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National Intellectual Capital and the Financial Crisis in Brazil, Russia, India, China, Korea, and South Africa

 Springer

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ISSN 2191-5504
ISBN 978-1-4614-6088-6
DOI 10.1007/978-1-4614-6089-3
Springer New York Heidelberg Dordrecht London

ISSN 2191-5512 (electronic)
ISBN 978-1-4614-6089-3 (eBook)

Library of Congress Control Number: 2012951665

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Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Foreword 1

The economic crisis is a consequence of many parallel factors which are all related to globalization and digitalization. My main concern, assessing this in more detail from the European perspective, is that the revolutionary global forces have not been taken early nor seriously enough by most national and regional decision makers. The Heads of European States and Governments have once again recalled the importance of fiscal consolidation, structural reform, and targeted investment to put Europe back on the path of smart, sustainable, and inclusive growth. The main question is how capable and ready are the national governments to tackling the complex and manifold issues of crises and to renewing even radically many of our public and private structures and processes.

The first basic requirement is that all the European Union Member States remain fully committed to taking the actions required at the national level to achieve the objectives of the Europe 2020 strategy. The second basic requirement is that the national and regional governments, as well as people, are ready for radical changes. This booklet and the other 11 booklets by the experienced authors focus on national intellectual capital and give necessary insights and facts to the readers and especially for readers in-depth systemic thinking of the interrelationships of NIC and economic recovery.

How should the national and regional decision makers tackle the existing knowledge of intangible capital? The focus needs to be more on the bottom-up approach stressing the developments on local and regional levels. I highlight our recent statements by the EU Committee of the Regions. The key priorities are to get more innovations out of research and to encourage mindset change towards open innovation.

The political decision makers are finally aware that the traditional indicators created for and used in industrial production cannot be applied to a knowledge-intensive, turbulent, and innovativeness-based global enterprise environment. Indicators that perceive the intangible dimensions of competitiveness—knowledge capital, innovation knowledge, and anticipation of the future—have been developed around the world, but their use has not yet become established in practice. This booklet accelerates the development and the use of these indicators.

This helps the local and regional, as well as central, governments in taking brave leaps forward on a practical level—giving greater ownership and involving all the stakeholders. This means the need of actions towards increasing the structural and relational capital of regions, both internally in communities of practice and in collaboration with others.

The new generation innovation activities are socially motivated, open, and collectively participated, complex and global by nature. The regions need to move towards open innovation, within a human-centered vision of partnerships between public and private sector actors, with universities playing a crucial role.

Regions should be encouraged to develop regional innovation platforms, which act as demand-based service centers and promote the use of international knowledge to implement the Europe 2020 strategy, smart specialization, and European partnerships according to the interests and needs of regions. For this to happen, we need to apply the new dynamic understanding of regional innovation ecosystems, in which companies, cities, and universities as well as other public and private sector actors (the “Triple Helix”) learn to work together in new and creative ways to fully harness their innovative potential.

New innovative practices do not come about by themselves. One major potential is the use of public procurement. The renewing of the European wide rules must increase the strategic agility and activities of municipalities and other public operators as creators of new solutions. Especially the execution of pre-commercial procurement should be reinforced even more in combination with open innovation to speed up the green knowledge society development, i.e., for common reusable solutions in creating the infrastructures and services modern real-world innovation ecosystems are built upon. Conditions must be created that also allow for extensive development projects which address complex societal challenges and which take the form of risk-taking consortia.

One of our working instruments within the Committee of the Regions is the Europe 2020 Monitoring Platform, which broadly reviews and reflects the opinions and decisions on regional level all around Europe. It gives a flavor of cultural and other socioeconomic differences inside the EU. This brings an important perspective to the intellectual capital, namely the values and attitudes needed for citizens supporting policy makers on appropriate long-term investments and policies.

Emphasizing the importance of these issues, decision makers in all countries and regions worldwide need a deep and broad understanding of the critical success factors affecting the national intellectual capital. With all the facts and frames for thinking this booklet gives a valuable insight into today’s challenges.

Markku Markkula
Advisor to the Aalto University Presidents
Member of the EU Committee of the Regions
Former Member of the Parliament of Finland

Foreword 2

Financial crisis—words very much heard today. What is all this about, actually, and how to get a grip on what we experience today? The booklet gives an important insight into the factors affecting competitiveness and productivity in modern knowledge society. We need to see behind the obvious, and we need to have increasingly “qualified guesses” as the character of the society and industry has fundamentally changed.

What is very important to notice is the shift towards intangible value creation beyond the deterministic phenomena we saw very clearly in the industrial era. Cost drivers were the important ones throughout the industry. Mass production, bigger is better, and very traditional productivity factor were the mantra.

However the production picture is changing. Increasingly value is created by the intangibles, often services related to the tangible components, and even totally in immaterial value creation, where perceptions and expectations determine the market value of the “extended product”. We also see rapid change in organisational forms; we see new type of entrepreneurship growing besides the traditional industry clusters; we see smart specialisation of regions and countries.

This means also that there will be clearly different and complementary roles of the actors in innovation and value creation ecosystems. Large companies, small ones, even microenterprises together with the public sector are traditionally seen as the active partners in such innovation environments. The real issue in the dynamic markets is however that the end users are increasingly to be taken on board as *active subjects* for innovation and not merely treated as objects, customers. Markets need to be shaped and created in much more dynamic way than ever before. Open innovation beyond cross-licensing includes the societal capital as important intangible engine for productivity growth. Innovation happens only when the offering is meeting the demand. Otherwise we can only speak about inventions or ideas.

We need to have a close look at the intellectual capital and the different factors within it when we design our policy approaches. Short-term investments in process capital (infrastructures) and market capital seem to be very important for the manufacturing base as such, but at the same time measures for longer-term intellectual capital development and efficiency need to be taken.

Increasingly important is the *structure* and the open *processes* related to intangible capital and knowledge pools. For sustainable long-term development both the *human capital and the renewal capital are crucial*, as they are directly related to the innovation capability of the region. The correlation between these factors and the GDP growth is undisputable. In knowledge-intensive industries talent is attracting talent, and the connectivity which modern ICT provides makes this talent pool fluid across disciplines, organisations and geographical settings. It is imperative to modernise the innovation systems enabling the full dynamics needed for success in knowledge-intensive industries, beyond the traditional boundaries.

Measuring performance of innovation systems becomes increasingly complex due to the mash-up of different disciplines, having new types of actors and interactions between them. Hence the importance of analysis of the various components of the national intellectual capital (and equally on national innovation capability) as done in this booklet cannot be underestimated when making qualified guesses for operational choices to create functioning innovation ecosystems. The only predictable in true innovation is the unpredictability and the surprises. The role of the public sector is to drive strategy and measures enabling the unpredictable, and to catalyse a fluid, seamless and frictionless innovation system to grow, with strong interplay with the surrounding society.

We need to have courage to experiment, to prototype in real-world settings, to have all stakeholders involved to find and remove the friction points of innovation and to achieve sustainable innovation ecosystems for knowledge-intensive products and services.

I wish you interesting reading with this mind opening report.

Bror Salmelin
Advisor, Innovation Systems
European Commission
DG CONNECT

Foreword 3

The 2008 global financial crisis hit the whole world with unprecedented speed, causing widespread financial panic. Consumer confidence dropped to the lowest level since the Great Depression. Taiwan, with an export-dependent economy, was seriously impacted by the crisis and the unemployment rate hiked while household consumption levels dropped. At the onset of the financial crisis, Professor Lin was the Dean of Student Affairs here at National Chengchi University in Taipei, Taiwan. She was the dean in charge of financial aid and student loans and thus saw firsthand the direct impact the financial crisis had upon our students. The crisis was so devastating that Professor Lin, along with the university, was compelled to launch several new initiatives to raise money and help students weather the difficult times.

I am very glad that she took this painful experience to heart and set herself upon the task of investigating the impact of the crisis, trying to look into the causes and consequences for policy implications, not only for Taiwan but also for an array of 48 countries. In particular, she approaches the crisis from the perspective of “national intellectual capital,” which is very important in today’s knowledge-driven economy.

Taiwan is an example of a knowledge economy and has enjoyed the fame of being referred to as a “high-tech island.” Without an abundance of natural resources, Taiwan’s hardworking and highly educated population is the single most precious resource that the island has. Acknowledging the value of such human resources and intellectual capital, we established the Taiwan intellectual capital research center (TICRC) under my leadership in 2003. Ever since then, Taiwan’s government has continuously funded the university to conduct relevant research projects aimed at enhancing the intellectual capital of Taiwan. Having been thus endowed with the responsibility of nourishing future leaders in the public and private sectors, we have focused on building up our strength in innovation, entrepreneurship, and technology management-related research and education.

To enhance intellectual capital research, we recently formed a joint team of professors for a four-year project in order to leverage their respective research capabilities. Through this project we hope to provide policy suggestions for the government by exploring the creativity, innovation, and intellectual capital at national,

regional, city, and county levels. The goal is to come up with an intangible assets agenda for Taiwan's future sustainability. Professor Lin is an integral member in this research team.

Following her 2011 book *National Intellectual Capital: A Comparison of 40 Countries*, this booklet series is Professor Lin's second attempt at presenting her research, conducted under the sponsorship of TICRC, to international readers. As the Founding Director of TICRC and her President, I am honored to give a brief introduction of the value of this booklet series.

In comparison to her 2011 book, this series increased the number of countries studied to 48 and particularly focuses on the impact of intellectual capital on the 2008 global financial crisis. Rarely has an economic issue been systematically studied from the viewpoint of intangible assets, particularly at such a large scale of 48 countries. The research results show without a doubt that national intellectual capital is indeed an important economic development enhancer. In particular, the fact that countries with higher national intellectual capital experienced faster recoveries from the 2008 financial crisis provides a strong message for the policy makers.

In addition to providing insights into national policy, the booklet also summarizes the background of each country before the crisis, the key events during the crisis, economic development afterwards, and future prospects and challenges. Each volume affords readers a holistic picture of what happened in each country in an efficient manner. The linkage between national intellectual capital and this financial crisis also provides a different perspective of the crisis.

We are happy that Professor Lin continues to share her valuable research results with international readers. I sincerely hope that her insights can garner more attention concerning the benefits of developing national intellectual capital for the well-being of every nation.

Se-Hwa Wu
Professor, Graduate Institute of Technology
and Innovation Management
President, National Chengchi University, Taipei, Taiwan

Preface 1

There are “mounting risks of a breakup of the Euro zone.” Such comments are frequent today on how the European leaders are handling the escalating crisis and its potential impact on non-European countries. But few leaders, reporters, or researchers are actually addressing the situation of national intellectual capital (NIC) and its signals. In addition to the financial crisis, is there an emerging NIC crisis as well? Why is it emerging? How should policy makers think about NIC? In what way does it need specific attention? When will the outcome and impact of taken NIC policy steps be realized?

In the midst of the European crisis, there are national interventions to address the issues mentioned above. In leading economical nations the investments going into intangibles now exceed tangibles and are positively correlated to income per capita. However, these still do not show up clearly in national mapping as well as policy-making insights. Therefore the New Club of Paris is focusing the knowledge agenda setting for countries on Societal Innovation (see www.new-club-of-paris.org).

Chairman Ben Bernanke of the U.S. Federal Reserve was addressing some of these same aspects in a key note speech in May 2011 hosted by Georgetown University: <http://www.icapitaladvisors.com/2011/05/31/bernanke-on-intangible-capital/>. OECD and the World Bank are developing NIC statistics, often based on the model from Corrado–Hultén. Japan has been developing both NIC and intangible assets (IA) at METI for some time now. Their research on IC/IA has resulted in a National IA Week with various key stakeholders, such as government agencies, universities, stock exchange, and enterprises. Japan is so far the only country in the world to hold such activities, and they have been doing so for the last 8 years. Australia, Singapore, South Korea, and China are currently undertaking various NIC initiatives. Other countries are also becoming more and more aware of NIC, with policy rhetoric centered on innovation, education, R&D, and trade. Despite this, the map for a more justified NIC navigation has been missing.

This booklet highlights NIC development for a number of countries, based on 28 different indicators, aggregated into four major NIC components of human capital, market capital, process capital, and renewal capital. The model here is a refined and verified statistical model in comparison to the Corrado–Hultén model. We call it the

L-E-S model after the contributors Lin–Edvinsson–Stahle. Based on a deeper understanding and the timeline pattern it sets forth, this model will add to a better NIC navigation, not to mention knowledge agenda setting for countries.

Upon looking at a global cluster NIC map, it is evident that the top leading countries seem to be small countries, especially Singapore, the Nordic countries, Hong Kong, and Taiwan. For the USA, Finland, and Sweden around 50 % or more of its economical growth is related to NIC aspects. Sweden, Finland, Switzerland, the USA, Israel, and Denmark are strongly influenced in its GDP growth by focusing on Renewal Capital.

It might be that we will see a clearer map of the NIC ecosystem and drivers for wealth emerge in the extension of this ongoing unique research of NIC. This booklet will present a NIC map for various clusters of countries. It can be used for bench marking as well as bench learning for policy prototyping. The starting point is awareness and thinking of NIC and its drivers for economic results. Based on this more refined navigation, NIC metrics can be presented.

Deeper understanding will emerge from this research, such as the scaling up of limited skilled human capital in one nation by using the globalized broadband technologies for migration and flow of knowledge (such as tele-medicine or mobile banking in Africa). This is also referred to as the IC multiplier. It might also be the way the old British Commonwealth was constructed, but without the IC taxonomy. In modern taxonomy it might be the shaping of NIC alliances for the migration and flow of IC between nations?

Another understanding that might emerge for policy making is the issue of employment versus unemployment. The critical understanding will be deployment of IC drivers. This will require another networked workforce of value networkers on a global scale, such as volunteering software and apps developers. However such volunteers do not show up in traditional statistics, for the mapping on behalf of policy makers.

On another level there might be clear gap analyses between nations to support the vision process of a nation. On a deeper level it is also a leadership responsibility to address the gap of NIC positions versus potential positions. Such a gap is in fact a liability to the citizens to be addressed in due time.

This will take us to the need for the continuous renewal of social systems. The so-called Arab Spring is explained by some as resulting from three drivers: lack of renewal of social systems, Internet, and soccer as cross class interaction space. The lack of social renewal and innovation is most likely critical early warning signals. For Greece, we can see such a tipping point occurred back in 1999.

On a global scale we might see that the concern for the Euro zone crisis should and can be explained by a deeper and supplementary understanding of national intellectual capital, in addition to financial capital. So we need to refine our NIC understanding, NIC mapping, NIC metrics, and NIC organizational constructs into societal innovation for the benefit of wealth creation of subsequent generations.

Leif Edvinsson
The World's First Professor of Intellectual Capital
Chairman and Co-founder of New Club of Paris

Preface 2

Our first book *National Intellectual Capital: A Comparison of 40 Countries* was published in early 2011, at a time when the 2008 global financial crisis had been declared over yet the European region was still plagued with sovereign debt problems. Before we finalized the book, we were able to retrieve some of our raw data concerning the troubled countries, such as Greece, Iceland, Ireland, Portugal, and Spain. The results of our analysis based on the data spanning 1995–2008 revealed some early warning signs of the financial turmoil in those countries. In my preface of that book, I mentioned the warning signs might reveal only the tip of an iceberg. At that time, my coauthor, Professor Edvinsson and I decided to do a follow-up study to trace the development of national intellectual capital (NIC) in as many countries as possible, particularly through the lens of the 2008 global financial crisis. This 12 booklet series is the result of that determination.

The 2008 global financial crisis came with unexpected speed and had such a widespread effect that surprised many countries far from the epicenter of the initial U.S. sub-prime financial problem, geographically and financially. According to reports, no country was immune from the impact of this financial crisis. Such development clearly signifies how closely connected the world has become and the importance of having a global interdependent view. By reporting what happened during 2005–2010 in 48 major countries throughout the world, this booklet series serves the purpose of uncovering national problems before the crisis, government coping strategies, stimulus plans, potential prospects and challenges of each individual country, and the interdependence between countries. The 6 years of data allow us to compare NIC and economic development crossing before, during, and after the financial crisis. They are handy booklets for readers to have a quick yet overall view of countries of personal interest. The list of 48 countries in 11 clusters is provided in the appendix of each booklet.

Searching for financial crisis-related literature for 48 countries is itself a very daunting task, not to mention summarizing and analyzing it. For financial crisis-related literature, we mainly relied on the reports and statistics of certain world organizations, including OECD, World Bank, United Nations, international monetary fund (IMF), European Commission Office, the U.S. Congressional Research Service, the

U.S. Central Intelligence Agency, and international labor office (ILO). Some reliable research centers, such as the National Bureau of Economic Research in the U.S., World Economic Forum, the Heritage Foundation in the U.S., and government websites from each country were also our sources of information. Due to the requirement of more update and comprehensive information, we were not able to use as much academic literature as we would have liked, because it generally covers a very specific topic with time lag and with research methods not easily comprehended by the general public. Therefore, we had to resort to some online news reports for more current information.

In the middle of 2012, the lasting financial troubles caused the European economy to tilt back into a recession, which also slowed down the economic growth across the globe. However almost 4 years have passed since the outbreak of the global financial crisis in late 2008; it is about time to reflect on what happened and the impact of the financial crisis. By comparing so many countries, we came to a preliminary conclusion that countries with faster recovery from the financial crisis have higher national intellectual capital than those with slower recovery. In other words, countries that rebounded fast from the crisis generally have solid NIC fundamentals, including human capital, market capital, process capital, and renewal capital. We also found that the higher the NIC, the higher the GDP per capita (ppp). This booklet series provides a different perspective to look beyond the traditional economic indicators for national development.

In an era when intangible assets have become a key competitive advantage, investing in national intellectual capital development is investing in future national development and well-being.

Enjoy!

Carol Yeh-Yun Lin
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Taiwan Intellectual Capital Research Center (TICRC)

Executive Summary

Human capital and renewal capital will be the key intangible assets that decide the forerunners for sustainable national development among emerging countries.

How can national intellectual capital (NIC) be supportive of national development and sustainable national well-being? What are the key factors that facilitate emerging countries in becoming developed countries in the future? What will be the differentiating factor for current emerging countries 20 years from now?

One main cause of the 2008 global financial crisis was the failure of conventional financial metrics and accounting systems to detect potential risks due to non-transparent information disclosure. Our earlier NIC research has revealed certain warning signs of impending financial crisis for Greece, Iceland, and Ireland. Such findings indicate that NIC, despite being intangible, can provide valuable insights into future risk control and strategy formulation. This booklet looks into the connections between the financial crisis and NIC development for Brazil, Russia, India, China, Korea, and South Africa (*BRICKS*).

Research analysis of intangible NIC presented in various figures and tables in this booklet largely aligns with the development of tangible economic indicators, such as GDP growth. Data of 48 countries indicate that the higher the NIC index, the higher the GDP per capita (ppp), accentuating the value of NIC in major countries throughout the world. **For the 6-year average of NIC ranking, Brazil ranks #42, Russia #38, India #44, China #40, Korea #22, and South Africa #37.**

The 2008 financial crisis came with an unexpected speed and spread into a global economic shock, resulting in a number of bank failures in western countries as well as political and societal leadership challenges. During this period, economies worldwide slowed, credits tightened, and international trade declined. Governments and central banks worldwide responded to the crisis with unprecedented fiscal stimuli, monetary policy expansions, and institutional bailouts in their respective countries. Although the global financial crisis was declared over by the end of 2009, European economies were tilted back into recession again in the second half of 2011 due to lasting sovereign debt problems.

All six BRICKS countries depend heavily on exports and were hard hit by the crisis, with Russia having the greatest drop (7.88 % GDP per capita (ppp)) in 2009 due to its single energy industry export. However, all the countries rebounded to positive growth in 2010. The general government debt level is relatively low and stable in BRICKS countries when compared to that of European nations. Over that 6-year period, Russia and China had about 10 % and 20 % of GDP government debt, respectively; Korea and South Africa about 30 %; and Brazil and India around 50 %. Possessing good pre-crisis surpluses, BRICKS' expanding stimulus spending during the financial crisis did not affect their debt level too much.

During the financial crisis, unemployment rate was a key position indicator of how devastating the situation was. Over the 6 years, Brazil, Russia, and South Africa have reduced their unemployment rate; China and Korea maintained a similar level of unemployment, and India is the only country that has a continuous unemployment rise after the financial crisis. For South Africa, although its rate decreased from 2005 to 2010, its 24 % unemployment rate for 2010 is still shockingly high and poses a great threat for its future development. With regard to consumer price inflation, although high inflation has troubled most of these countries (except Korea) for years, each country has been able to suppress inflation after the financial crisis with the exception of India. India ended up with 10.5 % inflation in 2010, which was more than double its 2005 level.

NIC ranking of the BRICKS countries fell in the last quartile (except Korea) among the 48 countries, indicating a huge "intellectual capital in waiting." Russia stands out particularly in the area of renewal capital and India has the best market capital among the six countries. Unlike its fast economic growth, China is losing its market capital, process capital, and NIC international competitiveness with a large-scale ranking drop over the 6 years. On the contrary, Brazil has large-scale ranking gains in market capital and renewal capital.

The NIC 3D trajectory analysis detects the enhancing and impeding factors of GDP per capita (ppp) growth. It turns out that government-related and R&D-related issues are the key contributing factors and human capital-related issues are the main inhibiting factors of GDP growth in the BRICKS countries. Using Japan's GDP as a benchmark, India has the longest distance to cover, followed by South Africa, Brazil, Russia, China, and Korea.

This economic crisis provides an ideal opportunity for nations to examine the soundness of their economic system and the effectiveness of national governance related to NIC. The following policy implications are drawn from our research findings. Readers can refer to Chap. 5 for the rationale behind these implications.

1. National intellectual capital development goes together with the economic development and should be regarded as an enhancer of national sustainable growth.
2. The BRICKS countries are under subtle co-opetition (cooperation and competition) pressure and managing the relationship constructively will lead to a progressing world.
3. Striking a balance between export encouragement and domestic markets expansion will build more resilient economies for BRICKS countries.

4. Human capital and renewal capital will be the key intangible assets that decide the forerunners for sustainable national development among emerging countries.
5. Nations should not be blinded by minor internal economic changes; identifying one's own position on the global landscape and taking proper coping measures are crucial for a nation's sustainable development.
6. Developing intangible national features helps accumulate better market capital and process capital.
7. Different from a majority of positive economic statistics about India, NIC analysis reveals warning signals for the country.
8. Russia should continue its industry diversification and develop its small and medium enterprises.
9. Korea is an ideal benchmark for showing the transformation from an emerging country to a newly developed country.

The original BRIC and later BRICS (adding South Africa) countries have caught worldwide attention, mainly due to their economic performance and future prospect. In general, they have weathered the financial crisis relatively well and are expected to lift global economy in the future with their abundant natural and human resources. Korea's balanced NIC, strong market capital, and process capital development even during the financial crisis set a good example of how to transform from an emerging country into a newly developed country over a relatively short period.

As of mid-2012, the world economy has been slowed down by the pending debt problems in the Euro zone. The BRICKS economies were also affected and exhibited slower growth. Each country's resilience to crisis will again be tested if the world plunges back into a recession.

Our NIC intelligence suggests that in an era where the intangible asset has become a key competitive and sustainable advantage, investing in national intellectual capital development is equivalent to investing in future economic development. National intellectual capital evolution can be enhanced from both a local culture standpoint and a global interconnectivity standpoint by social media.

Based on the emerging new insights of values, societal history as well as citizen relationships, a key focus for the future will be on the fusion of national intellectual capital, social service innovation, and societal innovation, for the enabling of a new societal fabric.

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