

# Exploring the Sources of Innovation in Food Processing SMEs of Kerala

Bhumika Gupta, Jeayaram Subramanian, Hardik Vachhrajani, Avinash Shivdas

**Abstract**—Indian food processing industry is one of the largest in the world in terms of production, consumption, exports and growth opportunities. SMEs play a crucial role within this. Large manufacturing firms largely dominate innovation studies in India. Innovation sources used by SMEs are often different from that of large firms. This paper focuses on exploring various sources of innovation adopted by food processing SMEs in Kerala, South India. Outcome suggests that SMEs use various sources like suppliers, competitors, employees, government/research institutions and customers to get new ideas.

**Keywords**—Food processing, innovation, SMEs, sources of innovation.

## I. INTRODUCTION

INNOVATION studies are dominated by studies from large firms and how they innovate. As Small and Medium Enterprises (SMEs) suffer from resource scarcity, sources of innovation may be different from that of their large counterparts. The SMEs interviewed by [33] stressed that innovation sources are multifaceted, internal and external (involving customers, suppliers and consultants), and not just driven by new technology. Sources of innovation may vary even based on the type of industry. Authors present outcome of a study, which is conducted on SMEs of food processing industry, which is considered a rather traditional industry in India.

Three main research objectives of the study are:

1. To investigate details of food processing industry in India
2. To investigate the nature of innovation activity, its associated discourse and resulting sources of innovation
3. To explore sources of innovation used by selected SMEs from Kerala, Indian state located in South India.

The purpose of this paper is to report on the preliminary findings of our study.

Dr. Bhumika Gupta is with Télécom Ecole de Management, France (corresponding author; phone: +33 1 60 76 47 49; e-mail: bhumika.gupta@telecom-em.eu).

Prof. Jeayaram Subramanian is with the Amrita School of Business, Amrita Vishwa Vidyapeetham (University), India (phone: + 91 476 280 8118; e-mail: jeayaram@am.amrita.edu).

Dr. Hardik Vachhrajani is with the Amrita School of Business, Amrita Vishwa Vidyapeetham (University), India (phone: + 91 476 280 8111; e-mail: hardikv@am.amrita.edu).

Prof. Avinash Shivdas is with the Amrita School of Business, Amrita Vishwa Vidyapeetham (University), India (phone: + 91 476 280 8110; e-mail: avinash\_shivdas@am.amrita.edu).

## II. LITERATURE REVIEW

### A. SME Sources of Innovation

In relation to the nature of SME innovation activity, [13] surveyed 107 US Midwestern small business owners to explore potential linkages between the strategic orientation of the firm and its influence on innovation practice. Analysis of the responses suggested: ‘Overall, the empirical results of our study demonstrate that a small business owner’s proactive personality is linked to a strategic orientation for the small firm that permits flexibility and change in response to surrounding business conditions.

By employing a prospector strategy, these proactive owners have a direct impact on the goals and direction of their organizations. Moreover, this strategic orientation can also influence the types of innovations developed and implemented within the internal and external framework of the small business environment’ [13].

Reference [1] analyzed data collected from about 500 SMEs across six European countries to explore the influence of external relationships on innovation. The results suggested proactive relationships with suppliers, users and customers’ facilitated innovation, and that more consistent new product development outcomes were observed in those having links was associated with laboratories and research institutes. Reference [31] analyzed Australian Bureau of Statistics data from 1,435 SMEs, considering nine networking, innovation and performance related attributes. Positive correlations were found between networking, innovation and performance measures, with the networking-innovation link having a greater impact than the direct networking-performance link, supporting the view that innovation is a means of realizing benefits from social capital.

Reference [4] interviewed 30 (non-food) small firm owner-managers in Ireland to explore how networking influenced marketing outcomes, and found that networking could have a multitude of facets. Sixteen contributions were identified, including access to new knowledge of various kinds, and the identification of new cooperation and market access arrangements. Reference [32] explored some other networking attributes via in-depth interviews with 20 participants in four small Dutch manufacturing firms to explore the influences of ‘strong ties’ on innovation. Strong networkers developed multi-faceted relationships with individuals (e.g. common interests, technical links) that created more opportunities to remain in contact. By comparison it was suggested that a multiplicity of ‘weak ties’ could dilute the potential results from maintaining such relationships. The clear message from

such studies is that for SMEs there is a significant social dimension to their innovation activities. Reference [27], in their study of food manufacturing SMEs of Kerala focus on social dimensions of innovation.

### B. The Food Processing Industry

Reference [3] explored the level of demand for innovation in 87 Italian food-manufacturing firms. Through focus groups and interviews they identified 285 different needs requiring an innovative solution, but for which firms did not have a solution in mind. Product innovation needs related to the guarantee for food safety, specific functional requirements, nutritional features, improved sensory features and increased convenience. Process innovations sought included reducing environmental impact, water and energy consumption, increasing yield and productivity. For SMEs we see such needs stimulating a continuing search for points of differentiation.

Food manufacturing industry studies suggest that relationships along the value chain can support innovation [38]. Reference [35] explored the drivers of product and process innovation in 177 firms in six EU rural areas. About 80% of the firms studied introduced some form of innovation over the preceding 5 years, with the majority introducing both product and process innovations. The skills of the innovating firm's qualified technical workforce were clearly higher than that of the non-innovators. Leading firms were more likely to rely on services and external sources of innovation, and to undertake small-scale R&D activities. It is suggested here that whilst this may not lead to breakthrough innovation, it would enhance the capacity of the firm to absorb and adapt new technologies [36].

### III. METHODOLOGY

The study has employed a multiple-case embedded design. To control for industry effects and to enable comparability, cases have been drawn from the food products manufacturing/processing Industry from the state of Kerala in South India. This subset is drawn from firms whose primary business is the manufacture of food additives, which includes food flavorings and taste enhancers, seasonings, colorings, processed herbs and spices, savory specialties, nutrients, and processing aids.

Three kinds of secondary data have also been used in our initial context analysis:

- Government and industry association statistics and reports related to SME innovations and the food-processing sector.
- Content analysis of the websites of 10 Food processing SMEs in Kerala. These websites generally contain information about the history of the firms, their main customers, and in some cases, their suppliers. The list was derived from the website of All India Food Processors' Association (AIFPA).
- Statistics and reports available from websites of AIFPA, Dun & Bradstreet India and Government of India

We have also conducted in-depth semi structured interview with general managers / proprietors of two leading food processing SMEs of Kerala region. The interviews were conducted face-to-face at the firm's premises by experienced researchers. Interviews were tape recorded and transcribed for ease of data analysis.

### IV. FINDINGS

The following draws on national and regional data sources, as well as information collected during this study.

#### A. Findings on Food Processing Industry in India

Indian food processing industry is one of the largest in the world in terms of production, consumption, export and growth opportunities. The food processing industry is among the sectors reserved for the small-scale industry [7]. The Indian food processing industry accounts for 32% of the country's total food market. Estimated to be worth USD 121 billion, it is one of the largest industries in India, and is ranked fifth in terms of production, consumption and exports. The industry employs 13 million people directly and 35 million people indirectly. It accounts for 14% of manufacturing GDP, nearly 13% of India's exports and 6% of total industrial investment. Currently growing at more than 10% per annum, it is expected to touch USD 194 billion by 2015 [40]. This kind of a substantial growth figures are enabled because of the country's strong base in the agricultural sector. According to the Ministry of Food Processing Industries, Government of India, the country is the largest producer of wheat and rice and also accounts for about 10% of the global fruit production, with India, topping the list of countries in mango and banana production. Adding to this, India is also the largest producer of milk and milk products in the world, accounting to almost 17% of the global milk production. [40]. As per the available information, it produces annually 90 million tonnes of milk, 150 million tonnes of fruits and vegetables, 485 million livestock, 204 million tonnes of food grains, 6.3 million tonnes of fish, 489 million poultry and 45,200 million eggs [5].

The following graph depicts the growth of the food processing industry and agriculture and their contribution to the country's GDP.

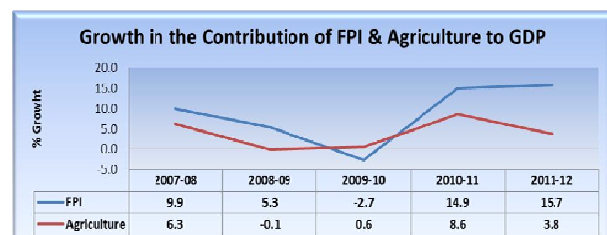


Fig. 1 Growth of food processing industry and agriculture to Indian GDP (Source [41])

As seen in the graph above, the contribution of food processing sector to GDP has been growing faster than that of the agriculture sector. If the contribution to GDP of both

agricultural sector and food processing sector were growing at the same rate, then it would mean that the growth in food processing sector is only due to increased agricultural raw material supply. However, what this graph indicates is that more and more agricultural products are being converted (in value terms) to food products. This means that the level of processing in value terms has been increasing. At present there is no other estimate on the level of physical processing (Tonne for tonne or litre for litre) of various agricultural products in India.

### B. Need for Innovation in Food Processing Industry

We can broadly define the term innovation as doing something new or a new way of doing something old [25]. The Indian food processing industry is not immune to change / innovation. There are numerous factors such as changing lifestyles, evolution of the concept of a nuclear family, women joining the workforce and spending lesser time in the kitchen, higher disposable income amongst families, and focus on healthier diet, that influence the players in this industry to come up with innovative products to satisfy these needs. The primary aims of the market players in this industry has been to increase the shelf life of perishable food products, to come up with new designs in packaging and also to come up with entirely new product ranges to cater specific needs of specific target markets. Some of the major food items that had been under the buzzer in the recent times include Edible oils, Soya, Oats, processed meat and fish categories, various fruit pulps, etc. A lot of focus has started flowing towards sugar-free food items, low calorie foods and artificial sweeteners, as India is slowly becoming the Diabetes capital of the world. Even innovative packaging has gained lot of momentum in recent years. According to a study, about 38% of the revenues of the packaging industry are sourced from the food processing industry. Similarly, as the consumer preferences change over time, there has to be a drastic shift in the level of innovation in the processing of foods too. Some of the innovative techniques of processing foods, to name a few, are Dehydration, Osmotic Drying, Freeze drying, Spray drying, Sterilization, Pasteurization, etc. Hence, the underlying concept here is, innovation comes into play during various stages of the food processing industry, whenever there is a change in the consumer preferences, lifestyle and day to day food habits [41].

#### 1. Innovation Dialogues

Reference [14] in their popular book *Managing Innovation: Integrating Technological, Market and Organizational Change* identify several sources of innovation, out of which the present paper focuses of certain specific sources. Recombinant innovation - ideas and applications in one world transferred to the other, Watching others: Entrepreneurs observe the how other entrepreneurs (may be from the same segment or a different segment) provide solutions to similar problems. These entrepreneurs adapt and refine those ideas and finally develop solutions for the problems they face, Users as innovators: This kind of innovation is propelled by the desire

for an individual or a group to modify the product to meet their needs [9].

During interview, most of the SME managers talked about sources or places from where they get innovations / innovative ideas. We asked this question to SMEs we studied and found following responses.

“We have got most of ideas and knowledge from CFTRI (Central Food Research and Technology Institute), Mysore. Customers used to give me lots of suggestions and they used to test products for us, too.”

“One of the reasons for change is suppliers. I have been getting lots of information from them. Once a new machine comes in the food industry, they will come and tell us a lot about that. They will explain the advantages of machine and of course one of the reasons for change is suppliers.”

“We are members of the AIFPA. They help us keep within the legal framework and give ideas for that”

“I keep relationships with the companies within the same league. We keep good rapport with our fellow companies and specially the main competitors. We mutually discuss problems faced and often mutually help each other.”

“I have direct communication with employees and they have rich experience. So, they provide the most crucial information on how to make products and services better.”

Clearly there are distinct discourses which give us idea on which are the sources of innovation for these SMEs. In following section, we consolidate and present the comprehensive list of sources which emerged from the research.

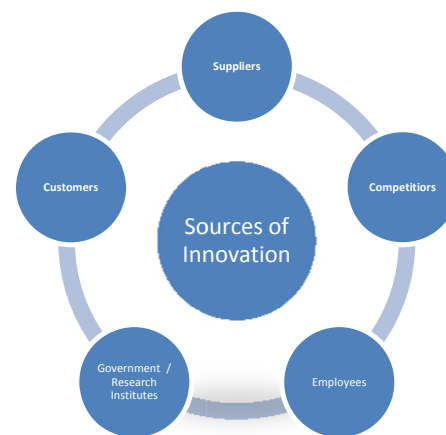


Fig.2 Sources of innovation as observed in the study

### C. Sources of Innovation

#### 1. Suppliers

Business networks are an important source of the innovation performance of firms [6], [10]-[12], [23], [24]. Suppliers form a key constituent of business networks. Reference [24] tried to identify a set of characteristics that can identify those suppliers that can make significant contributions to buyer-supplier collaboration. The statistical analysis of their survey data shows that a supplier's technical characteristic and collaborative attitude and the buyer-supplier

relational characteristics on buyer–supplier relationships explain an important part of a supplier's contribution to buyer innovation. From the above study it is clearly understood that suppliers play a significant role in the flow of innovative ideas. This phenomenon was clearly reflected in our study too.

### 2. Competitors

Competitors can be noteworthy contributors to innovative ideas for a firm. Interaction outside the supply-chain, mainly with competitors [20], tends to be more informal, leading to knowledge spillovers that are more an unintended consequence of the relationship than its main purpose, as firms try to avoid direct transfer to rivals, but cannot control indirect transfer [8], [29]. The interviewed SME managers in our study also focused on the significance of competitors in developing innovative ideas and even stressed for a mutual understanding and relationship between competitors in wherever and however way possible.

### 3. Employees

Since employees carry a substantial responsibility for the actual adoption of new innovation management principles like open innovation, understanding the consequences and the managerial drivers of their attitudes to knowledge is of crucial importance [2]. Empirical evidence about employee attitudes to knowledge is not only scarce, but also inconsistent, as it suggests contradictory results. While most studies have found that employees tend to be unwilling to collaborate, i.e. negative attitudes to knowledge sharing predominate [16], [21], [28], [34] and others have documented the existence of overly positive tendencies to knowledge in sourcing [18], [19]. In our study, both the SME's have elucidated positive employee collaboration and has successively contributed to the flow of new ideas. Further research with interactions with more companies may give contradictory results on this aspect.

### 4. Government/Research Institutes

Reference [22] conducted a study on the novelty of innovation in manufacturing firms with the evidence of the 1999 statistics Canada Innovation study. The policy implications deriving from the study results are worth noting. That is, novelty of innovation could be increased in developing policies promoting stronger linkages between firms and government laboratories and universities. Another study done by [15] examines the effects of inter-firm collaborations as well as the direct and indirect effects of government R&D support on innovation outputs, amongst Biotechnology SMEs in Korea. The government support through project funding directly and indirectly affects firms' innovation by stimulating internal R&D and domestic upstream and downstream collaborations. The study findings imply the importance of governmental R&D funding and networking with foreign universities and research institutions as well as downstream partners. In our Indian study, results seem to be two-sided. One of our samples focused heavily on Government Research Institutes like CFTRI and outlined the positives gained from them, whereas the other sample did not

yield much of a positive linkage between sources of innovation and government/research institutions.

### 5. Customers

With respect to the customer's role in sourcing out new ideas, quite an extensive literature exists, with one of them being done by [17], stating that customer participation may account for the effects of service firm innovation capabilities (both technical and non-technical) on service quality. Customer participation refers to "the degree to which the customer is involved in producing and delivering the service" [26]. Many firms increasingly focus their business practices toward actively encouraging customers to take on more active roles in the production of services [30], [37], [39]. The Indian perspective is no different too. In our study, both firms stressed upon the significant role played by customers in generating new ideas. Firms strongly believed that customers are strong and reliable source of innovation.

## V. CONCLUSION

Emergent theme from our study is that food processing is a very important industry for India. Sources of innovation in food processing SMEs are not limited to technology and research and development done in-house. Because of resource scarcity and often limited budget for in-house R&D; SMEs use various sources like suppliers, competitors, employees, government / research institutions and customers to get new ideas. They are open to ideas from different sources and embed them into their organization. Further research can be carried out at larger sample size to verify whether this phenomenon is wide spread. Further research may also reveal extent to which these innovations are diffused and absorbed by SMEs.

## ACKNOWLEDGMENT

Authors thank Centre for Sustainable and Responsible Organizations (CSARO), Deakin University, Australia for their funding to the project.

## REFERENCES

- [1] A. Lasagni, (2012) How Can External Relationships Enhance Innovation in SMEs? New Evidence for Europe. *Journal of Small Business Management* 50(2), pp. 310–339
- [2] A.L.D.A. Burcharth, M.P. Knudsen, & H.A. Søndergaard, (March 2014). Neither invented nor shared here: The impact and management of attitudes for the adoption of open innovation practices. *Technovation*, 34(3), 149-161.
- [3] A. Muscio, G. Nardone, and A. Dottore, (2010) Understanding demand for innovation in the food industry. *Measuring Business Excellence*, Vol 14, No. 4, pp35 – 48
- [4] A. O'Donnell, (2014) The Contribution of Networking to Small Firm Marketing. *Journal of Small Business Management* Vol 52, Iss 1, pp164 –187
- [5] Business Portal of India: Government of India, Indian Economy, Investment, Incentives, Trade, Infrastructure, Legal Aspects. *Business Portal of India: Industry and Services: Industries: Food Processing*. Retrieved August 27, 2013, from [http://business.gov.in/Industry\\_services/food\\_processing.php](http://business.gov.in/Industry_services/food_processing.php)
- [6] D. Corsaro, C. Ramos, S.C. Henneberg, & P. Naudé, (2012). The impact of network configurations on value constellations in business markets — The case of an innovation network. *Industrial Marketing Management*, 41(1), 54–67.

- [7] D&B - Dun & Bradstreet - D&B India - Dun & Bradstreet India - Global Risk, Credit, Sales, Marketing, and Supplier Management Solutions. *Emerging SME's of India - SME's in Auto Component Industry*. Retrieved August 27, 2013, from <http://dnb.co.in/food%20processing/smes.asp>
- [8] E. Von Hippel, 1987. Cooperation between rivals: informal know-how trading. *Research Policy* 16, 291–302.
- [9] E.V. Hippel, (1988). *Sources of Innovation*. Oxford University Press. New York
- [10] G. Ahuja, (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3), 425–455.
- [11] I. Wilkinson, & L. Young, (2002). On cooperating: Firms, relations and networks. *Journal of Business Research*, 55 (2), 123–132.
- [12] J. Baum, A.C., T. Calabrese, & Silverman, B.S. (2000). Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management Journal*, 21(3), 267–294.
- [13] J. Kickul, and L.K. Gundry, (2002) Prospecting for Strategic Advantage: The Proactive Entrepreneurial Personality and Small Firm Innovation. *Journal of Small Business Management* 40(2), pp. 85–97
- [14] J. Tidd, and J. Bessant, (2009). *Managing Innovation: Integrating Technological, Market and Organizational Change* (4<sup>th</sup> ed.). John Wiley and Sons, Hoboken, NJ
- [15] K. Kang, & H. Park, (January 2012). Influence of government R&D support and inter-firm collaborations on innovation in Korean biotechnology SMEs. *Technovation*, 32(1), 68–78.
- [16] L. Mortara, T. Minshall, 2011. How do large multinational companies implement open innovation? *Technovation* 31, 586–597.
- [17] L.V. Ngo, & A. O'Casey, (August 2013). Innovation and business success: The mediating role of customer participation. *Journal of Business Research*, 66(8), 1134–1142.
- [18] Menon, J. Pfeffer, 2003. Valuing internal vs. external knowledge: explaining the preference for outsiders. *Manage. Sci.* 49, 497–513.
- [19] Menon, L. Thompson, H. Choi, -S., 2006. Tainted knowledge vs. tempting knowledge: people avoid knowledge from internal rivals and seek knowledge from external rivals. *Manage. Sci.* 52, 1129–1144.
- [20] M.E. Porter, 1986. *Competition in Global Industries*. Harvard Business School Press, Boston, MA.
- [21] M. Reitzig, O. Sorenson, 2010. Intra-organizational Provincialism. Available from: SSRN: <<http://ssrn.com/abstract=1552059>> (16 April, 2010).
- [22] N. Amara, & R. Landry, (March 2005). Sources of information as determinants of novelty of innovation in manufacturing firms: evidence from the 1999 statistics Canada innovation survey. *Technovation*, 25(3), 245–259.
- [23] N.J. Pulles, et al., Identifying innovative suppliers in business networks: An empirical study. *Industrial Marketing Management* (2013), <http://dx.doi.org/10.1016/j.indmarman.2013.12.009>
- [24] N. J. Pulles, & H. Schiele, (2013). Social capital determinants of preferential resource allocation in regional clusters. *Management Revue*, 24(2), 96–113.
- [25] N. Lele, (2013). Food & Beverage News. *Food & Beverage News: F&B Specials - Innovations in food processing industry*. Retrieved August 27, 2013, from <http://fnbnews.com/article/detnews.asp?articleid=34101&sectionid=32>
- [26] P. A. Dabholkar, (1990). How to improve perceived service quality by improving customer participation. In B. J. Dunlap (Ed.), *Developments in marketing science* (pp. 483–487). Cullowhee: Journal of the Academy of Marketing Science.
- [27] P. Couchman, R. Beckett, & H. Vachhrajani, Exploring the Social Dimensions of Innovation in Food Manufacturing SMEs.
- [28] P. Herzog, J. Leker, 2010. Open and closed innovation—different innovation cultures for different strategies. *Int. J. Technol. Manage.* 52, 322–343.
- [29] R.D. Fitjar, & A. Rodríguez-Pose, (February 2013). Firm collaboration and modes of innovation in Norway. *Research Policy*, 42(1), 128 – 138
- [30] S. Auh, S. Bell, J., C. McLeod, S., & E. Shih, (2007). Co-production and customer loyalty in financial services. *Journal of Retailing*, 83(3), 359–370.
- [31] S. Gronum, M-L. Verreyne, and T. Kastle, (2012) The Role of Networks in Small and Medium-Sized Enterprise Innovation and Firm Performance. *Journal of Small Business Management* 2012 50(2), pp. 257–282.
- [32] S. Lowik, D. van Rossum, J. Kraaijenbrink, and A. Groen, (2012) Strong Ties as Sources of New Knowledge: How Small Firms Innovate through Bridging Capabilities. *Journal of Small Business Management* 50(2), pp. 239–256.
- [33] S. Massa, and S. Testa, (2008) Innovation and SMEs: Misaligned perspectives and goals among entrepreneurs, academics, and policy makers. *Technovation* Vol 28 pp 393–407
- [34] S. Michailova, K. Husted, 2003. Knowledge-sharing hostility in Russian firms. *California Manage. Rev.* 45, 59–77.
- [35] T. Avermaete, Viaene, J, Morgan, E.J and Crawford, N (2003) *European Journal of Innovation Management*, Vol 6, No 1, pp 8 –17
- [36] W. M. Cohen, & D. A. Levinthal, 1990. Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, 35(1): 128–152
- [37] W. S. DeSarbo, K. Jedidi, & I. Sinha, (2001). Customer value analysis in a heterogeneous market. *Strategic Management Journal*, 22, 845–857.
- [38] X. Gellynck, and B. Kuhne, (2010) *Int J Food System Dynamics*. Vol 2, pp 123 – 132
- [39] Y. Yi, R. Natarajan, & T. Gong, (2011). Customer participation and citizenship behavioural influences on employee performance, satisfaction, commitment, and turnover intention. *Journal of Business Research*, 64(1), 87–95.
- [40] (2012 ). Invest India. *Food processing / Invest India*. Retrieved March 21, 2014, from <http://investindia.gov.in/?q=food-processing-sector>
- [41] (2013), Ministry of Food Processing Industries: *Data Bank on Economic Parameters of the Food Processing Sector*. Retrieved September 21, 2013, from [http://www.mofpi.nic.in/H\\_Dwld.aspx?KYEWmOL+HGqTrhLeUJv1qtnM1Ayq/Q4OmzDNdfkzvW4D2rHvYa8L+w==](http://www.mofpi.nic.in/H_Dwld.aspx?KYEWmOL+HGqTrhLeUJv1qtnM1Ayq/Q4OmzDNdfkzvW4D2rHvYa8L+w==)