

# Local enterprise, global value

**Professor Ram Mudambi** focuses on the geography of innovation, exploring the tacit and explicit networks of knowledge that interlink places, people and businesses

## What fascinates you most about the field of business?

I was trained as an economist, specializing in game theory. The mathematical precision of economics was great training for my real interest, which is the study of business strategy as it is practised in the real world – a world that is rapidly changing. The key source of competitive advantage and value creation is migrating to intangibles like brands and technologies. Studying the most important aspect of modern business strategy is exciting!

## Could you offer examples of your most recent findings in terms of the geography of innovation?

We have made some important distinctions about the interrelations between firms, people and places, particularly with respect to innovation. For instance, we have found that the most innovative regions enable firms and individuals to establish more dense collaborative networks; in peripheral regions, these networks tend to be severely limited.

We have also confirmed the theory that innovation involving tacit knowledge tends to be accomplished by co-located teams, unless the firms involved have complex capabilities that allow them to transfer tacit knowledge across distant locations.

## During your investigation into varying national economies, you found that the Republic of Korea could offer important lessons for successful catch-up strategies. What is meant by 'catch-up'?

Catch-up describes the process whereby firms from less developed economies become as technologically capable as firms from advanced economies. Catch-up is not only about achieving output capability, but ultimately innovation capability. The Republic of Korea is a very interesting case in that it started as an extremely poor economy – as recently as 1970 its per capita GDP was on a par with Ghana's, and far lower than Brazil's or Argentina's. However, it grew rapidly within a short period of time. Our analysis shows that its catch-up in terms of output capability was complete in most industries by the turn of the century. However, its catch-up in terms of innovation capability took a great deal longer and is not yet complete in numerous sectors of the economy.

## Why did you choose Goodyear Tyre and Rubber Company for examining innovation in mature multinational enterprises (MNEs)?

We picked Goodyear because we were looking for the factors that undergirded the survival and performance of major US firms in the industrial heartland of the Midwest. The region has faced almost continuous decline in terms of employment and manufacturing over the last four decades, yet this bleak picture conceals quite a resilient landscape in terms of innovation. Goodyear is a perfect example of these contrasting trends. While its home base in Akron, Ohio, has almost been eliminated as a manufacturing centre, the firm has retained a significant innovation output there. We found a similar story in Detroit, where the Big Three automakers have remained the centres of healthy global innovation networks.

## What major trends did you uncover in your project on innovation in MNEs?

The first megatrend is the shift from trade-in-goods to trade-in-activities. Beginning several decades ago, but accelerating rapidly over the last decade, products and services are increasingly emerging from global value chains (GVCs) that are geographically dispersed around the globe. These GVCs are orchestrated, in the main, by MNEs and increasingly disaggregated and fine-sliced into narrow, highly specific activities undertaken in economic clusters.

The second megatrend is the rise of knowledge-intensive intangibles. Value is rapidly migrating out of tangible goods and commoditized services into the soft intangibles that encase them. This migration of value has dramatically magnified the importance of innovation, in tandem with shortening technology lifecycles.

The third megatrend is the rise of emerging markets. The number of locations where highly-specific GVC activities can be performed has ballooned over the last two decades. A long list of cluster locations in Asia and South America, and even some parts of Africa, have become integral parts of GVCs. These locations are tightly woven into the global economy and give rise to the perception of 'flatness' by many lay observers.

## Have you identified any emerging trends for your research over the next three years?

A new underlying reality of international business is the emergence of what can be called 'knowledge flatness', which is the replacement of hierarchical (boss-subordinate) relationships with those based on equality. Subsidiaries and emerging economy locations are increasingly moving from subservience to taking on partnership and even leadership roles in global innovation networks.





# Maps of innovation

Ambitious research at **Temple University** aims to show the past and future trajectories of all US innovation by conurbation

**WHY IS IT** that some inner city areas show vibrant economic growth, while others are associated with socioeconomic decline and the flight of businesses and city dwellers to outlying suburbs? In the US, the economic disparities between, for example, the metropolitan areas of San Diego and Silicon Valley, and those of Baltimore and Detroit, are particularly stark. In Baltimore's case, it has been suggested that excessive economic diversification is a contributor, as insufficient industrial specialization limited the spillover of innovative knowledge locally, inhibiting job creation. However, the full range of influences that underlie the greater employment opportunities and higher income levels in some cities relative to others are not clear.

Professor Ram Mudambi of the Fox School of Business at Temple University in Philadelphia observes that, as global value chains (GVCs) become increasingly dispersed geographically, connectivity between clusters of innovation and local and global knowledge networks fosters economic vitality. Exchanges of ideas between creative individuals, small firms, educational and research establishments, financial institutions and big companies drive the co-evolution of enterprises and the geographical regions they inhabit: "We live in a world where firms, industries and regions co-evolve and shape each other," Mudambi reflects. "Places need firms and firms need places. As firms connect to locations, the locations provide firms with knowledge, and both mutually change."

A company employing a GVC strategy may elect to site its R&D, for example, remotely from their home base to leverage economies of scale or access pockets of specialized resources and expertise. This approach has benefits for both companies and regions, particularly if the activity is expert and non-repetitive. The dispersal of such activities prompts the creation of location-based clusters of sophisticated knowledge, which in turn fosters innovation. Whether and how much of that innovation devolves to the local area, and how much of the knowledge acquired from global pipelines spills over into the local area, depends to a significant extent on the levels and quality of both global and local connectedness. Taking Detroit as an example, Mudambi considers that the isolation of the inner city from knowledge interchanges, especially those involving tacit elements, means that the region as a whole does not benefit from its vibrant innovation activity.

## CONNECTIVITY

At present, there is scant information about the connectivity of innovation networks both within and across US metropolitan areas – and with the rest of the world. Although many US-based multinational enterprises now coordinate large GVCs and innovation networks, better understanding of how these networks have evolved and the nature of their connections is needed.

Mudambi has embarked on a two-year project which will examine innovation systems and global connection in the 917 core-based statistical areas (CBSAs) – the metropolitan and micropolitan zones – of the US, the aim being to uncover empirical evidence on links between global connection and innovation performance, and ascertain whether economic and knowledge spillovers from global connections concern mainly large firms or start-ups, or both. The hope is to provide policy makers with greater depth of understanding of the characteristics of local innovation clusters and their associated networks, and to offer tools to support economic development and innovation decision making.

## DATA MINING

Mudambi uses patent data as a prime source for measuring elements such as collaboration and the spillover of knowledge. The CBSAs cover roughly half of the US land mass and 93.7 per cent of its population. Mudambi's project will analyse trends in innovation over the 40 years between 1975 and 2014 in line with the CBSA classifications, using patent data extracted from the US Patent and Trademark Office (USPTO) database: the USPTO database holds details of over five million patents granted in the period, of which more than 46 per cent have been granted to foreign residents. Mudambi will also gather data from complementary databases, such as the Harvard Patent Network Dataverse, which covers patents up to 2010.

The ongoing project collects patent data according to industry and technology. Evidence of collaborative research on local and global scales has been drawn from inventor name(s), inventor country(ies) and location(s). To ensure that all inventors per patent are included, patent numbers have been matched to inventors, to generate a list of patents with at least one inventor in a particular CBSA.

## A PROJECT OF COLLABORATION



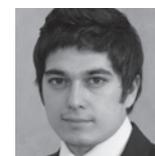
**Thomas Hannigan's** research covers the creation, development and orchestration of innovation across geographic and organizational space



**Ahreum Lee's** research interests are at the intersection of international business, economic geography and innovation



**Marcelo Cano-Kollmann** focuses on innovation management and institutional transition



**Izzet Darendeli** focuses on knowledge transfer and the institutional environment as well as political strategies



**Tim Swift's** investigations relate to technology and innovation management



**Vittoria Giada Scalera** focuses on internationalization strategies of multinational firms and innovation management



**Alessandra Perri's** work relates to innovation management in multinational firms



**Eunkyung Park's** research covers innovation management and catch-up dynamics



**Kristin Brandl** focuses on innovation management and offshoring by multinational firms



## TRACKING INNOVATION

The initial project will produce detailed maps of innovation by CBSA, with longitudinal assessments of patent activity in each CBSA and across the US over the 40 years. This will include connectivity to global innovation networks, patterns of linkages within a metropolitan area and between its inner city and suburbs, and the technological focus of each CBSA and its evolution over the years. This mode of analysis has already revealed some interesting results: "Until 1990, inventor numbers tracked population quite well, so the largest US metropolitan areas hosted the largest numbers of inventors and patents. Then there was a sea change, however, with the rise of smaller, highly innovative metros like San Francisco/San Jose, Seattle, Phoenix and Austin. The major metros of New York, Chicago and Los Angeles have seen their patent shares decline continuously over the last two decades," explains Mudambi.

The project will evaluate how patterns of local and global collaboration, in terms of both geography and technology, relate to start-up numbers, per capita income, employment levels, house prices, and demographic and economic growth at local and regional scales. It will also identify the CBSAs in which there is a concentration of activity within a certain industry. As this indicates clusters of innovation, Mudambi and his colleagues will be able to identify emerging and mature industries by specific geographical location. Another key deliverable will be a map of the overall output of the top companies in each CBSA and their interconnections, their local inventors and any 'stars' and collaborating companies.

The first major paper to emerge from this research project examines the evolution of innovation in the Detroit cluster from 1975 onwards, highlighting its continued centrality in the global innovation system of the automobile industry (Hannigan, Cano-Kollmann and Mudambi, *Industrial and Corporate Change*, 24(3), 2015, forthcoming). The data will be integrated into a US-wide map of knowledge creation, to pinpoint the future trajectory of national industrial innovation.

## FLEXIBLE INQUIRY

The ensuing project website will be open to all: academics, policy makers and the general public alike, allowing generation of maps of innovation activity and its evolution according to a range of criteria, such as year, geographical area or technology.

Mapping the nature of innovation in the US and its geographical shifts over time will enable policy makers to diagnose the status of innovation systems in their area and devise appropriate changes, the idea being to nurture growth. The project's output will also be valuable to both entrepreneurs and established businesses, allowing them to make informed decisions about their value chains based on the locations of clusters of innovation and specialized knowledge.

## THE GEOGRAPHY OF INNOVATION

### OBJECTIVE

To investigate the geography of innovation by analysing the co-evolution of firms and locations

### KEY COLLABORATORS

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**RAM MUDAMBI** is the Frank M Speakman Professor of Strategy and Perelman Senior Research Fellow at Temple University. He is an Area Editor of the *Journal of International Business Studies* (2013-2016). He was an Associate Editor for the *Global Strategy Journal* (2010-2013) and a guest editor for the *Journal of Economic Geography* and the *Journal*

of *Management Studies*. His work has appeared in major journals including the *Journal of Political Economy* and the *Strategic Management Journal*. He holds a master's degree from the London School of Economics, England, and a PhD from Cornell University, USA. He has held academic positions in both the UK and the US, and has published over 80 refereed journal articles and six books.

### EMERALD AFFILIATION

Author, *Multinational Business Review*