

Creating a culture of innovation

Why corporate culture is key to radical innovation in firms



Written by:

Jaideep Prabhu, AIM Innovation Fellow, Judge Business School, University of Cambridge

Gerard Tellis, Neely Chair of American Enterprise and Director of the Center for Global Innovation, USC Marshall School of Business

Rajesh Chandy, Tony and Maureen Wheeler Chair in Entrepreneurship, London Business School

The Advanced Institute of Management Research (AIM) develops UK-based world-class management research. AIM seeks to identify ways to enhance the competitiveness of the UK economy and its infrastructure through research into management and organisational performance in both the private and public sectors.

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- Engage with practitioners and other users of research within and beyond the UK as co-producers of knowledge about management

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Current AIM research projects focus on:

UK productivity and performance for the 21st century.

How can UK policymakers evaluate and address concerns surrounding the UK's performance in relation to other countries?

National productivity has been the concern of economists, government policymakers, and corporate decision-makers for some time. Further research by scholars from a range of disciplines is bringing new voices to the debates about how the productivity gap can be measured, and what the UK can do to improve the effectiveness of UK industry and its supporting public services.

Sustaining innovation to achieve competitive advantage and high quality public services.

How can UK managers capture the benefits of innovation while meeting other demands of a competitive and social environment?

Innovation is a key source of competitive advantage and public value through new strategies, products, services and organisational processes. The UK has outstanding exemplars of innovative private and public sector organisations and is investing significantly in its science and skills base to underpin future innovative capacity.

Adapting promising practices to enhance performance across varied organisational contexts.

How can UK managers disseminate their experience whilst learning from others?

Improved management practices are identified as important for enhancing productivity and performance. The main focus is on how evidence behind good or promising practices can be systematically assessed, creatively adapted, successfully implemented and knowledge diffused to other organisations that will benefit.

1 The importance of radical innovation

In the increasingly competitive globalised business world, radical innovation is central to the prosperous growth of firms and economies. Indeed radical innovation can create and destroy markets, render corporate giants extinct and transform small start ups into multinational superstars.

Despite its importance, however, little is known about the factors that make firms successful at radical innovation. If we had a better idea about what makes firms good at this kind of gamechanging innovation, then it would be possible for firms to benchmark their performance across a range of innovation related factors and make the appropriate adjustments that allowed them to improve. It would also mean that policymakers could target their policies more effectively at encouraging the appropriate conditions for radical innovation to take place.

2 Innovation drivers

We have identified four potentially important drivers of radical innovation: the availability of capital, the availability of skilled labour, culture, and government policy. The first three operate at both a country and firm level.

Markets for capital and skilled labour are fairly efficient, throughout the world, and most companies have access to both skilled labour and capital. Equally, government policies around the world are increasingly convergent, with a renewed global focus on regulatory and technological developments prompting many countries to unilaterally integrate into international markets. Moreover, multilateral trade agreements and pan-national institutions such as the World Trade Organisation have helped to promote increased convergence in government policies across nations with respect to intellectual property protection, government procurement, and collaboration between universities and industry.

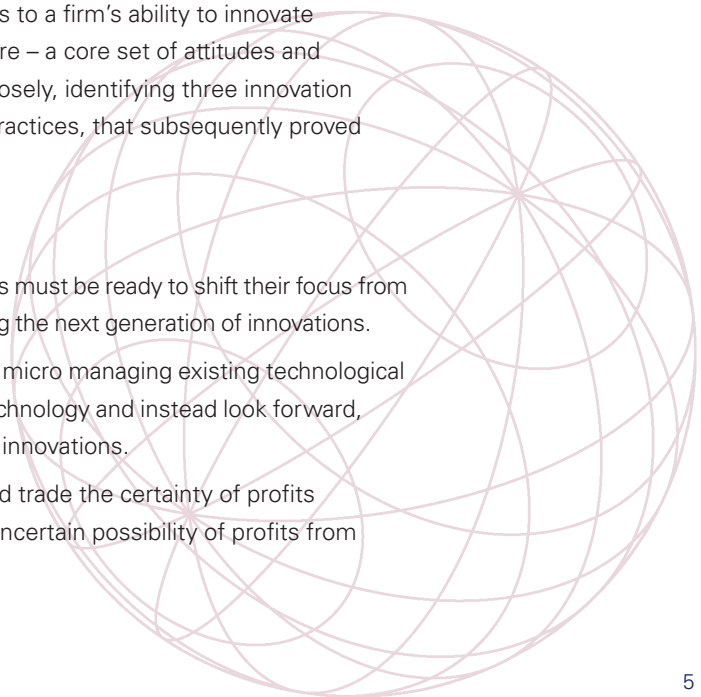
3 Corporate culture and radical innovation

Consequently, we argue it is the remaining factor, culture – and in particular corporate culture – that is the key differentiator with regards to a firm’s ability to innovate radically. As a result we looked at corporate culture – a core set of attitudes and practices shared by members of a firm – more closely, identifying three innovation related attitudes and two innovation sustaining practices, that subsequently proved important determinants of radical innovation.

Innovation attitudes:

- **The willingness to cannibalise assets** – firms must be ready to shift their focus from protecting existing profit streams to developing the next generation of innovations.
- **Future orientation** – don’t get bogged down micro managing existing technological success. Accept the limitations of existing technology and instead look forward, sensing and exploiting new technologies and innovations.
- **Risk tolerance** – be willing to take on risk and trade the certainty of profits from existing products and services for the uncertain possibility of profits from future innovation.

Markets for capital and skilled labour are fairly efficient, throughout the world, and most companies have access to both skilled labour and capital.



Innovation sustaining behaviours:

- **Product champions** – organisations need people to foment radical innovation, act as focus for others to coalesce around, and drive innovation within the organisation. By empowering product champions with the necessary resources organisations can entrench the spirit of radical innovation.
- **Incentivise innovators** – introduce incentives that reward those behaviours and attitudes leading to radical innovation, as well as radical innovation itself.

4 Establishing a link

There is little point focusing on radical innovation if that focus of activities and endeavour fails to create value. Our research, however, looking at many public listed companies across 17 countries confirms a positive link between the level of radical innovation and financial performance as measured by the market-to-book ratio of firms.

Interestingly, though, in terms of the link between radical innovation and financial performance, while skilled labour (measured as R&D employees as a ratio of all employees) is a strong predictor of market-to-book ratios, citation-weighted patents – a commonly used measure of innovation – are not.

Our results also confirmed our belief that corporate culture, and within that certain attitudes and practices, have a significant impact on a firm's ability to innovate in radical way and, as a result, create value.

5 Implications for managers and policymakers

And so the research findings lead to some important implications for managers and policymakers. Our study suggests that firms are special forms of organisation that increasingly transcend national boundaries, constraints, and systems. Innovative firms are very similar to each other in some important ways: they share the same cultural practices and attitudes, regardless of location.

The results showed that many commonly cited drivers of radical innovation in firms, including some frequently emphasised metrics of country level labour, capital, government regulation, and culture, do not seem significant. At the same time, internal corporate culture, and some specific attitudes and behaviours within that, are very important determinants in predicting radical innovation in firms across nations.

Finally this study has enabled us to construct a diagnostic tool (see Appendix 2) that firms can use to assess the relevant dimensions of culture that factor into a firm's capacity for radical innovation. They can then benchmark themselves against other firms, including competitors. Managers can attune to these cultural factors, measure them, identify those areas where a firm needs to improve its performance, and where already performing well, foster them in order to maintain a culture of relentless innovation.

introduction: understanding radical innovation

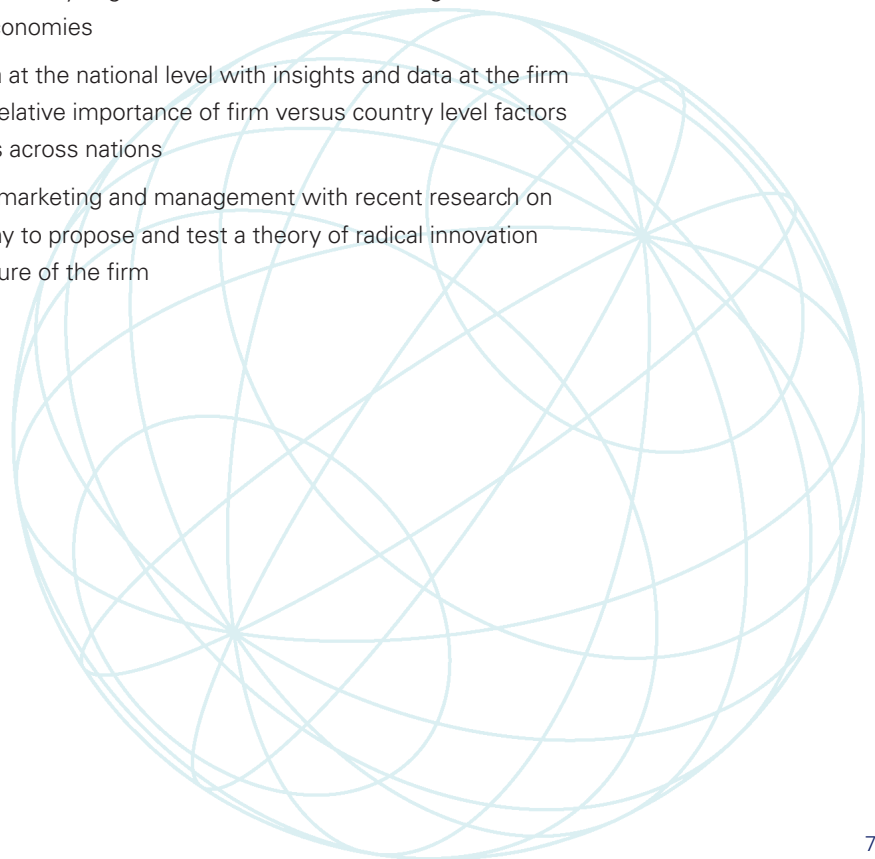
Radical innovation is crucial to the growth of firms and economies. It can create or destroy markets, allow small start ups to become industry leaders, cause dominant multinationals to falter or even fail. Evidence suggests that firms at the forefront of radical innovation tend to dominate world markets and promote the international competitiveness of their home economies. Thus, radical innovation, simultaneously, drives market growth, firms' success, and the economic prosperity of nations.

The factors that make firms successful at radical innovation are not well known, however. The capacity for radical innovation varies substantially in firms across nations, and, while there is a body of research focused on explaining these differences, this research has a number of limitations.

So, for example, cross-national literature on innovation: tends to focus on the consumer adoption of innovations, but not on the commercialisation by firms of those innovations; concentrates on innovation inputs such as R&D spending, and scientific personnel, but not on the challenge of converting inputs into commercially valuable outputs; favours comparisons among firms in the developed economies of North America, Europe, and Japan, rather than among firms from emerging economies; studies either the importance of country level drivers or firm level drivers of innovation, but not both in the same study.

Our research attempted to address these gaps in the understanding of radical innovation in firms. In particular we:

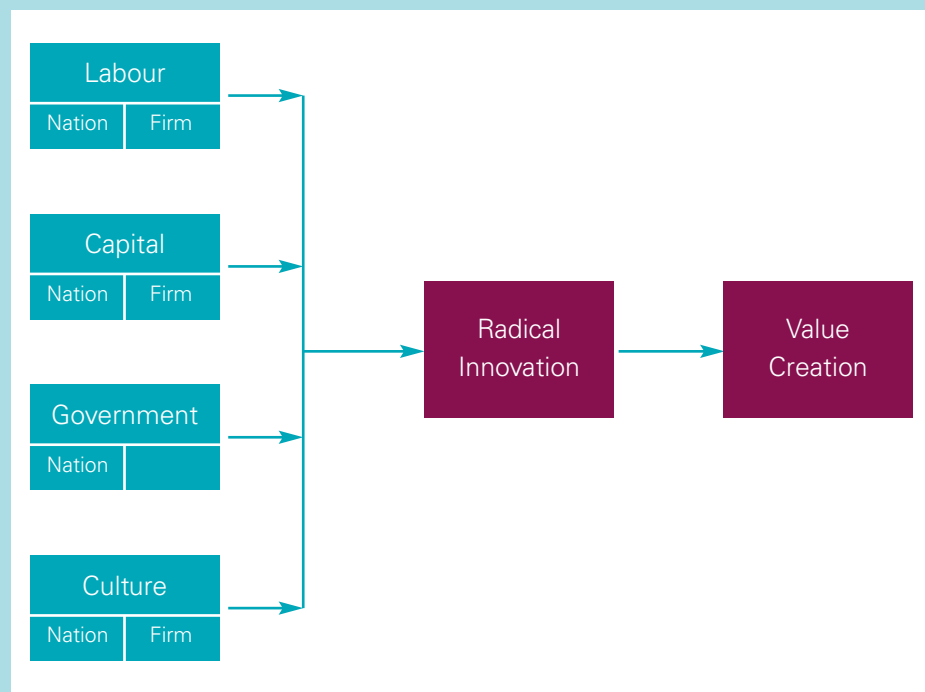
- Looked at the drivers of radical innovation, including country and firm drivers
- Examined the commercialisation of radically new products, including which inputs yield outputs in the form of innovative products and financial returns
- Studied radical innovation in a fairly large number of nations, including both developed and emerging economies
- Combined insights and data at the national level with insights and data at the firm level and so examined the relative importance of firm versus country level factors in driving innovation in firms across nations
- Integrated past research in marketing and management with recent research on trends in the global economy to propose and test a theory of radical innovation based on the corporate culture of the firm



There are many different concepts and theories relating to innovation, and attempting to unify these ideas in some way is a challenging task. Few existing theories or frameworks, for example, try to integrate the drivers of innovation across nations at both a firm and national level. The cross-disciplinary frameworks that do exist tend to be tailored to fit the unique circumstances of individual industries or countries, and therefore are not easily applied beyond their original contexts.

Using previous research literature and our own insights we suggest that there are a number of key drivers of radical innovation, and so suggest a framework linking key drivers of innovation with key innovation outcomes (see Figure 1). We then set out to test this through wide ranging research encompassing many firms across seventeen countries.

Figure 1: Framework of the Drivers of Radical Innovation and Value Creation



1 The drivers of radical innovation

Why are certain firms in certain nations more innovative than others? Four factors underpin the majority of explanations given for such differences: the availability of skilled labour, capital, the policies of government, and the culture of the country and firm. These factors, in a reasonably coherent way, incorporate most variables currently seen as driving radical product and service innovation in firms across nations.

All these factors, except government, operate at two levels: the national level, in the context of the entire economy; and the firm level, in the context of the individual firm.

i Labour

Labour refers to the skilled workforce accessible to a particular firm in a particular country. A long tradition of research points to the importance of a skilled workforce as a primary driver of innovation, both at the national and firm level. An educated and skilled workforce, especially in scientific and technical fields, is generally viewed as a pre-requisite for the development and commercialisation of novel products. Despite national differences, differences among firms' ability to recruit and retain talented technical personnel is likely to explain differences in their innovation output and the value they capture from this output.

ii Capital

Capital refers to the financial resources available both in a country and within the firms operating in that country. At the national level, countries with strong and vibrant financial systems are likely to provide greater access to the financial resources needed for innovation than those countries not so well-equipped. Many countries, for example, have an active network of venture capitalists that support new innovative enterprises. Risky and emerging firms and sectors are likely to benefit from such networks in their drive towards innovation.

A long tradition of research points to the importance of a skilled workforce as a primary driver of innovation, both at the national and firm level.



At the firm level, within any specific country, those firms with greater access to financial resources are, all things being equal, likely to be more innovative and create greater value from their innovations.

Capital only translates into innovation, however, if it is used to make the right sorts of investments. Greater investment in R&D at the national level is presumed to yield greater access to new product and service ideas for firms in the economy, with the spillover of knowledge created by such spending benefiting firms operating throughout the economy. In other words, it is commonly believed that firms that spend more on R&D are likely to be more innovative and capture more value from innovation.

iii Government

Previous research suggests that several aspects of government policy can help or hurt innovation within firms. Important aspects of policy include the protection the government provides for intellectual property, its involvement in technology development through encouragement of collaboration between universities and industry, and its involvement in the diffusion of innovation through procurement of innovative outputs in sectors such as defence, health, and education.

A strong case for intellectual property protection driving innovation is made by some legal scholars and economists. Protection for the ideas behind innovations, they argue, allows innovators to reap the rewards for developing innovations and undertaking risks in commercialising them. Some people suggest that the success of Europe relative to Asia in the post-renaissance period resulted from Europe's legal support of intellectual property rights. Others point to greater innovativeness in the US compared to Europe, during the last 100 years, as being due to the strong patent, trademark, and copyright laws in the US.

Many scholars argue that government legislation, such as the US Bayh-Dole Act that encourages and facilitates collaboration between universities and industry, drives innovation within firms. This type of policy may help transform the basic research that occurs at universities into applications that firms can commercialise. In addition, it may produce graduates with skills closely attuned to the innovation tasks that face firms. By creating laws that enable universities to engage in such collaboration with firms, as well as by providing incentives encouraging them to do so, governments can help stimulate the innovativeness of firms operating in their countries.

Governments can also support innovation in firms either indirectly, via R&D tax credits, or directly, via the procurement of new technology. Such support can potentially create markets for products and technologies that might otherwise take many years to materialise or never materialise at all. In recent years, R&D programmes targeted towards security, military, and public health needs, have been a primary arena for government procurement and tax credits. For example, technologies in semiconductors, telecommunications, energy and computing, now ubiquitous, owe their origins in part to government-sponsored research with military aims.

Nevertheless the actual impact of government procurement and R&D tax policies remains ambiguous with some scholars noting that, while such policies might have raised technical development or scientists' wages in certain fields, innovation outputs have been non-existent or slow to follow.

iv Culture

Culture refers to a core set of attitudes and practices shared by members of a collective entity such as a nation or a firm. While there are many definitions of culture, there is some consensus among researchers that culture is reflected in shared knowledge and standard operating procedures, for example. A definition of culture in terms of attitudes and practices is consistent with, and analogous to, definitions that view culture in other terms such as values, rituals, and codes. As with labour and capital, culture can operate at both the national and firm level.

Three related aspects of national culture have been identified as possible drivers of innovation: a country's religion, geographic location, and the values of its citizens.

Some analysts argue that differences in belief can influence the development and adoption of innovations. For example, some faiths provide believers with a strong rationale to work in and transform their environment, while others emphasise the renunciation of worldly pleasures and the promise of rewards in the afterlife.

Similarly, some researchers argue that a country's geographical location, specifically its distance from the equator, could reflect attitudes and practices that help or hinder innovation. Warm climates, being more abundant in animal and vegetable life than cold ones, lead to easier lifestyles and possibly fewer incentives for work and innovation, while cold climates, being more hostile, require long term planning and may provide greater motivation for action, work, and innovation.

Geert Hofstede, a renowned organisational sociologist, has shown that countries may differ along specific cultural dimensions such as individualism-collectivism, uncertainty avoidance, power distance, masculinity-femininity, and long-term orientation. More recently, other researchers have updated and refined these dimensions and highlighted their likely impact on innovation.

As with national culture, recent research suggests that corporate culture may play a role in radical innovation. Corporate culture refers to a core set of attitudes and practices shared by the members of the firm. A culture that fosters relentless innovation may help ensure that the firm stays constantly at the leading edge of innovation (we use the terms firm culture and corporate culture interchangeably in this paper).

Corporate culture refers to a core set of attitudes and practices shared by the members of the firm.

2 The role of corporate culture in radical innovation

Although researchers have proposed labour, capital, government, and culture as drivers of innovation, there has been little formal examination of the relative importance of these factors in contemporary firms. We believed, however, that in modern capitalist economies, it was not labour, capital, government, or country culture, that were the principle factors distinguishing innovative firms from others.

Instead, we thought that it might well be corporate culture that was the main driver of competitive differentiation with respect to the innovation in firms across nations, for several reasons.

i Efficient labour and capital markets

Markets for labour and capital have been evolving in capitalist economies over the last 400 years. In many capitalist countries, especially with the advances in information technology, these markets are now reasonably efficient and increasingly mature and interconnected. Thus most innovative firms have a similar ability to tap these markets for labour and capital to bring their innovations to fruition.

Markets for labour and capital have been evolving in capitalist economies over the last 400 years.

In particular, the increasing presence of venture capital markets enables entrepreneurs and entrepreneurial firms to gain access to capital for radical innovations, though at a greater cost than in the stock market. Although, it should be acknowledged that sources of available capital may vary among countries for historic and systemic reasons. While German and Japanese firms rely more on debt and bank sources, for example, US firms rely more on stock and non-bank sources.

ii Convergence of government policies

With respect to the contribution of national governments, there has been increased convergence across developed and emerging nations in terms of the accessibility of labour and capital for firms and the synchronisation of government policies in this respect. Inter governmental discussions have led to agreements on market and capital access across borders.

One factor that has promoted policy convergence is a renewed global focus on regulatory and technological developments what has prompted many countries to unilaterally integrate into international markets.

Reasonably efficient markets exist for both labour and capital in many leading and emerging countries. Economies in many parts of the world have seen capital markets flourish. Novel and promising ideas, whether in emerging economies like India and China, or in the established markets of the OECD, now attract capital in a manner that is, in many ways, unprecedented.

Similarly, developing and developed countries alike recognise the importance of educational and other labour-related investments. In India and China, for example, although there is a comparatively low proportion of qualified technical personnel, relative to the total population, the sheer number of people available makes it possible for firms in these emerging economies to meet their current innovation needs. Increasingly, therefore, access to labour is also diminishing in importance as a factor that explains differences in innovation in firms across nations.

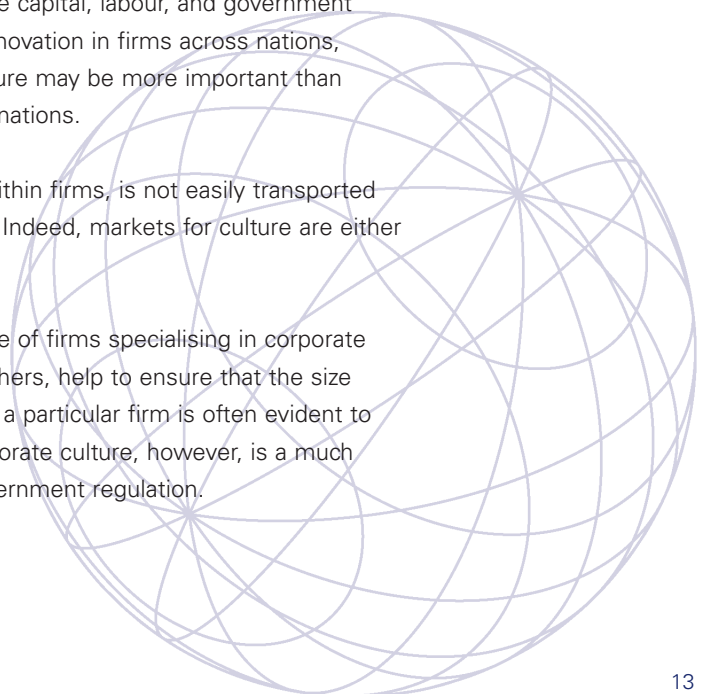
Moreover, multilateral trade agreements and pan-national institutions such as the World Trade Organisation have helped to promote increased convergence in government policies across nations with respect to intellectual property protection, government procurement, and collaboration between universities and industry.

iii The difference with culture

Culture, however, is a different proposition. While capital, labour, and government regulation may be important drivers of radical innovation in firms across nations, in today's converging economies, corporate culture may be more important than all three in explaining innovation in firms across nations.

A uniquely human product, it develops slowly within firms, is not easily transported across firms, and is tacit and not easily defined. Indeed, markets for culture are either non-existent or not very efficient.

Reporting requirements, along with the presence of firms specialising in corporate information such as Dun & Bradstreet among others, help to ensure that the size and type of labour and capital pool employed by a particular firm is often evident to its competitors and thus open to imitation. Corporate culture, however, is a much more elusive factor than labour, capital, and government regulation.



Research suggests that there is a core set of attitudes and practices shared by employees of a firm that is most relevant to radical innovation. We have identified three firm level attitudes – the willingness to cannibalise assets, future orientation, and tolerance for risk – and three firm level practices -product champions, incentivisation, internal markets – that may drive innovation.

1 Innovation attitudes

i The willingness to cannibalise assets

One barrier to long term innovation in firms is the stream of profits generated by existing products and services. Firms invariably marshal their resources to protect this stream of profits, vetoing or freezing any change or innovation which might threaten it.

Some firms, however, exhibit a willingness to cannibalise assets, and to put up for review and sacrifice current profit-generating assets, including current profitable and successful innovations, so that they can get ahead with the next generation of innovations.

ii Future orientation

Firms that have achieved success with one generation of technology are usually under pressure to focus on the many micro problems that emerge when managing that success. Firms should resist getting bogged down in challenge of managing existing technological success, at the expense of their ability to continue looking forward, sensing and exploiting new technologies and innovations.

Future orientation forces firms to accept the limitations of existing technology and detect the emergence of a new generation of technology that may become dominant in the future.

iii Risk tolerance

Trading the reliability of a stream of profits from existing products and services, for some future possible but uncertain stream of profits from future innovation is risky behaviour, and doesn't come naturally to managers. It is vital, therefore, that firms make a positive effort to foster and promote a tolerance for risk in order to make that essential tradeoff more likely.

2 Innovation sustaining practices

If a willingness to cannibalise assets, future orientation, and a tolerance for risk are three essential ingredients of an innovative culture, how can managers promote these kinds of behaviours in their organisations? We have identified three practices that engender and sustain these attitudes.

i Product champions

Organisations need people to foment radical innovation, to act as focus for others to coalesce around, to drive innovation in organisation. We call these people product champions. Organisations must empower product champions, and provide with the resources to explore, research, and build on promising but uncertain, future technologies. By empowering individuals in this way firms can embed within their organisation the enterprising spirit that brought them innovation success in the first place.

ii Incentivise innovators

Organisations often have incentives that are intended to reward a range of activities associated with the management of existing products and services, and even just seniority. However, firms must also establish incentives for the exploration or building of new enterprises for the firm, which is often a risky endeavor for employees who may instead opt to pursue other safer, more incentivised activities within the firm.

Organisations need people to foment radical innovation, to act as focus for others to coalesce around, to drive innovation in organisation.



iii Internal markets

A third practice is the creation and maintenance of internal markets, something that involves both internal autonomy and internal competition. Internal autonomy is the extent to which divisional managers in a firm enjoy the freedom and authority to make decisions on their own. Internal competition is where a firm makes elements within the firm, whether business units, or groups of employees, compete with each other to identify promising technologies and build innovations on those technologies. By creating an active internal market the firm hopes to avoid innovators from outside the firm stealing a competitive advantage.

1 The research

Although many variables at the country and firm level can drive radical innovation in firms across nations, our culture-centric theory of radical innovation suggests that in today's converging economies, corporate culture may be the most important driver among all these variables.

In order to test our ideas we looked at data related to innovation from 17 countries: the eight largest economies in the world on the basis of purchasing power parity – USA, China, Japan, India, Germany, UK, France, and Italy; four countries that have developed rapidly recently – Taiwan, Hong-Kong, Korea, and Singapore; and five countries with known major innovative or multinational firms – Canada, Switzerland, Netherlands, Sweden, and Australia.

We only looked at publicly listed firms, within the manufacturing sector, local to their country of origin, and excluding local subsidiaries of multinationals. Ultimately we ended up with a sample size of 759; to our knowledge the largest sample used to study firm innovation across several continents.

Data was collected on the possible drivers of radical innovation including:

- Country culture, using Geert Hofstede's measures of country culture – power distance, uncertainty avoidance, individualism, masculinity, long term orientation
- Labour and capital at firm level as measured by the percentage of the total number of employees employed in R&D and R&D spending as a percentage of sales
- Labour at country level using the following variables – the availability of scientists and engineers, the quality of scientific research institutions, the quality of management schools, R&D personnel per 1000 people nationwide and the total public expenditure on education as a percentage of GDP
- Capital at country level using data on financial market sophistication, soundness of banks, ease of access to loans, venture capital availability and the country's per capita R&D spending
- Religion at country level using data on the percentage of people within a country who were either Protestant, Catholic, Jewish, Hindu, Buddhist, or Muslim
- Government policy via data on intellectual property protection, university-industry research collaboration, government subsidies and tax credits for firm-level R&D, and government procurement of advanced technology products

Data was also collected, via questionnaire, on the organisational drivers of innovation linked to corporate culture – willingness to cannibalise, future focus, risk tolerance, product champions, the use of incentives, and internal markets – as well as key practices associated with these drivers – incentives, empowerment of product champions, and internal markets.

Finally, we obtained data to assess the level of radical innovation itself, and firm-level financial performance (in order to demonstrate a possible link between innovation and a firm's financial performance).

So, for example, the financial performance of firms was measured using the market to book ratio, the ratio of a firm's stock market value to the book values of its assets.

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2 Our results: the importance of culture confirmed

1 Creating value

There is not much point in firms gearing up to be better at radical innovation, if radical innovation does not lead to an improved financial position for those firms.

Part of our research looked at the link between radical innovation and financial performance as measured by the market-to-book ratio of firms. Encouragingly for those firms engaging in innovation, an analysis of our data showed that radical innovation has a significant effect on the market-to-book ratio, and thus is instrumental in creating real value for firms.

Interestingly, the results also showed that, at the level of the firm, while skilled labour (measured as R&D employees as a ratio of all employees) is a strong predictor of market-to-book ratios, patents – which are a very commonly used measure of innovation – are not. At the country level capital and population were shown to have a significant impact on the market-to-book ratio.

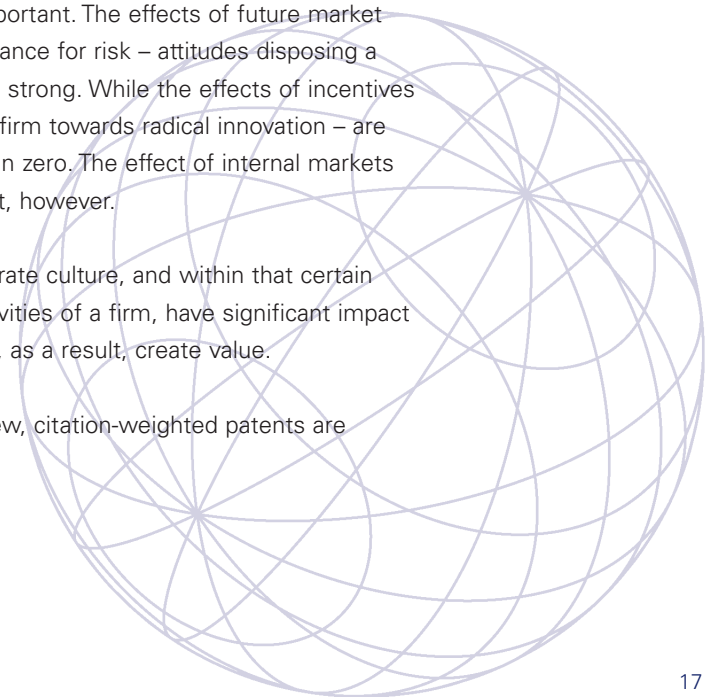
2 The impact of culture

As for the relative effect of the broad group of factors that we identified as having a possible impact on radical innovation – the effect of government, and labour, capital and culture at firm and country level – only corporate culture appears to have a significant impact.

Within this, five out of the six variables we identified as contributing to corporate culture -the attitudes and practices – appear important. The effects of future market orientation, willingness to cannibalise, and tolerance for risk – attitudes disposing a firm towards radical innovation – are particularly strong. While the effects of incentives and product champions – practices disposing a firm towards radical innovation – are relatively weaker, but still significantly larger than zero. The effect of internal markets on radical innovation does not appear significant, however.

Our research shows, therefore, that both corporate culture, and within that certain attitudes and practices, as well as the R&D activities of a firm, have significant impact on a firm's ability to innovate in radical way and, as a result, create value.

It also reveals that contrary to the traditional view, citation-weighted patents are not a good predictor of radical innovation.



Implications for practice: The six keys to an innovative corporate culture

If corporate culture is the answer to radical innovation in the world's increasingly convergent economies, how do you create the ideal conditions?

Our research has identified three specific attitudes and three practices that radically innovative firms share. The attitudes include the willingness to cannibalise existing products, a tolerance of risk and an orientation towards markets of the future.

The practices are the empowerment of product champions, internal competition and providing incentives for employees to be enterprising.

In summary:

- Embrace risk, don't avoid it
- Sacrifice existing successes to develop new ones
- Face the future, don't rest in the past
- Empower product champions
- Foster internal competition
- Provide incentives for enterprise

And, in line with AIM Research's goal to provide business research that has a practical application within business, we have created a benchmarking tool to enable firms to compare their own corporate culture against these criteria (see page 21). It enables managers to become attuned to cultural factors, measure them, and foster them to maintain a culture of relentless innovation.

conclusion: focus on the battle within

The capacity to engage in radical innovation is critical competence for firms if they wish to be viable over the mid to long term. The greatest, longest surviving firms, whether Ford, Apple, Nokia, or HSBC, have a strong record on innovation.

Yet while there are many suggestions as to what factors are important for firms when building innovation capacity, surprisingly in the modern globalised business age, there is little research across nations into country and corporate level factors that promote radical innovation. Of course if it were possible to identify some key factors that would, in theory allow policymakers and firms to monitor and improve their ability to innovate.

We identified a number of factors that have been suggested as having an impact on radical innovation and tested whether this was the case, as well as testing the link between radical innovation and the creation of financial value. Coupled with our prior analysis the research findings lead to some important implications for managers, researchers, and policymakers.

Our study suggests that firms are special forms of organisation that increasingly transcend national boundaries, constraints, and systems. Innovative firms, it would seem, are very similar to each other in some important ways: they share the same cultural practices and attitudes, despite differences in location.

The results showed that a number of factors do not seem to be as important drivers of radical innovation in firms across nations as many researchers believe. Among these are some frequently emphasised metrics of country level labour, capital, government regulation, and culture.

In contrast, in the current environment among the 17 economies that we looked at in our study internal corporate culture is a very important driver in predicting radical innovation in firms across nations. It is also unique, intangible, sticky, and very difficult to change – important factors when it comes obtaining competitive advantage.

These results are extremely useful for firms. They confirm that there are specific attitudes and practices within innovative firms that make them special and foster a culture that helps drive radical innovation.

The greatest, longest surviving firms, whether Ford, Apple, Nokia, or HSBC, have a strong record on innovation.

...R&D activities, measured as the percentage of R&D employees to all employees, have a significant positive effect on the level of radical innovation in a firm.

They also allow us to construct a diagnostic tool (see page 21) that firms can use to assess the relevant dimensions of culture that factor into a firm's capacity for radical innovation. This enables firms to benchmark themselves against other firms including competitors. Managers can attune to these cultural factors, measure them, identify those areas where a firm needs to improve its performance, and where already performing well foster them in order to maintain a culture of relentless innovation.

Such a focus may be more productive than one that relies on governments to invest in or protect markets. Indeed, the appeal for government relief and intervention by firms may well be a cover for cultural deficiencies in their organisations that they have previously overlooked.

We also discovered a clear link, as evidenced in hard archival, publicly available data, between radical innovation and financial value to the firm. At the same time, we discovered that R&D activities, measured as the percentage of R&D employees to all employees, have a significant positive effect on the level of radical innovation in a firm.

Finally, and perhaps surprisingly, we discovered that patents, a measure often used as a surrogate for radical innovation, turn out not to be a significant predictor of a firm's level of radical innovation, or its capitalisation.

Firms and policymakers have probably used patents as an indicator in these areas because they are easily measured, seem to be a pre-condition for innovation, or seem to offer protection to intellectual property. However, many high-tech firms now realise that patents provide only partial protection for their inventions and firms can be highly innovative without patenting. In this context, a senior Vice President of research at a Fortune 50 firm in the US said to us, "We have many technologies and patents sitting on the shelf. Our problem is getting them out to market!" So, firms and countries need to focus primarily on outputs such as radical innovation, rather than primarily on inputs such as patents; or they should at least focus on converting inputs to outputs.

In summary, our results question some long held premises about radical innovation, suggest a direct measure for the construct, and outline the attitudes and practices within a firm that support innovation. Authors who debate country labour, capital, culture or government policy, may be under-appreciating the innovative revolution within firms. Policymakers who rely exclusively on the plausible metrics of scientific talent, patents, and IP protection may be missing the real battle taking place. The battle is within. It is a cultural one: between glorifying the past or as former Intel boss Andy Grove put it, being paranoid about the future; between protecting one's successes or cannibalising them; between averting risk or embracing it. The battle is for the soul of the firm. Innovative firms are those that clearly understand this battle and are willing to take the necessary actions to win it.

a corporate culture

Innovation Benchmarking Tool

Decide how far you agree with the following statements and write down the corresponding score.

For every response assign yourself a score from '1-5', where 1 = 'strongly disagree' and '5 = 'strongly agree'.

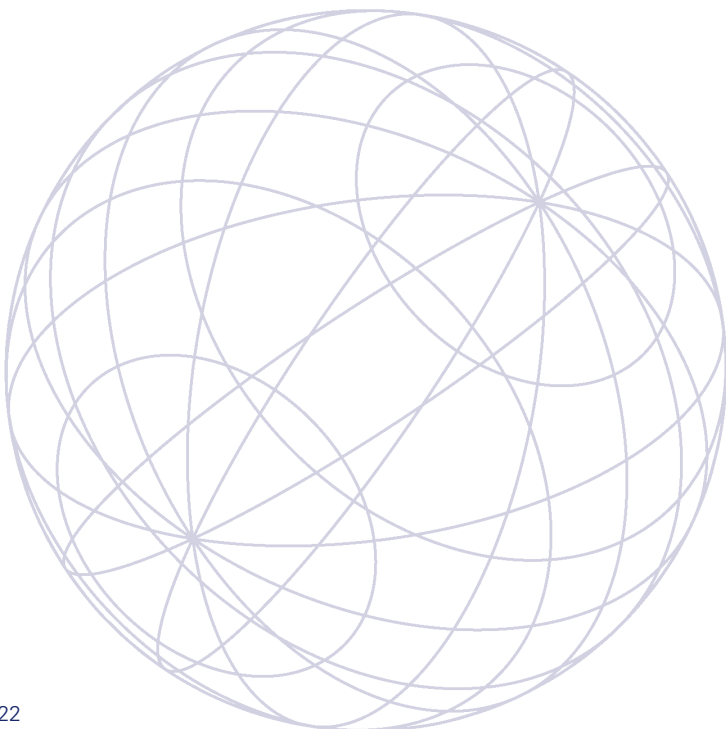
Then just add up your responses for your final score.

Scores between 22 and 44 indicate an extremely low level of innovation, with a need for drastic change across the board.

Scores between 45 and 66 indicate that attempts towards innovation have been made but major change is still required.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Radical Product Innovation					
1 Our firm frequently introduces products that are radically different from existing products in the industry					
2 Our firm leads others in introducing products based on radically new technologies					
3 We have no difficulty in introducing products that are radically different from existing products in the industry					
Willingness to Cannibalise					
4 We are very willing to sacrifice sales of our existing products to improve sales of our new products					
5 We tend to support new projects that could take away from sales of our existing products					
6 We will aggressively pursue a new technology even if it causes existing investments to lose value					
Future Market Focus					
7 Our firm gives more emphasis to customers of the future relative to current customers					
8 Market research efforts in our firm are aimed at obtaining information about customers' needs in the future, relative to their current needs					
9 We are quick to detect fundamental shifts in our industry (e.g., competition, technology, regulation)					
10 Our firm is oriented more toward the future than the present					
Risk Tolerance					
11 Managers in our firm often take risky decisions					
12 Relative to other firms, we tend to favour higher-risk, higher-return investments					
13 We are keen to engage in untested business ventures					
14 We believe it is often necessary to take calculated risks					

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Product Champions					
15 Employees with new product ideas receive a lot of support in our firm					
16 Top managers in our firm strongly support champions of ideas for new products					
Incentives for Enterprise					
17 We provide generous monetary rewards to innovative employees					
18 We provide many non-monetary rewards (e.g., recognition, autonomy) to innovative employees					
Autonomy					
19 New product and process decisions in our firm do not require the approval of the corporate office					
20 Most strategic actions can be taken in divisions in our firm before the corporate office approves these actions					
Internal Competition					
21 Divisions in our firm frequently enter markets served by other divisions					
22 Divisions in our firm actively compete with each other to gain new markets					



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For all enquiries please contact:

Advanced Institute of Management Research (AIM)
4th Floor, Stewart House
32 Russell Square
London WC1B 5DN

Tel: +44 (0)870 734 3000

Fax: +44 (0)870 734 3001

Email: aim@wbs.ac.uk

Web: www.aimresearch.org

The Advanced Institute of Management Research (AIM) was founded in October 2002. It is a multi council initiative of the UK's Economic and Social Research Council (ESRC) and Engineering and Physical Sciences Research Council (EPSRC) – with activities at over 180 institutions in the UK and overseas.

ISBN 978-1-906087-31-9