

# National Competitiveness – Local Innovation



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Exploring national competitiveness, economic productivity, and the contribution by information and communications technologies (ICTs) to economies.

# The Techno-economic Age

Technological advancements, such as the Internet, have increased cross-border trade, direct foreign investment, and worker migration, and have significantly influenced industry structure and sustainable competitive advantage for industries Porter (2001).

# Transformed Industries and Economies

Where...

- the emphasis in the labour process is one of technology application,
- there is an accelerated pace in internationalisation,
- and there are basic shifts in regional forms of global and national economies'. Jessop (1992)

# A Global Mosaic

National Governance is also being 'hollowed out'...

...upwards to pan-national institutions such as EU  
etc...

...and down to the regional/local city level...

to form a 'global mosaic of regional economies'

Allen J. Scott (1998)

# National Competitiveness

It is important to distinguish between competitiveness from a firm's point of view and a nation's point of view...

...firm's measure of competitiveness is market share and profitability...

...while a nation's 'true metric of competitiveness' is the **productivity** of its resources (labour and capital)

# Cities and Competitiveness

While ICTs heralded the spatial dispersal of economic activities, globally integrated markets, and operations, these enterprises still require central places where the work of running global systems is executed (Sassen 2000).

# Global Cities

So, while the techno-economic age has scattered workers across the virtual cloud of the Internet, it has also concentrated them into 'strategic nodes' of operations, i.e., global cities.

# Urban?

- Over the past 25 years, the urban growth rate in the developing world was 3 times higher than the rural growth rate.
- Over the next 25 years, the urban growth rate will be 25 times higher than rural growth rate.
- Rural and urban development are interdependent.

*In the next 15 years, many cities in Africa and Asia will nearly double in population.*

# Connected Cities

These connected cities drive economic growth and enhance national competitiveness, and are embedded within various global networks, such as the production and marketing of output of multinational firms, international labour migration flows, and the World Wide Web of information resources

# Economic Productivity

National- and firm-based prosperity are based not on the amorphous notion of 'competitiveness' but on the productivity by which a nation's resources (labour and capital) are employed.

National competitiveness is the set of factors, policies, and institutions that determine the level of productivity in a country' The World Economic Forum (2010)

# Economic Productivity...cont

The argument being that no nation can be competitive in everything, and, as such, the pool of human and other resources ideally should be deployed in the most productive uses possible.

# ICTs and Productivity

The ICT industry is a key driver of productivity growth for national economies. ICTs

1. Efficiencies are realised through rapid technological progress in the production of ICT goods and services in ICT-producing industries.
2. Investment in ICTs provides more capital for workers, which raises their productivity.
3. Greater use of ICTs in all sectors in the economy helps firms to increase their efficiency.

# ICT Production and Use

- Increased 'production' of ICTs contributes to output, employment, and export earnings,
- ICT 'use' increases productivity, competitiveness, and growth

40 per cent of all productivity gains expected among European businesses in 2010 were derive from the application of software technologies to their own businesses DG-INFOS 2009.

# ICTs and Innovation

Technologies also underpin new innovations in:

1. Products
2. Services
3. Process
4. Business Models

In both 'sustaining' and 'disruptive' modes

# ICT Sub Sectors

Hardware

Services

Software

# Hardware

The Hardware sub-sector comprises hardware and network infrastructure and includes the distribution channels to the first tier to which a hardware vendor sells, which could be a distributor or directly to a user (IDC 2010).

# Services

The Services sub-sector includes services provided to external customers for planning, building, supporting and managing systems and processes, and are characterised as services that are either IT- or business-focused.

# Software

The Software sub-sector includes 80 individual functional markets grouped within three primary segments of 'packaged' software: applications, application development and deployment (AD&D) software, and system infrastructure software. (IDC 2010).

# Packaged Software

Packaged software may be sold in a number of ways, including licensing only, licensing/maintenance and subscription, or other software revenue consisting of fees to use software products and to receive maintenance and support for those software products for a limited period of time (IDC 2010).

# Software Note

It should be noted that, in the IDC taxonomy, in order to be classified as packaged software, both of the following statements must be true:

- **Intellectual property is owned.** Application service providers (ASPs) that do not own the software code are not software vendors but channels for software vendors.
- **Product is replicated.** Software companies assemble a package of code from components and 'sell' multiple copies in a one-to-many business model.

# Measuring Sub-Sectors

And while statistics give some understanding of the overall impact of ICTs at the macro-economic level based on national productivity, there appears to be limited information available at the meso (industry) level, and micro (sector/firm) level within the ICT industry

# Challenge

These measurement issues present a challenge to understanding how to grow national competitiveness and economic productivity within an economy through the use and production of the hardware, software, or services, and, as such, form a significant barrier to understanding and benchmarking these sectors' impacts on economic growth, productivity and national competitiveness.

# Sub-Sector Maturity

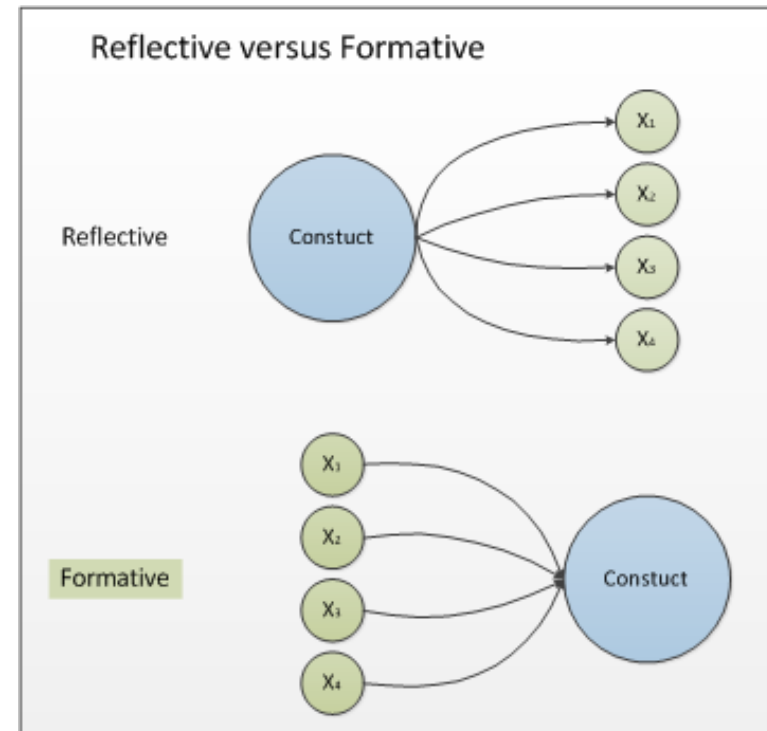
## Local Software Economy Example:

LSE Variable	Calculated from Baseline Dataset as:
<b>Software Employees Percentage to Total IT Employees</b>	Software Employees/Total IT Employees
<b>Software Companies Percentage to Total IT Companies</b>	Software Companies/Total IT Companies
<b>Software Sales Percentage to Total IT Sales</b>	Software Sales/Total IT Sales (Exports Excluded)
<b>IT Spending as a Percentage of GDP</b>	IT Spending as a Percentage of GDP

# Technical Note: Index, not a Scale

**Reflective Scales:** In reflective scale development, each item/indicator ( $x$ ) in the construct is assumed to share a common cause, which is the underlying construct of interest. As such, an increase in the value of the construct then translates into an increase in the value for all the items representing the construct (Bucic and Gudergan 2004).

**Formative Indexes:** Unlike reflective scales, in formative index development 'indicators [ $x$ ] could be viewed as causing, rather than being caused by, the latent variable [construct] measured by the indicators' (MacCallum and Browne 1993).



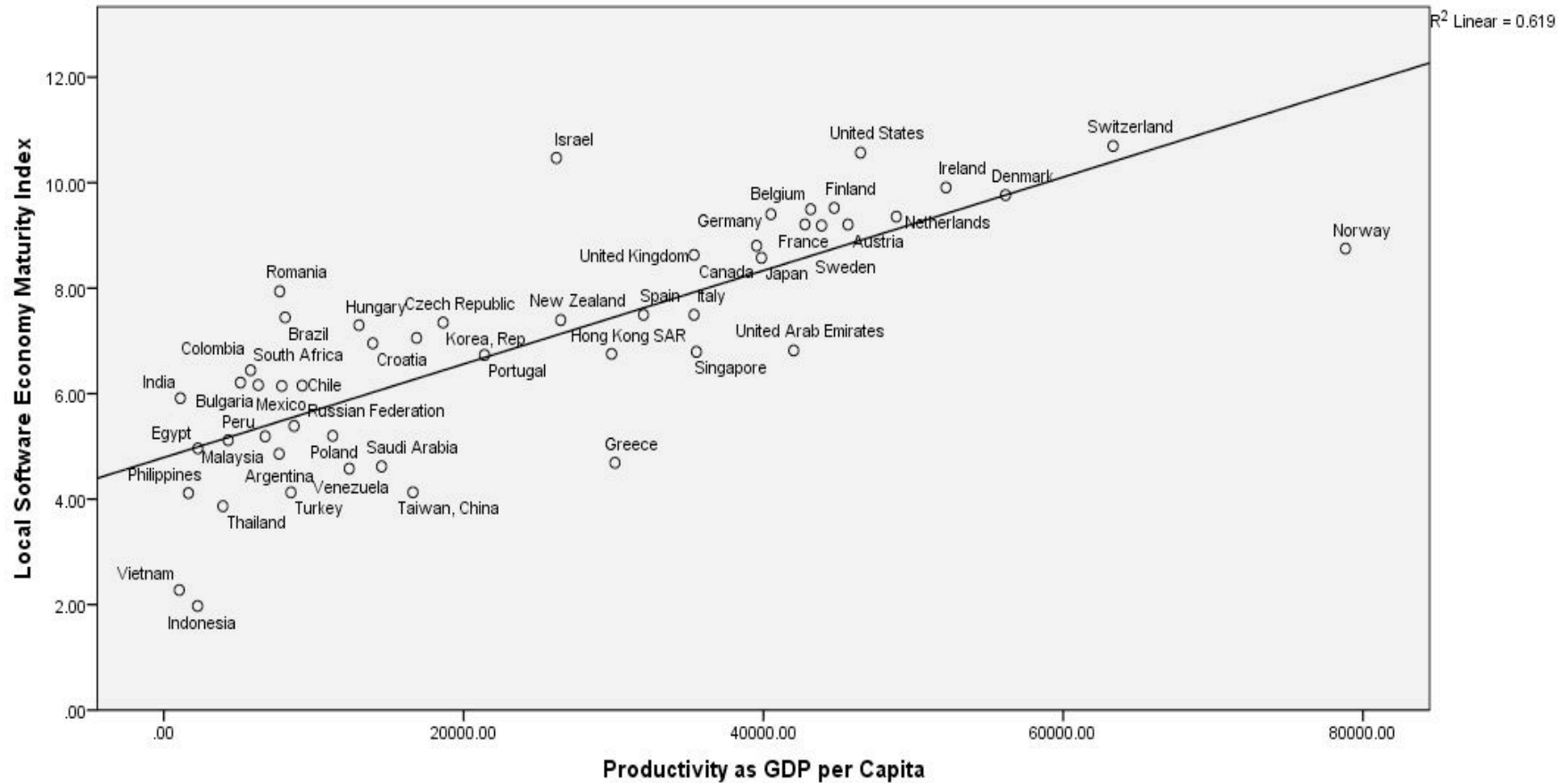
# Results

## Correlations

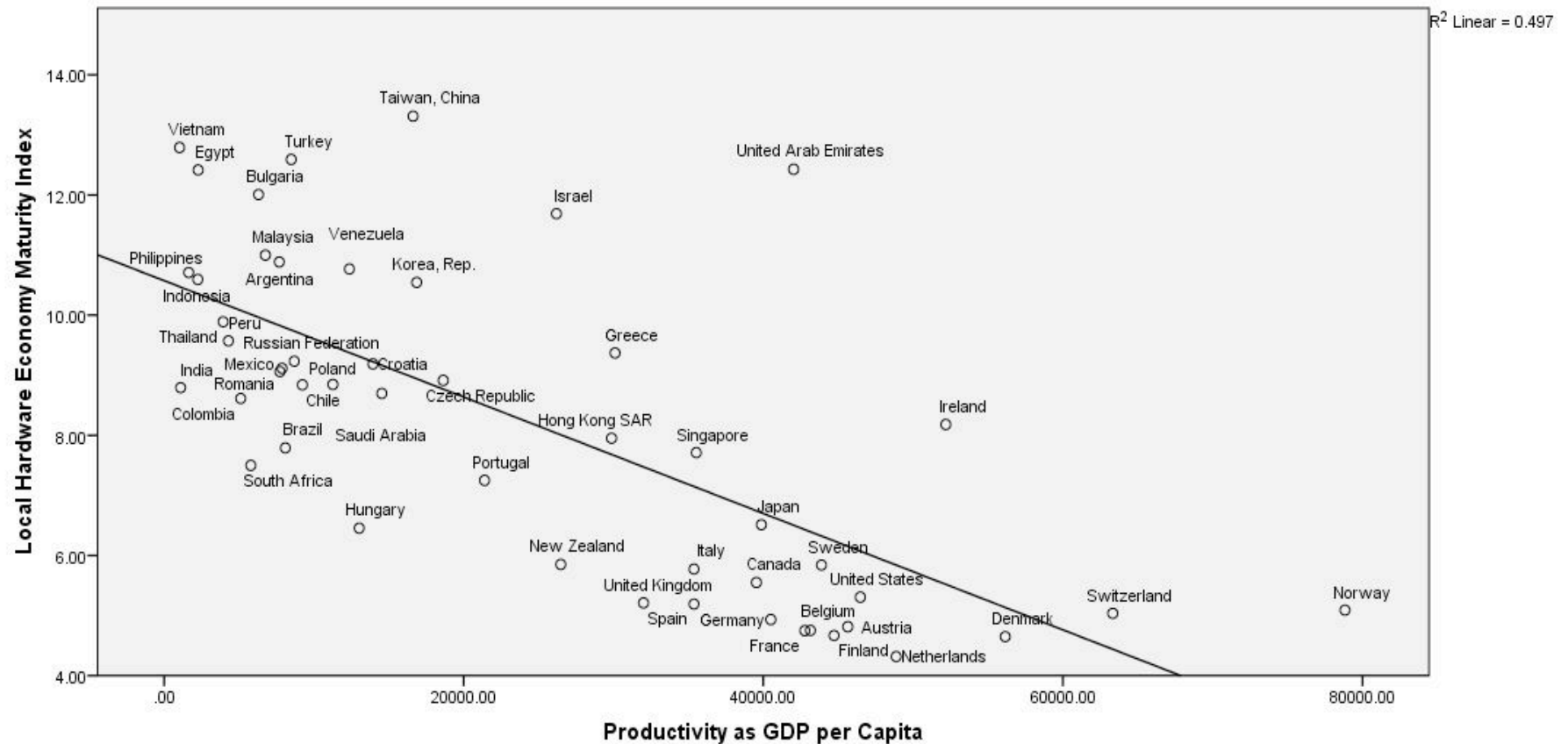
		GDP Per Capita (US\$)	Local Software Economy Maturity Index	Local Hardware Economy Maturity Index	Local Services Economy Maturity Index
GDP Per Capita (US\$)	Pearson Correlation	1	.787**	-.705**	.630**
	Sig. (2-tailed)		.000	.000	.000
	N	50	50	50	50
Local Software Economy Maturity Index	Pearson Correlation	.787**	1	-.743**	.641**
	Sig. (2-tailed)	.000		.000	.000
	N	50	50	50	50
Local Hardware Economy Maturity Index	Pearson Correlation	-.705**	-.743**	1	-.678**
	Sig. (2-tailed)	.000	.000		.000
	N	50	50	50	50
Local Services Economy Maturity Index	Pearson Correlation	.630**	.641**	-.678**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	50	50	50	50

\*\* . Correlation is significant at the 0.01 level (2-tailed).

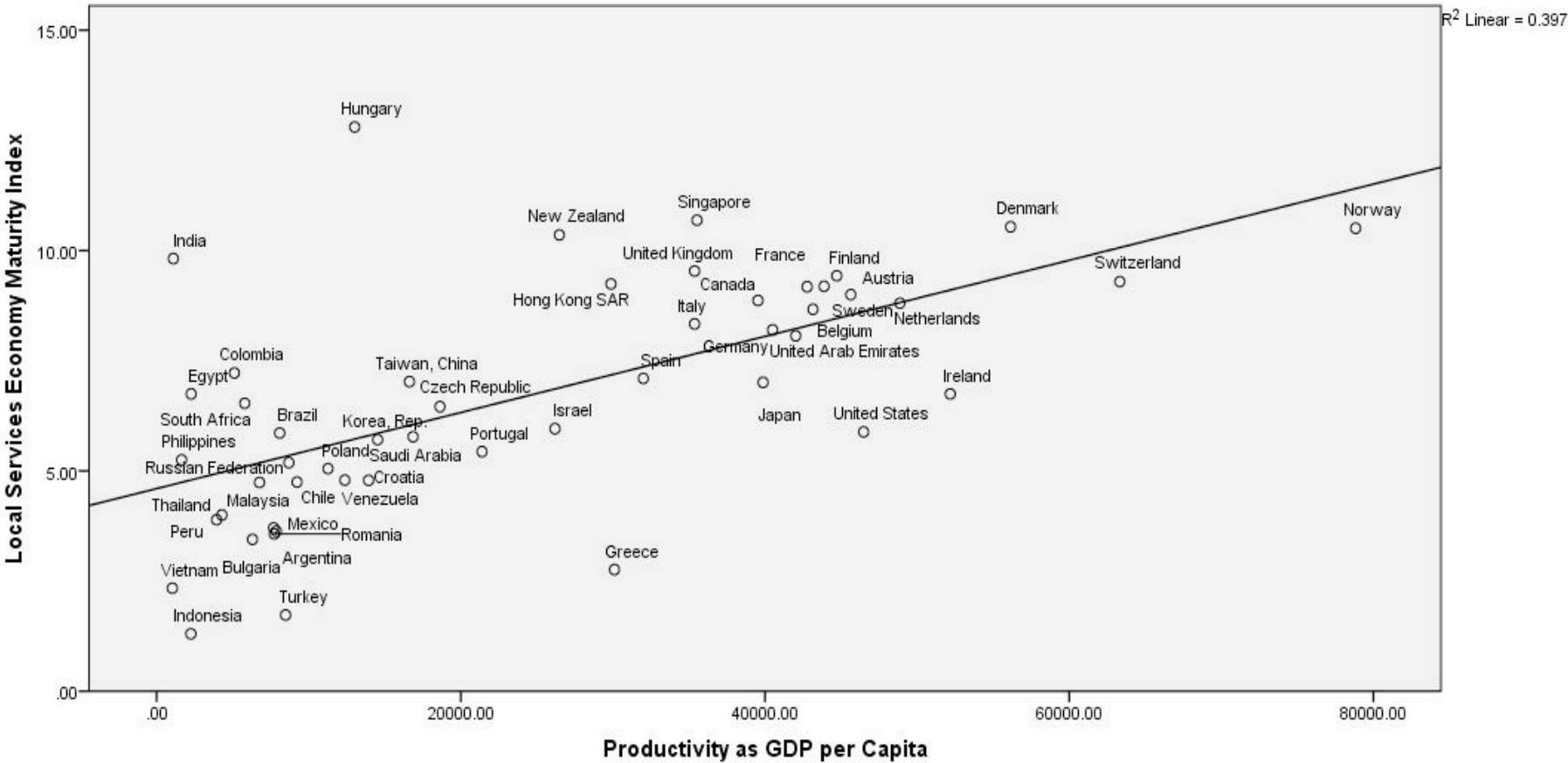
# Local Software Economy Maturity Index



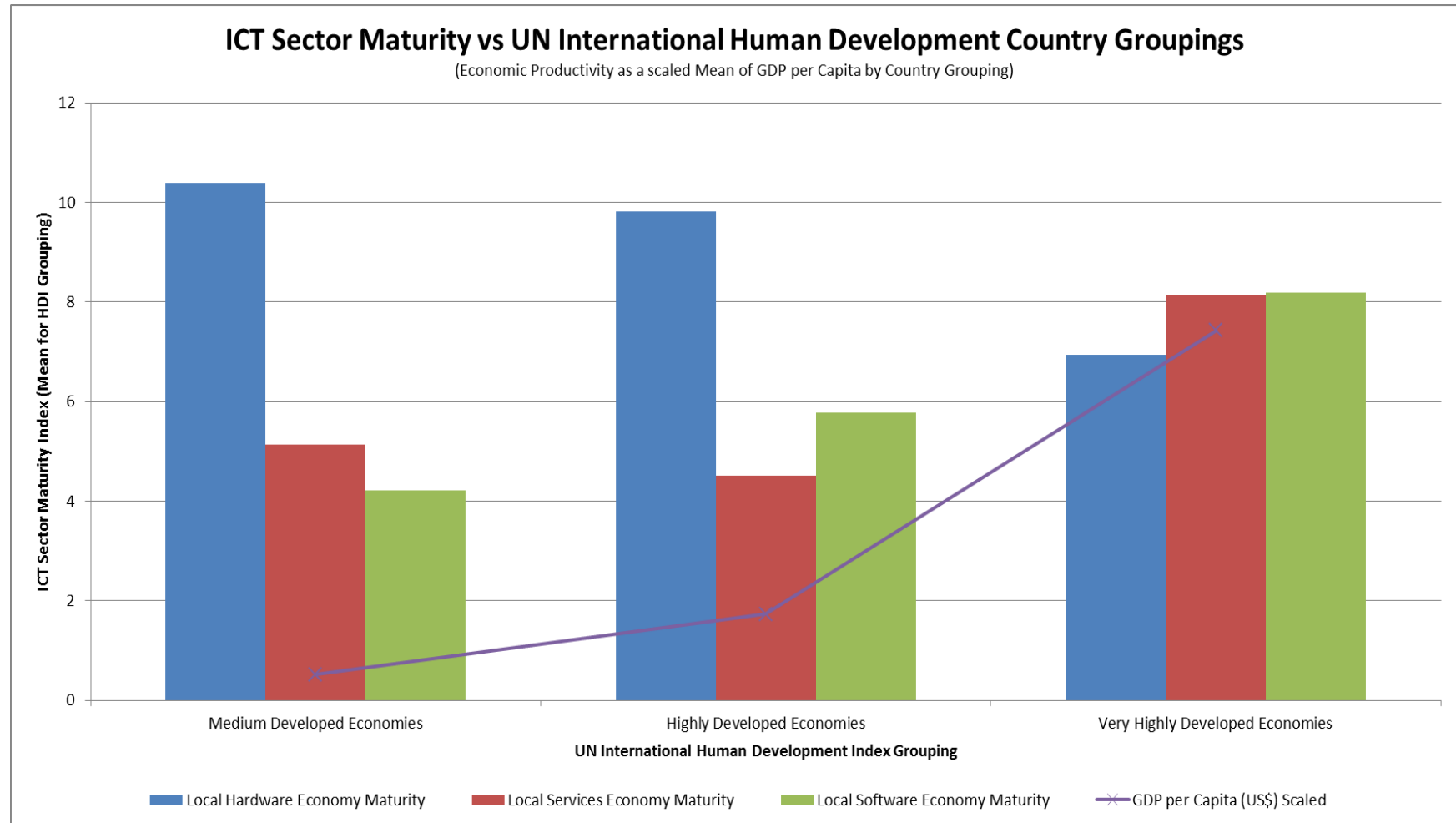
# Local Hardware Economy Maturity



# Local Services Economy Maturity Index



# Sub-Sectors and Human Development



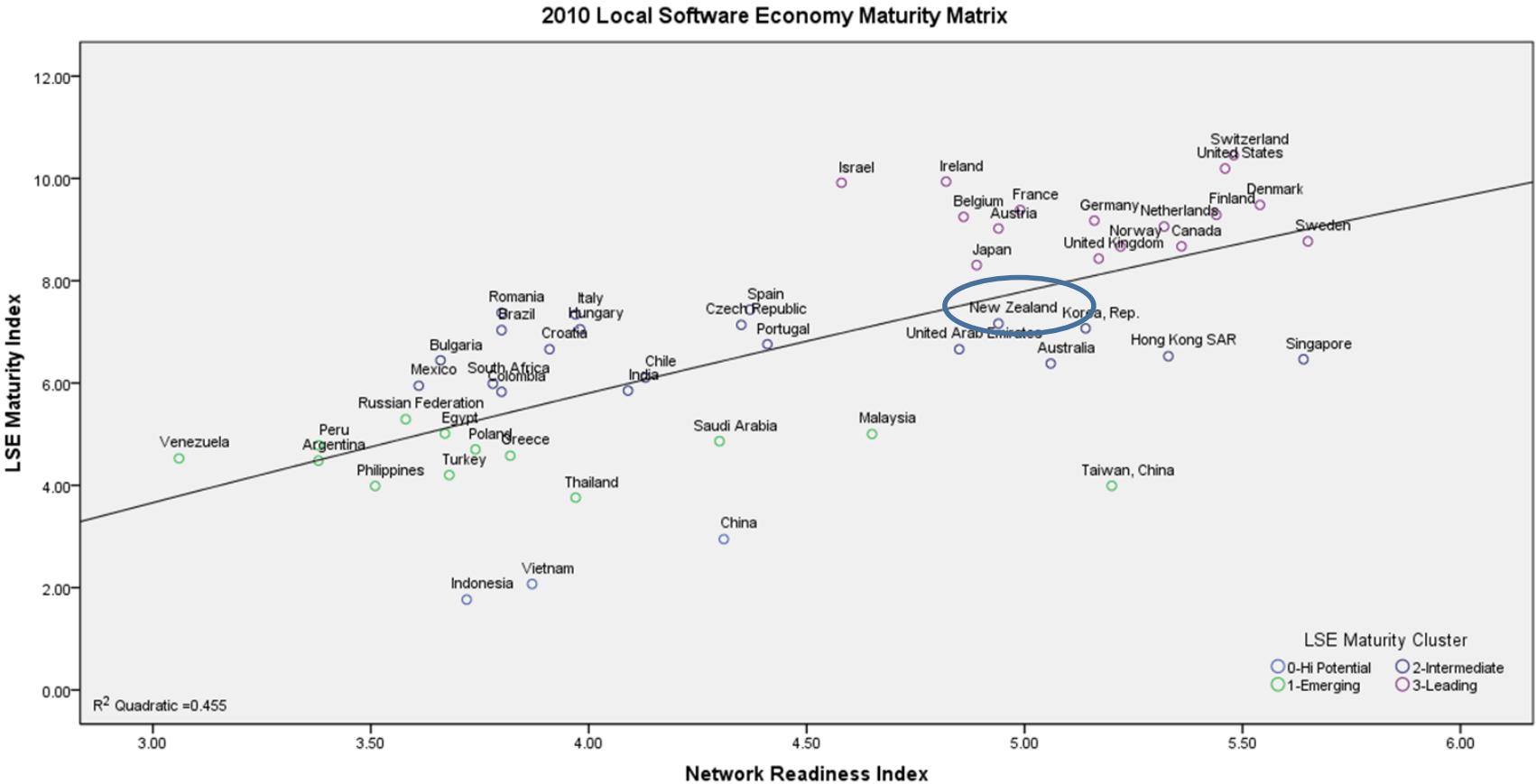
# Example Usage

Local Software Economy Maturity Index

# Local Software Economy Maturity Index

- Index that frames the country ecosystem maturity to drive policy recommendations , and
- Provides better focus, impact and consistency in the execution of local software economy and ICT cluster development programs.

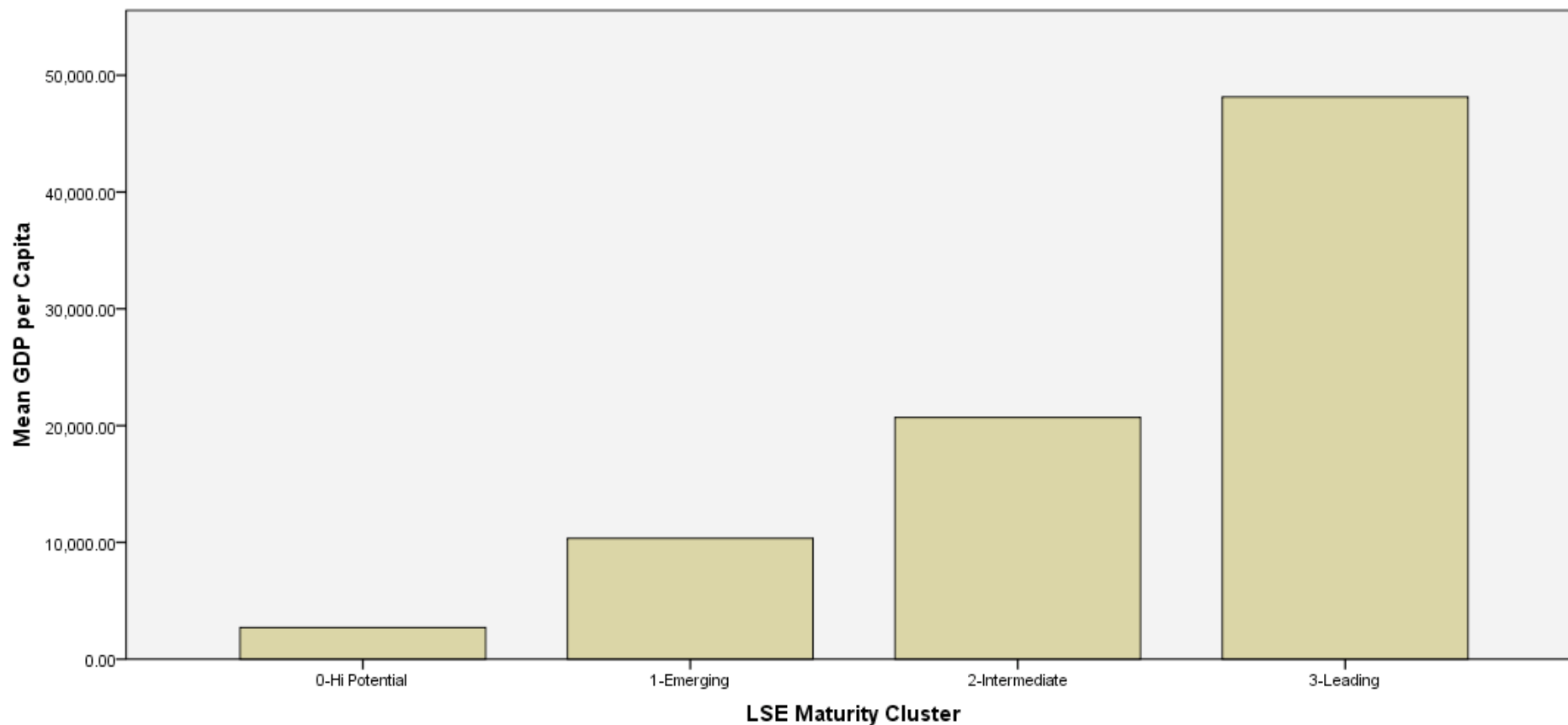
# Local Software Economy and Network Readiness



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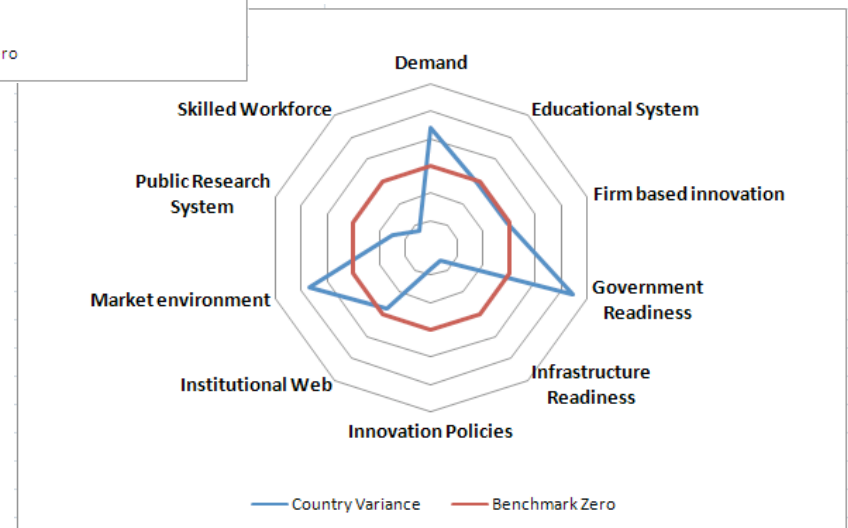
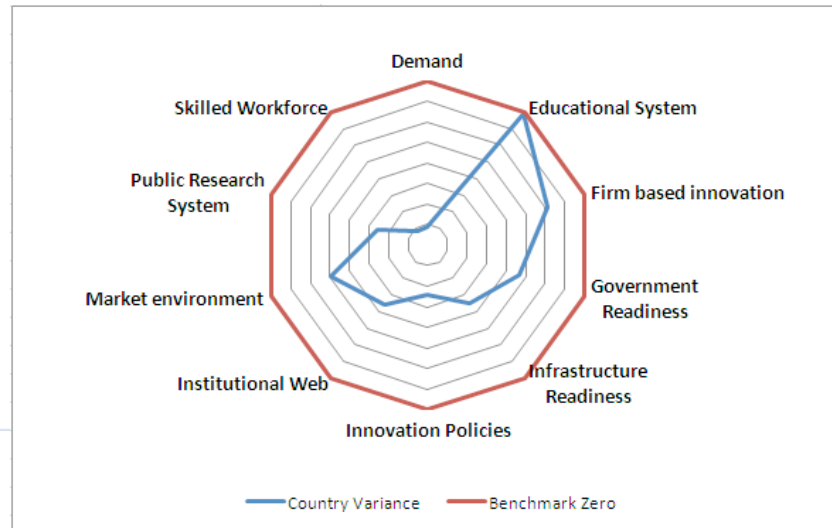
Sources: LSE Maturity Index: Future Cities Institute 2010, Network Readiness Index: World Economic Forum

# Software Sector Maturity and GDP

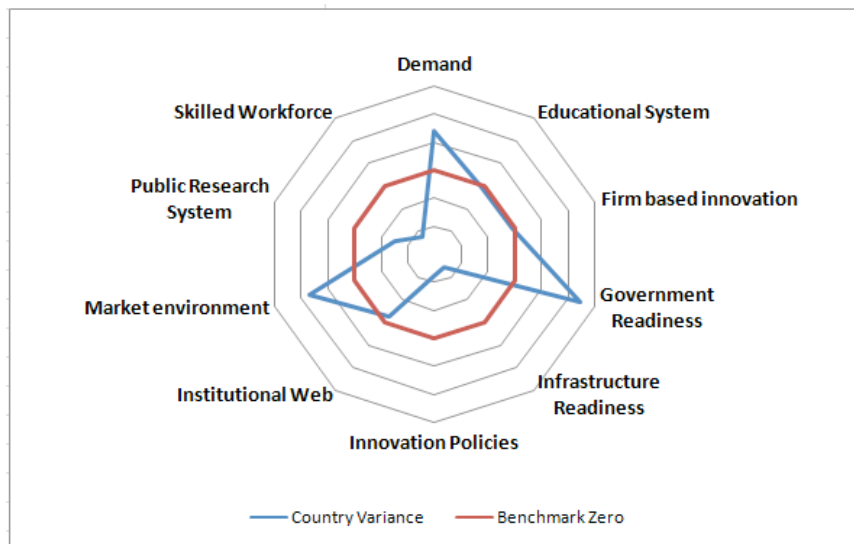


# Local Software Economy 'Spiders'

Skilled Workforce  
 Demand  
 Innovation Policies  
 Public Research System  
 Infrastructure Readiness  
 Institutional Web  
 Government Readiness  
 Market environment  
 Firm based innovation  
 Educational System



# WEF Data and Indexes



Category (Y)	Variables / Metrics
Demand	2006-2011 Annual IT Spending Growth % 2006-2011 Software Growth % Buyer sophistication E-participation index
Educational System	Education expenditure Quality of math and science education Quality of the educational system Tertiary enrolment
Government Readiness	E-government readiness index
Firm Based Innovation	Capacity for innovation Company spending on R&D Firm-level technology absorption Utility patents Venture capital availability
Infrastructure Readiness	Business monthly telephone subscription Business telephone connection charge Cost of mobile telephone call High-speed monthly broadband subscription Lowest cost of broadband
Innovation Policies	Government prioritization of ICT Government success in ICT promotion Importance of ICT to government vision of the future Intellectual property protection State of cluster development
Institutional Web	Effectiveness of law-making bodies Efficiency of legal framework Judicial independence Laws relating to ICT Property rights
Public Research System	Local availability of research and training services Quality of scientific research institutions University-industry research collaboration
Skilled Workforce	Availability of scientists and engineers Extent of staff training Quality of management schools
Market Environment	Dealing with Licenses - Cost (% of income per capita) Starting a Business - Cost (% of income per capita) Starting a Business - Starting a Business - Rank Starting a Business - Time (days) Doing Business Ranking

Therefore...

Mosaic: Measuring Local Innovation

# People + Ideas = Enterprise

*Empowered people with ideas, build enterprises,  
communities and economies...*

# Education Empowers People...

*A city's greatest asset is its people, where empowered and skilled individuals are the single most important prerequisite for success...*

# Research Powers Ideas...

*Research uncovers and builds new ideas for innovation in industries, communities and economies...*

# Local Innovation Ecosystems...

*Local innovation ecosystems converge technology, culture and urban development to convert ideas to innovation, and build enterprises and develop industries...*

# A Global *Mosaic* of Regional Economies...

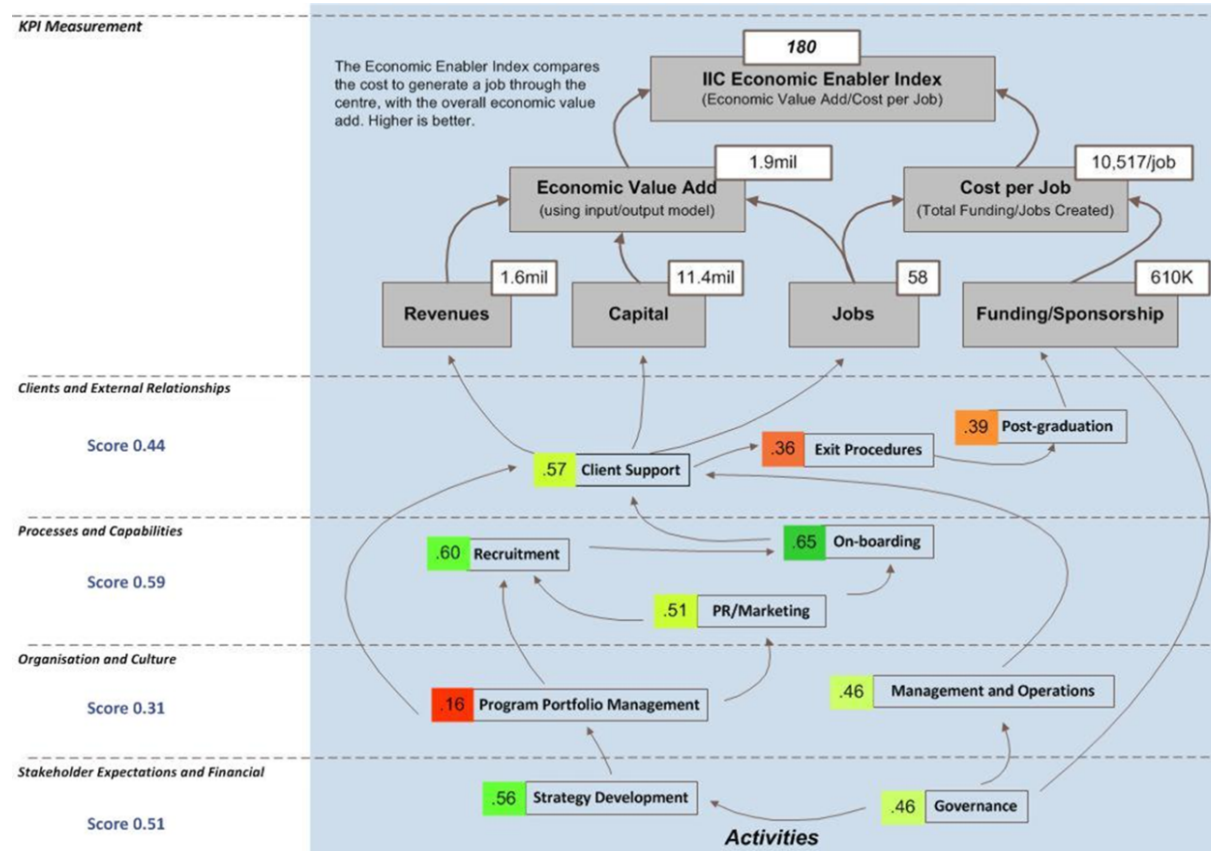


# Mosaic – Local Innovation...



*Mosaic supports measurement of local innovation, and build capacity to commercialise new products, services and business models for industries of national importance ...*

# Mosaic: Measuring Local Innovation



*Connects Innovation Communities and provides the ability to measure economic results of programmes and activities in local innovation ecosystem.....*

# Mosaic for Local Government...

*Works with city governments, and their economic development agencies to measure local innovation and build their capacity in urban innovation ecosystems...*

# Mosaic for Cities...

*Fosters belief within local entrepreneurs, drives city competitiveness and delivers economic growth via global markets...*

# Mosaic for Industries...

*Generates commercialisable ideas for industries that can be converted into world-class innovation and start-ups businesses in both the local and global economies....*

# Mosaic for Academia and Research...

*Creates new opportunities for research, knowledge sharing, innovation and connection to industry firms, multinational vendors and multilateral organisations....*

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