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Tacit knowledge and innovation capacity: evidence from the Indian livestock sector

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To cope and compete in this rapidly changing world, organisations need to access and apply new knowledge. While explicit knowledge is important, what is often critical is an organisation's ability to create access, share and apply the tacit or un-codified knowledge that exists among its members, its network and the wider innovation system of which it is a part. This paper explores the role of tacit knowledge in livestock sector innovation capacity though the case of Visakha Dairy, one of the most progressive producer-owned milk marketing companies in India. Analysis of two episodes in Visakha's evolution illustrates how it used tacit knowledge to innovate around challenges. The paper concludes that while tacit knowledge is a major resource that organisations rely on to cope with change, it does not follow that knowledge management approaches that centre on codifying this knowledge are the way forward. Instead, it suggest that better management of the learning processes, through which tacit knowledge is generated, would be a more useful contribution to innovation and innovation capacity – in other words, a shift from knowledge management to learning management.

I. Introduction

Recent studies on rural development have highlighted the importance of strengthening innovation capacity. While hard competencies such as scientific and technical skills and infrastructure are important parts of this capacity, equally important are the soft competencies, such as practices and routines (institutions), patterns of interaction, and policies that allow this knowledge to be accessed and applied. Such competencies are often based on tacit knowledge accumulated and shaped through experience. The innovation capacity of a sector and individual actors is understood to depend, to a large extent, on such knowledge. Thus, its exploration, and codification to make it explicit and shareable, is often assumed to be the way to make more of this resource. But is this really the case and is this type of knowledge amenable to codification and transmission in the way that formal knowledge is?

This paper explores the role of tacit knowledge in livestock sector innovation capacity through a case study of Visakha Dairy, one of the most successful dairies in India. The paper's major purpose is to understand:

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(1) how tacit knowledge has contributed to the innovation capacity of Visakha;
(2) what the nature of this tacit knowledge is; and
(3) how better use can be made of it as part of attempts to strengthen the innovation capacity of organisations and sectors.

The paper begins with an overview of relevant debates about the nature and role of tacit knowledge in innovation. Section III charts the growth of the Visakha Dairy from a small enterprise in the 1960s to its contemporary role as a major player in the milk sector. Section IV focuses on two mini case studies that explore the role played by tacit knowledge in meeting and overcoming a series of developmental challenges. Section V summarises what these mini-cases tell us about the role played by tacit knowledge in innovation capacity. Finally, Section VI presents conclusions that may be drawn from the wider case as a whole and its implications for policy.

II. Concepts: tacit knowledge and innovation capacity

An organisation's ability to learn faster than its competitors is considered a significant source of competitive advantage (Senge 1990). It is no longer the technology itself that is a strategic resource, but rather the organisational, technological and cognitive processes underlying the capacity to innovate and learn (Edmondson and Moingeon 1996). The idea of innovation as a complex systems phenomenon, whereby networks of research, entrepreneurs and other actors interact to produce and use new knowledge, was articulated by Freeman (1987) and Lundvall (1992) in their discussion of national systems of innovation. Lundvall (1992) identified learning and the role of institutions as critical components of such systems. Innovation – the process through which different sources of knowledge and ideas are put into use – happens when individuals and organisations, possessing different types of knowledge (scientific and non-scientific; codified and tacit), interact within particular social, political, policy, economic and institutional contexts. In other words, innovation is a process of interactive learning.

Organisations develop new knowledge and capabilities through their interaction with other organisations and it is this new knowledge and capabilities that leads to innovation. An organisation's propensity to interact and learn is influenced by its institutions – the rules, norms, habits and patterns of interaction, which is often collective tacit knowledge or embedded knowledge residing in organisational routines, practices and shared norms. Recent discussions on innovation capacity (Hall 2005; Hall *et al.* 2008) mainly focus on the collective capacity of the different organisations in a system to share knowledge and collaborate with each other.

Hall (2005, p. 625) defines this capacity (to innovate) as:

> 'the context-specific range of scientific and other skills and information held by individuals and organisations and the practices and routines (institutions), patterns of interaction and policies needed to create and put knowledge into productive use in response to an evolving set of challenges and opportunities'. A large element of this capacity arises from learning-by-doing, whereby organisations engaging in the innovation process continuously adapt ways of working and routines – institutional learning – thus incrementally improving their ability to utilise knowledge and information.

As learning is a pre-requisite for organisations to make changes or improve the capacity to respond, there has been a lot of interest to understand the processes by which organisations learn. According to Fiol and Lyles (1985), organisational learning represents

systems, histories and norms within the organisation that are transmitted to new members. Organisations approach learning differently, given their time, resources, histories and competitive constraints. Yeung *et al.* (1999) have identified four basic learning style typologies: *experimentation, competency acquisition, benchmarking* and *continuous improvement*. Typically, organisations mix all four, but in different combinations and to varying degrees.

This capacity to continuously learn, adapt and apply new knowledge has both tacit and explicit elements. The notion of tacit knowledge was first introduced by Michael Polanyi during the 1950s (Polanyi 1966). He argued that knowledge can be classified into two broad categories: explicit/codified knowledge and tacit knowledge. Tacit knowledge is obtained through experience and learning by doing. Very often, it is internalised to such an extent that it is taken for granted. In other words, it is know-how contained in people's heads. Nonaka and Takeuchi (1995, p. 57) defined tacit knowledge as 'the personal knowledge embedded in individual experience and involves intangible factors such as personal belief, perspective and value system'.

While some of the features of innovation capacity – such as scientific, entrepreneurial and managerial knowledge – are more explicit, others, such as routines, organisational culture, beliefs, perceptions, partnering, values, mental models, etc., are more tacit. Understanding two key aspects – firstly, how organisations learn, and, secondly, how they manage a wide range of knowledge – is important to explore how tacit knowledge contributes to innovation capacity.

Tacit knowledge plays an important role in providing meaning to explicit knowledge as well as contributing to development of new knowledge. Nonaka and Takeuchi (1995) argue that explicit and tacit knowledge, though conceptually different, are not separate in practice. They argue that new knowledge is generated through the dynamic interaction and combination of these two types of knowledge. They have identified four models of knowledge creation or conversions that are derived from the two kinds of knowledge (i.e., explicit and tacit knowledge) as shown in Table 1.

Though the SECI (socialization-externalization-combination-internalization) model is the mostly widely cited theory in knowledge management, many have questioned its empirical grounding (McAdam and McCreedy 1999; Tsoukas 2003, Gourlay 2003). Norris *et al.* (2003) noted that knowledge needs to be viewed through different lenses of 'know what', 'know who', 'know how', 'know why', 'know where', 'know when' and 'know if'.

Table 1. Different modes of knowledge creation or conversion.

	To Tacit Knowledge	To Explicit Knowledge
From Tacit Knowledge	Socialisation: Sharing of experiences to create tacit knowledge; shared mental models and technical skills; done through observation, imitation and practice; experience is the key – mere transfer of information makes little sense to the receiver	Externalisation: Articulation of tacit knowledge into explicit concepts through metaphors, analogies, concepts, hypotheses or models
From Explicit Knowledge	Internalisation: Closely related to learning by doing; knowledge is verbalised or diagrammed into documents or oral stories	Combination: Systemising concepts into a knowledge system; exchange of ideas through media such as documents, meetings and conversations

Source: Nonaka and Takeuchi (1995)

One of the main reasons why there have been very few attempts to empirically research tacit knowledge is that it is difficult to articulate. Research instruments such as surveys and structured interviews are likely to be inappropriate as individuals cannot be asked to state what they cannot readily articulate (Ambrosini and Bowman 2001). Codifying tacit knowledge is relatively difficult, but not impossible. Cowan and Foray (1997) have defined knowledge codification as the process of conversion of knowledge into messages that can then be processed as information.

There seems little point in codifying knowledge for the purpose of transferring it elsewhere in the organisation without someone else being able to de-codify it. And, without knowing who that someone may be, it is difficult to know how to codify the knowledge to begin with (Hall 2006). Moreover, organisations do need some level of prior related knowledge to identify, assimilate and exploit external knowledge, which Cohen and Levinthal (1990) called as absorptive capacity. McElroy (2000) noted that Knowledge Management can be divided into two generations, The first generation strategies focussed heavily on technical solutions such as codification of existing knowledge, whereas the second generation strategies are focussing on human connections and creation of new knowledge.

Three major points emerge from the above review:

Firstly, innovation capacity of a sector (comprising a cluster of interdependent and interacting organisations) depends on: [a] the knowledge and expertise (tacit as well as explicit) of individuals and organisations that comprise the sector; [b] the ability of organisations to manage knowledge (create, access, share and use knowledge) through adopting a range of strategies and [c] the ability of organisations to continuously learn, adapt and apply knowledge more effectively towards social, economic and environmental goals.

Secondly, the organisations learn and manage knowledge in several ways. This involves continuous interaction between tacit and explicit knowledge of individuals within the organisations and across different organisations.

Thirdly, codifying tacit knowledge – or the process of converting tacit knowledge into messages (which can be processed as information) – to make it explicit is relatively difficult, but not impossible and there are several methods for explicating tacit knowledge. Tacit knowledge could also be explicated without codification. But the explicated tacit knowledge should be of use only when users have the ability to de-codify the explicated information for use in their own context.

Given the foregoing, the main hypotheses set for this study were that the innovation capacity of a sector is linked to the knowledge (tacit and explicit) of actors in the innovation system; how it effectively manages this knowledge; and its ability to continuously learn, adapt and apply this knowledge.

III. Methods and case description: Visakha Dairy

Methods

For exploring the links between tacit knowledge and innovation capacity, we selected Visakha Dairy, one of the most successful dairies in India. Running a successful cooperative dairy enterprise necessitates integration of knowledge from a number of sources, ranging from milk producers, dairy staff, transporters, commission agents, dairy equipment manufacturers, consumers, bureaucrats, politicians, civil society, sector coordinating bodies, etc. The research consisted of doing an innovation history through semi-structured interviews with individuals associated with Visakha and causal mapping exercises, supplemented by analysis of relevant secondary data. Though Visakha has evolved rather successfully over the last four decades, we have focused only on certain episodes in order

to reveal the role of tacit knowledge and associated processes. We interviewed 25 senior and middle level managers working in different departments in Visakha and held around ten focus group discussions with staff in the three major departments, namely, procurement, processing and marketing; staff of Visakha Trust; milk producers in village level co-operatives and other members in its wider networks in order to understand how the dairy has been managing knowledge and learning to deal with challenges arising from the changing environment.

Case description

Visakha Dairy (Sri Vijaya Visakha Milk Producers Company Ltd.), headquartered at Visakhapatnam in Andhra Pradesh, is one of the fastest growing milk and milk products manufacturing organisations in India. It procures milk from four coastal Andhra districts and its sales operations cover several states in the country. Visakha was established in 1966 with government support and it was then registered under the Indian Cooperatives Act in 1973. It started with milk procurement operations in 50 villages and a handling capacity of 10,000 litres per day. It collected surplus milk produced in the village through setting up a producer co-operative and sold the same directly to consumers in urban areas thereby eliminating middlemen.

During the 1980s, the National Dairy Development Board (NDDB) helped Visakha in strengthening its societies by way of training milk producers to establish and maintain the society and its record books, as well as to produce clean milk. Using funds available from the government, the dairy constructed buildings for several of its milk societies. This helped in creating a common platform for interaction among milk producers and employees of the dairy and helped create a sense of ownership among milk producers. Realising the central role of producers and their families, Visakha established a 'Trust' in 1989, with the aim of providing educational, health and medical services to producers, their families, and employees of the Dairy (and their families). The trust currently manages a school, a college and a hospital in Visakhapatnam and provides a wide range of services to milk producers.

By the early 1990s, daily milk procurement started to exceed 200,000 litres. To tackle this surplus, Visakha commissioned and constructed a milk powder factory and also began diversifying its product portfolio. Under the new Andhra Pradesh Mutually Aided Co-operative Act, 1995 [MACS Act], Visakha converted into a MACS Society around this time, which gave it the much needed freedom and flexibility to experiment with and evolve new institutional arrangements. During the last decade, the dairy experimented with several strategies to increase the quality and quantity of milk collection as well as expanding its markets. Establishment of bulk milk chilling units at decentralised locations for a group of milk societies, the establishment of an Aseptic Packing Station for milk, the introduction of 200ml milk sachets, the introduction of new products based on consumer feedback, and expansion of its markets to other states are some of these. With NDDB assistance, it also established a training centre to train its staff and train village youth to emerge as para veterinarians.

In 2006, the dairy was converted as a producer company under a new Act. With the dairy's continued expansion and modernisation, the need for new skills and expertise became more evident. The MACS Act and the subsequent Producer Company status gave Visakha greater freedom from government controls on recruitments and financial management and this allowed the company to hire better professional expertise to manage its operations. Currently Visakha, procures milk from 2744 villages in Costal Andhra areas by serving more than 200,000 milk producers.

IV. Exploring tacit knowledge in Visakha

This section presents two cases of innovating around challenges by Visakha, which illustrate how it managed tacit and explicit knowledge to deal with two interesting and significant developments in its evolution.

(i) Breaking the hold of bicycle vendors: institutionalising milk societies

Before the establishment of producer societies, vendors on bicycles collected milk from producers and supplied it to hotels and restaurants in nearby towns and cities. Producers were often at the mercy of these vendors and the prices they quoted. In most cases, vendors also belonged to the same village. When Visakha first approached villages with the objective of establishing milk societies, it had to face stiff resistance from the bicycle vendors, as well as village elders. The elders were apprehensive about the entry of a new organisation into the village and its likely implications on the social fabric. For the vendors, the apprehension, obviously, was that the dairy would take away their business.

Despite the resistance, the dairy persisted with its efforts by highlighting the loopholes in the existing system (unfair practices of bicycle vendors) and how cooperatives can assist milk producers in achieving better returns. These attempts to sway milk producers usually took between three and six months, but eventually paid dividends. Once the majority of producers in a village were convinced of the cooperative model, they were taken to the societies already on the ground to show how these functioned.

The next step was to establish a society in the area. Realising the important role of vendors, the dairy adopted several strategies to win them over. In some cases, the village vendor was made the secretary of the society; in others, he was put in charge of running the society and taking care of daily milk collection. In some villages where producers were not willing to establish a society, the dairy came up with the idea of 'shadow societies' — societies set up on a trial basis to experiment with the cooperative model. If this still failed to convince producers, they were free to revert to their earlier model.

From the perspective of knowledge creation or conversion, we can see that for milk producers, the idea of a 'cooperative' was new knowledge that had both tacit and explicit elements. This was introduced in a situation where there was a tacit, shared or collective understanding of the respective roles of the milk vendor and producer. This shared understanding emerged from years of *socialisation* in these societies. Due to their lack of experience working as cooperatives, communities were apprehensive of their implications. When Visakha first introduced the idea of cooperatives, they were creating ambiguity in the minds of the villagers. To resolve this ambiguity, new experience had to be provided so that the idea of a cooperative – which was very abstract and tacit in the beginning – slowly became explicated and transformed into practice (Table 2).

The tacit knowledge on cooperative behaviour is *externalised* or explicated to the community in village level meetings through presentations, question-answer sessions, stories, anecdotes, etc., so that producers are fully able to appreciate these ideas. Once the majority of producers are convinced of the merits of the cooperative model, they are taken to already-established societies so that they see in practice what was explained to them in theory. This is the stage where different types of knowledge are *combined* (enrichment of collected information and its reconfiguration). This is followed by an experiential learning experience (running the society on a six-month trial basis) so that the new knowledge is *internalised.*

With changing technology, more stringent quality norms and increasing competition, this behavioural change needs reinforcement. This would also mean managing different

Table 2. Using Tacit Knowledge to establish new societies.

Innovating around Challenges	Different kinds of knowledge		Ways of explication and use of Tacit Knowledge
	Tacit	Explicit	
Breaking status-quo: Setting up new societies	• Shared or collective understanding of the roles of milk producers and vendors in society • Malpractices in the existing system of transactions • Apprehensions or fears about shifting to a new way of working (cooperative) • Varied understanding or mental models of what a cooperative may look like in practice • Bicycle vendors' networks, relations and knowledge about milk producers • Ethics, values and practices in running a producer-managed society	• Cooperatives: Definition, legal status, formation, selection of board, management, functioning, auditing, etc. • Guidelines on collection, transportation and payment of milk, maintenance of records	• Meetings, group discussions and question-answer sessions with milk producers to highlight loopholes in the existing system and reiterate value of cooperatives in order to create the motivation for change • Exposure visit to established societies; (Seeing is believing) to get a shared understanding of how cooperatives work in practice) • Running a society on a trial basis for six months (Experiential learning) • Making the vendor the secretary or an employee of the society (employing his tacit knowledge for the benefit of the society) • Training society members on the philosophy and principles of cooperatives and ways of managing them

bits of knowledge on a continuous basis – from 'tacit to explicit' and 'explicit to tacit' – and this necessitates regular communication. The supervisor employed by the dairy maintains regular communication with the society and the producers and acts as a link between the producers and the dairy.

The teams involved in forming and strengthening societies have been sharing their experiences of forming societies in divisional meetings. Therefore, the tacit skills/knowledge on forming societies is widely shared and explicated throughout the dairy. Although these experiences are not codified into written documents, these are sufficiently explicated within the organisation.

(ii) Weathering the storm: dealing with political change (2004–2006)

It's a well-known fact that cooperatives in India are managed as just another arm of government. The steady decline of a majority of cooperatives across the country (barring a handful) has been attributed to the politicisation and tinkering by bureaucrats under the 1964 Co-operative Societies Act. In response to the demands of several cooperatives and civil society organisations for a liberal cooperative law, the Government of Andhra Pradesh

passed the Andhra Pradesh Mutually Aided Co-operatives Act (MACS) in 1995. Eight out of the 11 existing district milk unions in the state, including Visakha, converted to the MACS Act. All eight improved their management and business capacities after conversion (CDF 2006), while the three milk unions that remained under the old law languished.

However, a change in state government in 2004 opened up new challenges for the MACS unions. During their time in the Opposition, the members of the current government had voiced their unhappiness with the 1995 MACS Act as it granted the milk boards greater freedom from government control. Another issue is that the constitution of the milk boards has traditionally always been highly politicised; in the case of Visakha Dairy (as with most of the other milk unions in the state), board members were overwhelmingly allied with the rival political party. The dairy had a tense relationship with the new party in power, stemming from prior clashes over elections to its board.

Once in power, the new government began exploring ways to amend the 1995 Act to bring the dairies back under government control by cancelling their registration under the MACS Act. To resist government interference, Visakha immediately proposed the transition to a producer company, based on the recent amendment by the Indian Government that allowed cooperatives operating in more than one state to convert to a producer company. However, the transition didn't prove as smooth as expected, as the dairy was inundated by a series of actions against it, ranging from court orders to a state government investigation into irregularities in its activities. Based on the advice of its wider network of supporters in the bureaucracy and the civil society, the Visakha Dairy managed to register as a producer company in early 2006.

Anticipating other dairies to follow suit, the government passed an order repealing the MACS Act and bringing all dairies into the 1964 Act. The government also issued an ordinance to take over management of Visakha Dairy and seven other cooperative dairies in the state. This order was challenged by Visakha immediately in the court on the grounds that it is a producer company and not a cooperative society. The very next day, the court granted them a stay. Other dairies followed suit, and following more than a year of petitions, hearings and deliberations, the High Court finally quashed the government order as unconstitutional.

Visakha was able to stay one step ahead of the state government all the while as it was well networked into the political and bureaucratic process. An added advantage was its recruitment, in 2004, of a retired government employee (from the state cooperative department) as its administrative officer. Besides being well networked into government circles, the officer also brought with him a wealth of expertise on cooperative laws.

Visakha's decision to convert into a producer company was essentially based on its tacit knowledge of the situation and its likely implications (Table 3). As soon as the government issued an ordinance enforcing a takeover of the dairies, Visakha used its networks to acquire a copy of the ordinance and filed a petition in the High Court. Other dairies in the state could not, however, pre-empt the government move, and spent the next 18 odd months fighting their case in court.

Visakha used three types of tacit knowledge to deal with the challenges. These are presented in Table 4.

V. Discussion: tacit knowledge and innovation capacity

One of the main reasons for Visakha's evolution and its capacity to innovate is its ability to successfully access, share and apply new knowledge. Importance of innovation capacity to deal with complex systems has also been articulated by Hall and Clark (2010), Klerkx *et al*.

Table 3. Using Tacit Knowledge to deal with uncertainties.

Innovating around Challenges	Different kinds of knowledge		Ways of explication and use of Tacit Knowledge
	Tacit	Explicit	
Weathering the storm: Dealing with the political change in the state	Likely consequences from change in government in 2004	Rules and regulations (Acts, ordinances, Government Orders) regarding cooperatives and Producer Companies	Using wide networks to derive credible information and pre-empt adverse consequences
	Knowledge about plans being considered by the new government to bring the dairy under its control	Legal provisions to deal with conversion to new forms of ownership	Using existing networks and expert sources to use explicit and tacit knowledge on rules/laws and regulations
	Knowledge on sources of reliable information and advice		
	Extensive contacts within the bureaucracy and political system		

(2010), and Pant and Hambly-Odame (2009). The two instances discussed in the previous section reveal that Visakha has built up context-specific skills and information and the institutions, patterns of interaction and policies needed to put knowledge into productive use that constitute 'innovation capacity'. The salient points that emerge from the two cases are as follows

Exploiting tacit knowledge helps in dealing with challenges

The cases reveal that Visakha's tacit knowledge about 'know-how', 'know when' and 'know who' – and its ability to use these strategically – helped it deal with the various challenges it faced during its evolution. These different types of tacit knowledge are embedded in its organisational routines, practices and shared norms. For example, its extensive networks in political, bureaucratic and civil society circles, its wide-ranging support to producers – including educational and medical support – and its commitment to consumers in terms of quality, pricing and availability are the three important 'institutions' that facilitated Visakha in its successful evolution and growth. These 'institutions' supported Visakha in accessing, sharing and applying tacit knowledge, to compete, expand and flourish.

Organisational learning allows for enhanced innovation capacity

Both cases discussed in the previous section reveal how Visakha used different organisational learning strategies to enhance its innovation capacity. These strategies were quite diverse, ranging from, for example, recruiting personnel with prior knowledge and capabilities in finance, administration; experimenting with new products and marketing

Table 4. Types of Tacit Knowledge in Visakha.

	Type of Tacit Knowledge	Means of Acquiring and Sharing Tacit Knowledge	Specific examples
1	KNOW HOW? How to acquire new expertise? How to learn and share knowledge?	Consulting/employing experienced hands Regular interactions at various levels for sharing tacit knowledge	• Employing NDDB consultants/staff as part of the co-operative development programme, a senior (retired) employee from the State Co-operative Department and former employees from the banking sector as finance manager • Regular meetings at divisional levels, at least once a week to discuss operational issues • Regular, almost daily, meetings of senior managers and the Managing Director • Continuous interaction with civil society groups working on development of cooperatives
	How to partner?	Work together and support each other	• Working with other dairies and supporting them by way of loans to tide over cash flow problems; • Developing business relations with other dairies
	How to resolve conflicts?	Conflict avoidanceResolving conflicts legally	• Selection/election of Board members belonging to the same group/political party • Champion for and facilitate the process of bringing parallel legislation to overcome hurdles • Use legal measures (fight in the courts)
2	KNOW WHEN? How and when to meet market demands?	Ensuring quality and aggressive marketing	• Developing mechanisms for obtaining customer feedback and acting on it; • Making available all its products to the customers through a wide delivery format – e.g. agents, parlours, retailers and supermarkets; and • Incentives to agents based on sales
	How and when to meet local needs and aspirations for development?	Addressing the wider developmental concerns of the community	• Forming a trust to address health (hospital, medical insurance), education (school, colleges and scholarship) and other rural infrastructure
	How to adapt to changing conditions?	Pre-emptive actions through political and legal measures	• Legal measures: stays on government orders • Pre-emptive moves (conversion to producer company)
3	KNOW WHO? Who knows what?	Wide networks	• Using wide networks in political circles, dairy business, cooperative development, bureaucracy for bringing out new legislation and dealing with change in governments
	Who can exploit new information/ help with new problems?	Use networks to identify and recruit right people	• Recruit those with right skills and experience (Administration, Finance, Training)

arrangements, benchmarking its performance with Amul, the national leader in co-operative dairying; to continuous improvements in its performance on quality (achieving relevant global quality standards such as HACCP).

Codifying tacit knowledge is not necessary for explicating and using the same

Though tacit knowledge contributed immensely to Visakha's innovation capacity, the dairy is yet to adopt mechanisms to codify this knowledge through documenting lessons and experiences. However, as the cases reveal, it has used tacit knowledge without codifying the same in the form of written documents. Explicating tacit knowledge therefore need not necessarily be in the form of written documents. For instance, exposure visits to successful dairy societies is a way of explicating tacit knowledge about managing dairy societies to members who do not have this experience.

Creating opportunities for sharing tacit knowledge and building trust and relationships is more important than trying to codify tacit knowledge

While codifying tacit knowledge has only limited value, what is more important is the creation of opportunities for its wider sharing. If people have to be motivated to share tacit knowledge, organisations also need to build and nurture an environment that creates relationships and trust among various individuals and organisations. Though Visakha has created some mechanisms for sharing tacit knowledge, mainly by way of regular meetings within and among the different divisions, there are several individual and social barriers to sharing tacit knowledge. For instance, during our interactions with the Visakha staff, many expressed fear regarding how the shared knowledge would be used by the management of Visakha, in case they heard about it.

Lin (2007) noted that individuals who have a feeling of emotional attachment to their organisation are likely to share their knowledge in situations where they realise that doing so is appreciated and their knowledge will actually be used and will eventually benefit the organisation. Therefore, building trust among staff within the organisation – and relationships and trust across different actors in the innovation system – assumes importance.

Lack of effective platforms to share knowledge within an organisation and among different organisations within a sector currently constrains creation and sharing of tacit knowledge. As Cowan and Foray (1997, p. 604) pointed out, 'knowledge is easier to codify and codified knowledge is easier to diffuse within a community of agents, who can read the codes'. A growing number of people and organisations in various sectors are now focusing on communities of practice as a key to improving their performance (Wenger *et al.* 2002). Developing a community of practice in the dairy sector, therefore, assumes importance as one mechanism for sharing tacit knowledge.

VI. Conclusion and policy implications

This discussion paper has explored the role of tacit knowledge in innovation capacity, using the case study of Visakha. The major conclusions are as follows:

Firstly, innovation capacity is very much a function of the diffusion and deployment of tacit knowledge. The episodes of coping with change discussed in the case study relied almost entirely on tacit knowledge. The identification, creation, sharing, and increased application of tacit knowledge is, therefore, an important route to strengthening innovation capacity.

Secondly, the ability to exploit tacit knowledge depends on how well networked an organisation is with its internal and external audience or stakeholders. This is also important for acquiring new skills and expertise. Therefore, strategies to improve networking with a broad set of stakeholders should be a priority for making better use of tacit knowledge and enhancing innovation capacity.

Thirdly, as these cases indicate creating and sharing tacit knowledge can be more important than codifying tacit knowledge. But if people have to be motivated to share tacit knowledge, organisations need to build and nurture an environment that creates relationships and trust among the various individuals and organisations and that also values sharing of knowledge.

Fourthly, creating time and mechanisms within organisations for reflecting and sharing of experiences can lead to creation of relevant new knowledge. Quite often, organisations do not clearly know what specific kinds of knowledge are relevant to the tasks, challenges and opportunities each individual within an organisation faces, as opportunities do not exist to share, reflect, improve and create new tacit knowledge. Regular reflective workshops, inter-divisional staff meetings, developing corporate yellow pages are some of the ways forward.

Fifthly, to promote creation, sharing and application of tacit knowledge, action is also needed at the sectoral level. Promoting sector coordination bodies, communities of practice on select themes, inter-agency policy working groups, etc., can go a long way toward enhancing innovation capacity through wider sharing and application of tacit knowledge.

The case study in this paper supports the idea that tacit knowledge plays a critical role in innovation and innovation capacity. While tacit knowledge is a major resource that organisations rely on to cope with change, it does not follow that knowledge management approaches that rely on codifying this knowledge are the way forward. Instead it suggests that better management of the learning processes through which tacit knowledge is generated and shared would be more useful contribution to innovation and innovation capacity. Findings from this paper also support the criticisms of the SECI model and emphasises the need for strategies that focus on continuous organisational learning. This suggests that a shift is required from knowledge management to learning management.

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