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Azerbaijan and Kazakhstan in the Era of Knowledge, Innovation and Green Growth

Paper prepared for UNECE and the Seminar and Stakeholder Meeting on *Promotion and Financing of Innovative Green Technologies: Ways to Greening Industry*, hosted by the Government of Kazakhstan, Astana
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Thomas Andersson

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1 Introduction[1]

Following their independence from the Soviet Union, the Central Asian economies went through a difficult first decade marked by huge frictions in how to shift from a centrally planned to a market economy. A few years into the new millennium, however, several of them started to enjoy higher and more stable growth along with political stability. Much of this has emanated from exploitation of the region's substantive natural resources, particularly oil and gas. It is an open question how far the present run can last however. The diffusion of information and communications technology (ICT) along with the shift towards a Knowledge-based Economy (KBE) offers a range of new opportunities but also gives rise to new demands. It is also accompanied by increasing attention to social issues and environmental degradation. The Central Asian economies meet with a fundamental need of broadening their economic base and generating new enterprises and job opportunities

Questions are arising for these countries in regard to dependency on narrow strands of mature economic activity and the need of generating new jobs and development opportunities on sustainable terms for a population that is rapidly becoming more expensive, sophisticated and demanding.

Table 1: Basic Statistics (2011or latest)

	Kazakhstan	Azerbaijan
Area ('000 km^2)	2,724,900 sq km	86,600 sq km
Population ('000)	17,736,896 sq km	9,590,159
GDP US$ bn (ppp)	235.6	98.36
GDP per capita, US$	14,100	10,700
Growth	5%	2.2%
Share in GDP (%)		
Agriculture	5.2%	6%
Industry	37.9%	63.8%
Services	56.9%	30.2%

Source: CIA Factbook (2013)

[1] This paper has been produced following the Joint National Seminar and Stakeholder Meeting, with some 40 policy makers from Azerbaijan and Kazakhstan, on the Promotion and Financing of Innovative Green Technologies: Ways to Greening the Industry. The event was organised by UNECE and hosted by the Government of Kazakhstan in Astana on October 23, 2014. The participants are thanked for excellent comments and input on the subject. Qammar Abbas and Glenn Gran, IKED, are thanked for data compilation and background analysis.

Table 1 presents some basic indicators for Azerbaijan and Kazakhstan, two of the most advanced countries in Central Asia. In terms of size, the former is much greater whereas the size of the population is much more even between the two. In most indicators, Kazakhstan stands out as the somewhat more developed of the two, although, as we shall see, that does not apply in all respects.

Despite the onset of the financial crisis and the resulting economic downturn, both these economies experienced only a temporary downturn and have been able to restore a convincing rate of economic growth. Both have displayed an impressive macroeconomic performance over the last decade as a whole, as is evidenced by recent rankings in the world competitiveness report (WEF, 2013), see also Appendix 1.

In both countries, substantial oil revenues have been re-invested in large-scale infrastructure projects. First steps have been taken to establish science and technology parks, innovation incubators and new initiatives to support the development of industrial clusters. Their performance is, however, strongly reliant on the hydrocarbon sector. Despite their strengths, there is a growing concern that the arrival of the KBE as well as concerns worldwide with sustainable economic development will undercut their performances.

Reviewing the case of Azerbaijan and Kazakhstan, this paper takes note of their standing with regard to KBE indicators, and to what extent the development of green technologies could be seen as a significant factor in their future development, and then in what way.

The paper is organised as follows. Section 2 reviews the rise of the KBE with particular focus on what it means for Natural Resource-Rich Economies (NRE): In Section 3, we benchmark country performances, and especially the standing of Azerbaijan and Kazakhstan in various aspects of relevance to their transition from the latter category to the former. Section 4 addresses the governance challenge, with particular emphasis placed on innovation, while sustainability issues are addressed in Section 5. Section 6 concludes. Appendix 1 presents selected country rankings from the latest World Competitiveness Report.

2 KBE and Innovation[2]

Traditional development economics saw control over a country's natural resources as key to development. Gradually the view set in however that such control and large gains from natural resources was not sufficient. Moreover, it was observed that natural resource based economies (NRE) tend to attract massive capital gains which flow directly to the government and politically dominating interests, resulting in a tendency for high concentration of power. Meanwhile, a number of researchers claimed the empirical evidence points to a negative impact on economic growth, leading to a widespread view that natural resource abundance tends to serve as a drag on development.[3]

Although many studies concluded on the opposite, that natural resources can indeed contribute to growth, economic diversification is important to most NRE for several reasons. One has to do with the dependence on prices of a narrow line of commodities, that may be particularly volatile and sensitive to manipulation by customers or vulnerable to external factors. Another has to do with the capital intensity of natural resource based industries. While these tend to allow for an accumulation of capital, a stronger currency and higher costs, they do not support many jobs. Third, a particular feature of NRE has to do with their common dominance of public sector activities, including the somewhat diffuse boundary between parts of the private and public sectors. Human resources tend to be attracted by public sector service, where the large presence of influential officials watching their mandates tend to hamper the development of other sectors. Coupled with the lack of inspiration among growing generations to receive the training required in professional and technical work as well as the risks associated with innovation and entrepreneurial efforts. this situation risks causing a vicious circle of deepening dependency on a narrow industrial base.

Given the current rate of technical progress however and the broad-based opportunities to raise value added across a widening spectrum of production processes, more or less all governments around the world today recognize that

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[2] This section and some other parts of the paper are partly based on Andersson et al (2010a), which can be revisited for further background on the transition of NRE to KBE.

[3] The notion of a "resource curse" implies that NRE would perform relatively badly in economic terms (Sachs and Warner, 2001). In reality, the econometric evidence is inconclusive in this regard and there is now straightforward evidence some such economies make effective use of their natural resource wealth for promoting a better economic performance (Lederman and Maloney, 2007).

one of their core policy responsibilities is to contribute to putting in place the conditions required for building and using knowledge in support of long-term sustainable growth.

As for the meaning of "Knowledge", it should be noted that its role differs from that of information. See Table 2 for some distinctions in this respect. It is further important from a societal perspective to differentiate between information best handled by markets, and information better handled as a "public good", i.e. distributed as widely as possible at the lowest possible cost. An ongoing powerful convergence of key technologies and information tools is in the process of bringing rapid changes in the relative reach and relevance of knowledge markets.

Innovation plays a key role in turning knowledge into economic value, reflecting the definition of innovation as based on what is put to use, and valued. Breeding new solutions further requires positive synergies between complementary competencies and an interactive information exchange. Within organisations, it is important with leadership that is appreciative of pursuit at all levels to identify and resolve problems. Many innovations occur at mid-level, rather than top level. A diversity of initiatives cannot occur merely within existing organisations, however, as these inevitably tend to be defensive about their sunk costs and what has already been achieved. Thus, start-ups, and entrepreneurship, are essential for putting knowledge into new forms of action.

Table 2: Knowledge versus Information

KNOWLEDGE	INFORMATION
Mental tools that make sense of things	A message that reduces uncertainty
An evolving set of beliefs about the world	
Knowledge is a crucial production factor that changes old routines into new ones	
Knowledge makes mere information valuable	
Dynamic	Static
Dependent on individual	Independent of individual
Tacit	Explicit
Analogue	Digital
Must be recreated	Easy to duplicate
Face-to-face communication	Easy to broadcast

Table 3: Evolution of Innovation Metrics

First Generation Input Indicators (1950s–60s)	Second Generation Output Indicators (1970s–80s)	Third Generation Innovation Indicators (1990s)	Fourth Generation Process Indicators (2000s plus emerging focus)
• R&D expenditures • S&T personnel • Capital • Tech intensity	• Patents • Publications • Products • Quality change	• Innovation surveys • Indexing • Benchmarking innovation capacity	• Knowledge • Intangibles • Networks • Demand • Clusters • Management techniques • Risk/return • System dynamics

Source: Milbergs and Vonortas (2004)

In this, there must again be room for risk-taking, and for failure, as well as for the successful challenge by newcomers of the incumbents.[4] Table 3 illustrates how innovation has been measured over the years, demonstrating the gradual shift towards getting a handle on not just traditional input and output measures but *management* of knowledge, networks, risk, etc.

Advancing KBE is thus about taking advantage of and leverage the whole spectrum of resources, from technology and ICT to physical and intangible assets. In commodities, as in other sectors, new opportunities blend with challenges how to cope with changing natural conditions, new ways of entering markets, new means of becoming more relevant to specific customers, etc. Success in any of this, and to what extent the value of natural resources is to be leveraged, will depend on the availability and applicability of those knowledge resources that are relevant for addressing those specific issues.

The special challenge confronting NRE in their move towards building KBE should not be seen as a question of how to shift their economic structure away from dependency on natural raw material production to other sectors. On the contrary, many NRE do too little to draw upon and capitalize on their presence of natural resources, e.g., by investing in R&D or fostering innovation so as to

[4] The link between KBE and entrepreneurship is elaborated in Andersson et al. (2010b).

upgrade, expand on and enable downstream (or upstream) business opportunities thriving on their natural resource base. There is generally a case for such economies to invest more in the kind of skills that are directly relevant to their specific natural resources, so as to strengthen value-added in the areas of specialization. Yet, success by NRE in fostering knowledge development and use is also interrelated with their ability to capture opportunities for growth in activities *other* than those that draw on natural resources (IKED, 2004).

The NRE typically have access to cheap capital, can afford to buy different types of expertise from overseas, and have an active state role. The abundance in resources in itself brings a drive for rent-seeking behaviour. In this kind of environment, resistance to societal transformation feeds naturally. This includes resistance to innovation, which is, by its nature, disruptive. While resource-rich countries such as Australia, Canada, New Zealand, Norway and Sweden have managed to diversify and develop endogenous innovation capabilities, they too have had histories of strong state intervention, large state-run corporations and well-organised vested interests. These economies still remain influenced by the availability of their natural resources and traditions.

Table 4 classifies different types of economies in terms of the role played by different production factors. As can be seen, NRE meet with special issues in a number of respects:

Capital: NRE are in the position to enjoy a steady flow of cash which, however, is likely to be relatively concentrated on few hands, while also flowing directly into public sector coffins. There is a tendency to concentrate efforts on finding a secure outlet for the available funds, i.e. a *rentier* economy develops with focus on investment in tangible assets such as real estate or mature industries. As the availability of capital drives up costs, other kinds of investments and economic activities are partly crowded out, traditionally referred to as the "Dutch disease".”

Labour and social capital: Unskilled labour is cheap and abundant, and there is a tendency for indigenous labour to perceive rent-sharing from natural resources as an inherent right, weakening incentives for effort in education as well as in the work place. Reliance on capital-intensive production processes and mismatch between available and needed skills often lead to massive misallocation. Often there is also a problem domesticate and anchor mobile skills?” In this regard, aspects such as social capital, attractive city planning and community development are greatly important.

Table 4: Gross Generalization of Types of World Economies

	Natural Resource Rich Economy	Industrial Economy	Knowledge-Intensive High Value Economy	Developing Economy
Capital	Liquid (cash), cheap, abundant, depleting slowly	Fixed assets, expensive, non-abundant, and depleting slowly	Intangible assets, expensive, relatively abundant, and non-depleting	Cash-strapped, expensive, non-abundant, depleting quickly
Labour	Abundant, unskilled is cheap, skilled is expensive	Increasingly less abundant and more expensive (both skilled and unskilled)	Relatively abundant, increasingly expensive (both skilled and unskilled)	Unskilled labour is cheap and abundant; skilled labour is expensive and non-abundant.
Knowledge	Limited (often to natural resources and wealth management), expensive (often expertise has to be imported)	Specialized and locked-in, process-specific, price-quality oriented. Novel knowledge is often developed elsewhere and is imported.	Complex and advanced; novelty-oriented, focused more on creating new niches and new product markets.	Limited, expensive, and generic in nature aimed at maintenance of existing resources.
Infrastructure	Good	Good	Very good	Poor
Governance	Ranging from strong state role to state-led economies. Large state-owned firms dominate.	Led by state-unions agreements/consensus. Large industrial agglomerates play important role in the economy.	Market driven; stronger role for universities and other knowledge producing players	State-led; with foreign firms and investments playing an important role.
Examples	Arab oil-rich, Nigeria, Venezuela; also Australia, Canada, Norway, Sweden in 20th century	Brazil, Korea, China; but also Canada, US, and Germany.	Most EU, Japan, and US	Majority of regions and countries in the world.

Source: Andersson et al. (2010a)

Knowledge: With costs high there is a need of developing and using knowledge as a basis for diversification. What is a realistic time horizon for this to happen? How do you inspire the young to gain a real interest in improvement and diligence. Also, how do you incentivize innovation and entrepreneurship, where risks are inherently high?" How do you get others to think of you beyond your natural resource profile? Instead of asking how to convert knowledge into capital, the question for these countries is rather now "How to convert capital to knowledge?

Infrastructure: Whereas not a major drawback for most NRE, infrastructure development and conditions for its use are often weakly tailored to specific development opportunities. Resources could generally be used more strategically as tools for stimulating local innovation through public demand and the tailoring of local solutions to local problems.

Governance: In NRE, given the abundance of capital and public sector ownership and initiative, there is a tendency for centralisation of power in government and where the money is. There is also the risk that considerations of policy rationale will be weak, as will the presence of checks and balances.
Reflecting hurdles to seed and venture funding, hindrances to setting up new companies, difficulties for small and young firms to get paid in time or resolve legal conflicts, and so forth, special efforts are needed to enable entrepreneurship, start-ups and capture new development opportunities,

In many countries, innovation policy and practices of knowledge management mistakenly aim to emulate what has been achieved elsewhere. Lessons can always be learned from others, but strategies and policies must generally be adjusted if they are to fit a different context. While this is particularly true for NRE, the situation is even more special for those in that category, such as Azerbaijan and Kazakhstan, which carry with them the legacy of having evolved from state planned to market-based economies over a relatively short time period.

A comprehensive innovation policy requires considerations are made to *systemic* aspects and the role played by the main stakeholders (Lundvall, 1991). Policies may be crafted so as to enable innovation, but ultimately innovation is the result of initiatives that are "bottom-up", not "top-down", and their advance is dependent on the ability of the overall system to allow for risk and failure in renewing itself, as well as for the successful challenge to incumbents by those that are newcomers in a particular market. Globalisation, the advance of ICT, service economy, technical progress, etc., are other key aspects.

3 Benchmarking

A country's position in regard to the KBE will depend on a range of factors, some of which are inherently difficult to observe, which may lead policymakers as well as analysts to look in the wrong direction. Quantitative measures of years in school or level of degree for instance tend to overshadow quality aspects. There is also the huge question how available skills match with what is needed. While many countries are now putting focus on raising requirements for skills in mathematics and technology, cherishing of soft skills that are critical for openness and creativity are often sacrificed, or pass unnoticed. The same applies to widely needed practical skills which generally are best built through vocational training which tends to have a relatively low status.

Official data will only capture part of the picture and need to be complemented with other measures, including those based on opinion surveys although the latter must be interpreted with care. Appendix 1 shows how Azerbaijan and Kazakhstan are ranked on selected indicators in the latest World Competitiveness Report. These results are based on responses to extensive questionnaires directed to business executives around the world as summoned by the World Economic Forum Secretariat in Geneva. Here we make use of sources as a complement to what we observe from official statistics.

Further, in this section, we make selected observations of relevance to the transition of Azerbaijan and Kazakhstan towards a KBE. Table 5 presents an overview of country performances as they appear from international benchmarking of relevance to the knowledge economy, innovation, and the quality of countries' environment for doing business. The positions of Kazakhstan and Azerbaijan, relative peers, have been marked out in bold. As can be seen, both countries tend to appear between positions 50 to 100, generally with Kazakhstan ranked a bit higher. In order to gain a clearer picture, however, we need examine their positions in specific priority areas.

For any country to make headway in the knowledge economy, it is important to devote attention, and resources, to building capacity in developing new knowledge and ideas. Here, the level of R&D expenditures, shown in Figure 1, represents a important measure of input into the innovation system. As can be seen, both Azerbaijan and Kazakhstan invest only limited resources on this point, i.e. some 0.2 percent of GDP or less.

The low level of investment made in new knowledge is reflected in measures of traditional output, such as scientific publications or patents. This is illustrated by Table 6 and also Figure 2 where the comparison with the countries in Figure 1 is visualised. In fact, both countries perform weakly in all established

Table 5: Global Indices and Selected Country Rankings

Knowledge Economy Index (World Bank (KAM)), 145 countries		**Global Innovation Index (INSEAD), 142 countries**		**Global Competitiveness Index (World Economic Forum), 134 countries**		**Doing Business Index (World Bank), 189 countries***	
Rank	*Country*	*Rank*	*Country*	*Rank*	*Country*	*Rank*	*Country*
1	***Sweden***	***1***	***Switzerland***	***1***	***Switzerland***	***1***	***Singapore***
2	Finland	2	Sweden	2	Singapore	2	Hong Kong China
3	Denmark	5	United States	3	Finland	3	New Zealand
5	Norway	6	Finland	5	United States	6	Malaysia
6	New Zealand	7	Hong Kong	6	Sweden	9	Norway
7	Canada	8	Singapore	7	Hong Kong SAR	11	Australia
9	Australia	11	Canada	11	Norway	12	Finland
12	United States	16	Norway	13	Qatar	14	Sweden
18	Hong Kong, China	17	New Zealand	14	Canada	18	Thailand
40	Chile	19	Australia	18	New Zealand	19	Canada
43	Bahrain	32	Malaysia	20	Saudi Arabia	26	Saudi Arabia
47	Oman	42	Saudi Arabia	21	Australia	34	Chile
48	Malaysia	43	Qatar	24	Malaysia	41	South Africa
50	Saudi Arabia	46	Chile	29	Chile	46	Bahrain
54	Qatar	50	Kuwait	33	Oman	47	Oman
60	Brazil	57	Thailand	36	Kuwait	50	**Kazakhstan**
64	Kuwait	58	South Africa	37	Thailand	56	Botswana
66	Thailand	64	Brazil	39	**Azerbaijan**	70	**Azerbaijan**
67	South Africa	67	Bahrain	43	Bahrain	116	Brazil
73	**Kazakhstan**	80	Oman	50	**Kazakhstan**	153	Algeria
79	**Azerbaijan**	84	**Kazakhstan**	56	Brazil		
85	Botswana	91	Botswana	74	Botswana		
96	Algeria	105	**Azerbaijan**	100	Algeria		

Source: World Bank (2012, 2014), INSEAD (2013), and WEF (2013-14)

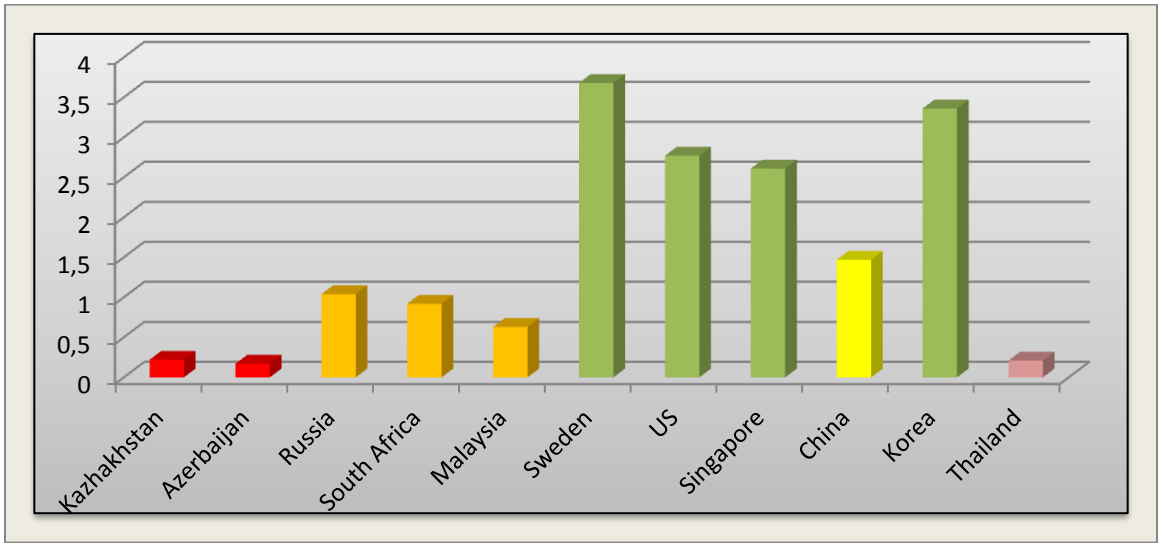
traditional measures of R&D and innovation output. As for degree of economic diversification, however, displayed in Figure 3, Kazakhstan comes out as relatively diversified, reflecting its industrial legacy of the past.

The way that knowledge is access and used is further linked to means of communications (fixed lines, mobile phones, Internet), including their availability and affordability. Figure 4 provides an overview of countries' standing in regard to the different generations of ICT tools and communications means. In computers both countries are weakly positioned. In Internet access they are better placed and in regard to mobile penetration especially Kazakhstan is high up. This illustrates the way in which both these countries are busily joining the networked economy while leapfrogging traditional generations of technologies.

Inter-linkages between international businesses through trade or foreign direct investment are also important channels of knowledge transfers. In this area, as seen from Figure 5, Azerbaijan has the most intensive exchanges, applying to both outward and inward investment, but both countries demonstrate high interconnectedness.

Again, Central Asia presents considerable challenges for commercialization of new technologies and ideas, where the critical assets are "intangible" rather than "tangible", such as land and real estate. In Azerbaijan and Kazakhstan, similarly

Figure 1: R&D Expenditures, percent of GDP 2008



Source: World Bank. KAM data base (2013)

Table 6: Innovation Output

	Scientific journal articles (2009)	Patents granted by USPTO/mil. Persons (2005-09)
Qatar	48	1.29
Bahrain	48	0.00
Botswana	62	0.00
Azerbaijan	97	0.12
Kazakhstan	106	0.10
Oman	129	0.51
UAE	214	1.60
Kuwait	242	3.55
Algeria	481	0.01
Saudi Arabia	589	0.92
Malaysia	808	5.63
Thailand	1727	0.51
Chile	1741	1.19
South Africa	2808	2.51
New Zealand	3176	40.08
Singapore	3793	97.01
Norway	4081	58.84
Finland	4990	138.10
Brazil	11891	0.68
Sweden	9917	138.05
Australia	17834	68.88
Canada	27834	119.63

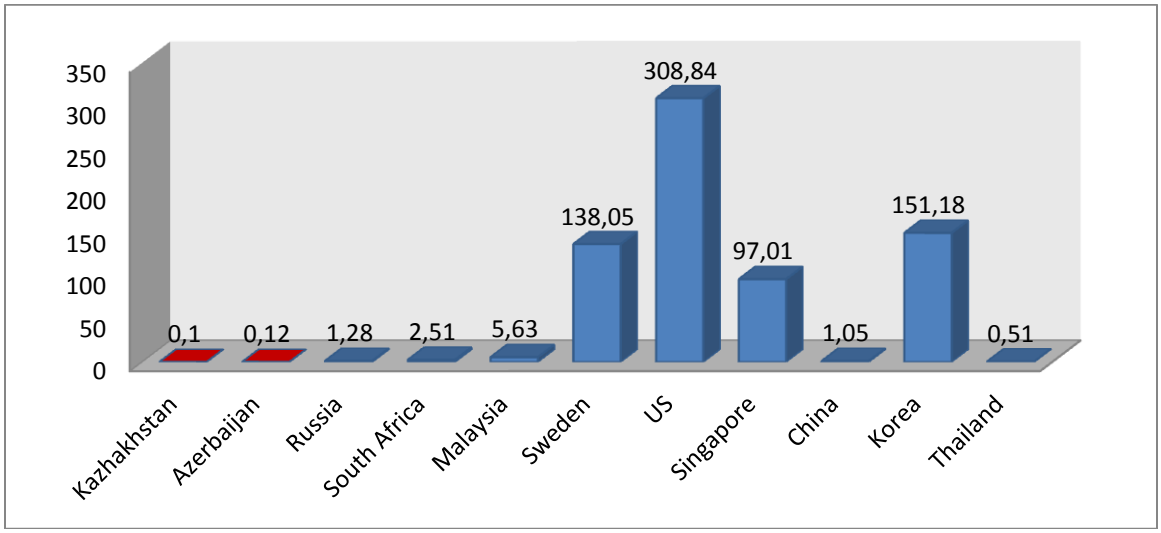
Source: World Bank, KAM data (2013)

to many other economies in transition, most research is carried out in public institutions. Increasing awareness of pitfalls and the involvement of partners with a commercial understanding in research decisions is important to assess and respond to market needs.

Meanwhile, the creation and growth of SMEs is critical not only for innovation but also to foster the modernisation and diversification of the economy. The legacy of state-planned economies mean that public authorities in a range of areas as well as educational institutions need to go through a major transformation of adopting a favourable perspective of entrepreneurship and start-ups. Both countries have taken this on and various policy initiatives have sought to launch comprehensive support programmes, such as Productivity 2020 and Business Innovation. [5]

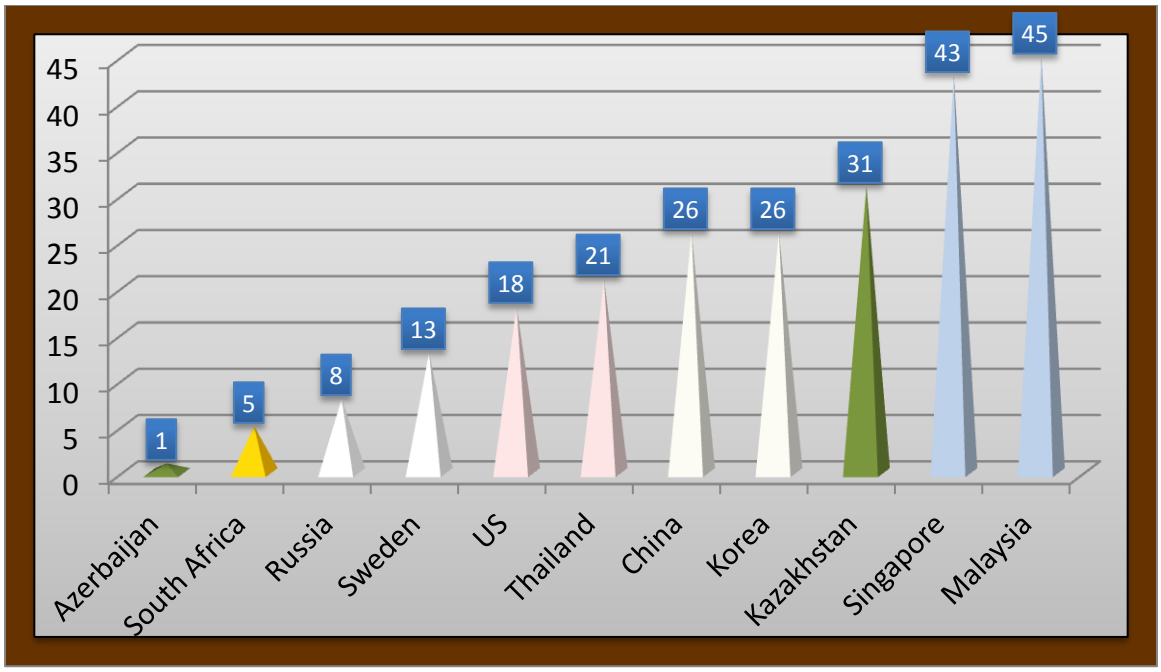
[5] See http://www.unece.org/fileadmin/DAM/ceci/publications/icp5.pdf

Figure 2: Innovation Output, Patents/mill. people (2005-2009)



Source: World Bank, KAM data (2013)

Figure 3: Level of Economic Diversification (share of high-tech in exports (2009-2013)[6]



Source: World Bank (2013)

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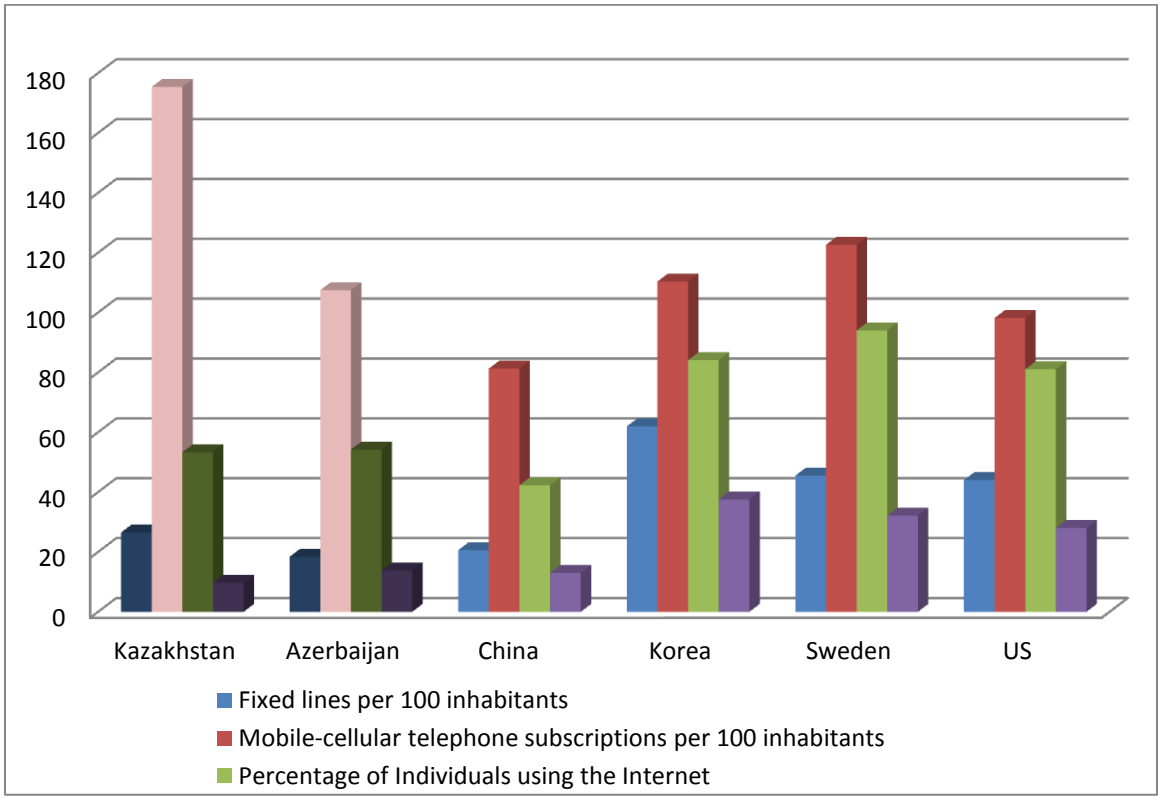
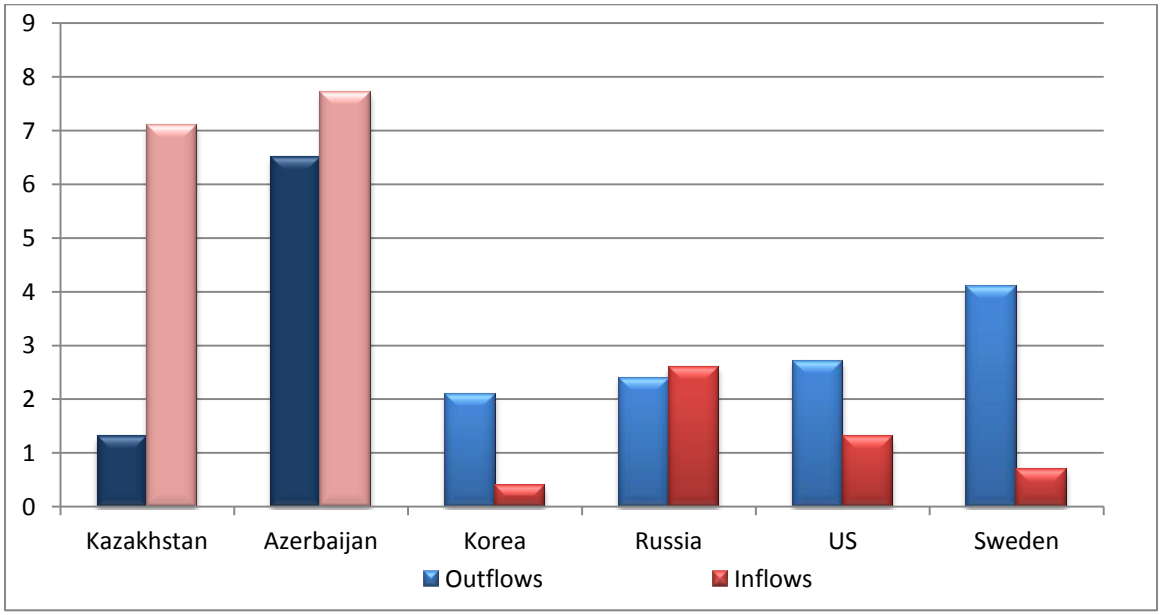
[6] "High technology" is defined as pharmaceuticals, fertilisers, photographic or cinemato-graphic goods, nuclear technology, electrical machinery, aircraft and spacecraft technology, optical, photographic, measuring and medical instruments, arms and ammunition

Figure 4: Access to Knowledge and Capacity



Source: World Bank (2013)

Figure 5: Outflows and inflows of FDI



Source: World Bank (2013)

Progress will however require continued efforts to remove regulatory and institutional hindrances, strengthening the standing of SMEs when confronted with late or no payment or other forms of bullying from authorities or customers, and to improve their skills and access to support structures. The rise of knowledge-based start-ups goes together with access to international markets, global value chains and partnerships outside their local sphere. Individual firms seldom manage such links in isolation but depend on institutional conditions along with professional business support in finance, marketing, design, IT, human resources and so forth.

Summing up, Azerbaijan and Kazakhstan display a strong economic performance overall, which is also demonstrated by their favourable macro-economic positioning of the World Competitiveness Report. They enjoy stable policy regimes and have embarked on consistent reforms to boost a transition from NRE to KBE status, while also continuing to evolve away from their past planned economy structure. Thus far, however, these countries enjoy few or no strengths in core aspects of R&D and innovation. R&D expenditures are quite low, as is key relevant private sector activity such as venture capital and the performance of SMEs. High cross-border flows of foreign direct investment and swift advances in modern ICT, especially mobile telephony, represent sources of strength. Thus far, however, there are few signs of high expectation entrepreneurship and innovation-based small firm dynamics and networking.

4 Governance of KBE

The transition of any country's economy towards the KBE is influenced by the approach to governance. Naturally, the effectiveness of government, as reflected in the quality of regulations or the impartiality and effectiveness of the judiciary influences any economy and society in multiple ways. Corruption is one of the critical issues hampering development.[7] Although both Azerbaijan and Kazakhstan have taken action to strengthen their regulatory environment, increase transparency and counter corruption, they still face challenges. For Azerbaijan this applies to the State Customs Committee, the energy sector and non-transparent arbitration rules. Kazakhstan reportedly faces problems with regard to property rights, land registration, heavy administrative trade practices and costly administrative interference by officials with companies.

[7] Transparency International (2012).

Further, many NRE lean towards promoting technology absorption and imitation, rather than innovating. Genuine advances in value-added often require full-fledged contributions in terms of innovation, possibly with research-based input as part of the equation. Partly unrelated to differences in political ideology, however, distinct differences prevail between countries, in the way "innovation policy" is devised and implemented, see Figures 6-9.

Figure 6: Traditional positioning of innovation policy

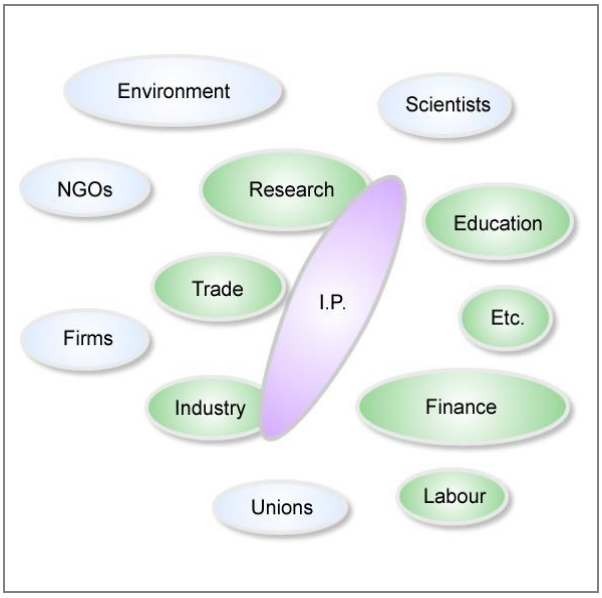


Figure 7: Implicit positioning of innovation policy

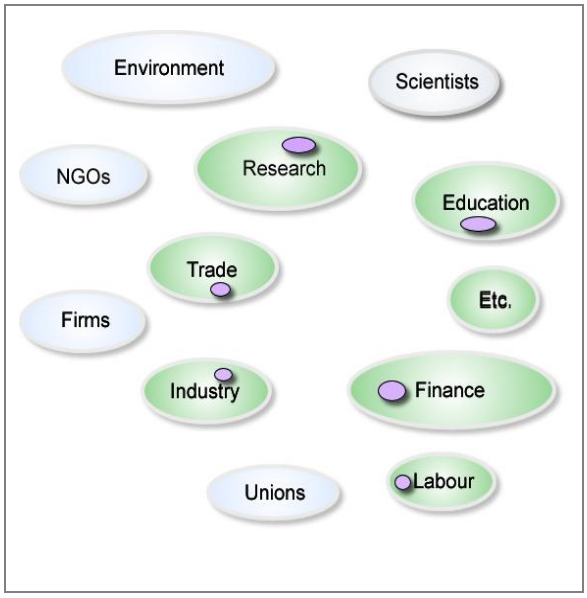


Figure 8: Explicit positioning of innovation policy

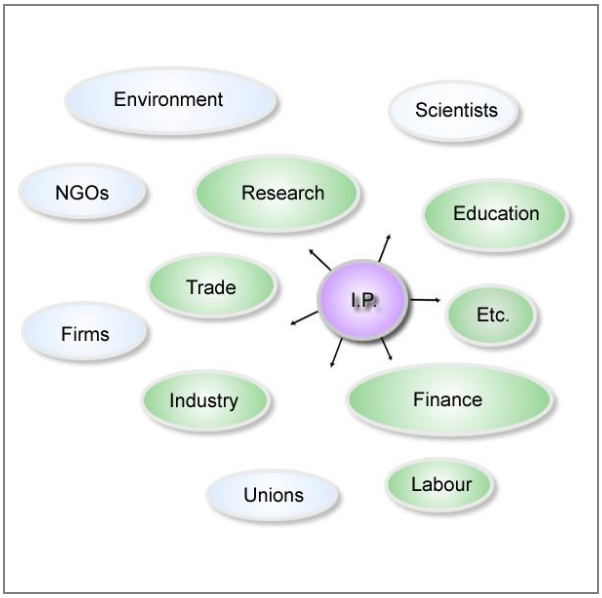
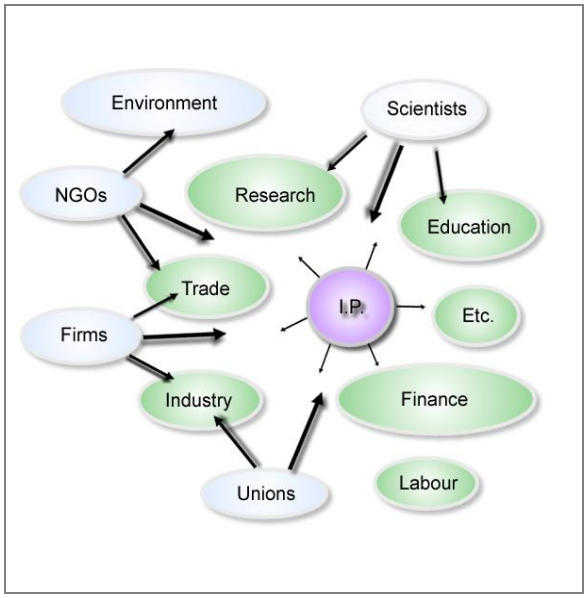


Figure 9: Explicit positioning with interactions



Source: IKED

Given a "traditional positioning", the responsibility of innovation policy (purple domain) is placed somewhere between ministries or departments (in green) in charge of education, research and industry. Some countries practice an "implicit" approach, where responsibilities are relatively more diffused, resulting in a shared sense of ownership but also typically serious coordination problems. Whichever approach is chosen, challenges arise in reconciling partly conflicting interests and getting stakeholders to lean towards collaborating and capturing synergies rather than towards turf battles and blocking each other's initiatives.

Conditions favouring short-term gains rather than long-term investments, or those punishing risk-takers relative to those that play it safely, likewise commonly distort outcomes.

In general, innovation policies have been the most successful when an "explicit" responsibility has been assigned and gained broadly based support. Only then has it generally been possible to combat destructive turf mentality. The innovation portfolio must carry sufficient clout among all relevant line ministries and the public authorities under their supervision, allowing for initiatives to be effectively coordinated across ministries. As the final chart shows, there is not only the task of bringing together departmental interests, but also that of allowing for, and orchestrating, the impetus of multiple relevant stakeholders. An explicit positioning of innovation policy increases chances to arrange with effective solutions in this regard.

Which of the mentioned approaches is built upon, and what is practiced in a particular case, matters for what weight is attached by national governments to different kinds of issues and concerns. Dominance by the Ministry of Industry, for instance, tends to account for a relatively large say by private sector interests. Direct responsibility by the Ministry of Finance for innovation policy will usually account for emphasis on indirect, horizontal policy instruments rather than public support of individual sectors or activities. A strong engagement by the Ministry of the Ministry of Education will most likely place priority on basic rather than applied research, and may emphasise longer-term supply-side aspects of human capital accumulation rather than the demand side.

Governments typically have difficulties in gauging the strengths and weaknesses of these different models or in recognising the significance of asymmetric influence by particular ministries. In many countries, the choice of innovation policy positioning or governance is not conscious or deliberate. Nevertheless, government officials tend to be well aware of the balance of

power and decision-making within given models, and of their ability to influence decisions within a particular constellation.

The multitude of public and private actors whose organisation and efforts are relevant in this area are naturally more or less aware of biases inherent in innovation policy. To the extent that they are closer to the situation on the ground, compared to central authorities at the centre of policy formulation, they are witness to practical consequences of policy biases. They surely do their best from their end to manoeuvre the situation they find themselves in, while they may also push for countervailing mechanisms. The final outcome will depend on the aggregate outcome of complex interrelated and partly contradictory relations between such actors.

Public-private partnerships can serve as a means to reduce government domination in the economy and make programs more susceptible to market needs. They may hence enable a greater influence of customer considerations. More generally, a productive interplay between potentially complementary actors, in regard to joint initiatives in capacity- or relation-building, pooling risks, etc., which for some reason does not come about spontaneously, should attract policy attention.

Whether governments should prioritise fostering "new economic activities" is a contentious issue. Government representatives concerned with science-industry interplay, the establishment of science parks and incubators, etc., tend to be most preoccupied with existing economic activities. Similarly, industry ministers and entrenched public authorities generally focus their attention and efforts on existing strongholds, as backing entirely embryonic or non-existing economic activities is treacherous and affords few political gains.

A common pitfall is for public agencies to promote "high-tech" activities irrespective of concerns whether they make sense or not. When the same sector is given priority in many locations, there is an obvious risk of over-supply. At the same time, such policies in effect discriminate against other potential growth areas, and possibly also against certain societal groups. For instance, women entrepreneurs are generally underrepresented in incubators due to the prioritisation of high technology and technical products, whereas areas such as health, education or crafts, in which women are more likely to launch a business, tend to receive less attention.

In the same vein, a one-sided emphasis on basic science and academic research excellence risks leading to a homogeneous and isolationist university sector,

rather than a landscape of complementary institutions capable of achieving diverse competencies and development objectives. Success in fostering KBE requires breeding new growth areas as well as strengthening existing ones. This is because innovation often draws on "old technologies" and established assets while triggered by the opportunities of making headway to something new. Innovation also relates to a range of institutions and actors, some of which operate in the public sphere, and relate to market outcomes as well as to societal needs. It must be understood however that the time dimension varies markedly between the two kinds. New growth areas cannot be counted on to take shape and flourish immediately. Governments must care for both short-term and long-term outcomes, and ensure that the fundamental infrastructure, including the institutional and regulatory conditions required for new growth areas to evolve as well as for existing ones to grow, are in place.

Those countries that have been the most effective in engineering an effective strategy based on explicit responsibility for innovation policy, entailing bottom-up engagement and demand-pull broadly in society, to date typically had gone through a difficult period entailing external crisis which helped trigger general awareness in reforms. This applies to Finland, Ireland, and in a sense also China Taipei and Singapore, which had to adjust to the twists and turns of evolving "hinterlands". Central authority charged with the task of coordinating such policy, but rather than experiencing crisis is loaded with cash.

In Azerbaijan and Kazakhstan, well-organised and stable policy regimes present the opportunity for embarking on well-coordinated comprehensive reform in support of KBE. The critical challenge has to do with reconciling a top-down strategy with the adoption of means to cherish a parallel track of bottom-up motivation. Private sector, non-governmental organisations, unions, consumer interest groups, non-profit associations, etc. all have their roles to play in initiating, accepting and channelling reforms and ways of working that are conducive to innovation. Setting in motion a process of broad-based learning and accumulation of relevant skills among the different relevant players, along with mechanisms that allow for a gradually improved division of labour between authorities and different stakeholders is greatly important.

The inevitable need of diversifying away from hydrocarbon nevertheless does build a momentum for change. The fact remains that, in the case of Azerbaijan and Kazakhstan, embarking on an effectively coordinated strategy towards building a KBE represents an opportunity rather than a necessity. There is a distinct need of devising a thorough strategy, communication and implementation policy to build the support that is required for success.

5 Sustainable Development and Green Growth

5.1 Introduction

The rapidly accumulating pressures on the natural environment, coupled with increasing transparency and improved information and also more clearly formulated preferences on the part of large numbers of people, are in the process of building support for **sustainable development**, including better **environmental management**. This implies a rapidly growing "pull" from the demand side, affecting more or less all sectors and kinds of input and output factors, in support of "green technologies" and a "green economy".

The above have a bearing on transition into a Knowledge Based Economy achieving innovation-led sustainable development. For Central Asian countries, a number of questions call for consideration in this context:

- How can the Central Asian countries reconcile their dependency on oil and gas resources with increased environmental concerns and the adoption of a green economy?
- How can these countries develop strategies that are effective in propelling green considerations into a driving force for the development of key sectors such as energy, water and waste management?
- Which particular areas represent opportunities for the Central Asian countries to attain competitive advantages through green growth?
- What are the relationships between environmental management and the other aspects of sustainable development across the Central Asian countries?

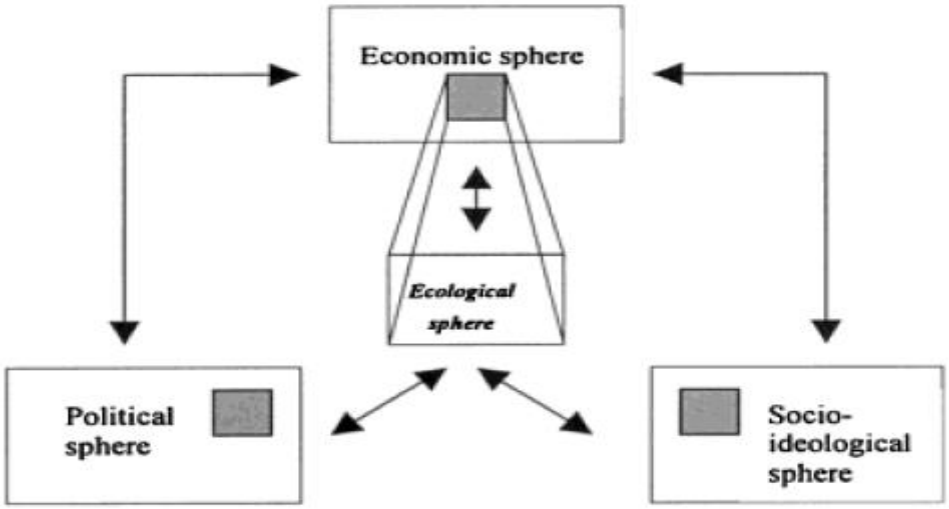
5.2 Policies and Markets

Many governments pledge adherence to a green economy. The government of Kazakhstan, for instance, has made strong statements of this sort. Its "Strategy 2050" sets clear guidelines for building a sustainable and efficient economic model based on the country's transition to a green development path (Presidency of Kazakhstan, 2013). [8]

[8] See http://www.eco.gov.kz/files/Concept_En.pdf

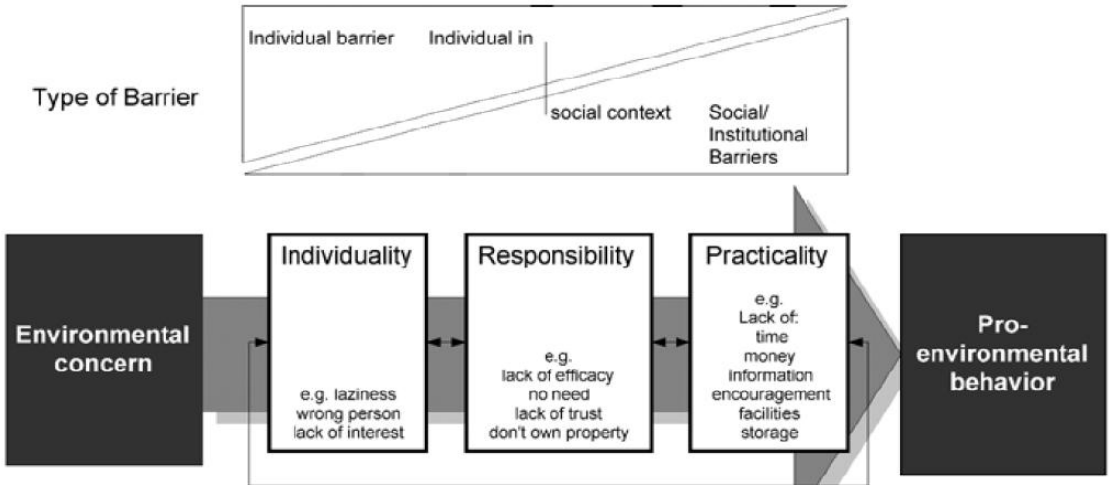
Policy to inject effective impetus towards the development of environmentally friendly technologies need to address a range of market and policy failures, spanning the economic as well as political and sociological spheres (Figure 10). In reality, however, many continue to view environmental considerations as a problem inflicting immediate costs rather than a source of present and future benefits.

Figure 10: Growing independence of the ecological sphere



Source: Spaargaren (2000)

Figure 11: Barriers between Environmental Concern and Action



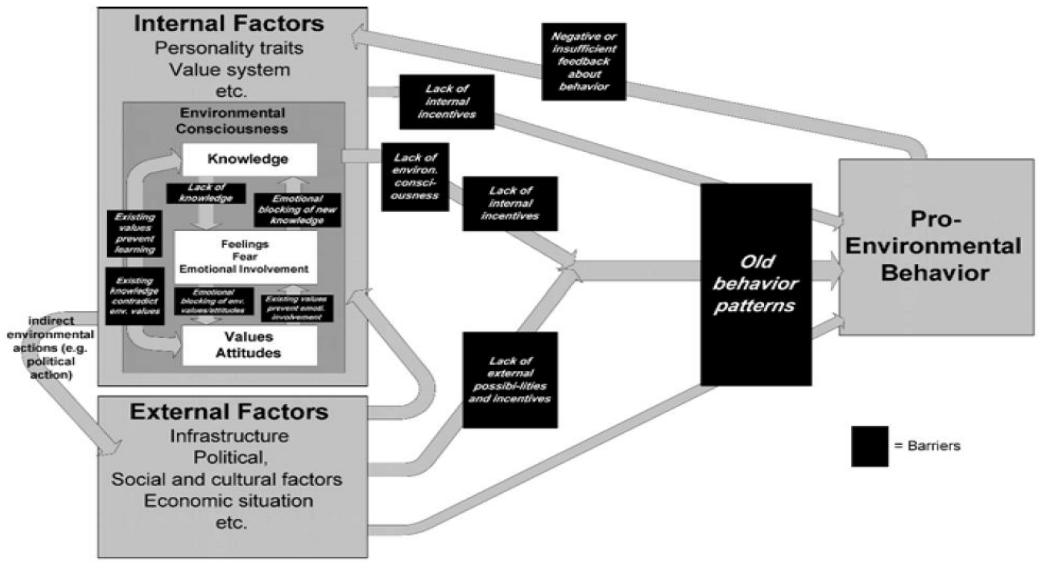
Source: Black (1999)

The way people behave, in their capacity of citizens as well as consumers. is greatly important in this regard. The fact is that the environment tends to be rated as the most important ethical driver impacting on purchasing decisions, followed by human rights then animal rights/welfare issues (Whealer and Hinton, 2007). Some product groups are more strongly linked to ethical issues than others, with 'food goods' being most clearly linked and 'brown goods' least linked.

One needs to bear in mind these consumer preferences are revealed in a situation where there is great difficulty to determine what particular actions, processes and products can be documented as "environmentally friendly". Figure 11 demonstrates the presence of noteworthy barriers between environmental concern and action.

With improved means to disclose true relationships, and for customers to make informed choices, their actual preferences can be expected to manifest themselves as into tangible market outcomes more effectively. At the same time, given the continued anticipated worsening in observed environmental impacts, "green" preferences are likely to keep hardening.

Figure 12: Model of Pro-Environmental Behaviour



Source: Kollmuss & Agyeman (2002)

5.3 Green Innovation and Entrepreneurship

This is not to say that Azerbaijan and Kazakhstan, along with other countries that benefit from production of fossil fuels, should be led to overhaul their economies and lay their natural resources to rest in the ground. What is critical is to allow the increasing demand for better environmental outcomes to open for channels to have them translate into more favourable outcomes, spanning the environment, society and the economy. Not only can demands for a better environment be turned into a source of revenue. Experience shows that focus on achieving more favourable environmental outcomes tend to "spill over" into a drive for other improvements in quality, efficiency and value-creation, all of which are closely associated with a strengthening of corporate culture, branding and professionalism. Other important aspects have to do with the way that innovation and entrepreneurship are unleashed.

This traditional focus on policy tools such as regulations or taxes is thus insufficient. In the knowledge area, the cornerstones of sustainability are developed in "ecosystems" where public and private actors alike matter for the extent to which technology and innovation are put to use to drive new processes, goods or services capable of alleviating environmental pressures and meeting with the demands of tomorrow.

Various studies have documented the way in which the most powerful innovations make use of new technologies or organisational changes to meet with actual or latent demands among customers for what they value most of all. Better water quality, air to drink, secure food, better heath, and so forth, have already proven capable of inspiring and rewarding a range of innovations capable of enabling or sustaining higher value added in a range of different industries. Embracing such innovations often requires certain investments in the early stages, whereas returns accumulate once a phase of organisational transition has taken place. Strong political leadership, as in Azerbaijan and Kazakhstan, can help overcoming the hurdles, given sensitivity to the underlying market sentiments.

As for entrepreneurship, three kinds are relevant in this context: green ("ecopreneurship"), knowledge-driven business entrepreneurship and social entrepreneurship. Green entrepreneurs ("Ecopreneurs") energetically work to introduce eco-friendly (or relatively more eco-friendly) products and processes into the marketplace. Knowledge-driven business entrepreneurs create viable and growing business organizations in the knowledge markets. Social

entrepreneurs accomplish social purposes, in addition to being commercially viable. Some of them focus on innovations that have social impacts.

"Growing green" holds the promise of developing a strong brand associated with an "eco-cycling" economy and a resource-saving and environment-friendly society capable of realizing sustainable development. At the same time, available international comparisons of a range of environmental as well as social indicators point to another picture. The "carbon footprint" of NRE, including Azerbaijan and (especially) Kazakhstan, is significant, as seen from Table 7. A formidable task remains to motivate the genuine participation of the supply side in producing sustainable goods, services and programmes.

Table 7: Environmental Performance Index

Country	Ranking
France	6
Sweden	9
Malaysia	25
Egypt	60
UAE	77
Saudi Arabia	82
Qatar	100
Morocco	105
Azerbaijan	111
Oman	110
Kuwait	126
Yemen	127
Kazakhstan	129

Source: Yale University (2012)

5.4 Green Policy openings for Central Asia

Targeted actions in achieving the sustainable development of the "Natural Resource Ecosystem" may have a high rate of return, by inspiring new development objectives, achieving new technology and firm developments,

earning goodwill in foreign markets, and so forth. Global concerns about environmental hazards also open up opportunities for building partnerships and gaining access to more readily available knowledge and new technologies.

There are the obvious benefits of enabling the population to access better food, a healthier atmosphere and life style, saving on healthcare costs and producing gains from more fit and inspired inhabitants. Considerations of these sorts go together with increased attention for quality through culture, links to the past, leveraging on and adding value to a living urban environment as well as bringing new life to rural areas, which is also essential for attracting and maintaining mobile skills and talent.

At the same time, progress is held back by the perception that huge costs are required up-front, lack of competencies, experiences and awareness (among individuals as well as authorities and businesses) of the environment as an asset and source of value. This means various actors show up as receivers rather than instigators of change. For action on the environment to turn into a true source of benefits, it is vital to find ways of capturing "first-mover advantages" by fostering " green" demand, i.e. meeting with needs that are real but presently latent or dormant. As proven time and time again, those who are able to be ahead on the curve in this manner and get the timing right stand to capture significant benefits.

While further analysis is recommended, we suggest that Azerbaijan and Kazakhstan should push for action in the areas presented in the ensuing sections.

5.5 Agricultural Production

Especially Kazakhstan has vast resources in agriculture, which used to account for the bulk of the economy and which still employs perhaps as much as half the country's population. The agricultural sector is plagued by low value added, however. Oversight of the sector resides with monolith public authorities that do not view innovation and entrepreneurship around new more environmentally and healthy products as a priority but, on the contrary, stick to rigid traditional means of production.

As has been seen above, food is one of those areas where great changes are under way and where changing consumer preferences valuing quality and ethics can be seen to exert a growing impact. Considerations to such market developments meanwhile tends to increase quality awareness and innovative

capacity and thus raise value-added through other means as well, Progress in fostering such a development, however, necessitates institutional renewal, developing game-changing training facilities and programmes related to professional practical skills, new marketing and distribution practices, along with some resources ear-marked to support innovation and entrepreneurship in this sector. In this case, sustainability carries the potential to be accompanied by rapidly enhanced consumer satisfaction, an improved physical environment, better health and wellness success in export markets, and increased valued added in production. In short, the following may guide reforms going forward:

- Reforming state agencies (grain, machinery leasing, and agricultural credit markets) while increasing presence of private service providers to agriculture;
- Public investment to remove deficiencies in transport infrastructure, water and land management, plant and animal health and food safety;
- Public goods provision, enabling private sector growth and managing opportunities for development and renewal in agriculture;
- Integrate small-scale producers into agricultural markets and diversify rural incomes through enhanced drive for quality rather than scale effects;
- Governance and evaluation and policy monitoring by stakeholders;
- Cherishing culture, reignite interest in traditions that are otherwise to be lost and maintain links to the past through positive search of quality and higher standards of living through food, health and wellness.

5.6 Natural Capital Services, "Green" Accounting and Auditing

Natural resources are "natural capital" converted into commodities and infrastructural capital. From conversion, "positive" or "negative" externalities pop up. Natural capital services promote the idea of "natural capital" as a way of valuing those effects – in particular, by including in economists' equations positive externalities from environmental goods, a sub-category of public goods which includes clean air, clean water, a stable climate, beautiful landscape and so on.

There is a saying, what is measured get's done! The countries should embark on practices to track resources such as water, oil, raw materials, soil, etc., followed by policies that incentives improved usage of those flows. Policymakers can

look for experiences on "green accounting" made in other countries, including China.

"Green" auditors are the avant-garde of "green" professionals to support a new, low-carbon path to green growth. "Green" professionals master a series of technologies that should allow local communities to make more valuable use of natural resources and reduce the ecological impacts of their use. Fields as diverse as manufacturing, energy, agriculture, logistics, and information technology have strong "clean-tech" components.

"Green" auditors evaluate how natural resources are used and the results of projects as well, and then put forward suggestions how to address identified problems found during the auditing process in such a way as to enhance long term sustainable resource use. "Green" auditing services can, for instance, help generate innovations that enable government as well as other stakeholders to prepare for infrastructures capable of taking early advantage of anticipated future global greenhouse gas policies. They can also trigger the development of new solutions to both insulate buildings better and improve overall air quality.
A service industry related to "green competencies and technologies" needs a vibrant knowledge base. The government should begin funnelling resources to universities and research centres which are or will be conducting, following government stimulus, research on "growing green". R&D areas under investigation may include carbon-capturing mechanisms, technologies that reduce greenhouse gas output, implementation of renewable technologies, and how to make business of water and waste management.

To conclude, "green" auditing services along with research can help shift the "Natural Resource Ecosystem" focus from efficiency to effectiveness, changing from measures of output to measures of outcome, fostering organisational change, learning, collaboration and innovation as crucial tools to meet with new requirements for public as well as private good.

5.7 Water Resources and Land Use Management Services

These services will be offering management of water innovation solutions in infrastructure replacement, filtration, irrigation systems (that deliver fertiliser as well as water, saving on fertiliser and labour costs), desalination, reversal of desertification, revegetation, repairing pipes without digging up roads, etc.

Specific innovative technologies are at hand to economise greatly on water while allowing for massive restoration of biomass and hydrological systems that prevent soil erosion and allow for attractive new landscaping and increased land prices. The following represents examples of what has proven attainable in a related context:

- Water savings of some 60-90% compared with conventional drip irrigation;
- Water wastage, e.g., through evaporation, is dramatically reduced (e.g. water diffused underground, without air contact);
- Pioneering knowledge of local species and root systems;
- Increased efficiency, reduced costs of fertilisers;
- Reduced maintenance costs and high robustness suitable to Central Asian conditions without losses in functionality.

5.8 Ecotourism Services

Ecotourism represents the intersection of "nature-based" tourism and sustainable tourism.

Ecotourism services are called for not to exploit and degrade the local environment but to serve as a basis for defining and implementing principles for a combination of environmental and cultural management with that of sustainable tourism. This means that economic viability, local prosperity, employment quality, social equity, visitor fulfilment, local control, community-wellbeing, cultural richness, physical integrity, biological diversity, resource efficiency, and environmental purity can and must go together.

Embarking on such a policy has the greatest changes of success in an environment where spectacular historical, cultural or environmental assets are present. In their various ways, as reflected in vast grass lands, historical sites and still present traditions and cultural landmarks of the past, Azerbaijan and Kazakhstan are both in that position, although work is needed to work out a comprehensive approach and identify the way forward in capturing the opportunities at hand

As for the policy approach capable of realising the above, experience points to the importance of adopting the following:

- A holistic view;
- Carving out interface research niches and industry;
- Reforming rigid public authorities that move slowly in regard to reforms supporting innovation, while applying regulations and tax incentives to cautiously incentivise green solutions;
- Phasing out unproductive subsidies, e.g. in regard to water and energy;
- Procuring and enabling waste management, new water and energy solutions;
- Making active use of diverse stakeholder engagement, financing, social pressure;
- Information management, monitoring, auditing, disclosure, certification, "naming and shaming".

6 Concluding Remarks

This paper has reviewed the standing of Azerbaijan and Kazakhstan in their venture of transitioning from a standing as Natural Resource Rich Economies (NRE) to becoming Knowledge-Based Economies (KBE), and also with consideration to the rise of a so-called "Green Economy".

As has been discussed, both countries displayed overall strong growth over the last decade, overcoming the crisis years with relative speed, and enjoy stable policy regimes. Yet, both are faced with challenges partly reflecting their past state-planned economy and partly their NRE status. Having evolved from a structure of rigid planning they have reformed labour markets but many functions remain marked by heavy bureaucracy, red tape and also corruption. Meanwhile, similar to other NRE, their economic structure and policy institutions are geared towards capital intensive mature industries. It is now critical to advance investment in knowledge and risk-taking, and to enable the kind of "bottom-up" initiative, that is essential for transitioning to a KBE conducive to generate economic value and prosperity.

In fact, moving towards a comprehensive and systemic approach to innovation and KBE tends to require a solid strategy from the top. Experience shows, however, this has mainly come about where economies went through a severe crisis. In the case of the Central Asian economies their performances are currently strong and they have an abundance of rich natural resources which may limit drive and support for reform. On the other hand, these countries went through a severe contraction over their first decade following

independence. They now embrace an understanding that diversification is needed while enjoying political stability and hence they may possess the means to put in place a systematic effort, spanning all relevant levels, to push forward with KBE. Success in this regard, we argue, will greatly benefit from adopting a constructive approach to green technologies and sustainability, which can help turn outstanding problems into a source of opportunities and drive quality improvements, professionalism and higher value added in a range of areas, while underpinning improved health, wellness and future prosperity.

Kazakhstan and Azerbaijan have already undertaken forward-looking policy initiatives and seem to be in the position to take bold action to remove hurdles to the task. The agenda ahead must be devised in a "smart" way though, so that stakeholders are motivated to provide strong support and so that needed reforms are not only legislated but also implemented.

Both countries experience substantive cross-border knowledge flows and both have taken advantage of becoming intensively networked by use of the new communication tools, notably cellular technology which is rapidly making the population wired with the outside world. It is therefore an important time to put in place a coherent strategy promoting research, innovation and entrepreneurship along with an upgraded effort to achieve quality and relevance in education, training and human resource management.

Appendix 1: Competitiveness Ranking, based on WEF 2013/2014

1 - Overall competitiveness ranking

Competitiveness ranking, 2013-14

Index rank	Kazakhstan	Azerbaijan	Russia	South Africa	Malaysia	Sweden	US	Singapore	China	Korea	Thailand
Growth Competitiveness Index Rank-GCI	50	39	64	53	24	6	5	2	29	25	37
Institutions	55	59	121	41	29	5	35	3	47	74	78
Infrastructure	62	69	45	66	29	20	15	2	48	11	47
Macroeconomic env.	23	8	19	95	38	14	117	18	10	9	31
Health and Primary Education.	97	109	71	135	33	13	34	2	40	18	81
Higher education and training	54	87	47	89	46	8	7	2	70	19	66
Goods Market Efficiency	56	71	126	28	10	12	20	1	61	33	34

Source: The Global Competitiveness Report 2013-2014

2 - Macroeconomics and Infrastructure

Macroeconomics and Infrastructure, 2013-14

Index Rank	Kazakhstan	Azerbaijan	Russia	South Africa	Malaysia	Sweden	US	Singapore	China	Korea	Thailand
Overall quality	64	55	111	63	25	21	19	5	74	23	61
Quality of air transport infrastructure	89	48	107	11	20	24	18	1	65	22	34
Quality of electricity supply	78	75	126	101	37	14	30	8	67	39	58
Budget balance	13	15	92	115	103	32	142	12	61	18	54
Government debt	14	13	54	73	105	62	140	141	28	50	78
Credit Ranking	53	65	97	48	39	3	12	4	23	22	44

Source: The Global Competitiveness Report 2013-2014

3 - Education

Education, 2013-14

Index Rank	Kazakhstan	Azerbaijan	Russia	South Africa	Malaysia	Sweden	US	Singapore	China	Korea	Thailand
Life Expectancy	103	94	101	136	63	10	34	8	75	19	65
Quality of primary education	69	111	61	133	33	24	41	3	56	23	86
Secondary education enrollment rate	29	39	75	55	105	43	49	18	90	47	94
Tertiary education enrollment rate	58	93	14	102	62	18	3	20	83	1	55
Quality of the educational system	88	114	85	146	19	17	25	3	54	64	78
Quality of Math and Science education	75	110	56	148	27	41	49	1	48	20	80
Extent of staff training	56	80	88	17	11	7	12	6	48	51	50

Source: The Global Competitiveness Report 2013-2014

4- Labour Market Efficiency

Labour Market Efficiency, 2013-14

Index Rank	Kazakhstan	Azerbaijan	Russia	South Africa	Malaysia	Sweden	US	Singapore	China	Korea	Thailand
World Ranking	15	30	72	116	25	18	4	1	34	78	62
Cooperation in labour-employer relations	40	48	112	148	19	6	42	2	60	132	37
Flexibility of wage determination	24	36	41	144	33	140	29	5	94	61	111
Hiring and firing practices	21	8	77	147	26	114	9	3	28	108	31
Redundancy costs, weeks of salary	27	101	85	35	110	68	1	6	120	120	135
Pay and productivity	9	23	46	142	2	74	12	4	17	21	31
Effect of taxation on incentives to work	56	70	122	15	10	20	38	4	42	111	44
Country capacity to attract talent	41	34	97	55	22	25	6	2	26	31	32

Source: The Global Competitiveness Report 2013-2014

5 - Goods Market Efficiency

Goods market efficiency, 2013-14

Index Rank	Kazakhstan	Azerbaijan	Russia	South Africa	Malaysia	Sweden	US	Singapore	China	Korea	Thailand
Intensity of Local competition	120	128	113	45	32	23	14	19	46	8	41
Extend of market dominance	78	83	93	37	18	21	10	12	23	118	76
Effectiveness of anti-monopoly policy	91	127	116	8	23	3	14	4	55	49	69
Effect of taxation on incentives to invest	54	76	125	16	12	23	40	4	41	104	57
Total tax rate, % profits	33	78	124	47	29	120	107	27	131	36	73
Domestic market size index	55	77	8	24	29	34	1	45	2	12	22
Foreign market size index	44	66	7	38	20	35	2	13	1	5	16

Source: The Global Competitiveness Report 2013-2014

6 – Technology Readiness

Technology Readiness, 2013-14

Index Rank	Kazakhstan	Azerbaijan	Russia	South Africa	Malaysia	Sweden	US	Singapore	China	Korea	Thailand
Availability of latest technologies	88	65	124	40	37	2	6	16	105	27	75
Firm-level technology absorption	78	59	126	35	33	1	9	13	71	21	50
FDI and technology transfer	93	65	125	40	13	33	46	5	78	84	36
Capacity for innovation	74	35	64	33	15	7	5	18	30	22	87
Quality of scientific research institutions	102	78	65	35	27	15	5	11	41	24	60
University-industry collaboration	79	84	64	29	16	10	3	4	33	26	51
Government procurement of advanced technology	58	14	108	119	4	22	15	2	13	31	105

Source: The Global Competitiveness Report 2013-2014

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