

The Transformation to a Knowledge Society

*Social and Economic Improvement Through
Innovation.*

A paper for the ASBAR World Forum, Saudi Arabia

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About The Work Foundation

Through its rigorous research programmes targeting organisations, cities, regions and economies, now and for future trends; The Work Foundation is a leading provider of analysis, evaluation, policy advice and know-how in the UK and beyond.

The Work Foundation addresses the fundamental question of what Good Work means: this is a complex and evolving concept. Good Work for all by necessity encapsulates the importance of productivity and skills needs, the consequences of technological innovation, and of good working practices. The impact of local economic development, of potential disrupters to work from wider-economic governmental and societal pressures, as well as the business-needs of different types of organisations can all influence our understanding of what makes work good. Central to the concept of Good Work is how these and other factors impact on the well-being of the individual whether in employment or seeking to enter the workforce.

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Abstract

Transformation to a knowledge society requires multiple co-ordinated actions on both the supply and demand sides of the economy and society. While supply-side initiatives such as programmes to enhance human capital through investment in education and skills are essential elements to upgrade to a flourishing knowledge-based economy, unless the labour market can absorb these increased skills and competencies in the population there will be limited progress towards a fully functioning knowledge-based society. ***A knowledge-based society can be said to generate, disseminate and use knowledge to improve the standard of living and the quality of life of citizens in a sustainable way.***

The stimulation of demand depends on increasing the “absorptive capacity” of the innovation ecosystem. This requires a set of actions which will deliver progress over the short, medium and longer term as interventions will require adjustment to deal both with progress and with resistance to change. The development of a vibrant innovation ecosystem is a necessary step towards building a successful knowledge-based economy but can also provide an anchor around which to build the necessary demand within the population for a knowledge-based society. Importantly, creating a strongly-led and engaging communication campaign to increase population transformation will be a critical element in this approach as building a successful knowledge society requires cultural change over time. In undertaking such an approach, lessons can be gleaned from places where such transformation is either underway or has already happened. Above all however, it is vital to chart a direction and an approach that is built to align with the local context and culture. Too many places have tried to adopt observed practices rather than adapt these for successful localisation.

Challenges

In the context of The Kingdom of Saudi Arabia’s Vision for 2030 there is a clear strategy for the development of a vibrant knowledge society founded on the development of a modern knowledge-based economy. The transition plan towards this vision clearly articulates the actions that need to be taken and the measures by which progress towards that vision will be judged.

Achieving the 2030 Vision of a vibrant knowledge society will require not only the actions of institutions which can plan and take steps to amend practices but also requires the engagement of all and the ability of individuals and society to “absorb” new ways of thinking, working and acting.

Much has already been undertaken and is underway in terms of education and the actions in place to move the Saudi economy from a predominantly resource (oil) dependent economy to one which builds on knowledge and innovation.

Studies from the Work Foundation¹, the OECD² and the World Bank³ clearly show that supply-side actions and institutional programmes will be necessary but not sufficient to change behaviours and attitudes. Pragmatic action is required by players across the

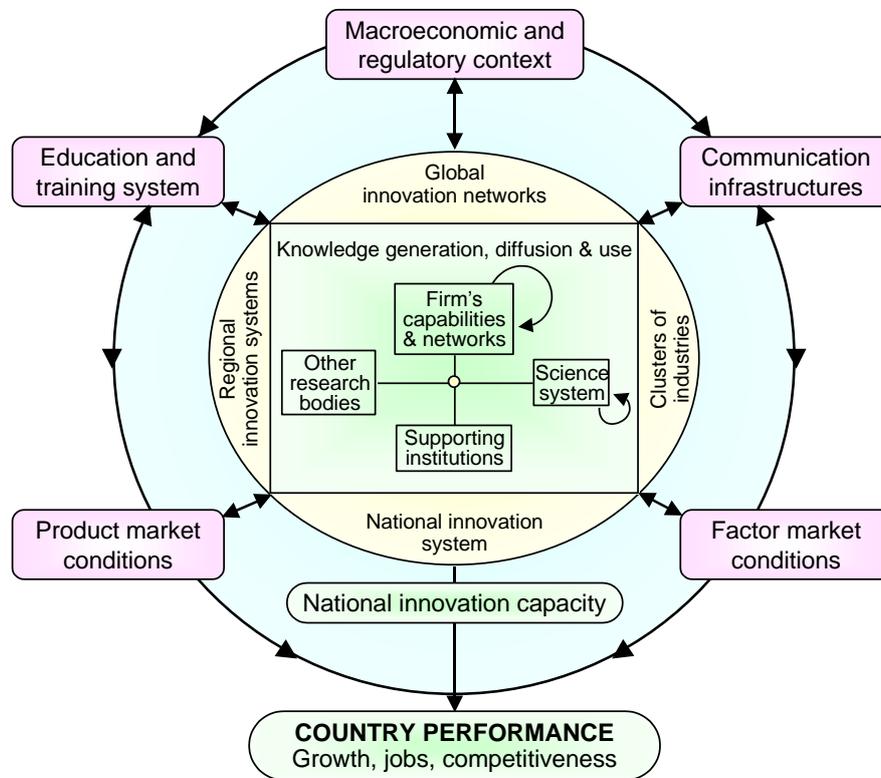
¹ Knowledge Economy Programme (2010-2016), The Work Foundation, London, UK

² OECD (2015) *Innovation Strategy 2015 An Agenda for Policy Action*

³ World Bank Institute (2007) *Building Knowledge Economies Advanced Strategy Development*, Washington DC

innovation ecosystem and importantly, they must be tailored to the current status of the knowledge-based developments in the country of focus and adopted to the progress of the local development trajectory; its political economy and the prevailing social-cultural context.

Figure 1 Innovation Ecosystem Components



Source: OECD, 1998.

Principal challenges identified be summarised as:

- Recognition that today's innovation is not solely R&D based but can come from new configurations of existing technologies and from service, social and organisational innovation.
- Ensuring that skills development is appropriate for innovation – it must move beyond qualification and recognise the need to build abilities to use and adopt codified knowledge into “tacit” knowledge and practical expertise.
- Building organisational capabilities to enable the use all of the economic levers available in the economy and society, such as embracing open innovation approaches.
- Recognition of the importance of the demand-side in innovation and its level of absorptive capacity.

Practices

Building a knowledge economy is complex and requires the engagement of many different actors and involves both supply-side initiatives such as the improving levels of skills and engagement in on-going education but also stimulation of demand-side actions and interest

through the creation of culture change and the development of communities of interest and practice.

Innovative capability grows in those places which are open to new ideas and have the capacity to exploit them. This clustering is associated with the level of **absorptive capacity** in the innovation ecosystem. Absorptive capacity depends on many factors, including the willingness of the leadership in the system to be open to new ideas, new people and new ways of working and tolerance of failure, but is best defined as:

“...the ability of the individual, the firm, organisations and places to recognise the value of new external knowledge, assimilate it and apply it to commercial (and social) ends.”⁴

Knowledge based economies require new approaches to economic development. While the ability to create new knowledge has served development since the dawn of time, there are a number of significant changes which David and Foray (2001) describe as transformational that characterise a modern 21st century knowledge economy.

- **First**, the pace at which knowledge is being created, accumulated and at which it also depreciates has increased dramatically. This creates the need for new organisations or communities consisting of networks of individuals. These networks produce and circulate new knowledge across organisational boundaries, creating a fertile environment for innovation. Their cross-organisational focus makes them a challenge for conventional supply-side economic development interventions.
- **Second**, the relative importance of intangibles which rely on human capital rather than purely natural resources or physical capital is a feature of advanced knowledge economies and societies. Knowledge workers are mobile workers and the need to attract, retain and release the creativity of that human capital in any place goes beyond its physical environment and building form, although each may be necessary if not sufficient to attract and retain talent.
- **Third**, innovation is increasing in both pace and range of sources as it becomes a currency of productivity and competitive advantage in the connected globalised economy. Whilst propinquity may be important for the first two transformational characteristics, it is increasingly likely that innovation value chains will extend globally and therefore the ease of connectivity to other innovation hubs becomes a critical asset for places.

These transformational factors which now drive economic growth together with the underlying ubiquitous presence of the internet and its digital connectivity are leading to a re-calibration of economic development approaches and a focus on innovation in modern knowledge-based economies. As a study by the Washington Economic Development Commission has pointed out this implies that efforts need to become more substantially people-focused, providing an attractive and supportive infrastructure to attract and retain agile entrepreneurs and their businesses. Collaborating to compete and building partnerships locally and globally become vital to success. **Relationships become important as pre-cursors to transactions.**

⁴ Cohen, W.M. and Levinthal, D.A.(1990) Absorptive capacity: A New Perspective on Learning and Innovation, *Administrative Science Quarterly*, Vol 35 (1) Special issues: Technology Organizations and Innovation, pp 128-152.

Innovation is not an end in itself but should be a servant of other objectives - such as new products and processes for business growth or societal benefit.

The importance of innovation is no longer a contested proposition. Government policy statements across the world proclaim the importance of innovation for their country's future economic success⁵. What remains subject to contention is how to inspire increased innovation and to capture the benefits of it for the local economy and society. Even the USA, which for decades has been the model of an innovative economy to which others have aspired, has seen the necessity to re-galvanise efforts for its future innovative leadership.⁶

Open innovation is driving a new paradigm of cross-sectoral, cross industry and international collaborative efforts. Supported and fuelled by the ubiquitous availability of digital connectivity, innovation has become distributed and diffuse, requiring very different approaches to policy and practical support mechanisms. Not only are innovations being sourced globally but customers may be anywhere across the world. Digital connectivity has exploded not only the supply chains for business but also the customer base.⁷

Models of Success

Studies of the success of iconic areas such as Silicon Valley and other technology "hotspots" in the USA have begun to demonstrate that many other factors beyond patenting and licensing have played their part.⁸

It is relatively easy to count and enumerate those assets that are essential for a successful knowledge hub, but it is harder to determine the policy and practice actions that underpin differential success. Just as many places inventoried the assets in Silicon Valley and emulated the conditions which apparently existed there, there were few⁹ who really understood that the nature of comparative advantage in Silicon Valley arose **not only** from the presence of venture capitalists and the clustering of firms and the co-location of research universities but from the nature of the "social capital"¹⁰ that existed there and how that created a uniquely entrepreneurial environment. As Rosenberg notes in his book, *Cloning Silicon Valley*¹¹, "*the basic chemistry is complicated. There are many more components to the formula and the way in which they come into play. Complexity reigns.*"

To be successful in emulating successful places, it becomes imperative to understand not only the ingredients which exist in those places but also the way in which these are combined into a successful recipe by the actions of the people in that place. Copying the ingredients, without understanding the social nature of the underlying processes, is a recipe for failure.

An innovation systems approach is challenging for policy makers. Stimulating the vibrancy of an ecology requires not only an understanding of the innovation assets in a place but also the form of interventions across diverse policy areas including education and skills; business

⁵ OECD (2007), *Innovation and Growth: Rationale for an Innovation Strategy*, Paris

⁶ InnovateAmerica – National Innovation Initiative, Council on Competitiveness, www.innovateamerica.org

⁷ Anderson, C. (2006), *The Long Tail*, Random House, London

⁸ Saxenian, AnnaLee.(1994), *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Harvard University Press, Cambridge, USA

⁹ Saxenian, AnnaLee.(*op cit*)

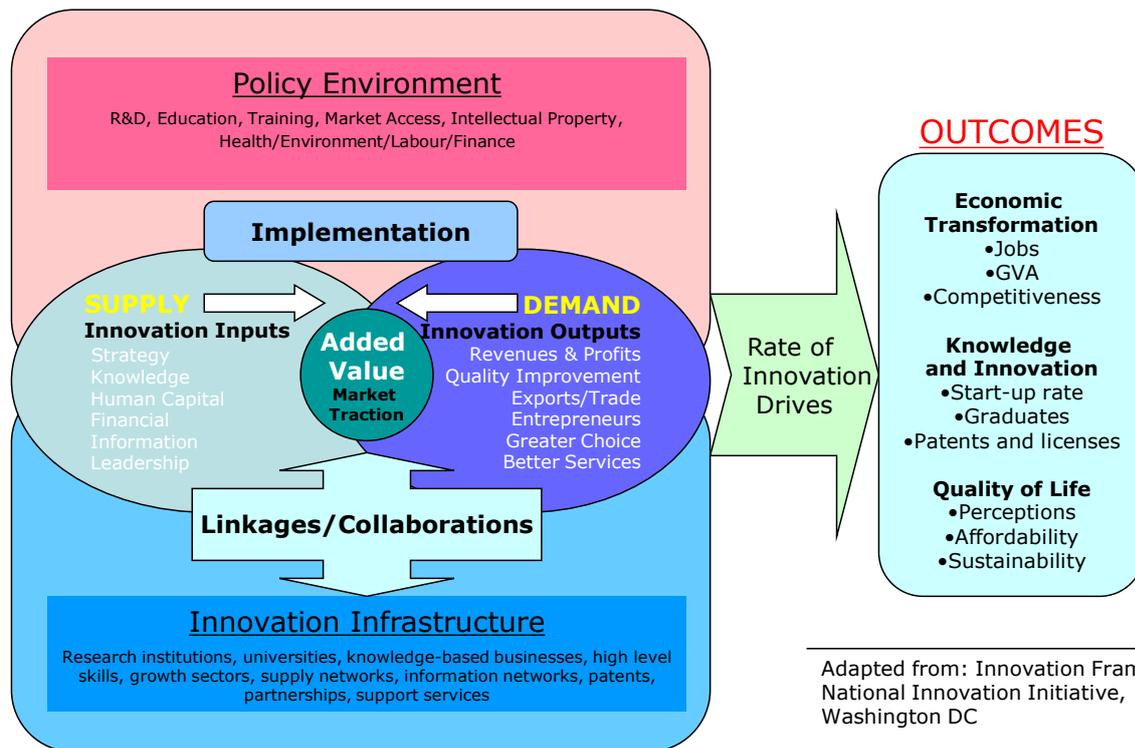
¹⁰ Cushing, Robert (2002) quoted in Emily Eaken, "*Cities and their New Elite*", New York Times

¹¹ Rosenberg, D.(2002), *Cloning Silicon Valley*, Reuters, Pearson Education, London

support and changes in the culture of attitude to risk. While an innovation-ecology is the basis for a system, it is not a system in of itself until subsets of the actors are connected with **the intention to promote innovation** and the purpose of the connections is to combine multiple sources of knowledge through the flow of information.¹² The complexity of necessary elements and their connectivity is set out in Figure 2 below.

Figure 2 Complex Nature of Engagement in the Innovation Ecosystem

Innovation Ecosystem – showing inter-connections



Arnold¹³ depicts four systemic failures which need to be addressed to increase the absorptive capacity of the innovation system:

- Capability failures (firm deficits, such as the lack of absorption of external knowledge and skills by local firms);
- Institutional failures (barriers in universities, performance gaps in other agencies);
- Network failures (problems in the linkages between innovation actors or path dependency barriers from industrial structures; too rigid competition or monopolies);
- Framework failures (restrictive practices and background conditions such as the lack of consumer demand or negative attitudes to risk).

An innovation ecosystem’s complexity requires a “whole-system” approach to its successful activation.

¹² Metcalfe, S. (2007), Innovation Systems, Innovation Policy and Restless Capitalism. in F. Malerba and S. Brusoni (eds.), *Perspectives on Innovation*, UK: Cambridge University Press, pp 441-454

¹³ Arnold, E. (2004), Evaluating research and innovation policy: a systems world needs systems evaluations, *Research Evaluation*, 13 (1) pp3-17

Approach

A pragmatic approach to the most significant barriers to enable step-wise progress and improvement may be the only practical approach.

Places which have a low level of absorptive capacity need to examine issues such as the following:

- Is there a lack of organic R&D capacity in local companies? R&D is seen to play a dual role in increasing absorptive capacity – both through the new knowledge generated and through enhanced learning.
- Are opportunities not being recognised by local organisations (ranging from the simple awareness of open innovation as a strategy at one extreme or the potential relevance of university research at the other)? A higher level of absorptive capacity affects expectation formation – permitting firms and organisations to predict more accurately the nature and commercial potential of technological advances. As a corollary, higher absorptive capacity will impact on the aspiration to excel.
- Are potential complementary firms, organisations and networks unaware of each other or are there barriers to productive relationships? Knowledge diversity facilitates the innovation process by enabling individuals to make novel associations and linkages.
- Is the organising principle (such as entrepreneurial behaviour) for innovation lacking? Cohen and Levinthal¹⁴ note that closed management produces a closed system with little capacity to accept information and new knowledge from external sources and therefore by definition will deliver low absorptive capacity. Open management on the other hand considers the environment as a source of valuable knowledge to be absorbed and will therefore deliver a higher absorptive capacity. This “open” approach reflects the type of behaviours that are exhibited in the context of business start-ups and entrepreneurial behaviour.
- Are translators or active intermediaries who could act as brokers between different organisations missing? The absorptive capacity of the system is related to those institutions and actions that enable the flow of external knowledge and its acceptance and assimilation by a range of organisations.
- Is the local environment affected by “lock-in” and negative path-dependency? Inertia in either the organising principles, the leadership and management of the locality or the industrial structure where firms exist in a stable environment, militates against innovation – and will lead eventually to stagnation. In a turbulent environment, raising the absorptive capacity of organisations in the system and of firms is vital to enable fast-moving adoption of new ideas, business models and technology.

Reflecting on these questions, in the local Saudi context, it becomes clear that a number of key attributes of the system should be encouraged through the supportive interventions of public agencies.

Three key areas are identified as unlocking the potential for innovation:

- **Leadership** which can operate beyond the boundaries of the leader’s organisation - working in a horizontal and dispersed fashion and a style which is permissive of

¹⁴ ibid

emerging innovation. Those places where partnership working is the norm; where organisations and people collaborate to compete are more likely to have the appropriate leadership to build and sustain an innovative environment.

- **Enabling knowledge exchange** by connecting institutions and people. This must enable both person to person knowledge exchange and the building of a community of innovators which leverages reciprocity, trust and mutual self-interest. The building of purposeful networks which facilitate such sharing and collaborative working for a common purpose are key to success.
- A process for **interactive learning** by the community (learning by doing) to address the dangers of path-dependent “lock-in” to out of date approaches and to try and test new ways of working. This should be multi-generational and diverse to build a pipeline of future talent and to inspire young people to engage in entrepreneurial activities.

Recommendations

- 1. Increase the absorptive capacity of the innovation ecosystem** by connecting the demand and supply side and across multiple organisations such as by using supply –chains or the exchange of personnel through placements to gain understanding of the process from different experience. Leadership across the different elements of the ecosystem will be vital and should not only be endorsed from the highest level but should be supported through the creation of a specific network which adopts *action-learning* approaches to collaborate and develop joint solutions to meet the aspirations of Vision 2030.
- 2. The effort to increase knowledge sharing and the breaking down of silos** across the economy and society may be best served by the creation of a dedicated Innovation Agency which is tasked, and its performance measured, by the increase in engagement across its component organisations. Examples such as the Massachusetts Technology Collaborative (<http://masstech.org/innovation-institute>) may be useful to explore. In Manchester, UK the establishment of a special partnership which brought together four universities; ten local government areas and business across the city led to a significant increase in engagement and co-operation over time (http://archive.agma.gov.uk/cms_media/files/driving_innovation_across_gm_pdf.pdf?static=1). Importantly this initiative reached out not only to triple helix partners but also to schools and other community–based agencies, such as through the annual science festival. (<http://www.manchestersciencefestival.com>) which has run for a decade and has a huge engagement across the city. Sponsorship by local firms and organisations enables reach-out from employers to young people and builds shared knowledge and trust through active engagement.
- 3. Interactive learning** by the community and business can range from first encounters with innovation and new tools such as the Fab Lab initiative. Since opening in 2010, the Manchester Fab Lab has attracted over 19,000 visitors, ranging from primary school children to people running established businesses. Fab Labs were based on a model from MIT and designed to inspire the next generation of talent. (<http://www.fablabaltrincham.co.uk>). Likewise, it is vital to support the development of new ideas by new businesses. Modelling on the SABIC approach (<https://www.sabic.com/corporate/en>) new businesses and new talent can be embedded through the instigation of a “challenge-based –approach” to innovation such as has been developed by major corporates in the UK. Examples worth

review include Unilever, GSK and BAE to name but three major firms supporting the development of an innovation culture.¹⁵ Societies that identify existing or emerging challenges as opportunities for innovation and organise funded and high-profile challenge competitions to solve have a win-win scenario in that they may find a solution to the problem but at very least they will raise the profile of those that are engaged in trying to do so.

4. Communicating the message in a consistent and inspiring manner is vital. Celebrating success and finding appropriate role models to take the message out beyond the corporate or institutional boundaries is essential. The media needs to be encouraged to feature stories regarding breakthroughs and successes and cover the innovation events to create a consistent and continuous narrative. Similarly, it is important for experts to be engaged in proselytising their knowledge-based discoveries and knowledge. One example in the UK is Professor Brian Cox¹⁶ who is a physicist but also was a member of a pop-group who has become a super-star in relation to astronomy and physics and a cult celebratory. This type of fame has encouraged many more academic experts to use the media to promote their own subject-based television shows that explain and inspire others to engage.

Implementation

Establish an Innovation Fund that specifically funds activities which will increase the absorptive capacity of the innovation ecosystem as set out above. This should be lodged with the Innovation Agency to ensure cross-cutting approaches and non-institutional silo-based thinking. It should be run on a competitive basis as not all will initially succeed but experience over a decade in places such as Manchester and in Tech City¹⁷ in London have shown that culture change can be achieved with a concomitant increase in entrepreneurial behaviour and societal engagement. However, constant review is important to ensure that original interventions remain appropriate for a fast changing and volatile world. For example, in the UK, the emphasis on increased number of start-ups has now shifted to programmes that are designed to support companies to grow and scale-up. Similarly, while the number of university graduates in the UK is now above the aspirational target of 50%, the lags in the system of education means that in fast-moving technology fields, there is now a push to move to University Technology Colleges which tend to undertake work-based learning.

Driving an increase in the potential to solve challenges that are relevant for the general population and especially the younger members of society is a very positive approach to engagement. Issues such as health and wellbeing tend also to attract a disproportionate proportion of women and therefore may be an important lever in terms of diversity.

Conclusion

Building a vibrant innovation ecosystem will not only support the increased effectiveness in building a knowledge-based economy but can be a significant step in developing the levels of engagement that are required to build a sustainable knowledge-based society.

¹⁵ <https://foundry.unilever.com>; <http://www.gsk.com>; <http://www.baesystems.com/en-uk/our-company/our-businesses--uk/shared-services/advanced-technology-centre/investment-in-innovation>

¹⁶ www.manchester.ac.uk/research/brian.cox/

¹⁷ <http://www.tech.london/>

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