



# Opportunities and challenges in food entrepreneurship: In-depth qualitative investigation of millet entrepreneurs

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## ABSTRACT

Consumer food preferences are undergoing a rapid transformation, and there has been a heightening of interest in eating healthy, sustainable foods. Food entrepreneurs are cashing in on the trend and are diversifying their existing offerings to include healthier options using alternate ingredients such as millets. However, these entrepreneurs face several challenges, and the actual growth of the market is lower than expected. The present study examines the opportunities and challenges faced by millet entrepreneurs. A total of 25 millet entrepreneurs were interviewed using a semi-structured qualitative design. Key opportunities include increased awareness of millets, people going back to their traditions, and informative food labels were the key opportunities, while a lack of awareness, lack of familiarity, preparation difficulty, sensory attributes, lack of affordability, inferior image, customer distrust, and millets' longer gestational cycle were major challenges.

## 1. Introduction

Climate change, migration, and the rapid pace of urbanization and globalization have had serious consequences for our health (Celik, 2020). With the rising cost of living, there has been a radical transformation of family structures, with both parents contributing income to support the family (Hepburn, 2018). The fast pace of life and busy work schedules have reduced the time available for preparing home-cooked, healthy meals, which have been substituted by processed and unhealthy foods (Pfeiffer, Speck, & Strassner, 2017). In Western societies, many children have a carbohydrate-rich diet along with high fat intake. This is nutritionally inappropriate and has led to obesity and iron deficiency in children (Nardo et al., 2019). With unhealthy diets and reduced physical activity, non-communicable or lifestyle diseases, such as diabetes, obesity, raised blood pressure and glucose levels, have become common (WHO, 2021). According to a recent report by the World Health Organization (WHO), such diseases kill 41 million people each year, equivalent to 71 % of all deaths globally (WHO, 2021). Customers worldwide understand the importance of nutritious food and are making a steady shift towards healthier eating, and the outlook of food retail has undergone a rapid transformation globally (FRESH, 2018).

A 2016 survey by PwC suggested a rise in media exposure and awareness is causing customers to prioritize healthy eating and that millennials are the generation most enthusiastic about changing their eating habits (PwC, 2016). Healthy foods have become a trend for customers, especially young and busy customers who want to stay healthy, and this has attracted the attention of several food entrepreneurs (Kasriel-Alexander, 2016). Recent literature also suggests that the upper-middle-income population understands and demands foods with better quality, health, and safety attributes (Jaffee et al., 2018).

In the recent past, the heightened interest in healthy eating has resulted in an almost constant proliferation of new varieties in the healthy food segment. As a result, more and more entrepreneurs are entering the food domain and exploring alternative ingredients and recipes that promise health, taste, and sustainability (Olayanju, 2019). Millets are such an ingredient and have recently become quite popular. Consumer awareness regarding the nutritional, economic, and ecological benefits of consuming millets is increasing (Shah et al., 2021). There also have been several efforts by policymakers and international organizations, to raise the status of millets and increase their consumption (Chera, 2017). Thus, there has been burgeoning entrepreneurial interest in the millet-based foods market.

"Millet(s)" is an English term for a group of cereal grains. This

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categorization is based more on culinary than botanical properties (Chera, 2017). Millets are touted as sustainable grains as they require few inputs and withstand severe biotic and abiotic stresses (Kumar et al., 2018). These seeded grasses include grains that are gluten-free and drought-tolerant (Chera, 2017). In comparison to staple cereals, such as wheat and rice, millets require significantly less water to cultivate (Bhatt et al., 2016), and since they are naturally more pest-resistant, they require fewer chemical fertilizers and pesticides (Shah et al., 2021).

Millets are classified into two groups based on grain size, major or minor (Chandi & Anoor, 2016). The major millets include sorghum, pearl, and finger millet, while minor millets include foxtail, proso, kodo, barnyard, and little millet (Bora et al., 2019). The existing literature notes the various nutritional and health benefits associated with the consumption of millets. Millets have significantly more calcium (finger millet), phosphorus, zinc, magnesium (barnyard millet), iron (pearl millet), dietary fiber, niacin, and folic acid than staple crops, namely wheat and rice (Bell, 2012). Millet consumption has been associated with slowing aging, helping with metabolic diseases (Kumar et al., 2018), reducing the risk of inflammatory bowel and heart disease and gastrointestinal conditions like gastric ulcers and colon cancer, lowering blood pressure, blood lipid levels, hypertension, diabetes, and cholesterol levels, and improving bone growth (Annor et al., 2017).

Changing consumer food preferences has attracted the attention of food entrepreneurs who want to take advantage of the rising millet trend in the healthy foods segment. The recent interest in cooking, local dining, food tourism, socializing, and wellness has evolved rapidly (Kline et al., 2014). The food movement has led to an increase in the categories and numbers of those who consider themselves “foodies,” which has, in turn, led to an increase in the breadth of food entrepreneurs serving their needs (Kline et al., 2014). Food entrepreneurs range from bakers operating from their home kitchens to café and restaurant owners and established names in the processed food industry (Appaiah, 2019). Millet-based recipes are also gaining popularity among Indians. The rise in lifestyle diseases and increased appreciation for everything traditional has resulted in millets being extensively used in cakes, cookies, muffins, and crackers (Ganguly, 2018). Millets, once known as the poor man’s staple, are now slowly changing their image into something that is “trendy” and “cool.” In India’s metro cities, it is common to find pizzas, noodles, and mixes for pancakes, cookies, cakes, and many more products based on millets. While quinoa is popular as an alternative healthy ingredient in Western countries (Nosi et al., 2020), millets are often preferred over this and other healthy grains because millets are cheaper to cultivate, gluten-free, and suited to the Indian soil and climate conditions (Sebastian, 2015).

Millet-based products are gaining acceptance in India, and the number of entrepreneurs in the organized sector has grown exponentially. However, food entrepreneurs are facing several challenges that have resulted in lower than expected actual growth, necessitating further investigation. The COVID-19 pandemic created extensive uncertainty and panic worldwide (Talwar et al., 2021). Food adequacy and security were severely affected, and food entrepreneurship suffered (Apostolopoulos et al., 2021). Global food supply chains were disrupted, and countries across the world took restrictive measures in transport and labor force movement to control the spread of the disease (Kumar & Shah, 2021; Mishra et al., 2021).

While there have been several studies on entrepreneurs and their characteristics, few have been conducted on food entrepreneurs and the opportunities and challenges that are unique to them. Our review of prior literature also suggests that the literature on millet entrepreneurship is limited. Further, an understanding of the current Indian millet market and the opportunities and challenges faced by millet entrepreneurs is still developing. There have been practitioner-based studies conducted but, to the best of our knowledge, empirical academic studies have remained neglected. It is especially important to address this gap for a holistic and comprehensive understanding of the Indian millet market and consumer trends. The present study attempts to fill this gap

by using a qualitative research design based on grounded theory through semi-structured in-depth interviews with 25 millet entrepreneurs. The study examines two key research questions (RQs): What are the different opportunities and challenges faced by millet entrepreneurs in India? (RQ1); and What were the effects of the COVID-19 pandemic on the individual businesses of millet entrepreneurs? (RQ2).

The novel contributions of the current study may be summarized as follows. First, at a time of expanding conversations on healthy eating and, relatedly, millets as an alternative ingredient, there is a pressing need to understand the opportunities and challenges in the millet-based foods market. The results here provide insights into, for example, why millet-based foods are more expensive than their counterparts. Further, it develops the previously limited empirical literature on millet entrepreneurship using a grounded theory approach. Finally, it takes into account how the COVID-19 pandemic has affected millet entrepreneurs and provides novel insights that may prove useful and relevant for a range of stakeholders.

The current study is organized as follows: Section 2 focuses on food entrepreneurship, healthy eating, and millet entrepreneurship in India. Section 3 sets out the study methodology and presents the research profile of the participants. Section 4 presents the thematically arranged opportunities and challenges to millet entrepreneurship, as well as the effect of the COVID-19 pandemic on millet entrepreneurship. Section 5 presents the discussion and study implications, and Section 6 concludes, notes limitations, and proposes future research directions.

## 2. Background literature

### 2.1. Food entrepreneurship

Entrepreneurial activities and desires have been appraised as an opportunity to create and add worth and value to the economy (Estrada-Cruz et al., 2019). India’s natural health food business was worth over 3.8 billion US dollars in 2018, and its value was predicted to reach over 8.5 billion dollars by 2023 (Statista, 2021). Food entrepreneurs run a variety of businesses, including as farmer’s-market or food-truck vendors, wholesale food manufacturers, internet food companies, caterers, and event managers, and there are an expanding number of home-based food businesses. (Colpaart, 2017). Food entrepreneurs are recognized for taking risks, pushing limits, and relishing the challenge of venturing into the unknown (Knudson et al., 2004). Furthermore, they are important drivers of the economic development of local food systems (Thilmany et al., 2017) and have a unique role in bolstering and ensuring the long-term viability of regional agricultural and food economies (Colpaart, 2017).

Prior studies have documented opportunities and challenges faced by food entrepreneurs. There are important entry barriers to starting a food business; for example, it is expensive to start and maintain, and building and operating a licensed commercial facility is not easy (Gartenstein, 2003). Food entrepreneurs also require a certain set of technical skills in order to access and communicate with their market and create and build a brand that is trusted by existing and new customers (The Hale Group, 2017).

In terms of opportunities, as in any other sector, food entrepreneurs also require conventional assets (Colpaart, 2017). Moreover, social and cultural capital investments, such as accessible ingredient supply chains, production facilities, processing technology, distribution, ecosystems, and financing, are very much needed (Flora, 1998; Carter et al., 2003; Santos, 2012). Food entrepreneurs often employ unique strategies to establish sales and distribution channels. These include raising and creating awareness for emerging or niche food markets and collaborating and networking through joint marketing programs and cooperative buying clubs (Colpaart, 2017).

Given the current consumer market and shifting consumer values, attributes such as healthy (Dahiya et al., 2021), organic (Tandon et al., 2020), green, sustainable (Dhir et al., 2021), natural (Sreen et al., 2021),

and Ayurvedic (following the south Asian medical tradition; Islam, 2010) are gaining importance in the food market. Food entrepreneurs must communicate principles associated with their business culture to their customers through marketing materials (Colpaart, 2017). However, these added attributes add a price difference for which, the existing literature suggests, customers do not want to pay. For instance, customers hesitate to purchase organic food products as they are expensive compared to other conventionally produced alternatives (Aryal et al., 2009; Buder et al., 2014; Van Loo et al., 2010; Żakowska-Biemans, 2011). People are willing to buy organic items but are not willing to pay a higher price for them. (Aertsens et al., 2009a; Marian et al., 2014; McDaniel and Rylander, 1993; Pearson et al., 2010). Customers are also less aware of the benefits associated with foods that are considered green and sustainable. When it comes to such foods, knowledge and information about nutritional benefits and information is crucial; it drives customers' attitudes, perceptions, and willingness to purchase (Briz and Ward, 2009; Xie et al., 2015). Customers who are health conscious may be motivated to purchase organic foods if they are aware of the benefits. (Dean et al., 2008; Lea and Worsley, 2005).

In terms of costs of production, adding attributes like sustainable packaging, organic ingredients, expensive raw materials, and locally sourced grains (and then accounting for labor) significantly increases the cost for the entrepreneur. For example, millet prices are typically higher than conventional staples, such as wheat and rice, because their per acre yield is lower (Michaelraj & Shanmugam, 2013). The higher cost of production and niche demand leaves food entrepreneurs in such markets with a lower profit margin than those operating elsewhere (Buder et al., 2014). This is a challenge, especially for new entrepreneurs; working at a low margin makes it difficult to spare resources for product promotion (Dahiya et al., 2021). Other challenges include poor government support (Michaelraj & Shanmugam, 2013), fewer funding options (Dahiya et al., 2021), and the availability of products in the market making false health claims (Sharma et al., 2016; Żakowska-Biemans, 2011).

Like any other business, the food business was also greatly affected by the COVID-19 pandemic. There were massive swings in consumer food purchasing, as well as unexpected and long-term closures of food businesses. This stressed global agri-food supply systems, with supply chains collapsing overnight due to transport restrictions, illnesses among food workers, and international trade uncertainties (Reisman, 2021). Disposable incomes were also significantly reduced, and customers were hesitant to spend on food (Lewis & Lee, 2020). A recent study suggests that COVID-19-pandemic restrictions (e.g., work from home and lockdown) gave food entrepreneurs time to work on their recipes and increase their use of social media to reach their customers and sell their products amid an increased interest in healthy eating (Chandra, 2020). Based on the above research, we can observe that while there have been several studies conducted to understand the opportunities and challenges faced by entrepreneurs in general, fewer studies have been conducted on food entrepreneurs; who were greatly affected by the COVID-19 pandemic. There is thus a particular need to broaden the scope of research to understand how they operate in the healthy foods sector, how they were specifically affected by the pandemic, and some of the strategies they used to overcome the challenges.

## 2.2. Healthy eating

India has undergone massive demographic changes in recent years and is expected to be the world's most populated country by 2024 (Press Trust of India, 2021). By the end of 2021, 63 % of the total Indian population were of working age, between 15 and 59 years (Kumar et al., 2018). Prior literature suggests that the working population experiences higher stress levels, busier working schedules, and less time for self-care (Bhui et al., 2016). With more Indians living modern lifestyles, eating out in cafes, restaurants, or canteens has become part of the lifestyle,

with one in six meals consumed outside of the home (Bray and Hartwell, 2017).

Eating out is associated with higher calorie intake and an increased likelihood of obesity (Kim & Ahn, 2020). It has also been associated with the onset of type 2 diabetes, undernourishment, and heart disease (Kim & Ahn, 2020). Due to these various factors, many individuals are becoming more health conscious and concerned about preventive healthcare culture in the form of wellness (Kumar et al., 2021). Many restaurants and cafes have started providing healthier options on their menus because of this trend (Yoon et al., 2020). The COVID-19 pandemic has redefined the daily lifestyle habits of people across countries. A recent survey revealed younger individuals increased their consumption of healthy food items while restricting unhealthy foods (Chopra et al., 2020).

There is also a heightened interest in Ayurveda and wellness in the current Indian food market (Chopra, 2020). This interest is linked to a revival of traditional and ancient Indian practices (Khalikova, 2017), and several companies in the fast-moving-consumer-goods (FMCG) sector are diversifying to include Ayurvedic food and other products. Healthy eating in India is perceived to be part of globalized biomedical knowledge (e.g., of nutritious eating and nutrients) and indigenous wisdom (e.g., knowledge of ancient religious texts, such as vedas; Khalikova, 2020). Healthy food is of significance in Ayurveda and is said to act as strength and medicine (Mishra et al., 2019). Several Ayurvedic texts mention millets and their utility in curing various diseases (Bhatt et al., 2016), fueling their popularity as healthy food. Therefore, we observe that the trend of healthy eating is catching on in India, along with interest in wellness, and Ayurveda and millets are gaining popularity as healthy alternatives. However, there is a significant lack of consumer studies that look at challenges and opportunities with respect to millet consumption in India.

## 2.3. Millet entrepreneurship

Health-conscious individuals are becoming more cautious about their food habits and fitness and actively managing their food habits (Kumar et al., 2018). Consumer spending on healthy foods has also seen a significant change in recent times. One of the leading causes of early obesity in India is the intake of simple carbohydrates in the form of wheat Rotis (flat bread), white rice, and white bread (Wee & Henry, 2020). Hence, millets, a group of cereal grains, are prescribed as an alternative because they are nutritional, gluten-free, and also economical (Thakur & Tiwari, 2019). A few generations ago, millets were the daily staple of many Indians; however, over the years, millets were eschewed in favor of polished wheat and white rice (Chera, 2017). This was the result of several agricultural, economic, and political changes over the past century (Finnis, 2007). Millets have made a comeback and are also being called superfoods (Shah et al., 2021), nutriceals (Singh et al., 2020), and immunity-boosting foods (Mirza, 2021). Millet-based food products are gaining significant acceptance, and there has been a dramatic increase in the number of millet entrepreneurs in recent years. Customers are increasingly asking for snacks and restaurant meals that are nutritious, with no chemicals, and made from locally sourced ingredients (Kumar et al., 2021), such as traditionally grown millets.

Many food entrepreneurs are diversifying into more healthy and nutritious offerings, using millets as an alternative ingredient. Millets are known to have a superior nutrition profile, aid in weight reduction, be good for overall health and benefit individuals suffering from lifestyle diseases (Muniappan et al., 2018). We define millet entrepreneurs as food entrepreneurs engaged in the food or culinary industry using millets as the primary ingredient in their food. Millet-based foods are broadly categorized as low-calorie, healthy-cooked meals, and packaged food items. Thus, we observe millets gaining popularity in the healthy foods segment, and many entrepreneurs are using these as alternative ingredients.

Nevertheless, there is a significant gap in the academic literature in

terms of studies focused specifically on millet entrepreneurs. The millet entrepreneurs interviewed for this study discussed at length the dilemmas of balancing taste, health, and sustainability; these are the three promises on which most millet entrepreneurs have positioned their brands. A driver of the growth of millets consumption is the perception that millets are healthier than their (conventional) counterparts, such as wheat and rice. This is supported by food and nutrition science (Bell, 2012; Shobana et al., 2013), but when millets are consumed in their value-added forms, such as millet snacks or millet-based sweets, the nutrition value drops considerably.

On the other hand, there is evidence of a negative association between taste and health (Raghunathan et al., 2006). For decades, taste has been prioritized over health attributes when it comes to food choices (Turnwald & Crum, 2019), and thus health-focused labeling and satisfying taste preferences are thought to be contradictory goals. Another perception is that healthy food is not tasty or appealing (Raghunathan et al., 2006), is less filling (Crum et al., 2011), and delivers less rewarding neural responses (Grabenhorst et al., 2013). Thus, we also see that marketing foods emphasizing only their nutritional qualities and health attributes is not the best strategy. In order to overcome the challenge, millet entrepreneurs in India use taste-focused and sustainability-focused labeling and marketing. When healthy foods are promoted on the basis of taste and satisfaction, this can improve the expected taste (Liem et al., 2012) and even the experienced taste (Raghunathan et al., 2006) of healthy foods, thereby increasing the frequency of their consumption.

### 3. Method

#### 3.1. Research design

In light of the limited existing scholarly work on the factors affecting millet entrepreneurs in India, a qualitative approach was adopted (Osemeké & Adegbite, 2014). We employed qualitative analyses on data assembled through semi-structured interviews. This exploratory qualitative method utilizes open-ended questions that prompt a dialogue with the respondents and facilitates the researcher’s focus on particular themes. This specific methodology has been found useful in allowing participants to use their own words in responding to a research issue within a controlled time frame (Winterton, 2008). Furthermore, they seek to explore and discover insights rather than confirm existing knowledge (Deshpande, 1983).

#### 3.2. Sample and data collection

Gray literature, research reports, and news articles were used to identify the various vertical factors operating in the millet market. A total of 25 entrepreneurs were identified from purposive sampling in which we aimed for maximum diversity among the interviewees by recruiting participants operating within FMCG domains (see Table 1). This includes those in food service (cafes, restaurants, and cloud kitchens) and millet processing and those owning brick-and-mortar organic and lifestyle stores. We purposefully selected participants on the basis of these categories and did so by making extensive use of professional networking platforms, such as LinkedIn, and social media platforms, such as Facebook and Instagram. Participants were given the contact details of the first author, and connections were appreciated. Initial contact with the participants was made in person or via phone, email, or text messages.

All participants received a project proposal, interview protocol, and consent form describing the study’s objectives and giving them a general sense of the structure of possible interview questions. They were allowed to ask questions regarding the study and schedule the interview at a convenient time. The interviews were conducted over a two-month period in English (n = 12), Hindi (n = 7), and Gujarati (n = 6), depending upon the participant’s preference and convenience. The

**Table 1**  
Descriptive profile of the interviewees.

ID	Gender	Age range	Location	Description
P1	Male	30–49	Karnataka	Restaurant /Café
P2	Male	30–49	Karnataka	Restaurant, Catering
P3	Male	50+	Karnataka	Restaurant /Café, Organic Store
P4	Male	50+	Gujarat	Organic Farmer, Entrepreneur
P5	Female	18–29	Gujarat	Organic Store
P6	Male	50+	Gujarat	Organic Farmer, Entrepreneur
P7	Male	30–49	Gujarat	Organic Store
P8	Female	18–29	Haryana	Restaurant /Café
P9	Male	30–49	Uttar Pradesh	FMCG
P10	Male	18–29	Maharashtra	FMCG
P11	Female	18–29	Tamil Nadu	Restaurant /Café
P12	Female	30–49	Tamil Nadu	FMCG
P13	Female	18–29	Maharashtra	FMCG
P14	Male	30–49	Maharashtra	FMCG
P15	Male	30–49	Andhra Pradesh	FMCG
P16	Male	18–29	Orissa	FMCG
P17	Male	50+	Tamil Nadu	FMCG
P18	Female	18–29	Delhi	Catering
P19	Female	18–29	Madhya Pradesh	Millet Processing
P20	Male	30–49	Rajasthan	Restaurant /Café
P21	Female	30–49	Rajasthan	Restaurant /Café
P22	Male	18–29	Punjab	FMCG
P23	Male	30–49	Gujarat	Millet Processing
P24	Male	30–49	Gujarat	Millet Processing
P25	Female	18–29	Delhi	Catering

interviews varied in length between 30 min and 1 h, with an average time of 44 min, and were conducted either in person (n = 6), by telephone (n = 3), or by Zoom video conferencing (n = 16), depending upon the participant’s preference and convenience. All interviews were audio recorded with prior consent.

The interview schedule was designed using pre-specified categories of questions to direct the data collection. In the first part of the interview, we attempted to familiarise the interviewees with the topic studied using general questions, such as “Tell us your millet story.” We encouraged them to discuss the various motives and barriers to the consumption of millet-based foods they have encountered. In the second part, we asked them to identify the opportunities in the Indian millet market, the challenges they have faced, and the strategies they have utilized. We adopted a narrative approach to understanding the strategies used by millet entrepreneurs in overcoming several challenges. Such an approach has been useful in identifying common themes and patterns (Singh et al., 2015). The final part focused on the effect of the COVID-19 pandemic on individual businesses. We met quality criteria and limited bias by wording all questions in an open-ended, unobtrusive, and non-directive way (Patton, 2002).

#### 3.3. Data analysis and interpretation

Interviews conducted in regional languages were first translated into English and transcribed verbatim. The demographic profiles of the participants were anonymized (see Table 1) and given unique identifying codes before analysis to ensure anonymity and confidentiality. We followed the principles of grounded theory (Strauss & Corbin, 1997), in which the analysis included deriving a range of codes that were categorized thematically. The authors identified the zero-order items using open coding, first-order constructs using axial coding, and second-order constructs using selective coding (see Table 2). The interview transcripts were analyzed using the qualitative data software NVIVO 12. Since the nature of this study is exploratory, an inductive approach was deemed appropriate for thematic analysis. The grounded-theory method allowed us to analyze the themes emerging from the responses and ground this analysis in the participants’ real-life experiences (Charmaz, 2006). The

**Table 2**  
Classification of zero-order, first-order, and second-order codes.

Zero-order	First-order	Second-order
<ul style="list-style-type: none"> <li>Millet-based foods are considered healthier than the staples wheat and rice</li> <li>Millet-based foods have a higher fiber and iron content than staple-based foods</li> <li>Consumption of millet-based foods is associated with a reduction in blood pressure and cholesterol levels</li> <li>Millet-based foods are gluten-free</li> <li>Customers with lifestyle diseases are more likely to consume and purchase millet-based products</li> <li>Millet-based foods are recommended by dietitians and personal trainers as a diet to lose weight</li> <li>Millet-based foods are recommended by doctors as part of a healthier diet</li> <li>Millet-based foods require significantly less water to cultivate</li> <li>Millet grains are drought resistant in comparison to staples wheat and rice</li> <li>Millet cultivation does not require chemical fertilizers and pesticides in large quantities</li> <li>Millet-based foods are foods of our ancestors</li> <li>Millet-based foods are native to India and were part of the traditional Indian diet</li> <li>Millet-based foods are marketed as “ethnic,” “traditional,” and “heritage” foods</li> </ul>	<p><i>Customers aware of nutritional benefits of consuming millets</i></p> <p><i>Demand based on recommendations of doctors, nutritionists, and/or dietitians</i></p> <p><i>Customers aware of ecological benefits of consuming millets</i></p> <p><i>Cultural heritage and increasing place-based identity</i></p> <p><i>Ayurveda prevents lifestyle diseases</i></p>	<p>Awareness</p> <p>Going back to the roots</p>
<ul style="list-style-type: none"> <li>Millet-based foods are mentioned in several places in Ayurvedic texts</li> <li>Millet-based foods are recommended for use as a medicine in the treatment of diabetes and obesity, among other conditions</li> <li>Millet-based foods are very popular in the Indian market owing to an attraction toward Ayurveda</li> <li>Millet-based foods are considered healthy in Ayurveda</li> <li>Recent wave of patriotism and nationalism in India has benefitted millet’s popularity</li> <li>Customers want food products that are nationally sourced and made in India</li> <li>Customers want food products that are made in India</li> <li>Customers who buy millet-based foods concerned about sustainability</li> <li>Customers who buy millet-based foods concerned about the environment</li> <li>Entrepreneurs sell millet-based snacks in eco-friendly packaging</li> <li>Vegan trend in Western countries is making millets a popular alternative ingredient</li> <li>Eat-local trend is favorably affecting the demand for millet-based foods</li> <li>Customers prefer foods with local ingredients</li> <li>Trend of purchasing “imported” foodstuffs has reduced greatly in India</li> <li>“Natural” attracted more customers to choose the product over its alternatives</li> <li>“Gluten-free” attracted more customers to choose the product over its alternatives</li> <li>“Healthy” attracted more customers to choose the product over its alternatives</li> <li>“Organic” attracted more customers to choose the product over its alternatives</li> <li>“Preservative free” attracted more customers to choose the product over its alternatives</li> <li>Transparent ingredient list attracted more customers</li> </ul>	<p><i>Rising sense of patriotism</i></p> <p><i>Labels related to sustainability</i></p> <p><i>Labels related to locally sourced millets</i></p> <p><i>Labels that indicate health attributes</i></p> <p><i>Labels that indicate transparency</i></p>	<p>Labels</p>
<ul style="list-style-type: none"> <li>Customers are unaware of the grains that come under the millet family</li> <li>Entrepreneurs are not able to market millet-based foods efficiently as most recognize only the regional names</li> <li>Customers are not aware of the nutritional benefits associated with consuming millet-based products</li> <li>Millet entrepreneurs first need to create awareness in the market</li> <li>South Indians more likely to consume millet-based products than North Indians</li> <li>North Indians are more used to consuming staple-based foods</li> <li>Customers do not know how to cook with millets</li> <li>Customers have forgotten how to cook with millets</li> <li>Most snacks available in the Indian market are staples based</li> <li>Processing technology of millets is not yet accessible to entrepreneurs in comparison to staples</li> <li>Staple foods are a default choice for the majority of Indians</li> <li>Customers do not want to try anything new</li> <li>Customers not familiar with the taste of millet-based foods</li> <li>Customers resist adopting millets in their regular diet</li> <li>Millet-based foods require more cooking and preparation time than conventional alternatives</li> <li>Lack of gluten makes it harder to prepare 100 % millet-based snacks</li> <li>Millet-based foods need to be cleaned, grounded, pounded, and soaked overnight before they can be cooked</li> <li>Customers’ awareness of millet recipes limited</li> <li>Entrepreneurs use social media where individuals can freely join and share their millet recipes</li> <li>Millet-based foods have a bitter aftertaste</li> <li>Customers are not used to the taste of millets</li> <li>Millet-based foods are not as soft in texture as conventional staple alternatives</li> <li>Baking with millets is difficult due to its coarse texture</li> <li>Millet-based foods are more expensive than the conventional alternatives made from staples</li> <li>Entrepreneurs charge a health premium on millet-based foods</li> <li>Millet-based meals cost more than staple-based meals</li> <li>Per acre yield of millets is less than that of wheat and rice</li> <li>Millet farming is less profitable for farmers</li> <li>Processing technology of millets is expensive and not easily accessible</li> <li>Building a network of millet farmers takes time</li> </ul>	<p><i>Customers only aware of the regional names of millet varieties</i></p> <p><i>Lack of awareness regarding benefits of consuming millets</i></p> <p><i>Regional differences</i></p> <p><i>Lack of knowledge regarding how to cook with millets</i></p> <p><i>Wheat- and rice-based foods are the status quo</i></p> <p><i>Customers are reluctant to try millet foods</i></p> <p><i>Lack of convenience</i></p> <p><i>Lack of knowledge about millet recipes</i></p> <p><i>Millets have a bitter taste</i></p> <p><i>Millets have a coarse texture</i></p> <p><i>Millet foods are more expensive</i></p> <p><i>Higher production costs</i></p> <p><i>Uneven supply patterns</i></p>	<p>Unawareness</p> <p>Lack of familiarity</p> <p>Preparation difficulty</p> <p>Sensory attributes</p> <p>Lack of affordability</p>

(continued on next page)

Table 2 (continued)

Zero-order	First-order	Second-order
<ul style="list-style-type: none"> <li>• Building a network of millet farmers takes more investment</li> <li>• Millets perceived as fodder for cattle</li> <li>• Millets are not aspirational food</li> <li>• Customers interested in purchasing millets but resist when it comes to knowing their regional names</li> <li>• Millets consumption not associated with wealth and status</li> <li>• Millets considered old-fashioned</li> <li>• Millet consumption associated with older demographics</li> <li>• Millet-based foods perceived as boring</li> <li>• Millets processed to the extent that it tastes the same as rice</li> <li>• Refining and processing of millets diminish nutritional content</li> <li>• Distrust of millet entrepreneurs among customers as there have been several cases of adulteration</li> <li>• Distrust of millet entrepreneurs among customers as there have been several cases of false health claims</li> <li>• Processed millet-based foods are not as healthy</li> <li>• Absence of standardized quality marks for millet-based foods</li> <li>• Health benefits of consuming millets are long term</li> <li>• Entrepreneurs found it difficult to convince the customers of the long-term benefits of millets</li> </ul>	<p><i>Millets regarded as poor man’s food</i></p> <p><i>Inferior image associated with regional names of millet varieties</i></p> <p><i>“Old-fashioned,” “sad,” “boring” image</i></p> <p><i>Polished millet products mixed with rice</i></p> <p><i>Unnatural and artificial ingredients added to millet foods</i></p> <p><i>Millet food products that do not match the claims made by the brand</i></p> <p><i>Lack of transparency in ingredients list</i></p> <p><i>Benefits of including millets in diet are not seen instantly</i></p>	<p>Inferior image</p> <p>Consumer distrust</p> <p>Longer gestational cycle</p>

first cycle of coding involved identifying open codes. All the transcripts were thoroughly read and reviewed for in-depth insight into the content. This was followed by line-by-line coding. In the second cycle, we grouped the codes together. We kept the specific local context in mind during this process as a significant part of the interviews focused on participants’ individual experiences, given the regional differences.

We attempted pragmatic double coding (Barbour, 2003) and emergent themes were iteratively challenged and discussed within the team to ensure rigor and reliability. This was done until consensus was reached. A panel of three professors and one subject specialist then conducted a reliability analysis. After the panelists separately inspected the coded categories, we calculated Fleiss Kappa estimates; the Kappa value was well above the threshold limit suggested by prior methodological literature. (Artstein & Poesio, 2008). Data saturation (Glaser & Strauss, 2017) was reached after 19 interviews, and we conducted six more. Holton’s (2010) recommendations were followed to evaluate data saturation after reviewing the interview data and emerging codes.

4. Results

The thematic analysis of the collected qualitative data was undertaken by identifying the opportunities and challenges faced by the millet entrepreneurs and considering the various sets of strategies they have utilized to overcome the challenges (see Fig. 1). The opportunities are classified under three sub-themes, namely awareness, going back to the roots, and labels. The challenges identified were a lack of awareness and familiarity, preparation difficulty, sensory attributes, lack of affordability, inferior image, consumer distrust, and millets’ longer gestational cycle. The third and final set of themes focuses on issues related to the COVID-19 pandemic.

4.1. Opportunities

4.1.1. Awareness

Awareness of the nutritional, ecological, and economic benefits of consuming millets was found to be the biggest driver of their consumption, offering millet entrepreneurs a great opportunity. This is also one of the key reasons that the majority of millet-based foods marketed as “healthy snacks” or millets are placed under the health segment umbrella. As an entrepreneur involved in millet processing commented,

In India, literacy, along with personal disposable income, has increased, and more and more people are concerned about their health and quality of life. Nowadays, in any newspaper, magazine,

and social media, there are videos and posts of benefits of consuming millets. (P23)

Millet entrepreneurs identified three key segments of millet customers. First were those customers who had included millets in their diet after receiving a recommendation from a doctor, nutritionist, dietician, or gym trainer. These recommendations were linked to awareness of millets and were a salient factor in motivating customers to consume more millets. Most customers of millet-based foods were health conscious; that is, they were concerned about diet and lifestyle. The second customer segment includes those suffering from lifestyle diseases, such as diabetes, high blood pressure or polycystic ovary syndrome, and who had adopted millets in their diet based on recommendations from their doctors and nutritionists. The third segment included those who were looking to lose weight or were concerned about their overall fitness or being overweight and were undertaking major changes to their diets by opting for gluten-free foods. During our interviews, one of the participants noted:

Awareness has increased because of many nutritionists, doctors, and gym trainers. They are recommending millet-based foods to their patients and clients and thus giving credibility also to the claims that millets are healthy and can help people with lifestyle diseases and even weight loss. (P7)

Lastly, awareness regarding the environmental benefits of consuming millets also acted as a major opportunity for millet entrepreneurs. Environmentally conscious customers were more likely to opt for millet-based foods than the cereal staples:

The awareness of not consuming crops laced with chemicals has increased a lot in this decade. For many years the consumption of wheat and paddy was there, but slowly the trend is changing and people are becoming aware of how millets do not require so much chemicals and water to grow. (P4)

4.1.2. Going back to the roots

Consumer preferences for health products are transforming rapidly because of increasing health consciousness (Deshpande, 2015). Entrepreneurs agreed to have witnessed a significantly positive trend toward alternative medicines in India, such as Ayurveda (Mukherjee et al., 2017). They also observed a trend of “bringing back” and “going back,” such as bringing back foods that earlier generations ate and returning to a traditional “Indian way” of doing things. During the interviews, an entrepreneur remarked:

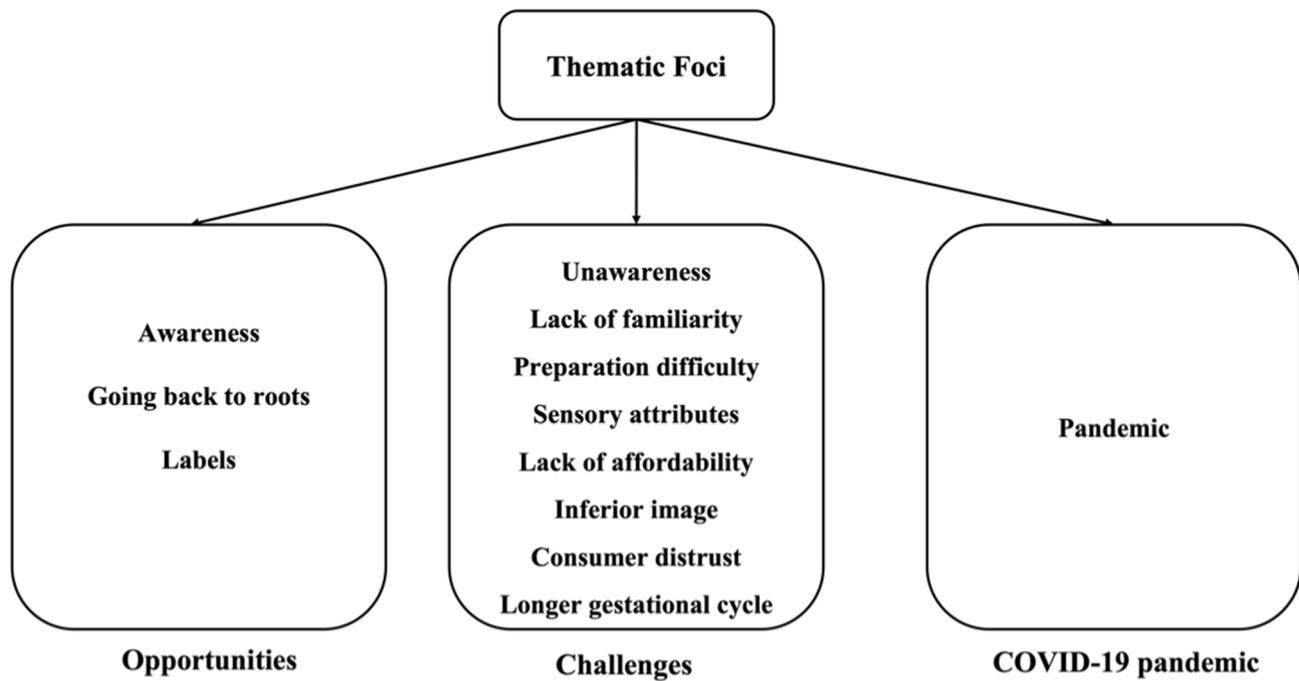


Fig. 1. Thematic foci.

This [millets] is the food of our ancestors. Indian people have been consuming millets for a very long time. Millets were in their actual diet. It’s always beneficial to follow something from our ancestors. (P13)

Consumer preferences are closely connected with place-based identity and cultural heritage (Chera, 2017). Preferences toward Ayurveda have also been correlated with a sense of patriotism toward India (Gnanakumar, 2020). We found that this was a significant opportunity for businesses operating in the millet-based foods segment:

With the recent wave of patriotism and nationalism, millet’s popularity has benefitted greatly. Customers want food products that are nationally sourced and are made in India. It is a great time for food start-ups. (P10)

Many brands have introduced products linked with traditional roots, and it has become very common in India to find “Ayurvedic” products on the shelves of grocery stores. This can be attributed to customers’ awareness of the negative side effects of alternatives, changing consumer lifestyles, an increase in purchasing power, and improvements in the literacy rate (Chandran et al., 2020). Millets are mentioned in several places in Ayurvedic texts (Sarkar et al., 2015) and are recommended for use as medicine in the treatment of diarrhea, edema, diabetes, obesity, and excess kapha (mucous/fluid) conditions (Morya et al., 2017).

Millets have become popular in the Indian market owing to an attraction towards Ayurveda. Millets are considered healthy in Ayurveda and were an integral part of the traditional Indian diet, with doctors and nutritionists increasingly prescribing a millet-rich diet, especially for diabetic patients. Customers have started to view millets as an alternative to taking allopathic pills and as a way to prevent lifestyle diseases. Many entrepreneurs also stated that lifestyle stores were opening in the current market, allowing customers a shopping experience from a hundred years ago with mud-covered floors and traditional food offerings, such as millets and hand-processed grains. Entrepreneurs mentioned that baby food was another segment that was seeing significant millet offerings in the then-current Indian market, as Ayurveda recommends finger millet as beneficial and nutritious for babies. Entrepreneurs discussed marketing millets as “ethnic,” “traditional,” and

“heritage” foods:

We have huge clientele from naturopathy to Ayurvedas, who recommend adding more and more of millets to diet, to every one, including children, pregnant women, and elderly people. I think overall, prevention is better than cure. If we could have a healthy mind and a healthy body, I am sure we don’t need to consume a lot of toxins or poisons, or chemical medicines. (P6)

4.1.3. Labels

We found that a recurring driver of consumption of millet-based foods was the label present on the packaging. Entrepreneurs discussed how certain labels such as “natural,” “gluten-free,” “preservative free,” “organic,” “healthy,” “eco-friendly” and “low-sugar” attracted customers to choose that product over its alternatives. This worked for customers who attached significant importance to the various labels discussed earlier. Because most of the millet offerings were marketed and sold under the health umbrella, “preservative-free” label came at a high cost. When a product such as a millet snack is preservative free, its shelf life is between 6 and 8 months. This also posed a challenge for millet entrepreneurs since they had to sell the product within the limited time before it went bad, and hence planning inventory became a crucial job. During the interviews, an entrepreneur remarked:

And another thing is that we list all of our ingredients on the packaging, very clean, clean in the sense, once the consumer picks a product, once s/he sees through the ingredients list, they will clearly understand what is in there. We don’t hide the sugar content; we even list whether it is natural or refined, we clearly mention our product is preservative-free and millets used are unpolished and not mixed with other grains. (P17)

Entrepreneurs stated that the “vocal for local” trend was growing in India and that customers preferred ingredients that were sourced locally, with “local” being another important label:

Currently, I think the consumer trends are positive for healthy eating, immunity-boosting foods, they are definitely going very local, they want to buy, what is available within necessity within that country. They don’t necessarily want to buy imported fruits, cereals,

whatever it is. They are looking for alternatives that is locally available to them. So, we feel huge trend happening for the 'go local' movement. (P12)

To appeal to a more environmentally conscious segment of the population, entrepreneurs agreed to use sustainable packaging. In such a scenario, labels such as "green," "recycled," "upcycled," and "sustainable" were more significant in positively attracting more customers. However, participants also pointed out that a trade-off to sustainable packaging was higher prices:

I think the people who buy millet-based foods are also aware and concerned about sustainability and the environment; thus, packaging also becomes crucial. We try to store our millet grains in gunny bags and sacks, use paper bags, the packaging is also eco-friendly. We look at the offering and packaging simultaneously because when you are a healthy brand, you want to look after sustainability angle, especially because you are doing millets; millets are a sustainable crop, so you also want to make sure your packaging is sustainable. So, it all goes hand in hand. (P22)

## 4.2. Challenges

### 4.2.1. Lack of awareness

There was a consensus that the biggest challenge in the current Indian market was the creation of customer demand for millets. Most of the customers were unaware of millets and their nutritional, environmental, and economic benefits. When millet entrepreneurs tried to market their products, a common question they were often asked was – "what are millets?" India is geographically and culturally very diverse, and while customers are aware of limited types of millets, they only recognize these in the regional languages. As a result, it becomes a challenge for entrepreneurs to determine how best to market these products and what terms to use on product packaging. The umbrella term "millet" has its advantages, but since not many people are aware of it, it is also its disadvantage. On this, an entrepreneur commented:

Bajri is a very common millet, but nobody recognises it as millet. For example, jowar is also a millet, but we did not call it millet till a few years back; we only knew it as jowar. Now people come to the store and say, "Do you have millets?" And I say, "we have bajri and jowar," they would respond, "no, no, I want millets." Thus, not many people recognise millets as this popular term "millets." (P5)

Moreover, even among dieticians and nutritionists, there was a lack of awareness regarding the variety of millet-based foods available in the market. They recommended limited millet recipes to their clients, which in turn discouraged their consumption of millets:

There is availability of millets everywhere there is availability, but people they don't know what millets are, why are they better, what are the benefits on consuming them. Hence our job becomes very difficult because we have to create demand first by spreading awareness and then sell. (P11)

Entrepreneurs also discussed regional differences in this context. People from the northern parts of India were more aware of the major millets, while those belonging to the southern parts were more aware of the minor millets. Thus spreading millet awareness was a primary and regular part of the job for millet entrepreneurs:

The current millet market is divided very regionally. In South India, the people are aware of the minor millets. Even people in Maharashtra know millets, but they are only aware of jowar, bajra, and ragi. But they don't know about the minor millets. (P14)

Secondly, there was limited awareness in customers regarding how to cook with millets. As millets do not contain gluten, they are difficult to make into chapatis (Indian bread) and turn quite hard if not eaten hot

and fresh. Many entrepreneurs regularly organized cooking workshops, had elaborate blogs on their websites and social media, and also introduced recipe books to increase awareness and encouraged customers to adopt millets. Sometimes unawareness regarding how to cook with millets led to dissatisfaction and a false notion that millets are hard to digest. Millets need to be soaked overnight before cooking with them. If this is not done, it may cause bloating and flatulence. Entrepreneurs discussed using social media to spread this awareness and also printing clear instructions on the packaging:

Many do not know how to cook with millets, they need to be soaked for a few hours before using, add a couple of pinches of salt and tablespoon of ghee while cooking; it would cut down the bitterness. One of the main things we as entrepreneurs do is always inform our customers about these things, as many are trying for the first time. (P11)

### 4.2.2. Lack of familiarity

Many entrepreneurs stated that one of the biggest challenges that they have faced and are still facing is customer reluctance to try their products. Consumer inertia-related behaviors are important to understand, along with adoption behaviors (Seth et al., 2020). While millets were a part of the traditional Indian diet, after the 1960s green revolution – a set of research and technological initiatives that increased agriculture production and made the country self-sufficient in terms of food grains (Eliazar Nelson et al., 2019) – consumption shifted to wheat and rice from millets due to a sudden increase in their accessibility and affordability (Michaelraj & Shanmugam, 2013). Younger generations were unfamiliar with the taste of millets, and wheat and rice have become the status quo over time. During the interviews, an entrepreneur remarked:

One is the inherent taste of the millet; people are not used to it. Take the example of my own mother. She is used to having white rice every day and she is diabetic and I try to convince her, she would only consume by force. But then if I ask her what does she like, she likes plain rice only. She is like 72 now and people of her generation, this comes as a default to them, the white rice and the wheat. (P2)

Despite entrepreneurs marketing millets as a superfood and spreading awareness about their nutritional, economic, and environmental benefits, customers resisted adopting millets in their regular diet. Social theory and behavioral research show that eating is influenced more by habit and external situations than by a rational assessment of benefits (Chera, 2017). The entrepreneurs interviewed reported organizing tasting sessions and giving free samples to expose customers to the taste of millets and hoping to translate that into a fondness for the product:

Customers don't want to try only! One of the biggest challenges for us when we started was to make people just try our millet offerings; we organised open Thursdays where every week, we would organise free testing sessions. (P1)

### 4.2.3. Preparation difficulty

Another barrier that we identified was a lack of convenience in cooking with millets. Millets need to be cleaned, grounded, and pounded before they can be cooked. Millets also need to be soaked overnight before cooking and require longer cooking time in comparison to wheat and rice. Customers purchase food products that are convenient to purchase, clean, and cook (Shah et al., 2021), and thus this becomes a barrier to millet demand. Customers had to research and experiment with millet-based recipes, which increased the preparation time. We also found that millets generally had a "sad" and "boring" image rather than "trendy" because they were generally made into limited recipes such as porridge which negatively affected their consumption. Millets do not have gluten inside them and hence break easily when making them as

chapatis (flat bread). This discouraged several customers, especially the ones belonging to northern parts of India where chapatis are a staple:

Presently, many women don't have enough time to make millet chapati, for example. And also, it requires some time because it does not have gluten and thus is harder to roll as it keeps breaking; you also have to eat it while it is hot; otherwise, it would harden. Thus, many customers find it inconvenient (P24)

Entrepreneurs reported using social media and building millet communities so that individuals could freely join and share their millet recipes. This motivated others to adopt millets and reduced preparation difficulties. Entrepreneurs interviewed in the study also argued that many of their products belonged to the ready-to-eat and ready-to-cook formats for convenience. Moreover, packaging became a crucial medium to increase recipe awareness and required preparation. North Indians typically consume more wheat in the form of flatbreads, while South Indians eat more rice. Entrepreneurs argued that people belonging to southern parts of India found it easier to cook with millets as they could easily replace rice in rice dishes. Millets were not so easily replaceable with wheat dishes, and North Indians found it difficult to incorporate millets into their regular diet. A common theme we identified in the interviews was that the frequency of consuming millets was, on average, once or twice a week for regular customers and that their staple was wheat and rice. How to increase the frequency of consumption and convert it into a staple was a challenge faced by the entrepreneurs:

As customers, there is this misconception is that very few foods can be made from millets like millet khichdi, or millet rice. Thus customers, before buying, have this image in mind that only limited recipes are possible, which is very far away from truth. Thus we have introduced several ready-to-eat and ready-to-cook millet offerings, which offers [a] wider range of millet recipes. (P16)

#### 4.2.4. Sensory attributes

Entrepreneurs reported that sensory attributes such as taste and texture had a significant influence on consumer preferences towards millets and were a major barrier to the demand for millet-based foods. Millets were bitter in comparison to wheat and rice, and their texture was also not as soft. Thus although customers were aware of the health benefits associated with millets, they did not consume them as they disliked the taste:

Taste! Taste is very, very big factor. Millets are naturally bitter than white rice and wheat and thus not very attractive to customers. We usually add natural coconut, chocolate, or orange to make it a bit sweeter (P8)

In this context, entrepreneurs mentioned regional differences, with those belonging to the southern parts of India being more familiar with the taste of millets and thus more flexible in accepting these. However, people belonging to the northern parts were not as flexible. Thus, an important challenge in working with these grains was that they are naturally bitter and have a coarse texture, and it is difficult to add value to make the food product palatable:

Millets are very rich in fiber, and thus texture-wise it's not soft as wheat. Thus baking with millets becomes a little bit difficult, and it took us a long time to arrive at recipes that are palatable for our customers. (P25)

Entrepreneurs noted that millet-based foods, such as snacks, required significant innovation and experimentation with several spice blends and additional flavors, such as chocolate and coconut. Customers were aware of these flavors, and it improved the palatability of the overall snack. We also found that many entrepreneurs exported millet-based foods to countries in Africa, the Middle East, and Asia; thus, internationally acceptable sensory attributes were an important consideration.

#### 4.2.5. Lack of affordability

The importance of price and its effect on consumer behavior has been explored by many marketing scholars (Khan et al., 2020). The entrepreneurs we interviewed reported that millet-based foods, for example, millet snacks were significantly more expensive than their wheat or rice substitutes, presenting a major barrier to consumer demand. While fried and roasted snacks were very much a regular part of the diet of millennials especially, due to the higher prices of millet snacks, they were not affordable for most. Even customers who were health conscious were unable to purchase millet products for this reason:

[the] most important barrier is high cost. High cost compared to economical products in the market. We take murukku, same rice murukku will be much lesser compared to millet-based murukku. (P15)

Entrepreneurs discussed several reasons that were responsible for such high prices. Primarily, the production costs were very high. Starting from the farmers from where millets were sourced, there was a trend in Indian farmers to grow wheat, rice, and cash crops, such as sugarcane, instead of millets. Due to the assured procurement of certain crops such as wheat and rice by the government at minimum support prices, there was not much incentive to grow millets, and hence most farmers chose to grow millets if they were unable to grow wheat and rice:

In our case, the scale of production is small, the fixed cost is high, and since we are not able to capture the market and reach out to many people, that creates cost. We do not have much manpower, so we cannot make crores of cookies using a machine; we are not doing that, we make our cookies with hand, and that consumes time and money. (P9)

The supply of millets was a constant problem faced by entrepreneurs. Millet entrepreneurs needed to have a network of farmers who supplied them with grains. Most farmers needed to be convinced at every stage and given added incentives in the form of higher prices. Moreover, minor millets were generally grown in the southern parts of India, and thus there was an associated transportation cost for entrepreneurs from other parts of the country:

[I]t is a game that requires time. You need to know the farmer first. You have to build the network. It requires time and effort. You cannot be a millet entrepreneur overnight. Most of the farmers will grow wheat and rice because the output is more, they do not see the worth or demand of millets and thus supply is always a problem. (P3)

Secondly, in the Indian market at the time, entrepreneurs reported there was a lack of appropriate, effective, and affordable post-harvest processing technologies for millets, especially for minor millets. This was a major barrier to extending the planting of these crops. Dehulling (removing the grain's outer skin) is especially laborious, and, in the absence of mechanization, it increases the cost of production and time taken. Customers also preferred millet products to be processed by hand rather than by machine. Entrepreneurs unanimously noted this as a significant cost:

In every village block, you will find rice and wheat processing facilities, whereas for millets, you won't find them. I tried to cultivate 300 acres of millet. So I was visiting Agricultural Engineering Department College here in Tiruchirappalli, which is run by Tamil Nadu Agricultural University. I went there as I was looking for machinery for precision farming and couldn't find it anywhere. When I went there, there is no machinery for millet there too. Millet combined harvester is difficult to find in India. (P11)

Thirdly, most millet businesses were small-scale, and there was a significant cost involved in the marketing of the products. Due to the above-mentioned factors, entrepreneurs demanded higher prices for millet products. Entrepreneurs also reasoned that the higher prices were worth it because millets contain significantly more fiber than wheat and

rice. As a result, the proportion of millet consumed is, on average, 60 % of wheat and rice consumption. Entrepreneurs stated that a 60-gram packet of millets and a 100-gram packet of rice were going to last almost equally long, thus justifying the higher prices.

#### 4.2.6. Inferior image

Entrepreneurs discussed at length the perception of millets being an “inferior” food and how that was a barrier to its demand. The marginalization of millets and stigmatization of millet customers has been extensively researched (Finnis, 2007). Due to the political, agricultural, and economic changes of the last few decades, for example, the green revolution, minimum support prices on select crops, and procurement of select crops, most Indians had substituted millets for other desirable food grains, such as wheat and rice. Indian customers were embarrassed to eat millets, since they thought it was a poor man’s food. (Shah et al., 2021). Rice, in comparison, has been associated with brahminical [upper caste] status, wealth, ritual celebration, a higher symbolic value, and as an aspirational food (Khare, 2004). As one entrepreneur remarked:

India is more rural than urban, and in rural areas, there is still a bias that millets are cattle feed and not for high-class people. (P4)

Many entrepreneurs reported that customers, after reading millets were good for babies, for example, in a magazine or on social media, rushed to organic stores asking for millet-based baby food. When they learned that millets are an English umbrella term for bajra or kodri, for example, they rejected it:

Many young mothers come to my store and ask for millet-based baby foods, and we show them bajra and jowar [regional names for pearl millet and sorghum] based baby food, so they are like it is not millets. When we explain that “millet” is an English term and that bajra and jowar are types of millets, they are not ready to buy because, to them, they are inferior. (P5)

Millets have an image as “old-fashioned,” “sad,” and “boring,” and were thus less appealing to millennials. Thus, having a fancy name, logo, good packaging, and digital marketing was very important to change this image. One of the reasons why entrepreneurs chose to use “millets” on the packaging instead of their regional names was because of the inferior image associated with the latter. Entrepreneurs also discussed that selling their products in rural parts of the country was a difficult task not only because people had less disposable income but also because of its perception as poor man’s food. Customers belonging to urban regions were comparatively more aware and chose to purchase millet-based foods. Entrepreneurs also reported starting a campaign for millet as the grain of a healthy rather than a poor man:

In most of the places, millets are always served in the form of porridge as it is easy to make. Thus in families where millets are consumed, the next generation has this idea that millet-based foods are sad and boring – words they associate with porridge; thus, they do not choose to consume millet offerings in restaurants and cafes. (P21)

#### 4.2.7. Consumer distrust

Brand trust, attachment, and loyalty are important aspects of customer engagement (Islam et al., 2019; Kumar et al., 2021). We found that building a brand and brand trust were two very important aspects with which millet entrepreneurs regularly. Since the market for millet-based foods was still niche in India, most of the brands operating were small-scale start-ups. Entrepreneurs discussed that customers did not like the bitter taste of millets but were interested in consuming them because of their nutritional benefits. There are many players in the market that processed the millets to such an extent that the entire husk was removed, leaving it tasting almost the same as rice. These fully polished millet grains and products made from processed millets were

left with no nutrition, and when customers came to know of this, they felt cheated.

So, the first thing is these days everybody wants to sell the millets; they all want to ride the millet wave. People are also realizing the benefits of consuming millets and hence demand is increasing every day. So everybody wants to sell it, they don’t know how to, from where to procure, how to procure, what are the benefits of unpolished millets, semi-polished millets. They don’t know. So, ultimately they end up in getting fully polished millets which loses maximum nutritional value, and to make it familiar for customers, they add broken rice flour to the product. (P20)

Second, many brands added unnatural and artificial ingredients to enhance the taste of the products and mixed the millets with other flours. Thus, in the name of millets and health, they sold an inferior product or a product that did match the claims made by the brand. One of the gaps we discovered in this context was that, at the time of this study, there existed no such thing as a standardized quality mark for millet-based foods. This, along with a lack of transparency in the ingredients list, made customers distrust emerging brands:

If you look at ragi [finger millet] products in the market, many people try to misguide us in the name of ragi laddu. They include 100 g of ragi flour, and the majority is either besan [chickpea flour] or maida [refined wheat flour], and they will sell it as healthy ragi laddu, which is not right. (P18)

When asked what they would do to increase customer trust, most entrepreneurs replied that they constantly interact with customers regarding ingredient proportions and cooking methods, such as roasting or frying. Most entrepreneurs started using only unpolished millets and trying to minimize mixing millets and other flours, such as rice flour. They also kept the product healthy by not adding refined sugar preservatives or other artificial ingredients to their products:

We know that there are businesses which add salt, sugar, fat, and MSG to their millet offerings to make them more attractive to the customers. We don’t want to abuse millets by adding unnatural or artificial ingredients, our all of the products are made with 100 % natural ingredients. We ensure that maximum nutrients of millets are passed on to all customers and are quite transparent about it. (P17)

Entrepreneurs noted they kept the ingredients as transparent as possible and engaged in dialogue with their customers through social media interactions and webinars. Some had a list of frequently asked questions on their website and elaborate information on the packaging, even accompanying the product with handwritten notes and a brief on their product:

And secondly, the ones who were selling the millet products by being healthy and tasty are trying to mislead the consumer. If you see diet millet chiwda, it includes paddy poha and that too fried one which is obviously high in calorie. They do not include the complete ingredients list, such as refined sugar, preservatives, other mixed flours/grains etc. (P14)

#### 4.2.8. Longer gestational cycle

We found that the benefits of including millets in a regular diet were not seen instantly, and thus millet-based foods had a longer gestational cycle. Entrepreneurs stated that purchasing millets and millet-based foods could increase the monthly expenditure spent on foodstuffs by 10–15 %, discouraging customers. However, compared to the money spent on hospitals, doctors, medicines, insurance premiums, dieticians, skin-care treatments, and the like (much of which could be avoided by making the said dietary changes), customers were likely to be better off with increasing this food expenditure. This was not very apparent to customers because the benefits of millets are only evident in the long term. This was a barrier to the consumption of millet-based foods and

hence a challenge for millet entrepreneurs, who found it difficult to convince customers of these long-term benefits:

Customers are alright with eating unhealthy things by paying a little less rather than spend more on millet-based foods, and with the saved money they buy insurance policies and end up paying hefty bills to doctors because the positive benefits of consuming millets are long term and not very apparent in short run. (P20)

#### 4.3. Effect of COVID-19 pandemic

When asked about the effect of the COVID-19 pandemic on the millet market of India, most entrepreneurs replied seeing a quantum jump in people's curiosity concerning eating healthy to build up their immunity with a significant impact on the consumption of millets:

Every one was suddenly into eating healthy and adopting an overall healthy lifestyle. The fear of the virus made customers extra conscious about their food choices. I could see lots of hits on our social media contents regarding millets as immunity-boosting foods. (P3)

Overall, the pandemic was good for grocery stores since they were allowed to remain open during the lockdown. Organic store owners, in particular, benefitted because supermarkets were very busy, and many customers opted to visit small stores to avoid the crowds.

Usually, I would get 20–25 customers a day, mostly regulars; however, during COVID lockdown, that number shot up to 100, to my absolute surprise. They would buy in bulk, products like flour, biscuits, chips etc. This was also because the big malls had run out of stock and the queues were 2 h long. (P7)

Most entrepreneurs agreed that there was a trend in India to purchase healthier food products and immunity-boosting foods and that people had, in general, become more health conscious. Before the pandemic, many entrepreneurs were working on millets part-time while also working corporate jobs. During the pandemic, they had significantly more time to work on creating unique millet recipes. We found that the pandemic gave them a chance to take the plunge and participate in the millet market full-time.

Cooking healthy has always been my passion. However, I couldn't find much time due to my day job. In lockdown, we were asked to work from home, which completely freed up my travel time; I had more time on hand and experimented a lot with millet recipes and tried to make the taste more acceptable. Post lockdown, I quit my job and started my millet food catering and snacks business. (P1)

However, there were also negative impacts of the pandemic on this market. Restaurants and cafes were most severely affected as they had to shut down completely. Even after the restrictions were lifted, customers resisted eating out.

We were hit pretty badly because of the lockdown. I had rented the space for my restaurant, where we offered several healthy meal options; however, during COVID, our staff did not come, customers completely stopped coming. There was no sale for several months. I couldn't afford giving the rent and salaries, I had to shut down. (P11)

Transportation was also a big problem, and for several months the FMCG millet brands could not do any deliveries. As most of the millet products are preservative free, and thus have a limited shelf life, a lot of product was simply wasted:

We had stock ready to meet the increased demand due to millets being nutritious and immunity boosting. However, the state lines were closed, we couldn't send the stock to the supermarkets and shops on time. Even online orders could not be catered to. A lot of it was wasted. (P16)

Out of the 25 entrepreneurs we interviewed, three had to shut down their restaurants as they could not afford to pay the rent. With a decrease in the average consumer's disposable income and the second wave of the COVID-19 pandemic, the situation seemed grim for millet entrepreneurs engaged in cafes and restaurants but for those engaged in organic grocery stores and the FMCG sector, the pandemic created opportunities for growth.

## 5. Discussion

Awareness of the importance of fitness and healthy eating has, on the whole, increased in India, especially among millennials. After interviewing 25 entrepreneurs, we found out that the current consumer base is divided. One part of the consumer base is attracted to junk and fast foods and is heavily influenced by Western cultures. Another segment that is rapidly growing is trying to go back to the Indian roots and is choosing to consume healthy organic food and traditional food crops. Millets are traditional Indian crops that have many nutritional and environmental benefits in comparison to global staples wheat, rice, and corn and thus make a healthy alternative. This has attracted the attention of several food entrepreneurs. Some of the entrepreneurs operating in the millet market are farmers who directly sell processed millet grains to customers, entrepreneurs engaged in millet processing, organic shop and lifestyle store owners who source from farmers or act as B2B (business to business) distributors, entrepreneurs in the FMCG segments, restaurant, and café owners, entrepreneurs operating from home or cloud kitchens doing millet-based delivery only meals, and entrepreneurs who curate millet recipes, organize millet workshops, and millet cooking classes. Catering is also slowly coming up as a segment of this market.

Most millet entrepreneurs have positioned themselves under the tasty plus healthy plus sustainable segment and are marketing their millet offerings as a healthy replacement to wheat and rice-based foods. We found that the general consumer perception regarding healthy foods is that they are not tasty. Millet entrepreneurs want to change that by offering foods that are healthier and tasty. Most of the millet entrepreneurs operating in the current FMCG Indian market are in the breakfast, healthy snacking, and baby-food segments. New avenues that are slowly picking up are millet-based beer and millet-based ice-creams.

Entrepreneurs we interviewed informed us that marketing is a huge part of their job because people in India are still not aware of the benefits of consuming millets, and there are segments of the population that have a negative perception of millets as poor man's food. Entrepreneurs found social media to be very useful for spreading awareness, boosting sales, reducing bias, and promoting their brands. Entrepreneurs discussed sharing posts on Instagram, for example, on millet recipes, cooking tips, health benefits, and information on the source of the millets. They also organized live interactive sessions to address frequently asked questions. Most brands also had blogs where regular stories and feedback were shared, and experimental recipes were posted.

Our analysis also points to the current asymmetry in India in the context of millets. Millets were perceived as inferior and a poor man's crop, but due to their nutritional content, they are increasingly recommended by doctors, nutritionists, and dieticians to aid in controlling lifestyle diseases and reducing weight. Due to this, an elite market has developed where modern millet snacks such as millet flakes, millet cookies, millet bars, and similar products are sold at very high prices at artisanal organic shops and online stores. Thus, on the one hand, farmers are afraid of growing millets because of a lack of an established market, on the other, customers are not including millets in their regular diet because they are so expensive and not easily accessible.

Future studies should explore the above-mentioned asymmetry and recommend ways to mitigate the gap. Further, there are tradeoffs between labeling food as healthy, tasty, and eco-friendly or sustainable. It would be interesting to test and measure these tradeoffs for more effective market positioning.

### 5.1. Theoretical implications

This work broadens our current understanding of the opportunities and challenges to millet entrepreneurship in India and makes a contribution to the development of knowledge regarding the consumption patterns of millet-based foods; research in this area has lagged behind others in recent years. The research makes significant theoretical contributions to the existing body of knowledge.

First, the current study focused on a niche subset of food entrepreneurs that engage in the food or culinary industry with millets as the primary ingredient. This research adds to existing theoretical understanding by focusing on the opportunities and challenges faced by millet entrepreneurs and the trend of healthy eating. Furthermore, to the best of our knowledge, this is the first study that has investigated this issue and, as such, adds to the existing academic literature while also influencing the design of future empirical investigations on this important topic.

Second, the current study attempted to gain a comprehensive understanding of customer decision-making for millet-based foods and the motivations for their purchasing behavior. It also critically examines the challenges and opportunities faced by millet entrepreneurs. Thus, the current study addresses the gap between actual and potential consumption of millet-based foods, thereby improving academic knowledge on the subject.

The existing literature is quite lacking in terms of identifying the various stakeholders in the millet-based foods market. This study aims to fill this gap in three ways. First, we identify the several types of millet entrepreneurs and propose several strategies that these entrepreneurs can use to combat their various challenges. Second, we offer an integrated view of the relevant customer-demand patterns to identify the antecedents of millet-based food consumption. Finally, we identify relevant barriers to consumption while discussing the opportunities and challenges to millet entrepreneurship. We see this as a significant contribution to the literature and to the development of a more comprehensive sense of the millet-based foods market.

### 5.2. Practical implications

The current study has five practical implications. Firstly, Food entrepreneurs and marketers who have just entered or are thinking of entering into the healthy food domain are interested in identifying consumer segments that are interested in purchasing millet-based foods. The findings of the present study are relevant as they identify the consumer groups that are more likely to purchase these food products and add them to their regular diet.

Second, certain labels have been identified as motivators of intentions to purchase millet-based foods such as “natural,” “gluten-free,” “preservative free,” “organic,” “healthy,” “eco-friendly,” and “low-sugar,” implying that these are the attributes customers find attractive and are seeking in healthy foods. Entrepreneurs can develop their products accordingly and brand them using these labels to attract more customers.

Third, the study found several barriers and challenges faced by current millet entrepreneurs, such as a lack of awareness of millets and how to cook with them. Here, the role of packaging, cooking instructions, and recipes becomes very important. We have provided several strategies that existing millet entrepreneurs have utilized to overcome this barrier, for instance, organizing tasting sessions, printing cooking instructions on the packaging, and introducing ready-to-eat and ready-to-cook formats. This may help entrepreneurs offset the impact of the challenges they face and improve consumer engagement and retention.

Fourth, the study has shed light on why millet-based food products are more expensive. Such insights are helpful and relevant for farmers and public policymakers who can identify the lack of post-harvest processing technology as a significant reason for the higher costs. Public

policymakers can improve the infrastructure to attract more entrepreneurs in the healthy millet foods segment and improve the overall public health and the health of the soil; millets have a low carbon footprint and are ecologically beneficial. Farmers can also benefit by understanding the leakages in the supply chain and how to map the demand and supply of millets better.

Lastly, the study sought to understand the challenges faced by millet entrepreneurs during the COVID-19 pandemic. Thus, the findings are especially relevant in the current times and may help practitioners, entrepreneurs, and stakeholders across the millet supply chain better understand the current market.

## 6. Conclusion

Millets are gaining popularity in the healthy foods segment, and many entrepreneurs are using them as alternative healthier ingredients. Despite this, there are few consumer studies on the challenges and opportunities offered by millet consumption. Moreover, while there have been several studies on the challenges and opportunities faced by entrepreneurs in general, fewer studies have been conducted on food entrepreneurs. There is a significant gap in the academic literature in terms of studies on millet entrepreneurs specifically, which is addressed by the present study. This study augments the research on the opportunities and challenges in the millet foods market from the point of view of millet entrepreneurs in India and provides insights into the effect of the COVID-19 pandemic on millet entrepreneurs in India. We have addressed RQ1 and RQ2 by conducting exploratory, inductive research to understand the challenges and opportunities with respect to the consumption of millet-based foods, the opportunities and challenges faced by millet entrepreneurs, and the effect of the COVID-19 pandemic on millet entrepreneurs. We interviewed 25 millet entrepreneurs and used a grounded-theory approach to identify major themes to answer the RQs. The opportunities for millet entrepreneurs include awareness, people returning to tradition, and the impact of labels. The challenges include a lack of awareness and familiarity, preparation difficulties, the sensory attributes of millets, their lack of affordability, inferior image, consumer distrust, and a longer gestational cycle. Millet entrepreneurs engaged in restaurant and café businesses were most severely affected by the COVID-19 pandemic as there was a country-wide lockdown, and, even after the lockdown was lifted, customers resisted going out to eat. However, organic grocery store owners benefitted due to heightened consumer awareness of eating healthy and immunity-boosting foods.

### 6.1. Study limitations and future research areas

Despite its significant contributions, this study has some limitations. First, it focuses only on millet entrepreneurs in India, and the findings may not be applicable to other entrepreneurs in the healthy food segment or in other cultural contexts. Future researchers can improve the generalizability of this study by considering other cultural backgrounds, geographies, and health food entrepreneurs. Second, the study used only in-depth interviews, limiting its generalizability. This could be addressed by future scholars using different study designs, such as experimental and longitudinal designs, to add to the credibility of future research findings. Finally, only the effects of the initial phases of the COVID-19 pandemic were captured by the present study. These could be replicated and compared with later phases of the pandemic for further insights and to strengthen the findings. Lastly, further studies could extend these findings by focusing on COVID-19 millet entrepreneurship, innovation, and digitization.

### CRedit authorship contribution statement

**Priya Shah:** Writing – review & editing, Writing – original draft, Data curation, Conceptualization. **Amandeep Dhir:** Writing – review & editing, Writing – original draft, Data curation, Conceptualization.

**Rohit Joshi:** Writing – review & editing, Writing – original draft, Data curation, Conceptualization. **Nalinprava Tripathy:** Writing – review & editing, Writing – original draft, Data curation, Conceptualization.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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