches (Chen et al. 2015). Here, it is important to note that there are many other interfaces that can necessitate functioning in this hybrid fashion: rural/urban, family/professional, public/private and analog/digital are some other instances. Moreover, the directionality can be reversed for certain firms: as an example, for MNC's working in India, honing their abilities at doing *jugaad* would likely comprise a significant part of building their *jugalbandi* repertoire. For all these actors, enacting *jugalbandi* represents both a comprehensive response to the complex and chaotic environmental conditions they are operating in as well as a pathway by which they develop more comprehensive innovation capabilities.

Performing *jugalbandi*, then, is an attempt to combine methodical and orderly approaches to innovation while embracing flexibility and improvisation as the situation demands – all of this while retaining relevance to the contexts within which the actors operates. As my narrative demonstrates, innovation here includes a wide variety of dimensions that include product, process, marketing, organizational and business model, among others. Moreover, the emphasis on inclusion further broadens the horizons of innovation. The paper has featured three organizations that are adept exponents of *jugalbandi*, each of whom are well regarded for the products/services/solutions they have provided, have demonstrated a high level of strategic vitality and are exemplars for similar initiatives across the world, especially in emerging economies. And by no means are they the only ones. There are a number of other organizations spanning multiple industries – established and start-up firms, for-profit and NGO organizations, multinational and local businesses – that have engaged in *jugalbandi*, synthesizing rigor and relevance at various levels of proficiency. These actors have gone beyond *jugaad* and established a sustained commitment to being innovative and entrepreneurial. In the spirit of symmetry, it also important to recognize that doing *jugalbandi* well is typically hard, and there are likely many organizations that have been unable to achieve this delicate balance despite their efforts at doing so.

While a more detailed exposition is beyond the scope of this paper, it is important to highlight the linkages between *jugalbandi* and analogous concepts and ideas that have emerged within the broader literatures on entrepreneurship, innovation and

organizations. Baker and Nelson (2005) employ the term selective bricolage (and contrast this with parallel bricolage) to highlight cases where firms are discerning in their efforts to "create something from nothing", relying mainly on conventional methods to develop their outputs. Eisenhardt and colleagues (Brown and Eisenhardt 1997; Eisenhardt and Sull 2001) elaborate on the notions of "semistructures" and "simple rules" as ways in which firms navigate chaotic and rapidly evolving environments. There is a fertile literature on multiple identities and hybrid organizations (Ibarra 1999; Pratt and Foreman 2000; Jain et al. 2009; Battilana and Dorado 2010; Pache and Santos 2013) that speaks to the identity work that actors engage in while managing the different roles that they enact. And finally, there is a growing discourse on ambidexterity (Benner and Tushman 2003; Gibson and Birkinshaw 2004; O'Reilly III and Tushman 2013) and paradox (March 1991; Smith and Lewis 2011) that highlights how actors address the tensions that contradictory demands place on them. While each of these streams of research has experienced vibrant growth in recent years, they have arguably placed little emphasis on the role that culture and embeddedness play (both as context and content) in handling these dualities. Given this, a *jugalbandi* between these literatures and the concept of *jugalbandi*, as articulated in this paper, is likely to be mutually generative and academically valuable!

An appreciation of the *jugalbandi* approach to innovation enables us to open up many interesting trajectories of research. For starters, identifying and specifying the repertoire of mindsets and practices associated with *jugalbandi* (beyond those specified in this paper), as well as exploring their antecedents and consequences, would be a worthwhile endeavor. Along these lines, taking a deeper dive into other companies and organizations operating in India (and other similar) contexts to examine how they combine *jugaad* and systematic approaches to innovation, and then detailing their experience with implementing/operating in this dual mode, is likely to provide useful insights. Here, viewing studies on frugal innovation and the circular economy from a *jugalbandi* lens will likely yield a novel understanding of these phenomena. As alluded to above, determining how and why some organizations are better (or worse) exponents of *jugalbandi* than others would be useful from a strategic perspective. Furthermore, studies that examine the evolution of industries in India (cf. Kumaraswamy et al. 2012; Jain and Sharma 2013; Jolly and Raven 2016) could look into the role that different modes of innovation play in shaping the structure of the sector. From a critical viewpoint, understanding whether *jugalbandi* approaches enhance or inhibit the corruptive effects of *jugaad* as well as the expense/exclusivity associated with systematic innovation would be valuable from a practical and policy viewpoint. Finally, looking at the use of *jugalbandi* by companies beyond the realm of innovation and entrepreneurship would speak to the willingness and utility of employing this mode of operation across different functional areas in an organization.

Implications

So what does this exposition tell us about the nature of Indian innovation? In an earlier paper, Prabhu & Jain et al. (2015) elaborated on its distinctive features –that is, its emphasis on frugality, flexibility and inclusion – and referred to this as the *jugaad* way of innovation. While *jugaad* is alive and well in India – in both its positive and negative

manifestations – it is increasingly being supplanted within progressive Indian organizations by what I refer to as a *jugalbandi* approach to innovation. This term connotes a melding of *jugaad* with mindsets and systems associated with more systematic approaches to innovation. The resultant combination is enabling these organizations to build their innovation capabilities even as they remain relevant to the needs of the contexts that they operate in. Equally significantly, these developments suggest that innovation from countries such as India are likely to retain their own distinctive character and trace their own unique trajectory even as they impact a broader populace (see also Arvey et al. 2015; Young et al. 2014; Polanyi 1944). I draw out some of the implications of these observations below.

From a theoretical perspective, there is an increasing need to understand and appreciate the contextual roots of innovation. Innovation studies have either ignored these forces and focused on the micro (individual, team and organizational factors) or as in the case of more macro-studies – such as economic geography or national innovation system scholarship – mostly emphasized the impact of a stylized set of formal institutions. However, as more recent studies of entrepreneurship in emerging economies (Mair et al. 2012; Jain and Koch 2020) have highlighted, informal institutions – that is, local understandings and practices – play a significant role in influencing actor behavior in these scenarios. Along these lines, a more comprehensive understanding of *jugaad*, *jugalbandi* and other forms of innovation coming from across the globe require a deeper appreciation of the institutions – both formal and informal – that these firms are embedded in (Jain and Koch 2017).

From a practical standpoint, the need for organizations operating in these contexts to get the appropriate balance while engaging in *jugalbandi* becomes paramount. For firms that have been accustomed to operating more in a *jugaad* fashion – that is, local companies, start-ups and small enterprises – porting systems that enable innovating on an ongoing, systematic manner makes sense (as well as curbing any self-destructive *jugaad* tendencies that they might possess). On the other hand, for multinationals entering these markets that are typically steeped in more Westernized approaches to innovation, fostering *jugaad* capabilities – that is, gaining a deeper appreciation of how to innovate in a frugal, flexible and inclusive manner – is likely key to operating effectively in these contexts (see Jha and Krishnan 2013). Moreover, becoming adept at engaging in *jugalbandi* on an ongoing basis will likely enhance an organizations ability to survive and thrive. Indeed as environments around the world become characterized by volatility, uncertainty and inequity, adopting a *jugalbandi* approach may be a more prudent and humane way of engaging in innovation. Along these lines, I view the term *jugalbandi* as generative in that it will likely inspire innovation initiatives by organizations that are creative combinations of local and global practices focused on addressing the grand societal challenges prevalent across the planet.

Another interesting implication that I draw from my observations of Indian innovation is that the emphasis for most organizations operating in these contexts should probably not be on exploring the technological frontier. Such innovation tends to be expensive and riskier and is often difficult to commercialize. Rather, the focus should be on making innovation outputs more inclusive, that is, available to a larger number of people such that they have a greater social impact. The characteristics of many emerging economies including India – that is, their large populations with a significant proportion of people living in poverty-like conditions – suggest that the challenges

facing these societies – and the potential solutions to these – are likely to be different (Jain and Koch 2017). Addressing these challenges can enable organizations operating in India craft a distinctive innovation competence. Each of the organizations profiled in this paper – ISRO, Amul and Aadhaar – have (partially) built their reputations for being innovative in this manner, and there are others – Aravind Eye Care, Akshaya Patra and Selco, to name a few – that have followed a similar path. Put differently, pushing the envelope on inclusive innovation (George et al. 2012; Krishna 2017; Chakraborty and Giuffredi 2019) is a goal that firms operating in Indian conditions should aspire to while building their worldwide reputation for innovation.

From a policy standpoint, the implications that this paper draws are consistent with prior observations, with some important differences. Here, the pre-eminent task still remains changing the context and the associated mindset. To the extent that *jugalbandi* builds on the darker side of *jugaad* (copying others, working the system and engaging in corruption), this needs to be minimized or eliminated through modifications in rules via government/industry action as well as a broader shift in culture. A second looming challenge involves modernizing the public sector and infusing it with *jugalbandi* based practices. Another key policy recommendation involves invigorating the Indian innovation ecosystem – in particular, energizing government R&D laboratories and the higher education system as represented by its universities – and developing impactful linkages between these institutions, private firms and NGO's (Khanna and Raghavan 2018; Niti Aayog 2019). On this front, while there have been a slew of initiatives introduced by the central government over the past decade (including naming the 2010's as the "decade of innovation"), their long-term effectiveness will depend on the extent to which the state is willing to let go, that is, be smart about the influence they intend to exert over the emerging innovation ecosystem. This paper suggests that these interventions need to be crafted through a consultative approach that takes into account the voices of the many constituents, that is, they need to be driven by a largely bottom-up process. Such decentralized efforts, as well as a more productive relationship between government and industry (that does not fall into the cracks of "crony capitalism") are going to be key to making these initiatives work and not just be another exercise in precision planning followed by inchoate implementation. The potential materialization of this infrastructure will help set the stage for organizations to rely on others for providing critical ingredients to their innovation initiatives, rather than have to develop these on their own.

Finally, in order to emphasize engagement in inclusive innovation, I suggest that the government implement policies that allocate significant resources to such initiatives (see also Dutz 2007) while also making funds available for projects that explore certain targeted frontier areas, primarily in order to build absorptive capacity in crucial technological domains. Key to each of these initiatives is retaining the uniquely Indian characteristics of innovation (even as the downsides are minimized) while embracing ideas from outside, and melding these together via a creative synthesis.

Conclusion

This perspectives paper has described the distinctive, homegrown nature of innovation in Indian organizations that I term *jugalbandi*. This mode combines *jugaad*, with its emphasis on frugality, flexibility and inclusiveness (Prabhu and Jain 2015), with

systematic innovation that involves building capabilities and ecosystems, emphasizing process and pushing the technical envelope. This paper has examined three organizations – ISRO, Amul and Aadhaar – that epitomize this form of innovation. These cases are exemplars of innovative activity within the Indian context. Moreover, there is growing evidence from the Indian business landscape, that different companies and organizations – that include start-ups, established local firms, MNC's, NGO's/non-profits and even government institutions – are engaging in *jugalbandi* innovation as they navigate an increasingly dynamic and competitive global environment. In highlighting this distinctive method of innovation, I also draw attention to its contextual roots – one, that I suggest needs to be understood in greater depth in order to recognize the various different varieties of innovation unfolding across the globe.

As innovation and entrepreneurship in economies such as India expands and enters a new phase, it is apt to update the language that describes the mindset and practices underpinning such activity. The use of the term *jugalbandi* is a step in that direction. Moreover, it is deliberate in that signifies an understanding of innovation practices in India (and elsewhere) on their own terms. In capturing the new as well as highlighting distinctive features of this form of innovation, this paper intends to open up conversations aimed at a deeper understanding of *jugalbandi* and its impacts, even as it changes (and is influenced by) the context in which it unfolds. If this paper could have one message, it would be to point out the importance of indigenous innovation approaches (such as *jugaad*) and how these need to coexist and be melded with more systematic methods that involve testing and refinement (Ahlstrom 2010). In constructing helpful extensions to our conceptual vocabulary through the use of the term *jugalbandi*, we open a window to understanding how practices and processes associated with it play an important role in fostering innovation and growth (Acs et al. 2018) in the major emerging economies of today. The journey has just begun….

Acknowledgments The author would like to thank Tulasi Srinivas and the anonymous reviewers for their supportive feedback and senior editor David Ahlstrom for his developmental guidance on this manuscript.

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